

RESEARCH

Open Access



Intervention impact on quality of life in Ukrainians with post-traumatic stress disorder

Liudmyla Kiro^{1*}, Alina Urbanovych² and Maksym Zak¹

Abstract

Background The World Health Organization (WHO) estimates the prevalence of Post-Traumatic Stress Disorder (PTSD) among the population of Ukraine at approximately 25%. Almost half of the population, or 57%, is at risk of developing PTSD.

Methods This longitudinal study included an assessment of QoL dynamics among 109 Ukrainian civilians with PTSD, before and after receiving complex treatment during the Russian-Ukrainian conflict. Clinical, anamnesis, socio-demographic, psychological, and statistical methods were employed. To assess quality of life, we used the Ukrainian versions of the 36-item survey (SF-36) and European Quality Assessment Questionnaire in 5 Regions (EQ-5D-5L) questionnaires.

Results On the 30th day after the complex treatment, the following parameters showed significant improvement compared to the 1st day: physical functioning (48 vs 5), general perception of health (56 vs 52), and synthetic index associated with physical health (34 vs 29). On the 90th day, there was additional improvement in body pain, vitality, and mental health compared to the 30th day. By the 180th day, the score in general health reached statistical significance at 76. According to items characterizing mental health, it was possible to achieve reliable improvement in overall mental health 100, $p = 0.0049$ only on the 180th day of the study.

Conclusions Normalization of mental health indicators in patients with PTSD occurs more slowly than physical indicators. Therefore, it requires long-term active monitoring of this category of patients during the post-rehabilitation period. In particular, special attention should be paid to psychological aspects even when somatic recovery has been achieved.

Keywords Post-traumatic stress disorder, Quality of life indicators, The Russian-Ukrainian conflict, Cognitive behavioural therapy, Mental health

Retrospectively registered

The study was carried out in accordance with the plan of research works at the Petro Mohyla Black Sea National University (Address: 68 Desantnykiv St, 10, Mykolaiv,

Ukraine, 54000) on the topic: “Clinical-pathogenetic justification of the system of primary and secondary prevention of the most socially significant chronic non-infectious diseases of internal organs”, state registration number 0120U101641.

Date of registration: 17.03.2021

Duration of research: 03.2021-12.2024

*Correspondence:

Liudmyla Kiro
nawal08th@gmail.com

¹ Department of Therapeutic Disciplines, Petro Mohyla Black Sea National University, Mykolaiv, Ukraine

² Department of Endocrinology, Lviv National Medical University, Lviv, Ukraine



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

Introduction

In recent years, there has been a dramatic increase in traumatic events in both Ukraine and European countries. These events include mass murders, wars and civil wars, natural and man-made disasters, terrorist attacks, kidnappings, and sexual violence [1, 2]. Additionally, there are sudden and unexpected social changes that lead to human losses and forced displacement. All these events are associated with an increased risk of mental health issues related to stress. These conditions have a particular impact on the clinical picture of post-traumatic stress disorder (PTSD) in Ukraine. In addition to the typical symptoms of stress-related disorders, these conditions can cause additional feelings and reactions [3, 4].

PTSD typically develops in 12–20% of people who have experienced or witnessed extreme events [5]. It is most commonly seen in the first three months following a traumatic event [6].

A review of epidemiological studies on traumatic events and PTSD in European countries, focusing on data from recent cross-national research initiatives, found that approximately two-thirds of the European population had experienced at least one traumatic event in their lifetime. However, only between 1 and 3% of the European population developed PTSD and were suffering from symptoms in the past year, corresponding to approximately 7.7 million people. The prevalence of PTSD varied considerably between European countries, influenced by differences in trauma exposure, war and combat experiences, cultural factors, and healthcare access. The results of a study by the World Health Organization (WHO) showed that 60.3% of Polish people had experienced at least one event that could lead to PTSD, and 31.1% of those who had been exposed to trauma reported symptoms of PTSD. At the population level, the estimated rate of probable PTSD was 18.8% [7].

Lithuanian National Health Insurance (NHI) registry data from 2014 and 2015 were used to estimate the annual rates of posttraumatic stress disorder (PTSD) and other stress-related disorders in Lithuania. A large gap was found between 12-month PTSD prevalence based on epidemiological data and annual PTSD rates based on health care service utilization in Lithuania. Estimations from the health care service's utilization data revealed that only about 0.01% to 0.02% of the population in Lithuania is diagnosed with PTSD annually, indicating that the national health care system identifies only about 1% of potential PTSD cases in Lithuania. The low rates of PTSD diagnoses in the health care system seem to indicate a lack of recognition of psychological trauma among general practitioners and mental health professionals in Lithuania. The lack of visibility of PTSD in the national

health care system could be a major barrier to the treatment of PTSD in the country. The study indicates the importance of social factors, especially the recognition of trauma and PTSD, among health care professionals [8].

In the last century, the Romanian population faced a mixture of natural, historical, social, and economic traumatic events, suggesting that the general population was exposed to high levels of trauma. To document the epidemiology of self-reported trauma and PTSD in the general Romanian population, indicators of trauma exposure and PTSD incidence and burden were assessed. 41.5% of all respondents reported one or more lifetime traumas, with a frequency of 131.1 per 100 respondents; the lifetime prevalence of PTSD was 1.2% and the 12-month prevalence was 0.7%. The conditional prevalence of PTSD after trauma exposure was 4.7%. Both the PTSD conditional risk after trauma exposure and the probability of chronic progression after PTSD onset were highest for stalking (\pm sexual assault) victims. The most frequent traumatic events were witnessing a dead body or corpse or seeing someone seriously injured (20.1%), suffering a life-threatening illness (15.4%), car accident (13.4%), natural disaster (10.2%), and unexpected death of a loved one (15.1%). The conditional risk of PTSD, i.e., frequency of PTSD episodes from lifetime to present and duration of PTSD, was highest for being stalked and decreased for witnessing a domestic violence incident, presence of a life-threatening illness, victim of domestic violence (boyfriend or spouse), victim of rape, and unexpected death of a loved one with decreased gradually. Although Romanian people are more exposed to traumas from network class (having a child with a serious illness, traumatic event to a loved one, witness of death/dead body or seeing someone seriously hurt, accidentally caused serious injury or death, witness of physical fight at home), road traffic accidents and unexpected death of loved one, the burden of trauma and PTSD in the country are mostly related to sexual violence [9].

The problem of PTSD is relevant not only for the countries of the European continent but also for the Western countries. Approximately 6% of the US population will experience PTSD at some point in their lives. This equates to 13 million Americans in 2020, or 5% of the total population [10].

According to modern domestic studies, the prevalence of PTSD in Ukraine is approximately 25%. Almost half of the population (57%) is at risk of developing PTSD [11]. A survey conducted among civilians confirms the American data on the greater vulnerability of women to PTSD, but also shows that older people, forced migrants, and people from regions under Russian occupation are at risk. An online survey of students shows the significant impact of war on young people's lives: 98% were affected by the

war; 86% had nightmares, 49% suffered from insomnia, and 27% showed symptoms of PTSD [12]. War has not only affected adults and older people's mental health; it has also mercilessly destroyed the mental peace of children [2] Probable PTSD has been diagnosed in school-age children (14.4%) and preschool children (15.4%) [13].

According to the Ukrainian Ministry of Health, following the large-scale invasion by Russia, more than half of Ukrainians reported experiencing increased anxiety, irritability, difficulty concentrating, trouble sleeping, headaches, and obsessive thoughts related to traumatic events [14].

The number of patients with PTSD has been increasing steadily since December 2022. According to the National Health Service, there were 3,167 patients registered with this diagnosis in 2021. The following years saw an increase in the number of patients: 2022—7,051; 2023—12,494; as of June 6, 2024, the number had already reached 6,292. The Ministry of Health of Ukraine forecasts that this trend will continue to accelerate [15, 16].

The diagnosis and treatment of PTSD, which has become an increasingly significant issue in Ukraine in recent years, continues to present challenges in clinical practice, despite the existence of clear criteria for defining it [17, 18]. This is largely due to not only the stigma and self-stigma associated with the condition, but also the presence of comorbidities, where the symptoms of PTSD may be superimposed on, masked by, or distorted by other physical and mental health conditions.

Analysis of epidemiological research shows that individuals with a history of trauma are more likely to develop PTSD, and this risk is further increased by other mental health issues that may occur as a direct result of the traumatic event or that were present prior to it. These conditions include anxiety disorders, depression, thoughts or attempts of suicide, substance abuse, psychosomatic conditions, and cardiovascular disease [19]. Data suggest that between 50 and 100% of patients suffering from post-traumatic stress disorder (PTSD) have one or more comorbid conditions, usually two or more [20, 21]. In addition, high rates of suicide and suicide attempts are a particular concern for patients with PTSD.

One of the modern areas of research in medicine is the study of health-related quality of life (QoL) [22]. This area of research has gained interest from scientists from various fields due to its potential to provide a reliable and effective way to assess not only the health and well-being of individuals, but also the effectiveness of medical treatments, rehabilitation programs, and the healthcare system overall. The global scientific community is actively working to synthesize international experience and develop a unified methodology for assessing QoL in different areas of medicine. This work aims to

create a universal approach that can be applied across various healthcare settings and disciplines, allowing for more accurate comparisons and evaluations. By developing a standardized methodology, researchers can gain a better understanding of the impact of various interventions on patient outcomes, helping to improve treatment strategies and healthcare delivery. This could lead to more effective treatments, better patient care, and ultimately, improved overall health outcomes. As part of the ongoing activities in various countries worldwide, institutes, centres, associations, and societies are conducting research on quality of life (for example, the Center for Research on Quality of Life and Health in New Jersey, USA). Databases are being established, and scientific and practical journals such as the Quality of Life Research Journal are being published [23–25].

Considering that PTSD has a significant impact on various aspects of a person's life, it is essential to investigate the quality of life indicators of this group of patients. This is not only necessary to obtain initial information about the impact of PTSD on mental and physical health, but also to monitor the dynamics of these indicators to assess the effectiveness of treatment. Unfortunately, there is a lack of research on measuring quality of life among Ukrainians suffering from PTSD due to Russian aggression. This highlights the significance of this study.

The aim of the study was to assess the dynamics of quality of life indicators in civilian Ukrainians with post-traumatic stress disorder before and after complex treatment in the conditions of the Russian-Ukrainian war.

Materials and methods

Participants

In order to achieve the objective, 109 civilian patients with post-traumatic stress disorder seeking medical help at the University Hospital of Petro-Mohyla University were examined under the conditions of informed consent in accordance with the principles of bioethics and deontology. This longitudinal interventional study included participants from January 2024 to June 2024. Inclusion criteria were a primary diagnosis of PTSD according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), an age of 18 to 65 years (mean age was 46 ± 1.2 years) and motivation for trauma-focused treatment. Exclusion criteria were a lifetime diagnosis of psychosis, bipolar disorder, acute suicide risk, children and pregnant women. During the study, the clinical, anamnesis and socio-demographic data of all subjects were examined in detail. Adapted Ukrainian version of a 36-item questionnaire (SF-36) [26] and a 5-level EQ-5D-5L (European Quality Assessment Questionnaire in 5 Regions) [27] were used to

assess quality of life. The socio-demographic data of all subjects included information on age, gender, marital status, employment status, socio-economic status, education, length of stay in the combat zone and the presence of harmful habits (smoking, alcohol consumption) (Table 1).

It should be noted that out of the 104 patients examined, 20 people underwent lower limb prosthetics and 15 were diagnosed with chronic pain syndrome.

Measurements

The study used the Ukrainian version of the European Quality of Life Questionnaire (EQ-5D-5L) with 5 dimensions. This questionnaire has several advantages,

including its universality, ease of use, and wide application in different countries [28]. It provides a single score that can be used to assess the quality of life, making it useful for evaluating the state of health, treatment effectiveness, rehabilitation, and various types of medical care. The questionnaire assesses a person's health using 5 components: mobility (movement in space), self-care and activity in daily life, presence of pain/discomfort, and anxiety/depression. These components are represented by separate questions, where the respondent indicates the severity of each problem on a scale. The rating scale for each component has three levels, depending on the severity of the problem. Level 1 indicates no disorders, level 2 indicates moderate disorders, and level 3 indicates pronounced disorders. Based on the patient's assessment of their health, they receive a single-digit score that corresponds to the level chosen for that particular aspect. The combination of these five scores, combined into a five-digit number, represents 243 different possible health states for the patient.

The Ukrainian version of the 36-item short survey was applied in research. The SF-36 health survey: manual and interpretation [29] and the SF-36 physical and mental health scales: user's guide [30] were used to calculate and interpret the questionnaire data. During the study, 8 scales were grouped into two indicators: physical and mental health components. The physical health (PH) component included: physical functioning (PF); role physical functioning (RF); body pain (BP); general health (GH). The psychological and mental health (PH) component included: vitality (VT); social functioning (SF); emotional role (RE); mental health (MH). The quality of life parameters on the scales varied from 0 to 100. The higher the value of the indicator, the better the assessment on the selected scale.

The investigation included an assessment of patients' quality of life before the start of treatment (0 day), and after start complex therapy (days 30, 90, and 180). The psychotherapy consisted of a series of trauma – focused cognitive behavioural therapy (TF-CBT) sessions related to trauma.

The main advantages of CBT for patients with PTSD include: short-term treatment, focusing on specific problems, leading to quick and long-term results; scientific evidence supporting the effectiveness of the therapy; an emphasis on action, which focuses on changing behaviour and thinking rather than dwelling on past events, leading to faster resolution of current issues; individualized treatment tailored to the specific needs and characteristics of each patient; and accessibility of the therapy method.

TF-CBT was divided into three main phases: stabilization, reappraisal (cognitive processing and narrative),

Table 1 Descriptive socio-demographic data on the study subjects

Variable	Mean ± SS/ n (%)
Age (years)	46 ± 1.2
Gender	
Female	50(46.2)
Male	59(53.8)
Marital Status	
Married	41(38.0)
Single	35(32.5)
Separated/Divorced	33(29.5)
Employment Status	
Employed	52(47.3)
Unemployed	57(52.7)
Smoking	
Yes	49(45.6)
No	59 (54.4)
Alcohol	
Yes	22(20.1)
No	87(79.9)
Education	
Secondary school education	35(32.1)
Full School Education	46(42.2)
Further Education (college)	19(17.4)
Higher education	9(8.3)
Place of residence	
East of Ukraine	44(40.4)
West of Ukraine	5(4.6)
South of Ukraine	35(32.1)
North of Ukraine	12(11.0)
Center of Ukraine	13(11.9)
Duration of stay in the zone of occupation and /or hostilities	
1–3 months	18(16.5)
3–6 months	39(35.6)
> 6 months	52(47.7)

integration, and consolidation, totalling 20 sessions divided into 3 blocks evenly. The sessions were 60 min long and were held weekly, both individually and in groups. The main goal of the CBT therapy was to change the pessimistic and catastrophic assessments and memories related to psychological trauma in order to overcome behavioural and cognitive patterns that maintained avoidance and interfered with normal daily function. Under the guidance of a psychotherapist, patients were trained to identify internal and external triggers that maintained PTSD symptoms. To reduce the intensity of intrusions, a thorough assessment of memories and the integration of traumatic experiences was carried out. Socratic dialogue was used to address dysfunctional thoughts related to trauma and the underlying beliefs that create a sense of constant threat. In order to overcome avoidance associated with traumatic experiences, psychoeducational methods were employed, including keeping a diary of automatic thoughts, identifying maladaptive beliefs that contribute to PTSD symptoms, and engaging in Socrates-style dialogue to change attitudes towards the traumatic event. This included overcoming self-blame and focusing on the strengths of the individual. The final phase focused on strengthening adaptive cognitive skills related to safety, trust, power, control, respect, and intimacy—areas that were affected by the trauma. The goal of this phase was to help the patient improve their daily functioning and overall quality of life.

Pharmacotherapy included the use of a selective serotonin reuptake inhibitor, Sertraline. The medicine was started at a dose of 25 mg once daily in the morning for the first week. After 7 days, the effectiveness of the drug was evaluated, and then the dosage was adjusted. For 2–14 weeks, patients continued taking Sertraline at 50 mg once a day in the morning. The total course of Sertraline treatment was 14 weeks or 98 days.

Statistical analysis

Categorical data were presented as absolute number and percentages and compared by two-tailed χ^2 -test or Fisher's exact test when appropriate. Continuous data were presented as means (\pm standard deviation [SD]) for normally distributed variables and as medians (25th and 75th percentiles) for variables when distribution was not normal. Continuous measurements were compared using the Wilcoxon–Mann–Whitney test or Student T-test if data were normally distributed. Two-sided significance tests are used throughout. A P -value < 0.05 was considered statistically significant. In order to justify the sample size of this observational single-arm study, we estimated the accuracy of the SF-36 synthetic component of physical health. For this reason, a total number of 100

patients produces a two-sided 95% confidence interval (CI) with a width equal to 0.20 when the sample proportion is 4219 (95% CI = 32 to 52). For the SF-36 synthetic index of mental health, a total number of 100 patients produces a two-sided 95% CI with a width of 20 when the sample proportion is 48 (95% CI 38 to 58). Statistical analyses were performed using the STATA program (version 15; College Station, Texas, USA).

Results

The results of the assessment of the patients' quality of life parameters using the Short Form Health Survey (SF-36) showed that on the first day of treatment, all of the patients' quality of life indicators were below normal. After one month of complex treatment (day 30), the following parameters increased significantly: physical functioning (48 (5; 70) vs. 5 (0; 35), $p < 0.001$), general health perception (56 (41; 67) vs. 52 (40; 65); $p = 0.049$), synthetic index related to physical health (34 (27; 42) vs. 29 (23; 35), $p < 0.001$) compared to the first day of observation. On the 90th day of treatment, there was an additional improvement in scores for Body Pain (57 (41; 84) vs. 41 (22; 100), $p < 0.001$), Vitality (43 (26; 55) vs. 35 (25; 55), $p < 0.01$); Mental Health (60 (44; 76) vs. 56 (43; 68), $p = 0.026$). On the 180th day, the increase in the score in the area of general health reached statistical significance and amounted to 76 (50; 96), ($p = 0.03$). According to the items characterizing mental health (vital activity, social functioning, limitations in performing an emotional role, mental health), it was possible to achieve a reliable improvement in the overall mental health score 71 (64; 100) $p = 0.0049$ only on the 180th day of the study (Table 2).

The results of the EQ-5D-5L questionnaire are shown in Table 3. After one month of treatment (day 30), the following indicators improved: mobility (2.57 \pm 1.41 vs. 3.39 \pm 1.53, $p < 0.001$), self-care (2.27 \pm 1.36 vs. 3.05 \pm 1.48, $p < 0.001$) and usual activity (2.51 \pm 1.27 vs. 2.97 \pm 1.33, $p = 0.023$), compared to the first day of observation. However, the VAS Health Perception indicator only significantly improved on day 90 of treatment, at 60.67 \pm 24.98 ($p < 0.001$). Significant increases in pain/discomfort and anxiety/depression were only achieved on day 180 of treatment and were 1.66 \pm 0.98 ($p = 0.015$) and 1.98 \pm 1.03 ($p = 0.037$), respectively.

Discussion

An assessment of quality of life indicators in patients with PTSD, as well as a thorough analysis of socio-demographic, clinical, and anamnesis data, allows us to conclude that several factors affect the quality of life for this group of patients. These include comorbidities, marital status, gender, and the duration of exposure to

Table 2 Parameters of quality of life of patients with PTSD according to the Short Health Survey (SF-36) (0 days, 30 days, 90 days, and 180 days)

SF-36 — parameters	Values in research group				p-value		
	Day 0 (before treatment)	30 days	90 days	180 days	0–30 days	0–90 days	0–180 days
Physical Functioning (median; Q1, Q3)	5 (0; 35)	48 (5; 70)	68 (29; 95)	75(45;95)	<0.001*	<0.001*	<0.001*
Limitations to the physical role	0 (0; 50)	0 (0; 0)	25 (0; 100)	75 (0; 100)	0.07*	0.23	<0.001*
Bodily Pain	41 (22; 100)	57 (41; 84)	74 (42; 100)	84 (63;100)	0.1	<0.001*	<0.001*
General Health perceptions	52 (40; 65)	56 (41; 67)	61 (45; 76)	76 (50;96)	0.046*	0.015*	0.03*
Vitality	35 (25; 55)	43 (26; 55)	50 (30; 70)	55 (40; 75)	0.28	<0.01*	<0.001*
Social Functioning	50 (37; 87)	50 (37; 75)	75 (37; 100)	87 (56;100)	0.18	0.1	<0.001*
Emotional role limitations	33 (0; 100)	33 (0; 100)	83 (0; 100)	100(33;100)	0.24	0.22	0.019*
Mental Health	56 (43; 68)	60 (44; 76)	66 (44; 84)	72 (60; 82)	0.16	0.026*	<0.001*
Synthetic index linked to physical health	29 (23; 35)	34 (27; 42)	43 (32; 51)	46 (36; 52)	<0.001*	<0.001*	<0.001*
Synthetic index linked to mental health	44 (34; 53)	40 (32; 51)	43 (36; 53)	71 (64; 100)	0.12	0.18	0.049*

* p -value < 0.05 was considered significant (Wilcoxon–Mann–Whitney test)

Table 3 Trends in quality of life about the individual dimensions of EQ-5D-5L parameters

EQ-5D-5L — parameters	Values in research group				p-value		
	Day 0 (before treatment)	30 days	90 days	180 days	0–30 days	0–90 days	0–180 days
Mobility (mean \pm SD)	3.39 \pm 1.53	2.57 \pm 1.41	2.08 \pm 1.36	1.75 \pm 1.03	<0.001*	<0.0001*	<0.0001*
Self-care	3.05 \pm 1.48	2.27 \pm 1.36	1.63 \pm 1.15	1.36 \pm 0.85	<0.001*	<0.0001*	<0.0001*
Usual Activity	2.97 \pm 1.33	2.51 \pm 1.27	2.13 \pm 1.27	1.86 \pm 1.09	0.023*	<0.0001*	<0.0001*
Pain/Discomfort	2.06 \pm 1.01	2.03 \pm 1.04	1.93 \pm 0.93	1.66 \pm 0.98	0.865	0.39	0.015*
Anxiety/Depression	2.37 \pm 1.18	2.19 \pm 1.22	2.12 \pm 1.07	1.98 \pm 1.03	0.325	0.16	0.037*
VAS Health Perception	48.23 \pm 23.04	54.57 \pm 24.35	60.67 \pm 24.98	69.76 \pm 17.91	0.081	<0.001*	<0.0001*

* The difference was considered significant at $p < 0.05$

a traumatic event [31]. For this reason, the Ukrainian government should ensure that this group of people has early access to both medical and psychological support. One way to achieve this goal is by forming mobile medical and psychological teams that include not only general practitioners but also psychologists and/or psychiatrists.

A large British study conducted from 2010 to 2015, involving 500 patients with PTSD, identified three categories of risk factors for its development: internal factors (gender, age, and heredity); social and environmental factors, including the duration and severity of traumatic events; and external factors, such as lack of social support and burdened family histories. The study found that the severity of PTSD is most influenced by the severity of trauma, lack of social support, and a history of traumatic events in the family [32].

The assessment of the quality of life of patients with PTSD using the SF-36 and EQ-5D-5L questionnaires at the time of admission found that all quality of life

indicators for individuals with PTSD were below recommended reference values. At the first follow-up time point (30 days), there was an increase in indicators for the physical condition, while there were no significant changes to mental health parameters. The number of points on the Anxiety and Depression sections of the EQ-5D-5L questionnaire after 30 days was similar to that recorded at admission. It can be inferred that, despite some physical improvement, patients had difficulty returning to everyday life and making independent living attempts.

After 90 days, there was a tendency towards improvement in all areas, as reflected in both questionnaires. Although the obtained indicators were lower than in the general population, they showed the adaptation of patients' roles to their actual health condition. The only component of the EQ-5D-5L scale that did not show positive dynamics was the "Anxiety and Depression" section in patients with PTSD. The number of points in

this section corresponded to “moderate anxiety and/or depression”.

Finally, after 180 days, there was a trend towards improvement in all domains. The study found that physical health scores improved faster than mental health scores among patients with PTSD.

In our opinion, the dynamics described above were associated with the positive effects of TF-CBT and the antidepressant and anti-anxiety effects of Sertraline. CBT contributed to the initiation of the cognitive processing and analysis of traumatic factors, which was supported by the reduction in tension and relaxation resulting from the psychotropic effects of Sertraline. TF-CBT seems to be the most effective in reducing symptoms and improving remission rates for adults with PTSD. We believe this psychotherapy also helps maintain symptom improvement after treatment ends. Further research is necessary to study the long-term effectiveness of psychotherapy for adult PTSD, as well as the influence of PTSD severity and complexity on treatment outcomes. It should be noted that 20 of the 104 patients who underwent lower limb prosthetics experienced improvement in their quality of life, which may have further contributed to their recovery.

Similar research findings were also found in a systematic review that analysed randomized controlled trials of various treatments for PTSD in adults, published between January 1st, 1980 and April 1st, 2012 and written in English [33]. The review included data from PubMed, MEDLINE, PILOTS, and PsycINFO. The study assessed changes in PTSD symptoms after treatment and at 1–4 month follow-ups, as well as the rate of remission. The quality of the evidence obtained was rated as moderate to low. Eye movement desensitization and reprocessing (EMDR), combined somatic and cognitive therapy (SCT), trauma-focused cognitive behaviour therapy (TF-CBT), and supported self-help were found to be the most effective methods in reducing PTSD symptoms when compared to a wait-list control group. The effects of EMDR and CBT persisted for 1–4 months, and also increased the likelihood of remission after treatment. The results of other studies were either mixed or based on limited evidence.

Practical and theoretical implications

This research can serve as a basis for further studies aimed at evaluating the effectiveness of interventions aimed at improving the outcomes of remote recovery from PTSD. The findings of this study pave the way for complex individual monitoring of patients with PTSD, including assessing both early and long-term treatment outcomes. They will assist in developing predictive models of the course and prognosis of the disease, conducting

medical and social population-based studies to identify high-risk groups, and establishing the fundamental principles of palliative care. Additionally, this will enable dynamic monitoring of high-risk populations and evaluation of the effectiveness of prevention programs. Furthermore, it is essential to economically justify treatment methods by considering factors such as cost-effectiveness and economic efficiency.

Research limitations

Traumatic events/PTSD causes due to ongoing war may limit the generalizability of the findings to other PTSD patient groups. Although this research is a pilot study, the number of participants is relatively small, at only 109. However, in the future, we plan to conduct a longitudinal study to assess the quality of life of a much larger group of people over a longer period of time. This will allow us to analyse more deeply the mental and physical health indicators of Ukrainians in relation to Russian aggression. The current study focuses solely on the quality of life of patients with PTSD. However, the impact of co morbid conditions on the dynamics of quality-of-life indicators was not taken into account. Future studies should address this gap by examining the changes in life indicators among patients with PTSD who also have other medical conditions. Such an approach would help us better understand the interconnections between various aspects of health and how they affect each other. This knowledge could lead to the development of more effective support and rehabilitation strategies for those in need, ultimately contributing to a better quality of life for all.

Conclusion

PTSD is a condition that can lead to disability. People with PTSD experience physical, cognitive, and emotional consequences that can affect their long-term quality of life. It's important to assess not only the initial quality of life indicators for people with PTSD, but also to monitor their changes over time, taking into account their clinical, socio-demographic, and psychological characteristics. Normalization of mental health in people with PTSD is slower than physical recovery, and long-term monitoring of this group is essential. Special attention should be paid to their psychological needs, even if they appear to be physically recovered. When working with people with PTSD, it's crucial to establish a safe and trusting relationship that allows them to access and process their traumatic experiences. And only after that, focusing on the trauma with an analysis of all its manifestations, including isolation. Properly organized psychotherapy can help patients with post-traumatic stress disorder “break away”

from the experienced shock and reconnect with family, friends, and society.

Acknowledgements

Authors would like to thank the Rector of the Petro Mohyla Black Sea National University for his facilitation of this research.

Authors' contributions

Liudmyla Kiro – A- Manuscript preparation, B- Study design, C-Data collection; D-Statistical analysis; Alina Urbanovych – E-Questionnaires and clinical examination of patients; Maksym Zak – H – Literature research.

Funding

The authors received no financial support for the research. No funding.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the basic bioethical norms of the Helsinki Declaration of the World Medical Association "Ethical Principles of Medical Research Involving Humans as Research Subjects" (1964), with changes and additions to the General Declaration on Bioethics and Human Rights. United Nations (2005), Council of Europe Convention on Human Rights and Biomedicine (1997). All participants were informed about the goals, organization, methods of the study and signed an informed consent to participate in it. All measures are also taken to ensure patient anonymity. The study was approved by the Ethics Committee of the Petro Mohyla Black Sea National University; Registration card No. 0120U101641 (Address of the institution: Petro Mohyla Black Sea National University, 68 Desantnykiv str.10, Mykolaiv, 54003, Ukraine).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 5 July 2024 Accepted: 22 October 2024

Published online: 29 October 2024

References

- Badenes-Ribera L, Molla-Esparza C, Longobardi C, Sánchez-Meca J, Fabris MA. Homicide as a source of posttraumatic stress? a meta-analysis of the prevalence of posttraumatic stress disorder after committing homicide. *J Trauma Stress*. 2021;34(2):345–56. <https://doi.org/10.1002/jts.22630>. Epub 2020. PMID: 33241619. <https://pubmed.ncbi.nlm.nih.gov/33241619/>.
- Ahmed DR. From Holocaust to Anfal: The impact of genocide and cross-generational trauma on the mental health of Kurds. *Int J Soc Psychiatry*. 2024;70(3):621–5. <https://doi.org/10.1177/00207640231210107>. Epub 2023. PMID: 37947284. <https://pubmed.ncbi.nlm.nih.gov/37947284/>.
- Baker MS, Baker J, Burkle FM Jr. Russia's hybrid warfare in Ukraine threatens both healthcare & health protections provided by international law. *Ann Glob Health*. 2023;89(1):3. <https://doi.org/10.5334/aogh.4022>. PMID: 36743284; PMCID: PMC9881440. <https://pubmed.ncbi.nlm.nih.gov/36743284/>.
- Khorram-Manesh A, Goniewicz K, Burkle FM Jr. Social and healthcare impacts of the Russian-Led hybrid war in Ukraine - a conflict with unique global consequences. *Disaster Med Public Health Prep*. 2023;21(17). <https://doi.org/10.1017/dmp.2023.91> PMID: 37476992. <https://pubmed.ncbi.nlm.nih.gov/37476992/>.
- Merians AN, Spiller T, Harpaz-Rotem I, Krystal JH, Pietrzak RH. Post-traumatic Stress Disorder. *Med Clin North Am*. 2023;107(1):85–99. <https://doi.org/10.1016/j.mcna.2022.04.003>. Epub 2022 Oct 28. PMID: 36402502. <https://pubmed.ncbi.nlm.nih.gov/36402502/>.
- Maercker A, Cloitre M, Bachem R, Schlumpf YR, Khoury B, Hitchcock C, Bohus M. Complex post-traumatic stress disorder. *Lancet*. 2022;400(10345):60–72. [https://doi.org/10.1016/S0140-6736\(22\)00821-2](https://doi.org/10.1016/S0140-6736(22)00821-2). PMID: 35780794. <https://pubmed.ncbi.nlm.nih.gov/35780794/>.
- Vargová L, Jozefiaková B, Lačný M, Adamkovič M. War-related stress scale. *BMC Psychol*. 2024;12(1):208. <https://doi.org/10.1186/s40359-024-01687-9>. PMID: 38622687; PMCID: PMC11020644. <https://pubmed.ncbi.nlm.nih.gov/38622687/>.
- Kazlauskas E, Zelviene P, Eimontas J. "No posttraumatic stress disorder in Lithuania": National health care fails to identify PTSD. *J Trauma Stress*. 2017;30(1):99–102. <https://doi.org/10.1002/jts.22152>. Epub 2017. PMID: 28072906. <https://pubmed.ncbi.nlm.nih.gov/28072906/>.
- Kessler RC, Aguilar-Gaxiola S, Alonso J, Benjet C, Bromet EJ, Cardoso G, Degenhardt L, de Girolamo G, Dinolova RV, Ferry F, Florescu S, Gureje O, Haro JM, Huang Y, Karam EG, Kawakami N, Lee S, Lepine JP, Levinson D, Navarro-Mateu F, Pennell BE, Piazza M, Posada-Villa J, Scott KM, Stein DJ, Ten Have M, Torres Y, Viana MC, Petukhova MV, Sampson NA, Zaslavsky AM, Koenen KC. Trauma and PTSD in the WHO World Mental Health Surveys. *Eur J Psychotraumatol*. 2017;8(sup5):1353383. <https://doi.org/10.1080/20008198.2017.1353383>. PMID: 29075426; PMCID: PMC5632781. <https://pubmed.ncbi.nlm.nih.gov/29075426/>.
- Murthy RS, Lakshminarayana R. Mental health consequences of war: a brief review of research findings. *World Psychiatry*. 2006;5(1):25–30 PMID: 16757987; PMCID: PMC1472271. <https://pubmed.ncbi.nlm.nih.gov/16757987/>.
- Johnson RJ, Antonaccio O, Botchkovar E, Hobfoll SE. War trauma and PTSD in Ukraine's civilian population: comparing urban-dwelling to internally displaced persons. *Soc Psychiatry Psychiatr Epidemiol*. 2022;57(9):1807–16. <https://doi.org/10.1007/s00127-021-02176-9>. Epub 2021 Oct 1. PMID: 34596712. <https://pubmed.ncbi.nlm.nih.gov/34596712/>.
- Stein BD, Tanielian TL. Building and translating evidence into smart policy: continuing research needs for informing post-war mental health policy. *World Psychiatry*. 2006;5(1):34–5 PMID: 16757991; PMCID: PMC1472274. <https://pubmed.ncbi.nlm.nih.gov/16757991/>.
- Mahmood HN, Ahmed DR, Neldner S, et al. Psychological scars of genocide: a systematic review of post-traumatic outcomes in Kurdish Anfal survivors. *Curr Psychol*. 2024;43:20383–93. <https://doi.org/10.1007/s12144-024-05863-3>.
- Friedman MJ, Bernardy NC. Considering future pharmacotherapy for PTSD. *Neurosci Lett*. 2017;10(649):181–5. <https://doi.org/10.1016/j.neulet.2016.11.048>. Epub 2016 Nov 24. PMID: 27890743. <https://pubmed.ncbi.nlm.nih.gov/27890743/>.
- Stein DJ, Zungu-Dirwayi N, van Der Linden GJ, Seedat S. Pharmacotherapy for posttraumatic stress disorder. *Cochrane Database Syst Rev*. 2000;(4):CD002795. <https://doi.org/10.1002/14651858.CD002795>. Update in: *Cochrane Database Syst Rev*. 2006 25;(1):CD002795. <https://doi.org/10.1002/14651858.CD002795.pub2>. PMID: 11034765. <https://pubmed.ncbi.nlm.nih.gov/11034765/>.
- Yadav G, Gunturu S. Trauma-Informed Therapy. 2024 Jun 8. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2024 Jan–. PMID: 38861623. <https://pubmed.ncbi.nlm.nih.gov/38861623/>.
- Harper GW, Neubauer LC. Teaching during a pandemic: a model for trauma-informed education and administration. *Pedagogy Health Promot*. 2021;7(1):14–24. <https://doi.org/10.1177/2373379920965596>. Epub 2020 Oct 14. PMID: 33614921; PMCID: PMC7894645. <https://pubmed.ncbi.nlm.nih.gov/33614921/>.
- Brown T, Berman S, McDaniel K, Radford C, Mehta P, Potter J, Hirsh DA. Trauma-Informed Medical Education (TIME): advancing curricular content and educational context. *Acad Med*. 2021;96(5):661–7 <https://doi.org/10.1097/acm.0000000000003587>. PMID: 32675789. <https://pubmed.ncbi.nlm.nih.gov/32675789/>.
- Melton H, Meader N, Dale H, Wright K, Jones-Diette J, Temple M, Shah I, Lovell K, McMillan D, Churchill R, Barbui C, Gilbody S, Coventry P. Interventions for adults with a history of complex traumatic events: the INCITE mixed-methods systematic review. *Health Technol Assess*. 2020;24(43):1–312 <https://doi.org/10.2174/1570159X22666230927143106>. PMCID: PMC7520719. <https://pubmed.ncbi.nlm.nih.gov/32924926/>.

20. Purgato M, Gastaldon C, Papola D, van Ommeren M, Barbui C, Tol WA. Psychological therapies for the treatment of mental disorders in low- and middle-income countries affected by humanitarian crises. *Cochrane Database Syst Rev*. 2018;7(7):CD011849. <https://doi.org/10.1002/14651858>. CD011849.pub2. PMID: 29975811; PMCID: PMC6513488. <https://pubmed.ncbi.nlm.nih.gov/29975811/>.
21. Lewis C, Roberts NP, Bethell A, Robertson L, Bisson JI. Internet-based cognitive and behavioural therapies for post-traumatic stress disorder (PTSD) in adults. *Cochrane Database Syst Rev*. 2018;12(12):CD011710. <https://doi.org/10.1002/14651858>. PMCID: PMC6516951. <https://pubmed.ncbi.nlm.nih.gov/30550643/>.
22. Roberts NP, Kitchiner NJ, Kenardy J, Robertson L, Lewis C, Bisson JI. Multiple session early psychological interventions for the prevention of post-traumatic stress disorder. *Cochrane Database Syst Rev*. 2019;8(8):CD006869. <https://doi.org/10.1002/14651858>. CD006869.pub3. PMID: 31425615; PMCID: PMC6699654. <https://pubmed.ncbi.nlm.nih.gov/31425615/>.
23. Haraldstad K, Wahl A, Andenæs R, Andersen JR, Andersen MH, Beisland E, Borge CR, Engebretsen E, Eisemann M, Halvorsrud L, Hanssen TA, Haugstvedt A, Haugland T, Johansen VA, Larsen MH, Løvereide L, Løyland B, Kvarme LG, Moons P, Norekvål TM, Ribu L, Rohde GE, Urstad KH, LIVS-FORSK network. Helseth S; A systematic review of quality of life research in medicine and health sciences. *Qual Life Res*. 2019;28(10):2641–50. <https://doi.org/10.1007/s11136-019-02214-9>. Epub 2019 Jun 11. PMID: 31187410; PMCID: PMC6761255. <https://pubmed.ncbi.nlm.nih.gov/31187410/>.
24. Aaneland H, Larsen MH, Helseth S, Wahl AK. Quality Appraisal of Quality of Life Research in Children and Adolescents with Food Allergy: A Systematic Review. *Int Arch Allergy Immunol*. 2024;1. <https://doi.org/10.1159/000539113>. Epub ahead of print. PMID: 38885630. <https://pubmed.ncbi.nlm.nih.gov/38885630/>.
25. van Groenestijn AC, Kruitwagen-van Reenen ET, Visser-Meily JM, van den Berg LH, Schröder CD. Associations between psychological factors and health-related quality of life and global quality of life in patients with ALS: a systematic review. *Health Qual Life Outcomes*. 2016;14(1):107. <https://doi.org/10.1186/s12955-016-0507-6>. PMID: 27439463; PMCID: PMC4955215. <https://pubmed.ncbi.nlm.nih.gov/27439463/>.
26. Truscott A, Hayes D, Bardsley T, Choksi D, Edbrooke-Childs J. Defining young people's mental health self-care: a systematic review and co-development approach. *Eur Child Adolesc Psychiatry*. 2023. <https://doi.org/10.1007/s00787-023-02320-7>. Epub ahead of print. PMID: 37947894. <https://pubmed.ncbi.nlm.nih.gov/37947894/>.
27. Ware JE Jr, Kosinski M, Gandek B, Aaronson NK, Apolone G, Bech P, Brazier J, Bullinger M, Kaasa S, Leplège A, Prieto L, Sullivan M. The factor structure of the SF-36 health survey in 10 countries: results from the IQOLA Project. International quality of life assessment. *J Clin Epidemiol*. 1998;51(11):1159–65. [https://doi.org/10.1016/s0895-4356\(98\)00107-3](https://doi.org/10.1016/s0895-4356(98)00107-3). PMID: 9817133. <https://pubmed.ncbi.nlm.nih.gov/9817133/>.
28. Coretti S, Ruggeri M, McNamee P. The minimum clinically important difference for EQ-5D index: a critical review. *Expert Rev Pharmacoecon Outcomes Res*. 2014;14(2):221–33. <https://doi.org/10.1586/14737167.2014.894462>. PMID: 24625040. <https://pubmed.ncbi.nlm.nih.gov/24625040/>.
29. Ware J, Snowww K, Kosinski MA, et al. SF-36health survey: manual and interpretation guide. Boston, USA.: Quality Metric Inc.; 1993. https://www.researchgate.net/profile/John-Ware-6/publication/313050850_SF-36_Health_Survey_Manual_Interpretation_Guide/links/594a5b83aca2723195de5c3d/SF-36-Health-Survey-Manual-Interpretation-Guide.pdf.
30. Ware JE, Kosinski M, Keller SD. SF-36 physical and mental health summary scales: a user's manual. Boston, USA.: The Health Institute, New England Medical Center; 1994 https://www.researchgate.net/profile/John-Ware-6/publication/292390260_SF-36_Physical_and_Mental_Health_Summary_Scales_a_User's_Manual/links/5af580264585157136caee31/SF-36-Physical-and-Mental-Health-Summary-Scales-a-Users-Manual.pdf.
31. Ahmed DR, Heun R. The prevalence of psychiatric disorders among Yazidi people results from ISIS invasion and consecutive trauma: A systematic review. *Asian J Psychiatr*. 2023;88:103703. <https://doi.org/10.1016/j.ajp.2023.103703>. Epub 2023 Jul 23. PMID: 37517332. <https://pubmed.ncbi.nlm.nih.gov/37517332/>.
32. Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin*

Psychol. 2000;68(5):748–66. PMID: 11068961. <https://pubmed.ncbi.nlm.nih.gov/11068961/>.

33. Coventry PA, Meader N, Melton H, Temple M, Dale H, Wright K, Cloitre M, Karatzias T, Bisson J, Roberts NP, Brown JVE, Barbui C, Churchill R, Lovell K, McMillan D, Gilbody S. Psychological and pharmacological interventions for posttraumatic stress disorder and comorbid mental health problems following complex traumatic events: Systematic review and component network meta-analysis. *PLoS Med.* 2020;17(8):e1003262 <https://doi.org/10.1371/journal.pmed.1003262> PMID: 32813696; PMCID: PMC7446790. <https://pubmed.ncbi.nlm.nih.gov/32813696/>.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.