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Modified acceptance and commitment psychotherapy in in complex treatment of comorbidity of post-traumatic stress disorder and mild traumatic brain injury

O. Ye. Smashna
I. Gorbachevskiy Ternopil National Medical University

The objective: **approbation of the effectiveness of modified Acceptance and Commitment Therapy in a complex treatment of patients with comorbidity of posttraumatic stress disorder (PTSD) and mild traumatic brain injury (mTBI).**
Materials and methods**. 329 veterans from three clinical groups: individuals with PTSD (n=109), with mild TBI (n=112) and with comorbid PTSD + TBI (n=108), underwent a course of combined therapy lasting 8 weeks: in addition to standard therapy, they received psychotherapeutic intervention (psychoeducation with elements of motivational interviewing and acceptance and commitment therapy for PTSD) and transcranial direct current stimulation (tDCS).**
The evaluation of the effectiveness of the treatment, in addition to a comprehensive psychodiagnostic examination before and after the therapy, included the Quality of Life Assessment Scale (O. Chaban).
Results**. Based on the obtained data, we can assume that representatives of the PTSD group, who initially evaluated the quality of social aspects of their lives more negatively, after the therapy looked more positively at the emotionally colored spheres of life (sex and mood). At the same time, after the therapy, the feeling of satisfaction with life was more positively assessed by those patients who were more satisfied with their life conditions before the therapy, and a higher assessment of the quality of life after the therapy was observed in those patients who, even before the therapy, had a higher level of satisfaction with your sex life.**
Summarizing the obtained data, it can be asserted that as a result of the therapy, the best results in the direction of increasing self-esteem of the quality of life were achieved precisely in relation to patients with PTSD/TBI.
Conclusions**. Complex treatment of patients with comorbid PTSD and TBI using modified acceptance and Acceptance and Commitment Therapy in combination of standard treatment and tDCS is a promising individual treatment methodology in this patient population.**
Keywords: *post-traumatic stress disorder, traumatic brain injury, social functioning, acceptance and responsibility therapy.*

Модифікована психотерапія прийняття та зобов'язання в комплексному лікуванні коморбідності посттравматичного стресового розладу та легкої черепно-мозкової травми

О. Є. Смашна

Мета дослідження: апробація ефективності модифікованої психотерапії прийняття та зобов'язання у комплексному лікуванні пацієнтів з коморбідністю посттравматичного стресового розладу (ПТСР) та легкої черепно-мозкової травми (ЛЧМТ).
Матеріали та методи. У дослідженні взяли участь 329 учасників бойових дій, які були демобілізовані, з трьох клінічних груп: особи з ПТСР (n=109), з ЛЧМТ (n=112) та з коморбідним ПТСР+ЛЧМТ (n=108). Вони пройшли курс комбінованої терапії тривалістю 8 тиж: крім стандартної терапії згідно з протоколом лікування пацієнти отримали психотерапевтичне втручання (психоосвіта з елементами мотиваційного інтерв'ю і терапії прийняття та зобов'язання для ПТСР) та транскраніальну електричну стимуляцію постійним струмом (Transcranial direct current stimulation (tDCS). Оцінка ефективності проведеного лікування окрім розгорнутого психодіагностичного обстеження до і після проведеної терапії включала Шкалу оцінки рівня якості життя (О. Чабан).
Результати. Представники групи ПТСР, які від початку більш негативно оцінювали якість соціальних аспектів свого життя, після проведеної терапії більш позитивно дивилися на емоційно-забарвлені сфери життя (секс та настрій). Водночас після проведеної терапії більш позитивно оцінювали відчуття задоволення від життя ті пацієнти, які ще до терапії були більш задоволені умовами життя, а більш висока оцінка якості життя після терапії спостерігалася у тих пацієнтів, у яких ще до її проведення фіксували більш високий рівень задоволення від свого сексуального життя.
У результаті проведеної терапії найкращі результати в напрямку підвищення оцінки якості життя були досягнені саме щодо пацієнтів із ПТСР+ЛЧМТ.
Висновки. Узагальнюючи отримані дані, можна стверджувати, що комплексне лікування пацієнтів з коморбідними ПТСР та ЛЧМТ із застосуванням модифікованої терапії прийняття та зобов'язання разом із стандартним протокольним лікуванням та tDCS є ефективним методом індивідуального лікування у цій популяції пацієнтів.
Ключові слова: *посттравматичний стресовий розлад, черепно-мозкова травма, соціальне функціонування, терапія прийняття та відповідальності.*

A feature of modern wars is an increase in the number of injured persons with mine-explosive injuries, as a result of which there is a significant number of veterans with complex comorbid pathology – a combination of PTSD and mTBI. Data from the US Veterans Health Administration national database indicate more frequent visits to a psychotherapist and completion of at least 8 sessions by veterans with a combination of psychiatric disorders and TBI compared to individuals without a history of TBI. Moreover, comorbidity of PTSD and TBI itself, but not depression or anxiety, was associated with more visits to a psychotherapist. PTSD, anxiety, depression, and a history of TBI were also associated with more visits after which psychotropic medication was prescribed. Also, a history of TBI is associated with greater use of mental health services, regardless of psychiatric diagnoses [1].

Objective and subjective barriers to veterans' access to treatment/rehabilitation, combined with difficulties associated with the creation of a comprehensive treatment team of specialists, make it difficult to provide effective scientifically based care for PTSD, TBI and related mental illnesses in military personnel [2, 3]. Veterans with a history of TBI may falsely attribute their symptoms to the head injury they experienced rather than symptoms of an underlying psychiatric disorder. However, a lot of current scientific evidence indicates that long-term symptoms of mild TBI (>12 months) are primarily related to psychiatric factors, such as a premorbid diagnosis of mental disorder or acquired comorbidity with a mental disorder, and not just to head injury [4–7].

Veterans with PTSD often have significant interpersonal problems and low levels of social support from family, partners, and peers, leading to problems with social reintegration [8]. For example, Operation Iraqi Freedom/Operation Enduring Freedom Veterans [9, 10] reported a fourfold increase in interpersonal conflict within six months after returning from deployment [11]. Importantly, veterans' low level of availability and receptivity to social support is also associated with suicidal ideation and self-destructive behavior. PTSD veterans have higher suicide rates than the general population [12], indicating the importance of interventions to reduce social isolation among these veterans.

Avoidance of social contact among people with PTSD can be conceptualized as empirical avoidance within the framework of psychological flexibility theory [13, 14]. This theory posits that avoiding experiences interferes with living a life that is consistent with one's values [15], which mostly includes maintaining relationships with family, partners, friends, and others [16]. Accordingly, avoiding the experience of such a life over time leads to a further decrease in social support. In a study of 145 veterans who served in the Iraq and Afghanistan conflicts, experiential avoidance was found to be a significant mediator between PTSD symptoms and veterans' social support [17]. There is also evidence that social support (and, conversely, social problems) influenced PTSD treatment outcomes with the help of cognitive psychotherapy [18, 19].

Acceptance and Commitment Therapy (ACT) is a cognitive-behavioral approach of third-wave psychotherapy aimed at increasing psychological flexibility as a means of reducing distress. It is a transdiagnostic model that has proven effective in overcoming complex and multifactorial difficulties faced by persons with mental disorders, in particular PTSD [20]. Although ACT has been applied to a wide range of problems, it is well suited to trauma treatment because its processes are specifically designed to reduce experiential avoidance. In addition, the high rates of patients' non-completion of psychotherapeutic brief interventions and the high drop-out rate of exposure therapy, which has been considered the main empirically supported intervention for the treatment of PTSD, have called for the development of alternative interventions [21–23].

Empirical research evidence has shown that ACT is an effective therapeutic approach for PTSD veterans with social difficulties [24–30]. In a number of scientific works, the effectiveness of ACT intervention to facilitate psychological adaptation and reduce psychological distress after TBI [31–34], including comorbidity with PTSD, has been proven.

The theory of the relational framework or the theory of verbal behavior [35] is considered to be the theoretical basis of ACT, so ACT theorists claim that avoidance of experience partly originates from the verbal behavior of a person. Language, and in particular self-talk, can play a critical role in mitigating the distress caused directly by a traumatic event, because aversive (harmful, destructive) experiences are described, categorized, and evaluated by our psyche, and the bidirectional nature of human language makes this process automatically aversive. Evaluation of the traumatic event as uncontrollable, unpredictable, and objectively dangerous determines the subsequent reaction to the traumatic event – people often feel the need to explain unusual, unwanted, or unexpected events and make cause-and-effect attributions after the trauma, but become entangled in self-explanations.

Some of the key forms of verbal confusion are covered by the acronym FEAR – fusion, evaluation, avoidance, and reason-giving. Cognitive fusion refers to the process in which the behavior-regulating verbal/cognitive stimuli dominate over other sources of behavioral influence. In this case, a person can take his thinking literally as truth and react to his/her constructions of the world as if they were a realistic world.

It is acceptance and commitment/responsibility therapy through the development of psychological flexibility that allows the veterans to begin to accept their problems and difficulties, and then commit to making the necessary changes in their own behavior, regardless of what may be happening in their life, and regardless of their attitude to these events.

Therefore, new approaches to the organization of treatment with special emphasis on evidence-based psychotherapeutic interventions for veterans with PTSD and TBI are needed to improve their quality of life, resocialization, and societal reintegration.

The objective: approbation of the effectiveness of modified Acceptance and Commitment Therapy in a complex treatment of patients with comorbidity of PTSD and mTBI.

MATERIALS AND METHODS

We investigated 329 veterans from three clinical groups, namely: individuals with PTSD (n=109), with mild TBI (n=112), and with a comorbid condition of PTSD+TBI (n=108), after providing prior informed consent to participate in the study underwent a course of combined therapy, namely: in addition to standard ther-

apy in accordance with the Unified Protocols for PTSD and mTBI, they received psychotherapeutic intervention (a combination of psychoeducation with elements of motivational interviewing and Acceptance and Commitment Therapy for PTSD, and transcranial direct current electrical stimulation (tDCS). The duration of treatment was 8 weeks: 10 tDCS sessions daily and 8 weekly psychotherapy sessions lasting 45–60 minutes 1–2 times a week.

The assessment of the effectiveness of the treatment, in addition to a comprehensive psychodiagnostic examination before and after the therapy, also included the study of various aspects of the quality of life according to the Quality of Life Rating Scale (O. Chaban). Patients filled out a self-questionnaire with questions about their physical condition, mood, leisure time, intimate relationships, sexual, daily, social activity, financial well-being, living conditions, and assessed their overall level of life satisfaction. The minimum number of points is 0, the maximum is 100.

Classical ACT emphasizes the following components [36]:

1. Identification of problems of social communication avoidance: participants identify efforts to avoid interpersonal experiences. The discussion focuses on how and to what extent avoidance is problematic for the development and maintenance of relationships.

2. Avoidance triggers: Negative thoughts and emotions that lead to poor functioning and poor quality of life (eg, rejection anxiety, inability to trust others, anger, feelings of inferiority) are identified, and veterans practice acceptance and mindfulness to manage these experiences.

3. Acceptance: Veterans are encouraged to consciously accept, rather than avoid, interpersonal situations that cause anxiety.

4. Mindfulness: Participants engage in mindfulness exercises to practice nonjudgmental awareness of their thoughts about others and negative emotions (such as being aware of anger).

5. Self-compassion: Veterans are encouraged to look at themselves with more compassion and practice self-compassion exercises (such as seeing themselves as a child in need of compassion).

6. A Life of Value: Participants explain their values and goals (e.g., building relationships, achieving at work, participating in the community) and identify barriers that prevent them from achieving their life goals.

7. Readiness Exercises (Exposure): Participants develop hierarchies for interpersonal triggers and avoidance of social experiences and practice mindful acceptance during planned readiness exercises.

8. Cognitive Diffusion: Participants learn that these are not their anxieties or fears, and they carefully observe and accept these internal experiences.

9. Purposeful Action: Participants identify life goals and engage in activities to improve social functioning, quality of life, and social reintegration, while committing to achieving valued goals.

A structured study by M. M. Kelly *et al.* The effectiveness of a 12-week course of ACT therapy and POP (personally oriented psychotherapy) were shown to a group of 40 pre-selected veterans. It also revealed that PTSD was associated with a number of interpersonal problems, including sensitivity to rejection, low self-esteem, and distrust of others. In this regard, classic traditional ACT strategies aimed at poor social functioning were supplemented.

For example, adaptation includes:

1) acceptance and mindfulness exercises regarding fear of being rejected by others, threatened by others, feelings of inadequacy and mistrust of others;

2) identifying how social avoidance associated with PTSD symptoms negatively affects social functioning, with preparedness (exposure) exercises specifically focused on reducing social avoidance and increasing community participation;

3) inclusion of exercises for active social interaction with others (a new socially oriented goal each week).

Second, the researchers also included self-compassion exercises and a focus on forgiveness of self and others to reduce the negative focus on low self-esteem as a reason to avoid others.

Third, material on how to build healthy relationships was included, including specific interpersonal skills (e.g., being present, supporting the other person, being empathetic, sharing valuable experiences, and practicing connection).

Fourth, anger management content was included in a manner consistent with ACT, as anger is a key emotional barrier to developing and managing healthy relationships. Veterans practiced being more mindful of anger and choosing their actions based on their values rather than anger itself.

Finally, content was included about trust in relationships, which is a major barrier to healthy communication with others. The ACT treatment description and case study by Kelly *et al.* provide more detail on this treatment approach [36].

Our participants received 8 weekly 50-minute individ/ual ACT consultations in a modified author's version based on the prototypes described above. Session 1 was devoted to explaining the rationale for treatment and identifying interpersonal triggers. Sessions 2–4 focused on mindfulness, cognitive distress, and acceptance of PTSD symptoms, anxiety about interacting with others, and acceptance of other negative thoughts and emotions. Sessions 5 and 6 focused on self-compassion, relating to others, values, anger, and forgiveness, with a strong emphasis on committed action and the social anxiety and avoidance hierarchies of influence. During the termination phase (Sessions 7 and 8), therapy focused on ending treatment, planning for the future, and reviewing progress and successes in therapy.

All studies of this scientific work meet the requirements and principles of bioethics. When performing the work, safety rules for patients were observed, rights and canons of human dignity were preserved, moral and ethical norms in accordance with the main provisions of GSP (1996), Council of Europe Convention on Human Rights and Biomedicine (on April 04, 1997), Helsinki Declaration of the World Medical association on the ethical principles of scientific medical research with human participation (1964–2000).

The obtained results were analyzed using the method of descriptive statistics, W-test of Wilcoxon, as well as correlation analysis.

RESEARCH RESULTS AND THEIR DISCUSSION

Preliminary results from this study showed that although the use of ACT led to improvements in overall quality of life, it was associated with improvements in the quality of social relationships, likely because this is a direct target of this intervention. The ACT intervention focused on developing a long-term plan to improve social relationships, which may have helped veterans maintain their social relationships after treatment. In addition, this result was confirmed by increased participation in social and recreational activities at the end of treatment.

The effectiveness of the complex intervention was indicated by the dynamics of assessment of the quality of life according to the «Quality of Life Assessment Scale» method by patients of all clinical groups before and after the course of therapy, the indicators of which were analyzed using the Wilcoxon test for two dependent samples (tables 1–3).

According to the results of the analysis, it was found that the quality of life of the representatives of the PTSD group as a result of the therapy significantly ($p \leq 0.0432$) increased according to all the investigated criteria of this phenomenon, except for the quality of physical condition ($p=0.0539$) and the quality of living conditions ($p=0.0512$).

According to the results of the analysis of the results of the Wilcoxon test of the «Quality of Life Assessment Scale» method in patients with TBI before and after the therapy (Table 2), it was established that, as in the respondents of the PTSD group, self-assessment of the quality of life also increased after therapy ($p \leq 0.02053$), but only in six out of ten spheres, and there was no improvement in the spheres of daily activity, living conditions, sexual and financial spheres ($p \geq 0.05205$).

The analysis of the results of the «Quality of Life Assessment Scale» method, obtained during the examination of the respondents of the comorbid condition of PTSD+TBI

Table 1

The results of the Wilcoxon test comparing the indicators of the «Quality of Life Assessment Scale» method during the first (1) and re-examination (2) of respondents of the PTSD group

Scale	Ranks	Average rank	Sum of ranks	Number of cases	Comparison	Z	p
1	a	51,263	2050,5	40	(1) > (2)	-1,927	0,0539
	b	51,653	3202,5	62	(1) < (2)		
	c	-	-	7	(1) = (2)		
2	a	32,833	689,5	21	(1) > (2)	-6,776	1,24E-11
	b	58,606	4981,5	85	(1) < (2)		
	c	-	-	3	(1) = (2)		
3	a	24,094	385,5	16	(1) > (2)	-7,616	2,62E-14
	b	57,665	5074,5	88	(1) < (2)		
	c	-	-	5	(1) = (2)		
4	a	23,167	139	6	(1) > (2)	-8,513	1,7E-17
	b	55,32	5532	100	(1) < (2)		
	c	-	-	3	(1) = (2)		
5	a	27,563	441	16	(1) > (2)	-7,307	2,73E-13
	b	55,953	4812	86	(1) < (2)		
	c	-	-	7	(1) = (2)		
6	a	23,389	421	18	(1) > (2)	-7,246	4,29E-13
	b	56,451	4629	82	(1) < (2)		
	c	-	-	9	(1) = (2)		
7	a	50,162	1856	37	(1) > (2)	-2,022	0,0432
	b	49,098	2995	61	(1) < (2)		
	c	-	-	11	(1) = (2)		
8	a	48,42	2130,5	44	(1) > (2)	-1,950	0,0512
	b	55,492	3329,5	60	(1) < (2)		
	c	-	-	5	(1) = (2)		
9	a	29,1	436,5	15	(1) > (2)	-7,576	3,55E-14
	b	57,522	5234,5	91	(1) < (2)		
	c	-	-	3	(1) = (2)		
10	a	30,733	461	15	(1) > (2)	-7,304	2,78E-13
	b	55,625	4895	88	(1) < (2)		
	c	-	-	6	(1) = (2)		
Quality of life	a	13,5	13,5	1	(1) > (2)	-9,023	1,83E-19
	b	55,384	5981,5	108	(1) < (2)		
	c	-	-	0	(1) = (2)		

Note: a – negative ranks, b – positive ranks, c – coincidence of observations.

Table 2

The results of the Wilcoxon test comparing the indicators of the «Quality of Life Assessment Scale» method during the first (1) and re-examination (2) of the respondents of the TBI group

Scale	Ranks	Average rank	Sum of ranks	Number of cases	Comparison	Z	p
1	a	36,36	909	25	(1) > (2)	-5,917	3,3E-09
	b	57,607	4551	79	(1) < (2)		
	c	-		8	(1) = (2)		
2	a	48,4	1936	40	(1) > (2)	-2,316	0,02053
	b	53,5	3317	62	(1) < (2)		
	c	-	-	10	(1) = (2)		
3	a	36,388	1637,5	45	(1) > (2)	-2,392	0,01677
	b	58,45	2922,5	50	(1) < (2)		
	c	-	-	17	(1) = (2)		
4	a	46,7062	2148,5	46	(1) > (2)	-1,451	0,14689
	b	54,590	3002,5	55	(1) < (2)		
	c	-	-	11	(1) = (2)		
5	a	47,6363	2096	44	(1) > (2)	-1,629	0,10332
	b	53,5964	3055	57	(1) < (2)		
	c	-	-	11	(1) = (2)		
6	a	40,3709	1251,5	31	(1) > (2)	-3,096	0,00196
	b	47,4741	2753,5	58	(1) < (2)		
	c	-	-	23	(1) = (2)		
7	a	46,5243	1907,5	41	(1) > (2)	-1,695	0,09016
	b	50,8125	2845,5	56	(1) < (2)		
	c	-	-	15	(1) = (2)		
8	a	44,03125	1409	32	(1) > (2)	-3,127	0,00176
	b	49,29032	3056	62	(1) < (2)		
	c	-	-	18	(1) = (2)		
9	a	48	1920	40	(1) > (2)	-1,94	0,05205
	b	51,35593	3030	59	(1) < (2)		
	c	-	-	13	(1) = (2)		
10	a	44,9142	1572	35	(1) > (2)	-3,166	0,00154
	b	52,7812	3378	64	(1) < (2)		
	c	-	-	13	(1) = (2)		
Quality of life	a	40,2631	765	19	(1) > (2)	-6,896	5,4E-12
	b	59,25	5451	92	(1) < (2)		
	c	-	-	1	(1) = (2)		

Note: a – negative ranks, b – positive ranks, c – coincidence of observations.

before and after therapy (Table 3), indicates that they had a statistically significant increase in the assessment of the quality of their life in all the studied areas ($p \leq 0.00184$).

In order to identify the possible interdependence of the level of satisfaction with the quality of one or another sphere of life of the respondents of the studied groups, the calculation of the Spearman rank correlation coefficient of the indicators of the «Quality of Life Assessment Scale» method during the first and second examination was carried out (tables 4).

According to the results of the analysis of the indicators of the «Quality of Life Assessment Scale» method of the representatives of the PTSD group (table 4), it was established that between the indicators 9 of the scale at the first examination and the indicators 2 of the scale at the re-examination, as well as between the indicators 6 of the scale at the first examination and the indicators 4 of the scale upon re-examination, there were statistically significant negative correlations ($\rho \geq -0.188$; $p \leq 0.05$). In addition, there were, on the contrary, positive correlations between indicators 8 of scale at the first examination and the indicators 10 of the scale at re-examination, as well as between indicators 4 of the scale at the first examination and the integral indicator of quality of life at re-examination (quality of life) ($\rho \geq 0.223$; $p \leq 0.02$).

Based on the obtained data, we can assume that representatives of the PTSD group, who from the beginning evaluated the quality of social aspects of their life more negatively (social activity and the sphere of employment), after the therapy looked more positively at the emotionally colored spheres of life (sex and mood). At the same time, after the therapy, the feeling of satisfaction with life was more positively assessed by those patients who were more satisfied with their life conditions before the therapy, and a higher assessment of the quality of life after the therapy was observed in those patients who, even before the therapy, had a higher level of satisfaction with their sex life.

Table 3

The results of the Wilcoxon test comparing indicators of the «Quality of Life Assessment Scale» method during the first (1) and re-examination (2) of respondents of the comorbid condition of PTSD+TBI group

Scale	Ranks	Average rank	Sum of ranks	Number of cases	Comparison	Z	p
1	a	38,5303	1271,5	33	(1) > (2)	-4,533	5,83E-06
	b	57,7029	3981,5	69	(1) < (2)		
	C	-	-	6	(1) = (2)		
2	a	20,9286	293	14	(1) > (2)	-7,802	6,09E-15
	b	56,3636	4960	88	(1) < (2)		
	c	-	-	6	(1) = (2)		
3	a	22,1364	243,5	11	(1) > (2)	-7,801	6,14E-15
	b	53,483	4706,5	88	(1) < (2)		
	c	-	-	9	(1) = (2)		
4	a	22,2	333	15	(1) > (2)	-7,845b	4,33E-15
	b	58,1333	5232	90	(1) < (2)		
	c	-	-	3	(1) = (2)		
5	a	33,25	266	8	(1) > (2)	-7,608	2,79E-14
	b	50,4157	4487	89	(1) < (2)		
	c	-	-	11o	(1) = (2)		
6	a	27,6154	359	13	(1) > (2)	-7,460	8,66E-14
	b	53,9195	4691	87	(1) < (2)		
	c	-	-	8	(1) = (2)		
7	a	39,6711	1507,5	38	(1) > (2)	-3,388	0,0007
	b	56,4344	3442,5	61	(1) < (2)		
	c	-	-	9	(1) = (2)		
8	a	38,3429	1342	35	(1) > (2)	-3,114	0,00184
	b	51,5088	2936	57	(1) < (2)		
	c	-	-	16	(1) = (2)		
9	a	24,6667	296	12	(1) > (2)	-7,792	6,6E-15
	b	55,0778	4957	90	(1) < (2)		
	c	-	-	6	(1) = (2)		
10	a	24,125	289,5	12	(1) > (2)	-7,755	8,8E-15
	b	54,6236	4861,5	89	(1) < (2)		
	c	-	-	7	(1) = (2)		
Quality of life	a	1	1	1	(1) > (2)	-9,019	1,9E-19
	b	55	5885	107	(1) < (2)		
	c	-	-	0	(1) = (2)		

Note: a – negative ranks, b – positive ranks, c – coincidence of observations.

Among all research groups, the fewest correlations occurred in the TBI group (4). Negative correlations ($\rho \geq -0.197$; $p \leq 0.037$) in this case occurred only between indicators of scale 5 at the first examination and scale 4 at re-examination, as well as between indicators of scale 6 at the first examination and scale 9 at re-examination. That is, respondents who rated the quality of their daily activities more poorly after therapy felt more satisfied with the sexual sphere of life, and those who rated the aspects of social activity in their lives more poorly after treatment, on the contrary, rated their employment more highly. The obtained results make it possible to state that as a result of the therapy, the best results in the direction of increasing the self-esteem of the quality of life were achieved precisely in relation to patients with comorbid TBI.

An analysis of existing research on psychotherapeutic effects in servicemen with comorbid PTSD and TBI indicates that the majority of studies were concerned only with the identification and analysis of factors of psychotherapeutic effects, specifically, Matthew Price et al [8] examined the role of four theoretical functional aspects of social support on pretreatment PTSD symptom severity and treatment response in a sample of Operation Iraqi Freedom/Operation Enduring Freedom veterans receiving a social support-based psychotherapeutic intervention.

M. M. Kelly et al [16] investigated the impact of avoidance responses on perceived social support in veterans with PTSD on the process of social reintegration, and concluded that experiential avoidance may be an important treatment target to enhance long-term functional recovery and reintegration.

A study by K. A. Lord et al. [18] examined temporal relationships between PTSD symptoms and measures of social functioning during cognitive processing therapy. The researchers concluded that social-role functioning problems for patients with military status led to a slower

Table 4

The results of the calculation of the ρ-Spearman rank correlation coefficient of the indicators of the «Quality of Life Assessment Scale» method of PTSD group representatives at the first (1) and re-examination (2)

Scale		1 (2)	2 (2)	3(2)	4(2)	5(2)	6(12)	7(2)	8(2)	9(2)	10(2)	QL (2)
1(1)	ρ	-0,065	-0,125	0,12	-0,042	-0,047	-0,035	0,045	-0,051	-0,128	-0,056	-0,152
	p	0,502	0,195	0,213	0,665	0,628	0,716	0,644	0,602	0,186	0,56	0,114
2(1)	ρ	0,095	-0,046	0,01	0,054	0,097	-0,145	0,138	0,1	0,145	-0,061	0,109
	p	0,325	0,635	0,916	0,577	0,315	0,132	0,151	0,301	0,132	0,532	0,258
3(1)	ρ	-0,024	-0,059	0,021	-0,115	2E-04	-0,028	0,021	-0,009	-0,083	0,052	-0,091
	p	0,804	0,539	0,825	0,235	0,998	0,774	0,827	0,924	0,392	0,591	0,348
4(1)	ρ	0,109	*0,205	-0,039	0,109	0,165	0,013	0,186	0,086	-0,033	0,07	*0,285
	p	0,259	*0,032	0,687	0,258	0,086	0,891	0,053	0,377	0,735	0,47	*0,003
5(1)	ρ	-7E-04	0,131	0,036	0,068	-0,034	0,02	0,088	-0,014	-0,118	0,005	0,112
	p	0,994	0,175	0,709	0,483	0,723	0,84	0,362	0,882	0,22	0,959	0,248
6(1)	ρ	-0,061	0,165	0,042	*-0,236	0,046	-0,157	-0,081	-0,071	-0,071	-0,095	-0,128
	p	0,526	0,086	0,663	*0,013	0,631	0,103	0,404	0,462	0,462	0,324	0,186
7(1)	ρ	0,055	0,042	0,09	-0,156	0,127	0,062	-0,171	0,125	0,024	-0,004	0,031
	p	0,569	0,667	0,352	0,105	0,186	0,522	0,076	0,197	0,806	0,969	0,746
8(1)	ρ	-0,024	-0,054	0,01	-0,066	0,003	-0,135	0,054	-0,015	0,085	*0,223	0,004
	p	0,803	0,575	0,914	0,494	0,977	0,162	0,574	0,876	0,378	*0,02	0,964
9(1)	ρ	0,027	*-0,188	-0,045	0,003	-0,066	0,098	0,113	-0,052	-0,024	-0,005	0,006
	p	0,778	*0,05	0,639	0,978	0,495	0,311	0,242	0,595	0,806	0,957	0,952
10(1)	ρ	0,037	-0,043	-0,07	-0,097	-0,009	0,067	0,043	-0,088	0,062	-0,02	-0,012
	p	0,702	0,654	0,468	0,315	0,925	0,492	0,654	0,36	0,525	0,838	0,904
QL (1)	ρ	0,037	-0,007	0,068	-0,133	0,092	-0,106	0,096	-0,03	-0,033	0,023	0,012
	p	0,704	0,946	0,481	0,168	0,341	0,275	0,323	0,758	0,73	0,814	0,9

Note: Note: QL – quality of life.

reduction in PTSD symptoms during psychotherapy intervention.

J. Rauwenhoff [29] investigated the effectiveness of an intervention in patients with TBI consisting of 8 psychological sessions of acceptance and commitment therapy. Evidence-based existing protocols have been adapted to the needs of clients and potential cognitive impairments after TBI. The general changes were the use of visual materials, note-taking and repetition. Specific adaptations for ACT include the Bus of Life metaphor as a repetitive exercise, shorter mindfulness exercises, simplified explanations, emphasis on experiential exercises, and monitoring of completed actions. However, this intervention was not combined with traditional drug therapy, and there was no group of patients with comorbid PTSD, as we conducted in our study.

Also, the existing studies did not cover the possibilities of differential therapeutic influence, which we formed in the course of our research, and which consisted in the difference in the set of therapeutic methods and strategies depending on clinical symptoms, indicators of vitality and pathogenetic dependence of symptoms.

The work of M.M. Harvey et al [2] was close in terms of the purpose and structure of our study. Harvey et al., who investigated the effectiveness of a comprehensive multidisciplinary two-week outpatient treatment of veterans with complex mental health problems. The organization of the therapeutic intervention was similar to that proposed in our study and consisted of a differential approach, taking into account whether PTSD or TBI symptoms predominated. The program combined skill-building group work, family education with individual treatment in two areas: one for those with primary PTSD and related mental health problems, and the other for those with post-traumatic stress disorder.

Cognitive rehabilitation, multimodal physical therapy, and psychological treatment may benefit from TBI. The results of the analysis of the effectiveness of this approach to treatment were characterized by a high level of completion of all stages of treatment, as well as a statistically significant and clinically significant decrease in the severity of PTSD, neurobehavioral and depressive symptoms in 107 veterans with PTSD and 21 veterans with TBI. However, the study did not aim to compare the effectiveness of this intensive model compared to standard evidence-based therapy, or the long-term outcomes of the study.

CONCLUSIONS

Therefore, the results suggest that complex treatment of patients with comorbid PTSD and mTBI is a promising individual treatment methodology in this patient population. This exploratory study lays the foundation for future prospective, controlled, comparative effectiveness studies that will contribute to further understanding of the effectiveness of intensive psychotherapy care based on acceptance and commitment therapy.

Conflict of interest. The author declares that she has no financial, personal, copyright, or other conflict of interest that could affect the research and its results presented in this article.

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Availability of data

Data will be provided upon reasonable request

Information about the author

Smashna Olena Ye. – MD, PhD, Associate Professor, Department psychiatry, addictive disorders and medical psychology, I. Gorbachevskiy Ternopil National Medical University; tel.: (098) 031-33-03. *E-mail: osmashna@gmail.com*
ORCID: 0000-0001-6595-2940

Відомості про автора

Смашна Олена Євгенівна – канд. мед. наук, доц., кафедра психіатрії, наркології та медичної психології, Тернопільський національний медичний університет імені І. Я. Горбачевського; тел.: (098) 031-33-03. *E-mail: osmashna@gmail.com*
ORCID: 0000-0001-6595-2940

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