

## IMPACT OF PHYSICAL AND SPORTS REHABILITATION MEASURES ON QUALITY OF LIFE INDICATORS IN COMBATANTS

Nataliia M. Krushynska<sup>1</sup>, Iryna O. Kohut<sup>1</sup>, Svitlana V. Fedorchuk<sup>1</sup>, Oleksandr I. Korbush<sup>1</sup>, Klavdiia H. Kozakova<sup>1</sup>, Viktoriia B. Zamkevych<sup>2</sup>

<sup>1</sup>National University of Ukraine on Physical Education and Sport, Kyiv, Ukraine

<sup>2</sup>Bogomolets National Medical University, Kyiv, Ukraine

### Abstract

**Introduction.** As the war continues, the number of defenders suffering from physical and/or mental health impairments is steadily increasing. After victory, this number will rise even further, as approximately one million individuals will return home in need of professional support. Studying the quality of life is a pressing and integral issue in the socialization of combatants.

**Aim.** To assess the effectiveness of physical and sports rehabilitation measures for combatants by evaluating their quality of life indicators using the SF-36 questionnaire.

**Materials and methods.** The study involved 40 combatants (men, with an average age of 42.35±8.98) who participated in physical and sports rehabilitation and prepared for national and international competitions in track and field running events during 2020-2021.

**Results.** The study revealed statistically significant differences ( $H(7; N=336)=92.717; p < 0.05$ ) in the quality of life component scores for combatants. Multiple comparisons demonstrated that the physical functioning score of combatants statistically significantly exceeded all other quality of life components ( $p < 0.05$ ). The lowest scores were observed for role functioning related to physical health and role functioning related to emotional state, both of which had a median score of zero. Further analysis confirmed that role functioning related to emotional state had the minimum scores, statistically significantly lower ( $p < 0.05$ ) than role functioning related to physical health. Additionally, combatants showed reduced scores in general health perception. However, the general health score was statistically significantly higher than the scores for role functioning related to both physical and emotional health ( $p < 0.05$ ).

**Conclusions.** The results indicate a positive impact of physical and sports rehabilitation measures on the physical and mental recovery of combatants and their reintegration into civilian life.

**Keywords:** quality of life, SF-36 questionnaire, physical and sports rehabilitation, combatants

### INTRODUCTION

According to data from the Houph Foundation, 200,000 individuals have sustained severe injuries due to the war [9, 10]. The adverse effects of war impact not only the physical but also the mental health of participants of military actions (combatants), which hampers their socialization process in civilian life [12].

Individuals affected by the negative consequences of war experience numerous stressful situations in a continuously hazardous environment [1]. They may also face challenges such as injuries sustained during

armed conflict, disability, the loss of loved ones, friends, or acquaintances, as well as the loss of employment, housing, and more [12]. The war in Ukraine has been linked to cardiovascular issues, exacerbation of chronic somatic diseases, increased susceptibility to infectious diseases, and the emergence of various functional and psychosomatic disorders [16].

The most common nonspecific tool for studying the quality of life among combatants is the SF-36 questionnaire (Medical Outcomes Study Short-Form 36), which allows for the assessment of the consequences of sustained injuries and the adjustment of physical and

sports rehabilitation (PSR) measures to better facilitate the respondents' socialization in civilian life [6].

Domestic and international researchers address specific issues of mental health [16] and physical health [8], as well as various aspects of combatants' socialization [3, 10]. However, the overall quality of life of military personnel after returning from combat zones has been insufficiently studied.

***Relationship of research with scientific or practical tasks, plans, and programs.***

The scientific work was carried out following the Research Plan of the National University of Physical Education and Sports of Ukraine for 2021-2025 on topic 1.4. Theoretical and methodological foundations for developing professional, non-Olympic, and adaptive sports in Ukraine in the context of reforming the sphere of physical culture and sports (state registration number 0121U108294).

## AIM

To assess the effectiveness of physical and sports rehabilitation measures for combatants by evaluating their quality of life indicators using the SF-36 questionnaire.

## MATERIALS AND METHODS

***Participants.*** The study involved 40 participants of military actions who took part in physical and sports rehabilitation (PSR) activities during 2020-2021, specifically in the preparation for national and international track and field running competitions. The participants were informed about all aspects of the study and gave their consent to participate.

***Research methods.*** The study was conducted with a sample of 40 participants (combatants) who underwent a course of physical and sports rehabilitation. Inclusion criteria were ages ranging from 18 to 60 years, the absence of serious chronic diseases, and consent to participate in the study. Data was collected using questionnaires that assessed the quality of life of the participants, as well as their age and body weight.

***Procedure (Organization of the Research).*** The survey was conducted at the National Sports Complex «Olympic» during training sessions for preparation for international and national track and field running competitions (On Amendments to the Law, 2022; On Approval of the State Social Standard, 2021). The study involved 40 participants (combatants) who had completed military service. The survey was conducted by the coach during the first training session and one year after regular sessions. All participants (combatants) were informed about the use of the testing materials and gave their consent for their processing.

The quality of life in combatants was assessed using the «SF-36 Online Instrument» questionnaire, which participants were asked to complete at the beginning of the study and after one year of observation. The thirty-six items of the questionnaire were grouped into 8 scales: physical functioning, role functioning, bodily pain, general health, vitality, social functioning, emotional well-being, and mental health. The scores for each scale ranged from 1 to 6. The higher the score, the better the rating on the chosen scale. The 8 scales were grouped into two indicators: physical and psychological health components.

The physical health component (PhHC) included: Physical functioning (PF), Role functioning due to physical condition (RF), Pain intensity (PI), General health (GH).

The psychological health component (PsHC) included: Vitality (VA), Social functioning (SF), Role functioning due to emotional condition (RE), Mental health (MH).

***Statistical Analysis.*** During the study, the following hypotheses were formulated:

- H1: The components of the quality of life of combatants differ.
- H2: Physical and sports rehabilitation activities positively affect the quality of life of combatants.

To test the proposed hypotheses, statistical analysis methods were applied. The normality of the data distribution was checked using the Shapiro-Wilk test, which is recommended for sample sizes up to 50 observations. Since the studied indicators did not follow a normal distribution, the median (Me) and the 25th and 75th percentiles were used to represent the central tendency and dispersion of the empirical data. The Kruskal-Wallis H-test was used to compare the quality of life components of combatants, and the Wilcoxon signed-rank test was used for comparative analysis before and after the study. To obtain detailed information about which groups differ from each other, a  $z'$  value was calculated for each pair of groups, indicating the significance of differences between groups in the data analysis.

The hypotheses were tested at a significance level of 0.05.

For the calculations, MS Excel and STATISTICA 16.0 software were used.

## RESULTS

As the war continues, the number of defenders who experience physical and/or mental health issues is constantly increasing [2, 4]. After the victory, this number will rise even further, as around one million people will return home, requiring professional support. The study of quality of life is a relevant and integral

issue for the socialization of combatants [13, 14, 15]. It is important that each combatant evaluates the impact of the war on their emotional, physical, psychological, and social life. This allows for a meaningful assessment of the significance of each indicator in the conducted study [8, 11].

To study health-related quality of life, a survey was conducted among combatants (n=40) who systematically engaged in PSR.

The study showed that the quality of life component scores for combatants have statistically significant differences ( $H(7; N=336)=92.717; p<0.05$ ) (Fig. 1).

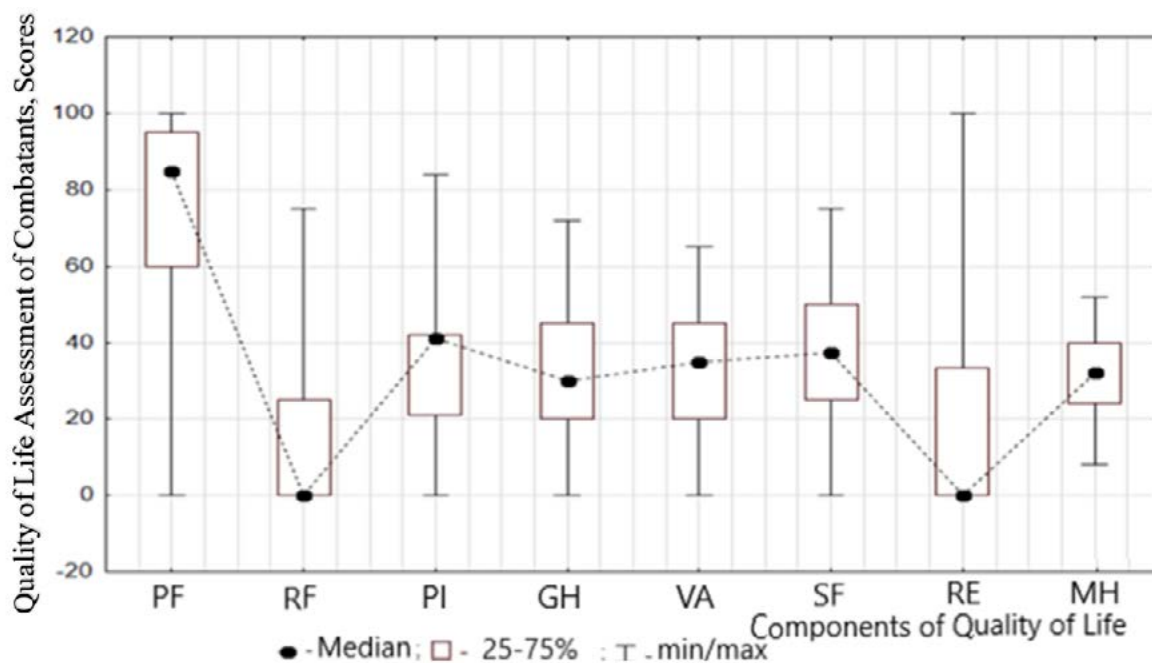


Figure 1. Assessment of Quality of Life Components of Combatants (n=40).

Where\* PF – physical functioning; RF – role functioning due to physical condition; PI – pain intensity; GH – general health; VA – vitality; SF – social functioning; RE – role functioning due to emotional condition; MH – mental health.

Multiple comparisons allow us to assert that the assessment of PF (physical functioning) in combatants significantly exceeds all other quality of life components ( $p<0.05$ ). The lowest scores are characteristic of RF (role functioning due to physical condition) and RE (role functioning due to emotional condition), both of which have a zero median. However, further analysis suggests that the RE scores are minimal. It has been proven that the RE score is statistically significantly ( $p<0.05$ ) lower

compared to RF. Additionally, the combatants show lower scores in the GH (general health) indicator, but the GH score statistically significantly exceeds the scores of RF and RE ( $p<0.05$ ) (Table 1).

Physical and sports rehabilitation measures are a crucial part of the recovery process for military personnel after combat. Their impact on the quality of life of combatants requires thorough investigation.

Table 1

Matrix of z' values for multiple comparisons of mean ranks for all quality of life components

PF R:275,2	RF R:108,6	PI R:186,0	GH R:165,4	VA R:173,1	SF R:176,6	RE R:95,8	MH R:167,3
	7,856	4,206*	5,180*	4,816	4,648*	8,462*	5,089*
7,856*		3,650*	2,676	3,040	3,208*	0,607	2,767
4,206*	3,650*		0,974	0,610	0,442	4,256*	0,883
5,180*	2,676	0,974		0,364	0,532	3,283*	0,091
4,816*	3,040	0,610	0,364		0,168	3,647*	0,273
4,648*	3,208*	0,442	0,532	0,168		3,814*	0,441
8,462*	0,607	4,256*	3,283*	3,647*	3,814*		3,374*
5,089*	2,767	0,883	0,091	0,273	0,441	3,374	

Note\*: Indicates statistical significance at the 0.05 level; z' – a measure of the significance of differences between groups in data analysis; R – mean rank.

## DISCUSSION

The study of the quality of life of combatants provides an opportunity for the correction of psychological and physical conditions through PSR methods. Researchers Krushynska N. and Kohut I. [11] considered one of the effective means to be the use of running disciplines in athletics, which reduces symptoms of depression, helps improve socialization, and positively impacts the emotional state of combatants.

It is well known that depressive and anxiety symptoms, which are exacerbated by stress in wartime conditions, lead to a decrease in, and sometimes a complete loss of work capacity. In contrast, the creation and functioning of mutual support groups have significant potential to promote post-traumatic growth, as they encourage discussions about prospects, sharing experiences, etc. [7, 17]. The results of the conducted study prove that group sports training, communication with coaches, and interaction with team members also have a positive effect on both the overall functional state and mental health of the surveyed combatants.

According to the results of an empirical study [3] conducted within the framework of an international project on the impact of war on mental health (sample: N=633 respondents, including 150 men and 483 women; age of participants: 17-62 years), the indicators of the current state of mental health of Ukrainians in 2022 were studied. The levels of anxiety and depression were relatively low; however, the stress level was high (with an expected increase in post-traumatic stress disorder rates). Nevertheless, this did not lead to an increase in social isolation or interpersonal alienation. Nearly 38% of respondents found their own resource for the future in what was happening, and 23% of respondents indicated that the war inspired them to achieve. Fifty-eight percent of respondents value life above all else, and only 7% of Ukrainians considered life to have less value [3].

The SF-36 (Medical Outcomes Study Short-Form 36) questionnaire is the most widely used non-specific tool for studying quality of life in individuals, which allows for the assessment of various life components [5, 6]. Due to the regularity of training and the quality of exercises performed, combatants were able to improve their quality of life and reduce the negative effects of the consequences of war.

## CONCLUSIONS

After the implementation of physical and sports rehabilitation measures – including training in running disciplines of athletics – the most significant improvements in the combatants were observed in the mental health component, role functioning related to emotional state, social functioning, general health, pain intensity, role functioning, and physical functioning. The results obtained demonstrate the positive impact of physical and sports rehabilitation measures on the mental and physical recovery of combatants and their reintegration into civilian life. After the study, the maximum absolute median increases were 100 points for role functioning (RF) and emotional role functioning (RE), which were the lowest quality of life components. The findings have significant practical value for planning and implementing physical and sports rehabilitation programs for combatants.

**Perspectives for further research.** To overcome the outlined limitations, additional studies are needed that will include a larger and more diverse sample of combatants.

## FUNDING AND CONFLICT OF INTEREST

The authors guarantee full responsibility for everything published in the article. The authors declare the absence of any conflict of interest and financial interest. The article was prepared at the authors' own expense.

## COMPLIANCE WITH ETHICAL REQUIREMENTS

The study was conducted in accordance with the principles of the Helsinki Declaration of the World Medical Association «Ethical Principles for Medical Research Involving Human Subjects.» All study participants provided informed consent in writing to participate in the study.

## AUTHOR CONTRIBUTIONS

Krushynska N. M.<sup>A, B, D</sup>

Kohut I. O.<sup>A, D, E, F</sup>

Fedorchuk S. V.<sup>B, C, E</sup>

Korbush O. I.<sup>B, C</sup>

Kozakova K. H.<sup>D, E</sup>

Zamkevych V. B.<sup>D, E</sup>

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**Резюме****ВПЛИВ ЗАХОДІВ З ФІЗКУЛЬТУРНО-СПОРТИВНОЇ РЕАБІЛІТАЦІЇ НА ПОКАЗНИКИ ЯКОСТІ ЖИТТЯ УЧАСНИКІВ БОЙОВИХ ДІЙ**

Наталія М. Крушинська<sup>1</sup>, Ірина О. Когут<sup>1</sup>, Світлана В. Федорчук<sup>1</sup>, Олександр І. Корбуш<sup>1</sup>, Клавдія Г. Козакова<sup>1</sup>, Вікторія Б. Замкевич<sup>2</sup>

<sup>1</sup>Національний університет фізичного виховання і спорту України, м. Київ, Україна

<sup>2</sup>Національний медичний університет імені О. О. Богомольця, м. Київ, Україна

**Вступ.** Поки триває війна, постійно збільшується кількість захисників і захисниць, які отримують порушення фізичного та/або психічного здоров'я. Після перемоги їх стане ще більше, адже додому повернеться близько мільйона людей, що потребуватимуть фахової підтримки. Вивчення якості життя є актуальною та невід'ємною проблемою соціалізації учасників бойових дій.

**Мета.** Визначення ефективності заходів з фізкультурно-спортивної реабілітації учасників бойових дій шляхом оцінки показників якості їх життя за допомогою опитувальника SF-36.

**Матеріали та методи.** У дослідженні брали участь 40 учасників бойових дій (УБД) (чоловіки, середній вік учасників становив  $42,35 \pm 8,98$ ), які впродовж 2020-2021 рр. займалися фізкультурно-спортивною реабілітацією та підготовкою до всеукраїнських та міжнародних змагань з бігових дисциплін легкої атлетики.

**Результати.** Дослідження показало, що оцінки компонентів якості життя УБД мають статистично значущі ( $H(7; N=336)=92.717; p<0,05$ ) відмінності. Множинні порівняння дозволяють стверджувати, що оцінка фізичного функціонування учасників бойових дій статистично значуще перевищує усі інші компоненти якості життя ( $p<0,05$ ). Найнижчі оцінки характерні для рольового функціонування, обумовленого фізичним станом та рольового функціонування, обумовленого емоційним станом, які мають нульову медіану. Проте подальший аналіз дозволяє стверджувати, що оцінки рольового функціонування, обумовленого емоційним станом – мінімальні. Доведено, що оцінка рольового функціонування, обумовленого емоційним станом статистично значуще ( $p<0,05$ ) менша порівняно з рольовим функціонуванням, обумовленим фізичним станом. Крім того, знижені оцінки учасників бойових дій (УБД) демонструють за показником загального стану здоров'я, але оцінка загального стану здоров'я статистично значуще перевищує оцінки рольового функціонування, обумовленого фізичним станом і рольового функціонування, обумовленого емоційним станом ( $p<0,05$ ).

**Висновки.** Отримані результати є свідченням позитивного впливу на стан УБД заходів з фізкультурно-спортивної реабілітації на етапі відновлення психічного і фізичного здоров'я та їх повернення до цивільного життя.

**Ключові слова:** якість життя, опитувальник SF-36, фізкультурно-спортивна реабілітація, учасники бойових дій

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