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Efficacy of two-step resilience-oriented intervention for veterans with a remote traumatic brain injury

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Abstract: *Researchers argue that rehabilitation interventions which cultivate resilience may potentiate the effect of standard treatment and promote the readaptation of veterans with traumatic brain injury. At the same there is a lack of such interventions. The objective of the article was to investigate the efficacy of two-step resilience-oriented intervention for veterans with traumatic brain injury in remote period. We hypothesized that, compared with patients who received standardized treatment and rehabilitation in inpatient setting, those who received standardized treatment plus TROI would report increase in resilience effectiveness and positive outcomes, as well as reduced clinical symptoms. A total of 146 veterans with traumatic brain injury were enrolled into a randomized controlled trial either into intervention group, which received two-step resilience-oriented intervention and standard treatment and rehabilitation or to control group, which received only standard treatment and rehabilitation. Psychometric measures were administered at baseline, post-treatment, and 3 months follow-up. Connor-Davidson Resilience Scale (CD-RISC), Neurobehavioral Symptom Inventory (NSI), Montreal Cognitive Assessment Scale (MoCA), Hospital Anxiety and Depression Scale (HADS), Positive and Negative Affect Scale (PANAS), Posttraumatic Stress Disorder Checklist 5 (PCL-5), Chaban Quality of Life Scale (CQLS) were used to assess the treatment effectiveness. A linear mixed effect modelling was used to model each outcome. Improvements in all outcomes at post-treatment were observed in both intervention and TAU groups. After adjusting for the baseline cognitive performance, gender, brain injury clinical type and time since last trauma, the intervention group demonstrated more favorable score on CD-RISC, MoCA, PCL-5, PANAS while demonstrating no clinically significant improvement in NSI, HADS and CQLS at both post-treatment and follow-up. Difference between groups in resilience-related outcomes like positive affect and quality of life only increased throughout time, making a good follow-up prognosis. In summary, targeting cognitive and emotional factors in a single psychological intervention improves the resilience in veterans with traumatic brain injury, making veterans more adaptable and more effective in managing both persistent clinical symptoms and comorbid post-traumatic stress. Adding such resilience-oriented program to the standard inpatient treatment and rehabilitation provides improvement in clinical outcomes and better prognoses than just following usual treatment strategies.*

Keywords: psychological resilience, rehabilitation, traumatic brain injury, veterans

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Introduction

Traumatic brain injury (TBI), especially blast-related, is relatively unique and very common event for military population (Elder, et al., 2019). While commonly considered by many clinicians to be a non-serious condition, even in case of mild TBI from 10 to 15% of patients still have symptoms years after trauma (Sivak, et al., 2015). Persistent symptoms may include problems like shakiness, headaches, dizziness, fatigue, irritability, and cognitive impairment (Elder, et al., 2019; Hebert, et al., 2018; Sivak, et al., 2015). Leading to the occurrence of its own specific clinical symptoms, TBI also reduces the adaptability of veterans and relates to higher prevalence of mental health issues like posttraumatic stress, depression, anxiety, and alcohol abuse (Greer, et al, 2020). Inappropriate stress reactions and comorbid mental health issues also affect post-concussive symptoms, worsening them (Bryant, R., 2011). Quality of life of veterans with TBI also remains poor even years after brain injury event (Merritt, et al., 2021).

A systematic review of psychological treatments for persistent TBI symptoms showed that there is limited evidence for the use of common psychoeducation and psychotherapy approaches to treat mental health conditions in veterans (Cooper, et al., 2015). Therefore, this indicates the need for additional studies and development of new approaches to the psychological treatment and rehabilitation of remote TBI in veterans.

One of perspective approaches in psychosocial interventions is to shift from addressing negative outcomes to cultivating positive phenomena, among which different authors especially single out resilience (Reid, et al., 2018; Elliott, et al., 2016). Resilience is a process that reflects the dynamic ability of a person to restore adaptive and effective psychosocial functioning and personally grow after a period of desadaptation, which occurred due to the disorganizing effect of traumatic factors (Assonov, 2021). It was shown that lower resilience of veterans is strongly associated with poorer neurobehavioral symptoms of TBI both in acute period of trauma and even 10 years after (Merritt, et al., 2022). Moreover, resilience has a robust influence on neurobehavioral functioning after TBI (Merritt, et al., 2022). Some researchers argue that rehabilitation interventions which main aim is to cultivate resilience may potentiate the effect of standard treatment and promote the readaptation of veterans with TBI (Vos, 2019; Neils-Strunjas, et al., 2017).

At the same moment, there is a lack of such interventions now despite the request for them (Bushnik, et al, 2015). Priorly, we have reviewed and analyzed a few existing resilience-oriented interventions for patients with TBI (Assonov, 2021). Despite of promising results, most of them are at the pilot trial stage. Among the limitations there were long time to complete, dominant part of psychoeducational component with little time allotted for skill building, and the absence of single theory in the intervention's core.

Based on our review of current state of knowledge about resilience in veterans with TBI and analysis of prior resilience-oriented interventions, we developed and evaluated a 6-session manualized psychological treatment, Two-step Resilience-Oriented Intervention (TROI), targeted at cultivating resilience and focused on cognitive and emotional factors of resilience. TROI consists of 2 parts (steps): Step 1, targeted at cognitive factors of resilience, and Step 2, targeted at emotional factors. These factors of resilience considered in literature among the most important (Nalder, et al., 2018; Stainton, et al., 2018; Parsons, et al., 2016). TROI also incorporated some principles and certain modified exercises of cognitive training. It was designed to be a short-term, complementary, and combined intervention, that doesn't require extensive training of a specialist in a specific psychotherapeutic modality. Previously pilot data regarding TROI was published and seemed to be promising (Assonov, 2021). However, a full-sample study with appropriate analysis is required to draw reliable conclusions.

Aim

The present study aimed to investigate the efficacy of TROI for veterans with traumatic brain injury in remote period. We hypothesized that, compared with patients who received standardized treatment and rehabilitation in inpatient set-

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ting, those who received standardized treatment plus TROI would report increase in resilience effectiveness and positive outcomes, as well as reduced clinical symptoms.

Methods

This is a two-arm parallel randomized controlled trial. Participants were recruited in Hospital for War Veterans "Forest Glade" of Ministry of Health of Ukraine and Kyiv City Clinical Hospital for War Veterans.

The study was approved by the Committee of Bioethical Expertise and Ethics of Scientific Research of Bogomolets National Medical University and all participants signed an informed consent to enter the study. It is a part of a state research program "Dynamic biopsychosocial model of medical and psychological care (diagnosis, therapy, rehabilitation, prevention) of patients of multidisciplinary hospitals in a rapidly changing crisis-associated society" (registry No. 0119U103910).

Inclusion criteria: 1) to be a veteran who participated in Anti-Terrorist Operation (ATO) / Joint Forces Operation (JFO); 2) to have a documented history of mild to moderate traumatic brain injury obtained during their deployment in ATO / JFO more than 3 years ago; 3) age 18-64 years old. Non-inclusion criteria: to misuse alcohol or drugs within six months prior to the enrollment; 2) to meet full criteria for posttraumatic stress disorder; 3) to have a diagnosis of dementia or to have a severe cognitive impairment (MMSE score <14); 4) to meet full criteria for any psychotic disorder; 5) to have a history of severe traumatic brain injury; 6) participation in other studies by the moment of enrollment.

After screening for inclusion criteria and signing informed consent, the participants underwent baseline assessment and were randomized into one of two trial arms. In the first arm (intervention group) participants received a standard inpatient treatment and rehabilitation (treatment as usual, TAU) and additionally were enrolled into a two-step resilience-oriented intervention program (TROI). In the second arm (TAU group) participants received only standard treatment and were included into the waiting list for TROI, being able to participate in the intervention after all protocol measures were done.

The TROI is a structured psychological intervention for veterans with TBI, aimed to cultivate resilience by targeting cognitive and emotional factors of resilience via psychoeducation, skill building, and creating new forms of positive behavior. The TROI consists of two parts (Step 1 and Step 2) each has 3 60-min long sessions (6 sessions in total). Every session was done individually with each participant. Step 1 is targeted at cognitive factors of resilience: executive skills, memorization, ability to focus and concentrate on important issues, planning and decision-making (sessions 1-3). Step 2 is targeted at emotional factors of resilience: stress-management skills, ability to cultivate positive emotions and to control for negative ones, ability to be optimistic and to think positively (sessions 4-6). Each session contains a psychoeducational part that describes how TBI affect different resilience factors and components, why these factors are important for effective resilience and adaptation, and a skill-building part, on which the patient is taught new forms of behavior to address resilience via cognitive and emotional factors.

Psychometric measures were administered at baseline (T1), post-treatment (T2), and 3 months follow-up (T3). To get broad information on resilience, its factors, and related outcomes, the following methods were used:

1. Connor-Davidson Resilience Scale (CD-RISC) was used to assess resilience, with total score ranges from 0 to 100 (Connor, K., & Davidson, J., 2008). Group difference of 10 or more points was defined as clinically significant. This was the primary endpoint of the study.
2. Neurobehavioral Symptom Inventory (NSI) was used to evaluate neurobehavioral symptoms (Cicerone, K., & Kalmar, K., 1995), with total score ranges from 0 to 88. Clinical significance was defined as a pre- post-treatment difference of 10 or more points.
3. Montreal Cognitive Assessment Scale (MoCA) was used to assess cognitive functioning, with total score ranges from 0 to 30,

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normal cognition is indicated by 26 or more points (Nasreddine, et al., 2005). Clinical significance was defined as a pre- post-treatment difference of 2 or more points.

4. Hospital Anxiety and Depression Scale (HADS) was used to assess depressive (HADS-D) and anxiety (HADS-A) symptoms (Zigmond, A., & Snaith, R., 1983). Subtests score ranges from 0 to 21. Clinical significance was defined as a pre- post-treatment difference of 1.5 or more points.
5. Positive and Negative Affect Scale (PANAS) was used to assess positive and negative affect. Subtests scores range from 10 to 50 (Watson, et al., 1988). Clinical significance was defined as a pre- post-treatment difference of 5 or more points.
6. Posttraumatic Stress Disorder Checklist 5 (PCL-5) was used to assess posttraumatic stress symptoms (Blevins, et al., 2015), with total score ranges from 0 to 80. Clinical significance was defined as a pre- post-treatment difference of 10 or more points.
7. Chaban Quality of Life Scale (CQLS) was used to assess quality of life (Chaban, et al., 2016), with total score ranges from 0 to 100. Clinical significance was defined as a pre-post-treatment difference of 10 or more points.

In the present study, both statistical and clinical significance was assessed. As a statistically significant was considered difference with $p < 0,05$. A Chi-square test was used to compare the frequencies between the groups. Two-sided t-tests or Mann-Whitney tests were used to check for group differences at baseline as applicable. Linear mixed-effect modeling (LMM) was used to model each outcome. Each model included a random effect of intercept for individuals and fixed effects of treatment group, visit and group*visit interaction to observe pre- post-treatment difference between groups. Each model was also adjusted for the baseline cognitive performance (presented as a dichotomous variable indicating normal/impaired cognition), gender, TBI clinical type, and time since the last trauma. The model predicting change in MoCA total score did not include baseline cognitive performance due to the inclusion of this data in the dependent variable. Additionally, Hedges g effect sizes of the group differences in change scores were also calculated separately from LMM with $g<0.2$ interpreted as a trivial effect, 0.2-0.5 as a small effect, 0.5-0.8 as a moderate effect, and > 0.8 as large effect. All data were stored in Microsoft Excel 365 and analyzed in statistics EzR v1.54. Data visualization was done by using a python programming language with seaborn, pandas, numpy, and matplotlib extensions.

Results

One hundred forty-six veterans participated in the study after providing written informed consent. There were no significant differences between the intervention group and the TAU group at baseline (see **Table 1**).

After baseline assessment patients were randomized into intervention group or TAU group and received appropriate treatment. The groups didn't differ significantly in the duration of inpatient treatment (18 [16-19] days for intervention group, 18 [16.75-24] for TAU, $p > 0.05$). Means and standard deviations for outcome measures at T2 and T3 with t-tests presented in **Table 2**.

Improvements in all outcomes at post-treatment were observed in both intervention and TAU groups. However, intervention group showed more favorable outcomes.

There was also a difference between groups in the outcomes at follow-up assessment. Participants in both TAU group and intervention group had improvements in resilience-related outcomes at the end of inpatient treatment (T2), but participants in TAU group had some sort of reduction up to 3 months post-discharge (T3), while participants in intervention group show further improvements or stable outcomes even after 3 months (**Figure 1**).

Both intervention group and TAU group participants had improvements in clinical outcomes at the end of inpatient treatment and almost all outcomes remained stable or further improved after 3 months. Both groups presented a slight reduction in MoCA scores at follow-up. After 3 months, the intervention group still had better outcomes than the TAU group (**Figure 2**).

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	Overall	Intervention Group (n=70)	Treatment As Usual Group (n=76)	t/W/ χ^2	p
Demographic					
Age (years)	46.03 ± 8.59	46.14 ± 8.28	45.93 ± 8.92	-0.14	0.884
Gender:					
Male	141 (96.58%)	68 (97.1%)	73 (96.0%)	0.13	0.717
Female	5 (3.42%)	2 (2.9%)	3 (3.9%)		
Education (years)	14 [12-16]	14.25 ± 2.96	13.78 ± 3.22	-0.90	0.364
Marital status:					
Married	83 (56.85%)	43 (61.4%)	40 (52.6%)	1.14	0.284
Single	63 (43.15%)	27 (38.6%)	36 (47.4%)		
Time spent in the warfare zone (years)	1 [1-3]	1 [1-3]	1 [1-3]	2723	0.788
Injury Severity:					
Concussion	83 (56.85%)	39 (55.7%)	44 (57.9%)	0.07	0.79
Mild Cerebral Contusion	63 (43.15%)	31 (44.3%)	32 (42.1%)		
TBI number	1 [1-1]	1 [1-1]	1 [1-1]	2730.5	0.665
Time since TBI (years)	6 [5-6]	6 [5-6]	6 [5-6.25]	2635.5	0.923
Clinical					
CD-RISC	62.17 ± 13.08	62.91 ± 12.76	61.5 ± 13.43	-0.65	0.516
MoCA	22.65 ± 3.39	22.77 ± 3.31	22.54 ± 3.48	-0.41	0.681
<26 points cutoff	118 (80.8%)	57 (81.4%)	61 (80.3%)	0.03	0.858
≥26 points cutoff	28 (19.17%)	13 (18.6%)	15 (19.7%)		
NSI	42.72 ± 14.53	43.36 ± 13.69	42.13 ± 15.33	-0.50	0.612
HADS-A	10.45 ± 4.11	10.77 ± 4.02	10.16 ± 4.19	-0.90	0.369
HADS-D	8.38 ± 3.19	8.57 ± 3.06	8.19 ± 3.33	-0.70	0.482
PCL-5	37.95 ± 15.62	37.59 ± 16.08	38.29 ± 15.29	0.27	0.787
PANAS+	25.87 ± 5.01	25.68 ± 5.52	26.05 ± 4.54	0.40	0.685
PANAS-	30.15 ± 9.43	31.20 ± 10.13	29.20 ± 8.73	-1.18	0.239
CQLS	46.78 ± 13.08	48.51 ± 11.38	45.18 ± 14.36	-1.54	0.125

Table 1. Baseline (T1) demographic and clinical data.

After adjusting for the baseline cognitive performance, gender, TBI clinical type, and time since the last trauma, the intervention group demonstrated a significantly higher change from baseline in resilience, positive affect, and cognitive performance over time, as well as a significantly higher decrease in neurobehavioral symptoms of TBI, anxiety and depression level, posttraumatic stress, and negative affect, while demonstrating no statistically significant increase in quality of life (**Table 3**).

At the same time, while reaching statistical significance, not all differences may be considered clinically meaningful. The primary outcome, CD-RISC score, achieved a clinically significant difference in change from baseline (with large positive effect), as well as MoCA (with large positive effect), PCL-5 (with large positive effect), PANAS positive (with huge positive effect size) and negative (with moderate positive effect) subscales. NSI score, being statistically significant, hasn't achieved a clinically significant difference (point

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	Post-treatment (T2)				Follow-up (T3)			
	Inter-vention Group (n=70)	**TAU Group (n=76)**	**t**	**p**	**Inter-vention Group (n=64)**	**TAU Group (n=71)**	**t**	**p**
CD-RISC	78,17 ± 12,08	63,72 ± 12,75	-7,01	<0,001	77.04 ± 12.39	62.85 ± 14.16	-6.17	<0,000
MoCA	27,41 ± 1,99	24,51 ± 2,85	-7.06	<0,001	26.64 ± 2.20	24.01 ± 2.19	-6.93	<0,000
NSI	26,27 ± 9,46	32,09 ± 11,69	3.29	0.001	25.60 ± 10.91	30.47 ± 13.42	2.29	0.023
HADS-A	6,46 ± 3,57	7,08 ± 2,97	1.14	0.252	7.06 ± 2.12	7.28 ± 2.68	0.52	0.602
HADS-D	6,17 ± 2,82	6,75 ± 3,05	1.18	0.237	6.20 ± 2.78	6.12 ± 2.81	-0.158	0.875
PCL-5	17,70 ± 11,49	29,14 ± 12,58	5.72	<0,001	16.98 ± 10.40	27.56 ± 13.25	5.11	<0,000
PANAS+	34,36 ± 5,74	25,89 ± 5,15	-8.66	<0,001	34.81 ± 7.99	25.70 ± 8.22	-5.95	<0,000
PANAS-	18.94 ± 7.19	22.16 ± 7.46	2.44	0.016	18.39 ± 5.81	23.08 ± 7.41	3.70	0.000
CQLS	61,13 ± 17,66	56,53 ± 14,27	-1.73	0.084	65.57 ± 17.43	54.15 ± 18.62	3.66	0.000

Table 2. Means (SD) for variables with t-tests across assessment on post-treatment and follow-up outcome measurements for the groups

	Intervention group – TAU group difference in change from T1 to T2							
	Difference	**2.5%**	**97.5%**	**Standard error**	**df**	**t**	**ES (g)**	**p**
CD-RISC	13.03	9.46	17.02	1.82	277.60	7.12	1,11	<0,001
MoCA	2.66	1.81	3.52	0.43	277.23	6.09	0,92	<0,001
NSI	-7.04	-10.25	-3.83	1.64	277.43	-4.29	-0,66	<0,001
HADS-A	-1.23	-2.31	-0.15	0.55	277.57	-2.22	-0,33	0.026
HADS-D	-0.95	-1.80	-0.10	0.43	277.33	-2.18	-0,34	0.029
PCL-5	-10.74	-14.42	-7.05	1.88	277.55	-5.69	-0,84	<0,001
PANAS+	8.83	6.65	11.00	1.11	233.68	7.92	1,90	<0,001
PANAS-	-5.22	-8.15	-2.29	1.50	236.66	-3.47	-0,61	<0,001
CQLS	1.27	-3.37	5.91	2.38	277.47	0.53	0,09	0. 593

Table 3. Baseline to post-treatment outcome measurement differences for groups (LMM)

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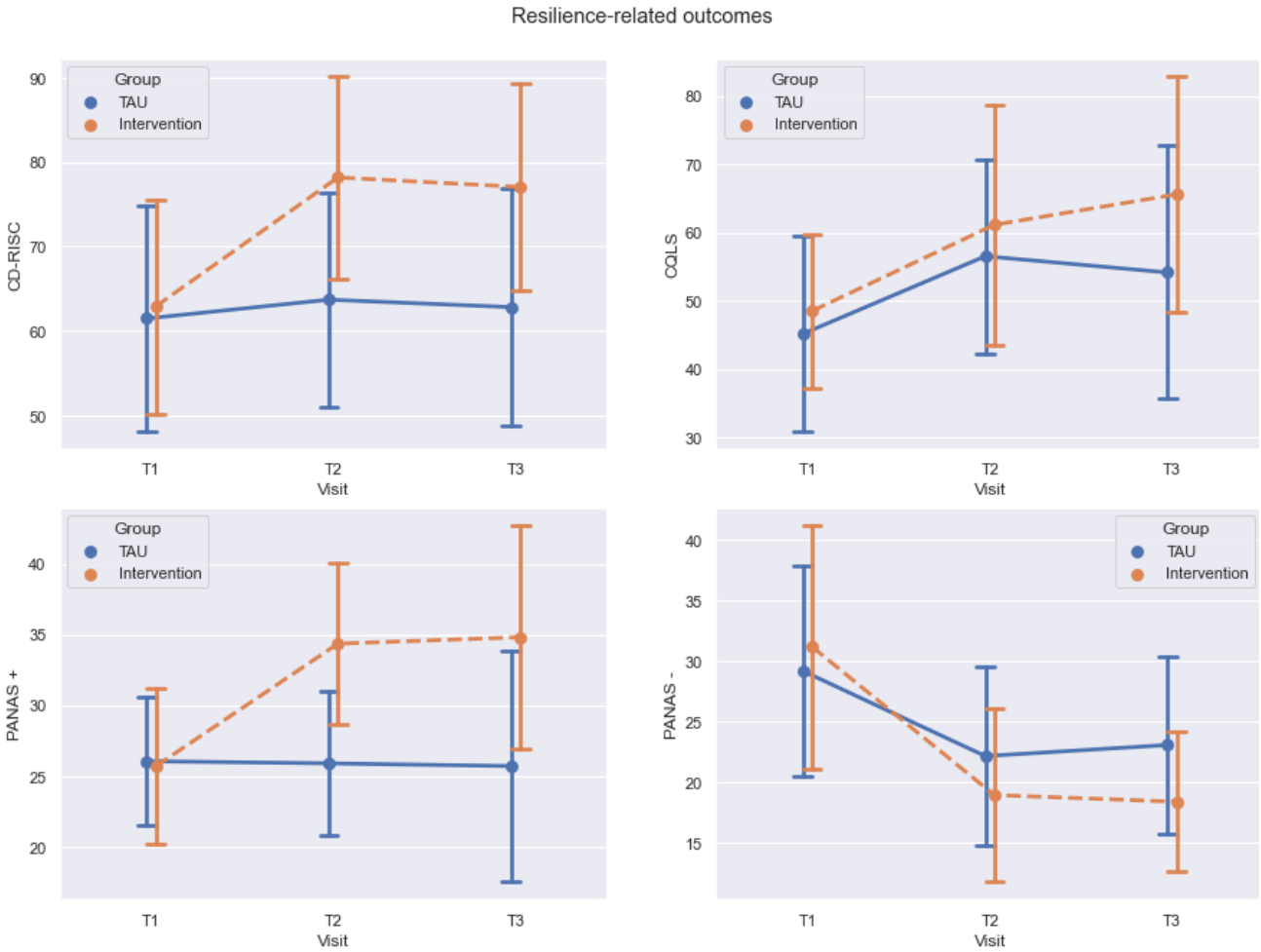

Figure 1. Resilience-oriented outcomes. Mean scores of CD-RISC, CQLS and PANAS scales at Baseline (T1), Post-treatment (T2), Follow-up (T3). Bounds on the estimates correspond to standard deviations.

estimation hasn't reached a defined threshold), as well as HADS-A and HADS-D scores (both haven't reached the defined threshold and for both effects size is small). CQLS hasn't achieved nor statistical, or clinically significant difference.

Participants in the intervention group demonstrated a significantly better change from baseline in CD-RISC, MoCA, NSI, PCL-5, PANAS positive and negative subscales, and CQLS, while demonstrating no statistically significant difference in HADS-A and HADS-D scores at 3-month follow-up as well (**Table 4**).

Difference between groups in CD-RISC change from baseline remained clinically significant. At 3 months follow-up difference in change from baseline in MoCA, NSI, HADS-A, HADS-D, and PCL-5 was not so high, as at T2, with MoCA and PCL-5 remaining clinically significant. Opposite, the difference in change from baseline to follow-up between the intervention and TAU groups on both PANAS subscales and CQLS was even higher 3 months post-discharge than right after the treatment (yet the difference on CQLS still didn't reach clinical significance).

Discussion

The remote period of TBI remains an important topic in the clinical neuroscience field, and scientists support the opinion that biological factors cannot account for persistent psychological symptoms of TBI by themselves (Young, G., 2020). Psychological factors can exaggerate clinical symptoms therefore they need to be addressed in assessment and treatment as well (Young, G., 2020). Good psychological resilience is a predictor of better neurobehavioral outcomes; therefore, different researchers propose to address it

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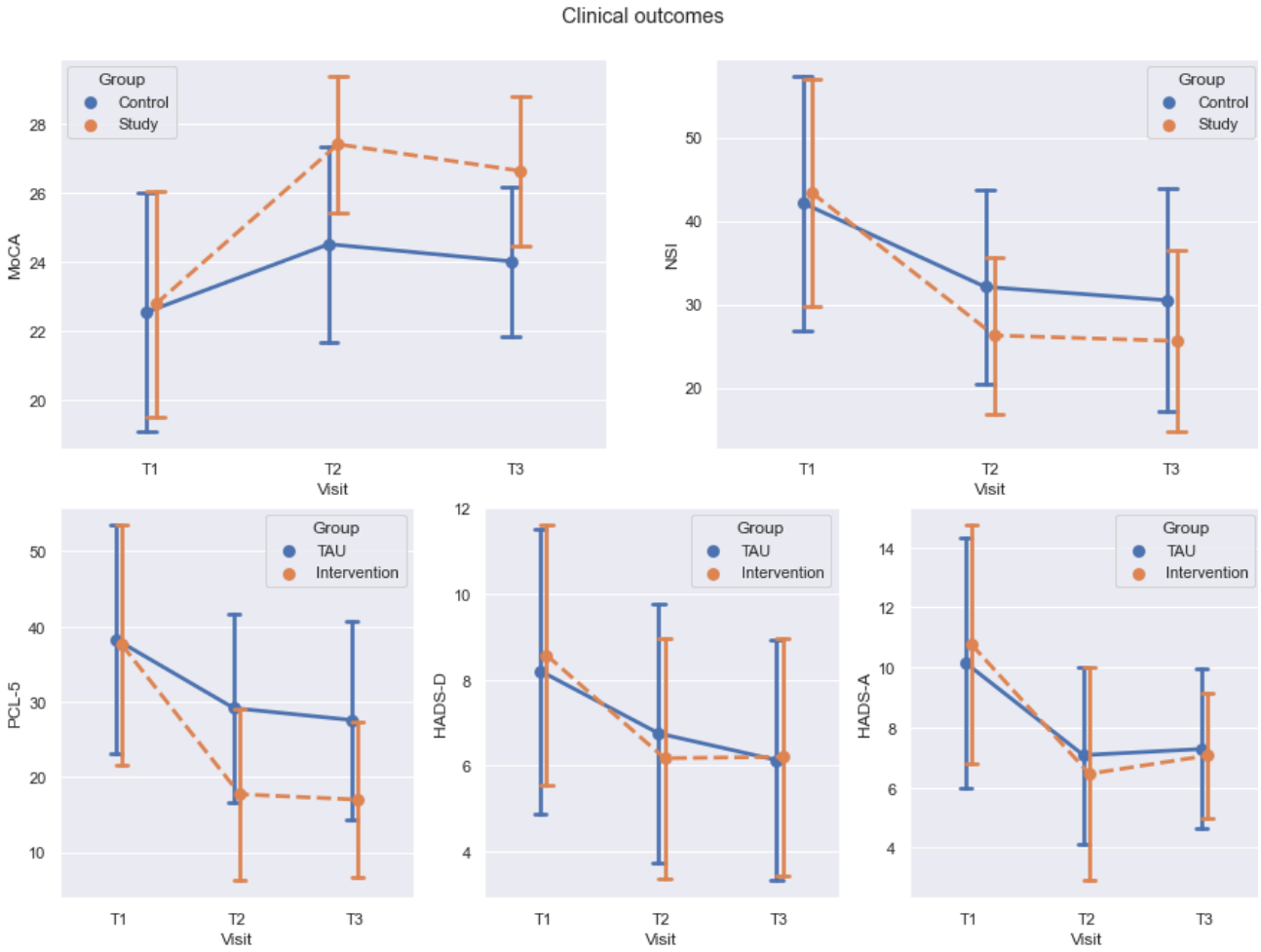

Figure 2. Clinical outcomes. Mean scores of MoCA, NSI, PCL-5, HADS-A, HADS-D scales at Baseline (T1), Post-treatment (T2), and Follow-up (T3). Bounds on the estimates correspond to standard deviations..

Table 4. Baseline to follow-up outcome measurement differences for groups (LMM)

	Intervention group – TAU group difference in change from T1 to T3							
	Difference	**2.5%**	**97.5%**	**Standard error**	**df**	**t**	**ES (g)**	**p**
CD-RISC	13.35	9.67	17.02	1.88	279.87	7.10	1,41	<0,001
MoCA	2.30	1.43	3.19	0.45	279.91	5.13	0,69	<0,001
NSI	-6.40	-9.70	-3.10	1.68	279.19	-3.79	-0,55	<0,001
HADS-A	-0.85	-1.96	0.260	0.56	280.54	-1.49	-0,18	0.136
HADS-D	-0.48	-1.35	0.39	0.44	279.52	-1.07	-0,16	0.284
PCL-5	-10.54	-14.32	-6.74	1.93	279.72	-5.43	-0,76	<0,001
PANAS+	9.58	7.34	11.82	1.15	236.73	8.33	1,29	<0,001
PANAS-	-6.36	-9.38	-3.34	1.55	236.66	-3.47	-0,66	<0,001
CQLS	7.99	3.22	12.78	2.44	279.83	3.26	0,46	0,001

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in routine assessment and targeted interventions for patients with TBI (Lange, et al., 2022; Rapport, et al., 2020). It is also connected with decreased recovery time after trauma (Ernst, et al., 2021). Another well-known issue for veterans with TBI is the presence of subclinical post-traumatic stress signs, which do not meet the full criteria for the diagnosis of posttraumatic stress disorder (PTSD) but negatively affect recovery (Korte et al., 2016). Posttraumatic stress severity in veterans with TBI also negatively correlates with good resilience (Elliott, et al., 2016). These findings support the idea that resilience-oriented interventions may be a positive complement to standard treatment and rehabilitation for veterans with brain trauma.

The present randomized controlled trial assessed how adding TROI to standard rehabilitation increased the resilience of veterans with remote TBI. Both TAU and TROI+TAU resulted in clinically significant reductions in neurobehavioral symptoms of TBI, anxiety and depression symptoms, posttraumatic stress, negative affect, as well as improvements in resilience, cognitive performance, and positive affect, and quality of life. However, targeting both cognitive and emotional factors of resilience by TROI resulted in clinically significant improvement in resilience, cognitive functioning, and positive affect as well as in clinically significant reductions in post-traumatic stress symptoms and negative affect compared to treatment as usual. While didn't reach the pre-defined threshold of clinical significance, there was a moderate difference in change from baseline between the groups on neurobehavioral symptoms. Adding TROI to the standard inpatient treatment did not show differential clinical benefit to anxiety and depression symptoms, as well as the quality of life despite statistically significant changes in anxiety and depression symptoms.

Therefore, the results of the study give some assurance that TROI was not harmful to patients and did not diminish the impact of standard inpatient treatment and rehabilitation on clinical symptoms in veterans with TBI. Moreover, targeting cognitive factors like the ability to concentrate and focus on goals, prospective memory, flexibility in reaching the goals, problem-solving skills; and emotional factors like stress-management skills, ability to raise positive emotions as well as manage negative ones, ability to be optimistic and think positive in a single psychological intervention improves the resilience in veterans with traumatic brain injury. Adding TROI helps to significantly improve mental health outcomes and cognitive performance of veterans with remote TBI. What is also promising, is that resilience-related outcomes like positive affect and quality of life only increased throughout time, making a good follow-up prognosis.

Further studies may be done to determine whether the effects of TROI will persist after 6 and 12 months. Another question to study is whether the intervention can be effective for veterans with recent traumas, more severe TBIs, non-veteran and non-TBI populations and as a group intervention rather than the individual.

Conclusions

In summary, targeting cognitive and emotional factors in a single psychological intervention improves the resilience of veterans with traumatic brain injury, making veterans more adaptable and more effective in managing both persistent clinical symptoms and comorbid post-traumatic stress. Adding such a resilience-oriented program to the standard inpatient treatment and rehabilitation provides an improvement in clinical outcomes and better prognoses than just following usual treatment strategies. Therefore, implementing a resilience-oriented interventions that targets cognitive and emotional factors of resilience in treatment programs promotes faster recovery from TBI and better functioning after discharge from the hospital.

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Conflict of interest

The author declares no conflict of interest.

Consent to publication

The author has read and approved the final version of the manuscript. The author consents to the publication of the present article in "Ukrainian Scientific Medical Youth Journal" in accordance with the terms of the license agreement.

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of article

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Ефективність двохетапної програми психокорекції резилієнсу ветеранів війни з черепно-мозковою травмою у віддаленому періоді

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Анотація: Дослідники стверджують, що програми психокорекції, які розвивають резилієнс, можуть посилювати ефект стандартного лікування та сприяти реадаптації ветеранів із черепно-мозковою травмою. Водночас таких програм наразі небагато. Мета статті – оцінити ефективність розробленої нами двохетапної програми психокорекції резилієнсу ветеранів війни із черепно-мозковою травмою у віддаленому періоді. Ми припустили, що, порівняно з пацієнтами, які отримували стандартне лікування та реабілітацію в стаціонарних умовах, ті, хто отримував стандартне лікування й був залучений до розробленої програми психокорекції, повідомлятимуть про кращий резилієнс та покращення клінічних симптомів. Загалом 146 ветеранів з черепно-мозковою травмою взяли участь в рандомізованому контрольованому дослідженні та були розподілені або до групи дослідження, яка отримувала двохетапну програму психокорекції резилієнсу і стандартне лікування та реабілітацію, або до групи порівняння, яка отримувала лише стандартне лікування та реабілітацію. Психодіагностичне обстеження

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проводилося тричі: перед рандомізацією, після проведеного лікування та через 3 місяці. Для оцінки ефективності лікування були використані шкала резилієнсу Коннор-Девідсона (CD-RISC), опитувальник нейроповедінкових симптомів (NSI), Монреальська шкала когнітивної оцінки (MoCA), госпітальна шкала тривоги та депресії (HADS), шкала позитивного та негативного афекту (PANAS), опитувальник симптомів посттравматичного стресового розладу (PCL-5), шкала оцінки рівня якості життя (CQLS). Порівняння груп було виконано із використанням моделей лінійної регресії зі змішаними ефектами. Покращення всіх результатів після проведеного лікування та психокорекції спостерігалося як у групі дослідження, так і в групі порівняння. Після поправки на вихідний рівень когнітивного функціонування, стать, клінічну форму черепно-мозкової травми і час з моменту останньої травми група дослідження продемонструвала кращі показники за CD-RISC, MoCA, PCL-5, PANAS, але не продемонструвала клінічно значущого покращення за NSI, HADS і CQLS як одразу після проведеного лікування та психокорекції, так і через 3 місяці. Різниця між групами в результатах, пов›язаних з резилієнсом (таких як позитивний афект та якість життя) тільки збільшувалася з часом, що свідчить про сприятливий прогноз. Таким чином, одночасний вплив на когнітивні та емоційні фактори резилієнсу в одній програмі психокорекції покращує резилієнс ветеранів війни з черепно-мозковою травмою, роблячи ветеранів більш адаптованими та ефективними в менеджменті як стійких клінічних симптомів, так і супутнього посттравматичного стресу. Доповнення стандартного стаціонарного лікування та реабілітації розробленою програмою психокорекції забезпечує покращення клінічних результатів та більш сприятливі прогнози, ніж лише дотримання стандартних стратегій лікування.

Ключові слова: ветерани, втручання, психологічний резилієнс, реабілітація, черепно-мозкова травма