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Psychological Complications During Military Operations in Ukraine: Neurobiological Effects

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Abstract: *The relevance to the investigation stems from the fact that during military operations in Ukraine there are psychological complications both among servicemen and the population. The most common type of psychological complications is fear as one of the most mysterious and contradictory emotions. Formed in the process of evolution as a signal and warning human reaction to danger, fear often misinforms people about the extent of external danger. Fear as a psychological complication is a powerful catalyst of human physical, spiritual strength and energy and, at the same time, it can paralyze his ability to withstand danger. It is reflected in the brain, the brain organ of the central nervous system, which regulates all the most important changes in the human body. In case of stress, it is the brain structures that react first and trigger a response, the purpose of which is adaptation and survival in difficult conditions. The brain detects a threat, recognizes the cause of psychological or physical stress. In response to the influence of a stressor protective mechanisms are triggered, changing the work of the nervous and endocrine systems. The article reveals the concept of horror and its psychotraumatic effect; the most important functions of fear as a psychological complication are defined; the neurobiological basis of stress as a psychological complication during war is investigated.*

Keywords: *Stress, brain structures, endocrine system, fear, fear catalysts.*

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Introduction

During military operations in Ukraine, psychological complications have been observed among both servicemen and civilians. The most common type of psychological complications is fear and stress, the most dangerous emotions. The impact of fear on human behavior is extremely varied. From simple autonomic reactions and a slight slowing down of actions to total paralysis of the body. Fear entraps the human body, its neuro-psychic and spiritual organization.

The roster of human fears is quite large. Sometimes it manifests itself in a barely perceptible, inarticulate fear-anxiety, and sometimes in the form of animal horror, a sense of the onset of an almost worldwide catastrophe. Indeed, fear is manifold, omnipresent, and contagious. There are special forms of fear that are on the borders of normality and pathology of the human psyche. However, perhaps, the most "fertile" base for the manifestation of fear in all its hypostases is created in war, in a combat situation.

Domestic and foreign scientists, scientists, psychologists, neurobiologists devoted their scientific researches to the topic of psychological complications manifestation during military actions in Ukraine, research of their neurobiological impact. Studies of scientists-psychologists Holyk et al. (2009) point out that fear affects all aspects of military combat activity. One of the consequences of this influence is a significant decrease in combat effectiveness of fighters, first of all, in the accuracy of fire defeat of the enemy. Also scientists confirms in his scientific works that the most dramatic consequence of fear is the psychotraumatization of combat participants. According to N. Ahayev et al. (2018), the most important functions of fear during military operations in Ukraine are motivation to survive, the need to solve the combat task and knowledge of the circumstances of its implementation.

The purpose of the article is to give the concept of fear and its psychotraumatic influence on servicemen during military actions in Ukraine; to determine the most important functions of fear as a psychological complication; to single out catalysts of fear during military actions in Ukraine; to study neurobiological basis of stress as a psychological complication during the war; to find out catalysts of fear during military actions in Ukraine.

The research methodology is aimed at studying the impact of psychological complications on servicemen during military operations in Ukraine.

The objectives of the study will be realized by using such methods: methods of critical analysis, synthesis of scientific and methodological sources, methods of system analysis, descriptive and predictive method, generalization and systematization of the obtained results - induction and deduction, traductive method.

The concept of fear and its psychotraumatization of servicemen

H. Vinichuk (2004), characterizing any war, noted that its main element is danger. The reaction to danger, fear - an inevitable attribute of war, influencing all aspects of military combat activity of servicemen.

One of the consequences of this influence is a considerable decrease in the combat effectiveness of the soldiers, first of all in the accuracy of the enemy's fire. Studies show that because of fear, the effectiveness of fire in combat is simply miserable (Holyk et al., 2009).

The most dramatic consequence of fear is the psychotraumatization of combat participants (Holyk et al., 2009). The size of this formidable phenomenon can be judged by the ratio of the number of psychological losses to the number of wounded.

In scientific research N. Ahayev, A. Kokun, and M. Herasymenko (2018) proved that the most complete statistics of the ratio of the number of psychological losses to the number of wounded as a result of psychotraumatization of combat participants is in the US army, where during World War I the ratio was about 10 to 100, in World War II - 36 to 100, and during World War II American troops lost 504 thousand people due to mental disorders on the battlefield. That number of personnel is enough to form 50 combat divisions.

J. Lawton (2018) researched that in the 1973 Arab-Israeli War, nearly one-third of Israeli casualties were due to psychological causes. Approximately the same was observed in the Egyptian forces. When the Israelis invaded Lebanon in 1982, the death toll from mental disorders was already twice as high as the number of those killed, and accounted for 27% of the total number of wounded. During the Vietnam War, psychogenic losses already amounted to 30% of combat casualties. During the fighting in Iraq and Afghanistan it was 12-20%.

Fear and its psychological effects have enormous power of contagion. According to E.Colston who interviewed hundreds of World War II veterans, 75% of them were convinced that fear could be contagious, transmitted from one soldier to another (Whitehead, 2021). In E. Colston's) study, 83% of those surveyed claimed to have had the experience of watching human nerves "break down" at the front. 70% of the 1,700

American veterans surveyed in Italy in 1944 showed that their psyche failed when they saw the effects of psychotraumatizing another person, Whitehead (2021).

The history of warfare and the art of war knows many instances in which the fear of single soldiers became epidemic and transformed into the unrestrained panic of crowds of thousands.

For a long time, fear was treated by military theorists and practitioners as a negative emotion. On the basis of this position, it was suggested that we "fight" fear, "conquer" fear, "overcome and terminate" it. As the above statistics show, this position turned out to be unfounded, and the attempts made on its basis to defeat fear proved to be untenable.

The task of today's military psychology is seen as offering the fighter real ways and means to act effectively in a dangerous situation, to transform fear from the fetters and shackles of a combatant into his combat psychological resource, Shay (2003).

To do this, first of all, it is necessary to know fear (to identify its nature, factors, catalysts, types, functions, symptoms and dynamics of manifestation in a combat situation), to accept it (to recognize it as an attribute of extreme activity) and to use the energy it generates rationally.

The study of the nature of fear allows us to assert that fear in combat is not a manifestation of the signs of cowards, but a normal, unavoidable, useful reaction to danger, as a danger signal produced by the human organism when it detects signs of danger in the surrounding world. The "normality" of fear is evidenced by its actual universality. It is well known today that among mentally and somatically normal people there are no absolutely fearless people, Vinichuk (2004).

The recognition of the naturalness of fear allows us to eliminate one of the most common fears in war, the fear of being afraid on the battlefield and of letting one's fellow soldiers down, that is, "fear of being afraid".

The most important aspect of cognition of fear is to comprehend its functions. Actually, fear's widespread occurrence in combat situations is connected with the fact that, "ideally," it performs extremely useful functions. In many respects, it is thanks to fear that a person is able to transform himself into a real warrior.

The essential functions of fear as a psychological complication

N. Ahayev, A. Kokuna, M. Herasymenko (2018) believe that the most important functions of fear during military operations in Ukraine are motivation to survive, the need to solve the combat task and to know the circumstances of its implementation. Because fear maximally mobilizes all

organizational resources, physical, nervous and mental energy of a person. It makes a person less vulnerable to pain, wounds, and adverse circumstances of combat.

The motivation to survive the fear of death and pain is a powerful motor of activity. Fear is a "nuclear" reactor in the human soul, one of the most resourceful and high-energy states of a warrior. Some specialists compare it to high-octane fuel capable of instantly accelerating the human body and psyche to enormous rates of functioning (Yevdokymova et al., 2016).

Disruption of any of the above functions of fear threatens to reduce or lose the warrior's combat capabilities. In this case the warrior gets rid of this or that "insurance" and finds himself "uninsured" against certain threats. If the warrior does not assimilate the energy of fear, fear becomes a disorganizing, paralyzing, painful and destructive mental state (Shvets et al., 2016).

To remove the contradiction between the highly adaptive, energetic, mobilizing properties of fear and the demoralizing and disorganizing effect, experts have distinguished between "controlled" and "uncontrolled" types of fear.

Controlled fear has the power to induce a person to take beneficial action. Uncontrollable fear is destructive. When fear is too weak, people become careless and expose themselves and others to unnecessary risk and danger. When it exceeds certain thresholds, it comes into play to induce a senseless panic that endangers one's life and the lives of one's fellow soldiers.

In order to master fear, it is necessary to learn its main factors. In literature it is possible to meet tens fighting circumstances treated by authors A. Krakhmalev and A.Kucher (2003) as a factor of fear. The warrior in combat is affected by many different stimuli, among them: flashes of explosions and shots, "fountains" from bullets, aircraft (helicopters) overflights, movement of combat equipment, enemy movement, movement of fellow soldiers, hot equipment and buildings, injuries and death of fellow soldiers, rescue shelters, sounds of shots and explosions, screams of wounded, commands of commanders, screams of fellow soldiers, shouts (battle cries) of the enemy, vibration of the ground, whistling of balloons, rustling of shells, rocket launchers, cold, heat, eye-grinding smoke, smell of burning, heat, taste of blood, body trembling, " formication", unpleasant body sensations, dry mouth, flashbacks, seeing corpses, thoughts, heat from fires, beating of own heart, pain sensations, feeling of fatigue, etc., Halyan (2012).

Undoubtedly, many of these stimuli have a very unfavorable effect on the mental state of combat participants, but not all of them are "fearful". Today experts distinguish three factors (reasons, driving forces) of fear as the main ones: the unknown, the unexpected, the feeling of helplessness.

Popular wisdom, the combat experience of great commanders reflected these factors in the form of peculiar formulas: "what I do not know, I am afraid of", "warned means armed", "surprised means victorious", "lost money - lost nothing; lost the other - lost half; lost faith - lost everything".

The need to solve a combat task and to know the circumstances of its execution is very high. Consequently, servicemen must know well the specifics of the enemy's tactics, psychology and combat tower level, specific indicators of the territory, the order, forces and ways of carrying out the task. If this knowledge is sufficient for effective action, there are no negative emotions in the soldiers.

If there is not enough information, however, warriors may have anxiety, worry and fear.

Thus, fear is a signal of the lack of important information. We can say that according to Yu. Ivanov (2006) fear is a signal of the lack of content of activity. It was the high content that our warriors put into winning the war that contributed to the development of mass self-sacrifice and heroism. The importance of giving content to soldiers' participation in deadly battles was realized in other armies as well.

The neurobiological basis of stress and fear as psychological complications during war

The brain is the main organ of the central nervous system; it regulates all the most important in the human body. And thus, in the case of stress, it is the brain structures that react first and trigger the response, the purpose of which is adaptation and survival in difficult conditions (Nash, 2007).

It is the brain that identifies the threat, recognizes the cause of psychological or physical stress. In response to the influence of the stressor, defense mechanisms are triggered, which change the functioning of the nervous and endocrine systems. Short-term adaptive changes are useful: they temporarily improve brain functions, allowing to react quickly and make quick decisions. A different picture is seen with chronic stress.

Sustained changes in brain function caused by stress disrupt normal brain function. The consequences of prolonged stress are dysfunction of the most important systems, a decrease in the activity of protective devices and

depletion of the body's reserves. This, in turn, can lead to the development of one or another disease, depending on the existing propensity for it. Chronic stress often becomes the "last straw", so it is very important to help the body recover in time.

When stressed, certain areas of the brain are activated, while inevitably the functions of other brain structures are diminished. If a person experiences stress, which lasts for days instead of hours, the whole brain is negatively affected - changes occur at all levels: structural, molecular, neurochemical. Stress affects the psyche, changes the work of the most important systems of the body, affects the higher brain functions. Their violation can be manifested by the reduction of cognitive abilities: memory, attention, speech.

The impact of stress on cognitive functions is explained by the physiology of the process. The brain, identifying danger, triggers the stress response. Its purpose is to protect the body from adverse emotional or physical effects. The brain response is determined by experience, so the perception of stress is subjective and largely depends on the individual characteristics of a particular person. But the links in the stress chain remain the same:

The sympathetic autonomic nervous system leads to the "alertness" of the cardiovascular system, lungs, muscles, triggers the active synthesis of stress hormones - catecholamines (adrenaline, noradrenaline), in the brain substance of the adrenal glands.

The hypothalamic-pituitary axis of the brain gives signals to the adrenal cortex corresponding to the release of another group of stress hormones - glucocorticoids (cortisol), regulating further changes. Stress hormones spread with the bloodstream throughout the body and even enter the brain.

It is at this point that the negative effects of stress on the brain associated with an excess of cortisol can begin. This hormone is responsible for energy supply and increases the release of glucose, which stimulates even brain activity. Therefore, short, moderate stress has a positive effect on thinking. During this period, reaction speed and concentration increases. At the same time cortisol contributes to the suppression of "secondary" processes in the body in which there is no acute need for a stress response. In chronic stress, glucocorticoid levels are constantly elevated and positive physiological effects are replaced by negative ones: metabolism is disturbed, immunity is reduced, brain functions are depressed.

There are two types of receptors in the brain that are sensitive to glucocorticoids. Hormones in this group first bind to one type of receptor,

promoting brain activity, but as glucocorticoid concentrations increase, they also bind to receptors of the second type, which has a detrimental effect on brain function: connections between brain regions are disrupted and inflammation develops Hippocampus volume, the part of the brain responsible for working, long-term and declarative (conscious) memory, decreases.

Because of persistent changes in the hormonal background, prolonged stress impairs a number of brain functions, reducing its ability to adapt and recover. The brain becomes less neuroplastic, i.e. it becomes difficult for it to change under the influence of new experience - to develop new neural connections that allow remembering this experience and applying it later. There are signs of emotional burnout and nervous exhaustion, sleep disorders develop, the person feels chronic fatigue and apathy. Confusion, speech and behavioral disorders are observed, it becomes difficult for a person to adapt to new things, cognitive function decrease is one of the most widespread post-stress conditions. In addition to neurological and psychological problems up to and including depression, stress often causes a decrease in libido.

The intensity and duration of stress determines the extent of its effect on the brain. If high levels of stress hormones persist for a long time, the negative effects can turn out to be irreversible. For example, under the influence of glucocorticoids there is an overproduction of excitatory amino acids, which is thought to trigger a chain of reactions leading to Alzheimer's disease (Khatsaiuk et al., 2021).

It is impossible to say exactly what concentration of stress hormones is critical, everything is very individual - the number of receptors, their sensitivity and location are different for everyone. On average, stress lasting more than three weeks is considered chronic, threatening. In this case, it is worth thinking not only about how to get out of this state, but also how to compensate for the damage caused to the body.

To return the body to a balance and normalize the neuroendocrine system, first of all, we should try to eliminate the causes of stress or minimize their impact. You can start with simple life changes: align the daily routine, add more physical activity, establish a healthy diet (Kokun et al., 2017).

To cope with the psychological effects of stress, psychotherapy is used. Physiological methods such as massage, sports, and breathing practices can affect the natural processes affected by stress. In some cases, medication support prescribed by a neurologist may be needed.

Fear catalysts during hostilities in Ukraine

In addition to the above factors, there are circumstances that aggravate fear, that is, peculiar catalysts of fear. These most commonly include: exposure time of fear factors, combat fatigue, sleep deprivation, a sense of isolation and loneliness of soldiers.

Particularly negative influence on servicemen has fear caused by a prolonged stay in a direct combat encounter with the enemy. N. Yevdokymova (2016) discovered the following pattern. According to his observations, the moral psychological capabilities of fighters begin to slowly increase after 3-5 days of being in a dangerous situation. Then within 20-25 days there is their maximum combat effectiveness due to relative adaptation to fear. But after 40 days of combat contact with the enemy the collapse of the fighters' psychological abilities is observed due to the rapid increase of fear and fatigue.

Later, American experts confirmed the results obtained by N. Yevdokymova (2016) and concluded that the limit of soldiers in a direct combat encounter with the enemy is 30-35 days. After this period it is necessary to withdraw troops to second echelons or reserves.

Practice shows that warriors not only have different time limits for resisting fear, but also experience peaks of fear at different stages of combat, that is, they differ in the dynamics of experiencing fear.

The above provisions allow us to define the main directions of mastering fear as a psychological resource for warriors.

1. First of all, regulation of the level of fear can be accomplished through comprehension--giving a clear meaning to the warriors' participation in combat operations, the formation of broad social motives (love of country; belief in God, justice, victory; hatred of the enemy; sense of duty, etc.) and motives of combat society.

2. Meaningful activity "takes" horror exactly as much as it is needed to preserve the meaning of the activity.

Fear regulation can be achieved by eliminating fear factors and catalysts in warriors' combat activity. The most important task here is, as one of the founders of the native military O. Halyan (2012) noted, "... to acquaint the soldiers in advance with the real phenomena in combat - in the sense of combat activity and in the sense of mental experiences". It, in his opinion, "is the preliminary accumulation of combat experience and, therefore, rational. work with the harmful influence of strong experiences on the psyche of soldiers in the feelings of anxiety and fear".

One of the strongest experiences in war is fear of the pain of wounding and trauma. This fear is based on ignorance of the

psychophysiological phenomenology of wounding. Meanwhile, warriors wounded during combat point to the phenomenon of total anesthesia of the body in the process of experiencing combat stress.

Fear and relaxation are antagonists and cannot exist simultaneously. Warriors develop the habit of thinking about injuries without fear of pain.

Given the limitations of the human capacity to resist adversity, care must be taken not to overexert warriors in a life-sustaining environment. Practice shows that soldiers' resilience to fear is greatly increased if they are initially aware of the duration of their participation in combat and the timing of their return to their permanent deployment locations.

3. In order to manage terror, one must be able to recognize its main symptoms in a timely manner and "turn on" the psychological mechanisms for effectively engaging or regulating terror.

The earlier symptoms of fear are detected, the more opportunities there are to bring it to an optimal level. To do this, one can use techniques of emergency psychological self-regulation based on muscle relaxation, changes in the tone of breathing, and placebo techniques such as "reflexive fixation of mental states. Proactive states accumulated in the course of life and fixed with special anchors can be instantly reproduced in a dangerous situation when the anchor is activated.

4. Of course, a certain potential of fear regulation is contained in the psychological mechanisms of the paradoxical intension method, Halyan (2012).

"Planning" the moments of fear during the stages of combat, and striving to "identify" and "feel" it can significantly reduce fear. The effect obtained in this case can be designated as the Fear Room effect. When visitors to the fear room enter it with the imagination, inflamed by the stories of those who have been in it before, and expect that "here's a witch about to pop out," and "now a dead man will appear," etc., there is no fear.

5. The most promising direction of research into fear and ways of integrating it into combat activity is the arbitrary transformation of fear into proactive emotions (anger, hatred, aggression). This transition can be carried out with the help of "rocking" ("pumping") technologies of using fear, which consist of conscious and controlled powerful pumping of fear and abrupt release of its energy into concrete action as anger.

The instinct of self-preservation has two sides. The first is that man runs for the purpose of self-preservation, the second is that man attacks and defends himself for the same purpose... This second side in man must be developed, because it pushes for defense, for attack. Self-preservation is a

noble trait not only of man, but of all living things. That is why this feeling is the primal engine in combat.

Thus, fear is a natural and useful warrior's reaction to danger, the unknown, and the suddenness of a combat situation. Fear is one of the most "energy-consuming" human emotions. Having fulfilled its main, signaling function, it becomes dysfunctional and disorganizes activity. The task is not to "destroy" fear, but to subdue it to its power and turn it into a fighting resource.

Conclusions

The importance of the article lies in the fact that the concept of fear and its psychotraumatic influence is revealed, because during military operations in Ukraine psychological complications among both servicemen and civilians are observed, among which fear and stress are the most common. Their influence on human behavior is very diverse: from the simplest vegetative reactions and a slight slowing down of actions to the total paralysis of the body.

The article also identifies the most important functions of fear as a psychological complication and proves that the most important functions of fear during military actions in Ukraine are the motivation of survival, the need to solve the combat task and the need to know the circumstances of the mission, etc. Survival motivation in fear of death and pain is a powerful driver of activity. It has been proven that fear is a reactor in the human soul, one of the most resourceful and high-energy states of a warrior.

Also neurobiological bases of stress and fear as psychological complications during the war were investigated and it was studied that under fear and stress certain brain zones are activated, which negatively affects the work of the brain as a whole - changes occur at all levels: structural, molecular, neurochemical. Stress and fear affect the psyche, change the functioning of the most important systems of the body and affect higher brain functions. Their disturbance can manifest itself as a decrease in cognitive abilities: memory, attention, speech.

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The Author 1 contributed significantly to the structure of the article and introduced the concept of fear and its psychotraumatic effects.

The Author 2 identified the most important functions of fear as a psychological complication.

The Author 3 investigated the neurobiological basis of stress as a psychological complication during war.

The Authors 4, 5 elucidated the catalysts of fear during warfare in Ukraine.

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