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Comparing the effect of prolonged exposure therapy (PET) and metacognitive therapy (MCT) on the quality of life among veterans with PTSD

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ABSTRACT

Veterans' quality of life (QoL) can be drastically affected by posttraumatic stress disorder (PTSD). We compared prolonged exposure therapy (PET) with metacognitive therapy (MCT) in their effects on quality of life (QoL) among veterans with post-traumatic stress disorder (PTSD). Overall, 57 veterans with PTSD were randomly assigned to three groups MCT (N = 17), PET (N = 17), and Control (N = 23). The 36-item short-form survey (SF-36) was used to evaluate QoL pretest, posttest, and after a 3-month follow-up. The MCT was based on the practice of detached mindfulness, controlling rumination/anxiety, and challenging negative beliefs about symptoms. The PET was based on in-vivo and imaginal exposure to trauma-related events, and discontinuation of avoidance-oriented coping strategies. Both MCT and PET groups significantly improved QoL at posttest and follow-up, compared with the control group (P < .001); however, the MCT and PET groups showed no significant difference at posttest (P = .644) or follow-up (P = .646). Our results support the efficacy of PET as the standard for PTSD treatment, while also signifying the effectiveness of MCT at increasing the QoL in war-related PTSD at a 3-month follow-up.

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Posttraumatic stress disorder; armed conflicts; metacognition; cognition

What is the public significance of this article?— The motivating question of our research is whether MCT and PET treatment have an effect on the quality of life of veterans. This study is about two post-traumatic stress disorder treatments and measured the effect of these two treatments on a group of veterans. The findings of this study signify that MCT and PET are effective interventions for alleviation of war-related PTSD symptoms and improvement of patients' quality of life; also compared with the Control group, the MCT group was found to have significantly greater total quality of life, both at post- test and follow-up.

Introduction

The consequences of combat stress on returning soldiers are the most noticeable outcomes of the war on public health. These outcomes are not merely limited to physical injuries and disabilities, but they also include a range of mental and behavioral issues, affecting families as well as individuals (Rahnejat et al., 2016). As such, the occurrence of war is a major contributor to the prevalence of mental and behavioral disorders, namely that of posttraumatic stress disorder. PTSD is a chronic, debilitating condition, brought upon by a traumatic experience such as war, natural disaster, automobile accident, torture, assault, or rape (Barlow et al., 2000; Joseph & Linley, 2006; Koenen et al., 2008).

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), a diagnosis of PTSD in individuals with a history of trauma (life-threatening experience, physical injuries, or rape) is based on four components, which have persisted for more than a month: intrusion (thoughts, flashbacks or nightmares), avoidant symptoms (limiting contact with trauma- related stimulants), cognition and mood changes (negative emotions), and arousal and reactivity changes (Pacella et al., 2013; Sadock et al., 2015).

With regards to war-related PTSD, the incidence is often associated with factors such as the length of military deployment, number of in-field missions and traumas (Ahmadizadeh et al., 2010; Shahmiri Barzoki et al., 2021), while generally occurring in 9–25% of military veterans who are wounded in action (Dohrenwend

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et al., 2006; Shahmiri Barzoki et al., 2021). The prevalence of PTSD in the United States veterans of the Vietnam War was 30%, Gulf War 10%,

Iraq War 15%, and the Afghanistan War 11% (Knowles et al., 2019; Müller et al., 2017; Richardson et al., 2010). Iranian medical records show that PTSD was diagnosed in more than 80% of returning combatants (Bahreinian & Borhani, 2003) and even 14.9% of the military staff (Donyavi et al., 2007), signifying PTSD as the most common mental condition of frontline soldiers (Mendenhall, 2009). Furthermore, PTSD is also notable for its common comorbid mental conditions; almost 60% of PTSD patients experience at least two simultaneous conditions such as depression, substance abuse, anxiety, or bipolar disorder (Arbanas, 2010; Barlow et al., 2000; King et al., 2006). Aggression and anger are common observations in war-related PTSD patients (Jakupcak et al., 2007; Kuhn et al., 2010), Aggression and anger are common observations in war-related PTSD patients, and these all contribute to the negative effects on social function, job performance, and personal well-being (Beck et al., 2009; Ouimette et al., 2008; Tull, 2009).

Among cognitive-behavioral therapeutic measures for PTSD, studies have demonstrated the superior efficacy of prolonged exposure therapy (PET) compared with other methods such as systematic desensitization, stress inoculation, assertiveness training or relaxation training (Nacasch et al., 2010; Rothbaum et al., 2000). PET, as originally developed by Foa et al. in 1991 (Foa et al., 1991), consists of a controlled confrontation with the traumatizing events, such that would reduce the stress associated with these situations throughout therapy. Many have shown that PET is also efficacious in combat-related PTSD (S. A. M. Rauch et al., 2019; Koven, 2018; Nacasch et al., 2010), suggesting a 42% alleviation of general PTSD symptoms, and a 31% reduction in depressive symptoms (Goodson et al., 2013). The high rate of comorbidities in PTSD patients might put clinicians on alert for possible counter-indicators of PET; however, not only do studies support the safety and efficacy of PET in these cases, but they also report a decrease in the severity of comorbid conditions, following PET (Van Minnen et al., 2012).

In contrast, metacognitive therapy (MCT) methods have also attracted the attention of clinicians and researchers, by demonstrating promising results in PTSD treatment (Adrian Wells et al., 2015). According to this model, memories, details, and judgments are not as focal as the cognitive processes which guide them; processes including suppression, rumination, and worry (Wells, 2011). Negative metacognitive beliefs can activate worrying, which can lead to an avoidance-oriented coping strategy with trauma; beliefs such as 'I need to stop these thoughts, to stay sane and normal" signify non-adaptive coping, which can prolong symptoms. Studies have shown that these metacognitions are involved in the maintenance of stress following trauma (Bardeen & Fergus, 2018; Fergus & Bardeen, 2017), and they can also notably predict a diagnosis of PTSD (Bennett & Wells, 2010).

The quality of life in PTSD patients is notably affected by the symptoms, influencing physical, emotional, and social aspects of their lives; as such, improving the quality of life of patients with post-traumatic stress disorder can accelerate the recovery process (Cella & Tulsky, 1990).

Considering these, and the relevance of PTSD in war veterans, we aimed to compare the effectiveness of PET and MCT on patient's quality of life and we wanted to know what results from each of the above treatments could have for PTSD veterans. The results of this study may extend previous findings and aid clinicians in devising treatment strategies.

Methods

Study settings and approval

This randomized quasi-experimental study was conducted in 2019–2020. All participants provided informed written consent and the Ethics Committee of Baqiyatallah University of Medical Sciences has approved this study (approval code: IR.BMSU.REC.1396.567).

Participants

Veterans diagnosed with PTSD (all participants were male) referred to the healthcare department of the Army Ground Forces from 2019 to 2020 were considered for this study. Initially, 57 participants were recruited; however, after considering the exclusion criteria (consent withdrawal or termination of treatment), 47 remained. The 57 initial participants were randomly assigned to the three study groups: PET: 17 participants receiving prolonged exposure therapy; MCT: 17 participants receiving metacognitive therapy; Control: 23 control participants on a wait list for intervention. Out of the 17 MCT participants, 15 were able to complete their therapy sessions, while 14 out of 17 PET participants completed their sessions; these along with 19 Control participants (out of 23), and were included in posttest evaluations. Three-month follow-up was conducted on 15 out of the 17 remaining MCT participants,

14 out of 14 remaining PET participants, and 18 out of 19 participants, making up a sample size of 47.

Data collection instruments

The 36-item short-form survey (SF-36) was administered to investigate the participant's response to treatment or lack thereof. The SF-36 is a reliable and valid test of the quality of life, which has been used in over four thousand studies, since its first publication (Adib-Hajbaghery & Abasinia, 2010; Brazier et al., 1992). The Persian version of this survey consists of 36 items measuring physical and mental health aspects: physical functioning (ten items), role limitation due to physical health (four items), pain (two items), general health (5 items), energy/fatigue (4 items), social functioning (2 items), role limitation due to emotional problems (3 items), and emotional well-being (5 items) (Farhadi et al., 2011). Answering the survey takes approximately 5–15 minutes (Adib-Hajbaghery & Abasinia, 2010). Each item has a score range of 0–100, designed to indicate the highest quality of life with a score of 100. An average score of lower than 50 indicates a poor quality of life (Adib-Hajbaghery & Abasinia, 2010; Farhadi et al., 2011). The validity and reliability of the Persian version of this survey have been investigated, with a reliability of 0.77–0.95 in 7 subscales and 0.65 in the energy/fatigue subscale (Farhadi et al., 2011). Farhadi et al. evaluated the correlation of the total mean score with each of the 8 subscale mean scores, and they reported correlations ranging from 0.45 to 0.75 (Farhadi et al., 2011) while reporting a Cronbach's alpha reliability of 0.80 (0.83 for the physical aspect and 0.78 for the emotional aspect). Previous work also reported a reliability of 0.87 for the survey (Adib Adib-Hajbaghery & Abasinia, 2010; Shahmiri Barzoki et al., 2021).

Metacognitive therapy

The metacognitive therapy model was designed based on the works of Wells and Sembi (Wells & Sembi, 2004a; Wells & Sembi, 2004b), and consisted of 12 weekly sessions (60-minute sessions at the beginning and 30 to 40 minutes for later sessions), practicing detached mindfulness (a state of awareness of internal events, without responding to them with sustained evaluation, attempts to control or suppress them, or responding to them behaviorally), and controlling of rumination/worry, as well as providing home assignments. The contents of MCT sessions are listed in Table 1.

Prolonged exposure therapy

The prolonged exposure therapy plan was devised based on the works of Foa et al. and others (Foa et al., 2009; Follette & Ruzek, 2007; Vera et al., 2011), and consisted of 12 90-minute sessions, dealing with the rationale of exposure therapy, imaginal exposure and in-vivo exposure and removing obstacles. The contents of the therapy sessions are listed in Table 2.

Table 1. The contents of MCT sessions.

Sessions	Description
1	Formation of basic concepts, as well as describing the therapy model, goals and rationales of the therapy, while incorporating the PTSD checklist, military version (PCL-M), and the structured interview for PTSD (SI-PTSD).
2	Challenging negative beliefs about symptoms, introduction and practice of detached mindfulness, and home assignments for detached mindfulness.
3	Assignment review, evaluating the improvements brought upon by detached mindfulness, introduction to controlling meta-worry, and home assignments for detached mindfulness and meta-worry.
4	Assignment review, discussing the advantages and disadvantages of rumination/worry, continued challenging of negative beliefs about symptoms, and home assignments for detached mindfulness, meta-worry and rumination/worry.
5	Assignment review, challenging positive beliefs about rumination/worry, challenging the suppression of thoughts and symptom avoidance, and home assignments for meta-worry and detached mindfulness.
6	Assignment review, extending the applications of deferring meta- worry/rumination, continued challenging of positive beliefs about ruminations and negative beliefs about symptoms, starting to discontinue non-adaptive coping strategies, and home assignments for detached mindfulness, rumination/worry,and stopping non-adaptive coping behaviors.
7	Assignment review, discussing the importance of processing concepts rather than details, discussing the negative effects of avoidance-oriented coping style, and home assignments for discontinuing avoidance, meta-worry and rumination.
8	Assignment review, discussing the positive and negative aspects of threat monitoring, challenging positive beliefs about threat monitoring and preservative thoughts, and home assignments for awareness of threat monitoring and stopping it.
9	Assignment review, continued challenging of positive and negative metacognition beliefs about worry, and assignment for returning to pre-trauma state cognition.
10	Assignment review, and assignment for working on a written summery of the therapy and its goals.
11	Assignment review and devising a new plan for managing intrusive thoughts, as well as finishing the therapy plan summery, and assignment for exercising the new plan.
12	Assignment review, discussing the importance of the new plan for handling intrusive thoughts, discussing future reinforcing therapy sessions, and assignment for determining the applications of the new plan for handling and preventing recurrence.

Table 2. The contents of PET sessions.

Sessions	Description
1	Discussing the therapy plan and the rationale behind it, presenting a fundament for future exercises, recognizing obstacles such as lack of motivation, gathering information about the traumatizing event and the specific symptoms of the participant, in reaction to confrontation.
2	Providing the participant with information about common reactions to distress, discussing the ordinariness of the participant's symptoms; discussing the reasons for the continuation of PTSD symptoms, and the role of avoidance and negative self- and world-beliefs on the matter; introducing the "relaxation" technique, as a core element of therapy, and providing instructions for it; exercising calm breathing and providing home assignments for relaxation (five times, daily) and calm breathing (three times, daily, for ten minutes).
3	Assignment review, practicing relaxation. Instructing and guiding the participants to form a list of stressors of the past, present and future, while ranking them with a score of 1 to 10, and providing three examples for each.
4	Reviewing the stressor list assignment and practicing relaxation; discussing the rationale behind imaginal exposure, and starting imaginal exposure based on an example of a score-1 stressor. The participant was instructed to discuss the details of the example, and then imaginal exposure was carried out for 30–45 minutes while practicing relaxation and calm breathing; following this stage, the participant was engaged in an open discussion of the exposure in order to ameliorate emotional processing; the imaginal exposure incorporated a revision of the traumatizing event, while interacting with the emotional memory of the event, focusing on suppressed feelings and thoughts; the therapy was intended to guide the emotional processing of events. This process was repeated for the second example of a score-1 stressor, during the same session, and the home assignment was to replicate this process for the third example.
5	Reviewing the assignment and investigating the potential achievements or problems of the participant with the process of imaginal exposure. Relaxation was practiced again and the session was focused on two examples of a score-2 stressor; the home assignment was directed toward the examples of score-2 and score-3 stressors.
6–8	Assignments were reviewed and relaxation was practiced; the sessions focused on two examples of score-4 to score-10 stressors, while leaving one example for home assignments.
9–11	Previous imaginal exposure assignments were reviewed, and the fundaments for in-vivo exposures were laid; the rationale was discussed and obstacles were examined. The in-vivo exposure consisted of confronting real experiences which were easily accessible and objectively safe, but they had been avoided by the participant; these included activities such as reviewing old photos, meeting comrades and watching documentaries. At this stage participants were assigned to engage with real experiences outside of the sessions, while their contemplations of the activities were discussed in therapy sessions.
12	The newly acquired abilities and their importance in preventing symptoms were discussed, and the participants were encouraged to continue with the treatment process. Finally, the overall elements of the therapy were summarized and discussed.

Statistical analysis

All data were analyzed using SPSS version 22 (IBM Statistics, Chicago, IL, USA).

Multivariate analysis of variance (MANOVA) was carried out to measure the effect of dependent variables between and among the groups. To control the effect of variables that were different in 3 groups and needed to be controlled, a two-factor analysis of variance on a repeated factor and the Mauchly test were used.

Results

The mean and standard deviation of the total age of the participants in this study were

48.37 and 23.3 years, respectively, and their age range was between 42 and 57 years. There was no difference in age between groups, $F = 1.37$, $p = .26$. One of the inclusion criteria was higher education. The average duration of the participation of all participants in the war was 29.77 months and the range of their participation in the war was between 6 and 94 months. There was no difference between groups in duration of being in the war, $F = 1.60$, $p = .21$. The average number of hospitalizations of all participants in the department of nerves and psyche was 1.14 times and the range of hospitalizations was between 0 and 5 times. There was no difference in groups in the number of hospitalizations, F = 2.54., $p = .09$. There was no difference between groups in current use of psychotropic medications, X2 = 0.019, $p = .86$.

The fifty-seven initially recruited, participants were randomly divided into three groups: MCT (mean age of 48.26 years, $N = 17$), PET (mean age of 49.50 years, $N = 17$), and Control (mean age of 47.63 years, $N = 23$). In total, 95.8% of the participants were married, $N = 47$; while psychiatric medications were used by 92.90% of the PET group ($N = 17$), 46.70% of the MCT group ($N = 17$), and 52.60% of the Control group ($N = 23$).

Table 3 shows the subscale scores of SF-36, at the pretest, posttest and 3-month follow-up, for all three groups of the study. The pretest, and posttest difference in the mean quality of life, for the MCT group, was 20.55, whereas the corresponding value for the PET group was 13.74; although it is worth noting that the pretest mean the quality of life was lower for the MCT group (34.68 ± 1.61 compared with 41.52 ± 1.44).

Levene's test, showed the multivariate homogeneity of variance between the three groups, for independent variables; thus, MANOVA was used to test the null hypothesis that the multivariate means of groups are equal (Table 4). Based on the results, the alternate hypothesis was true for the mean quality of life and all 8 subscale mean variables ($P < .001$); in other words, we found that both intervention methods (PET and MCT) were effective in improving the quality of life.

Fisher's least significant difference (LSD) test was used to compare variables between group pairs

Table 3. Quantitative comparison of quality of life between study groups, based on the SF-36.

Scale subgroups	Group	Pretest	Posttest	3-month follow-up
Total QoL	MCT	34.68 ± 1.61	55.23 ± 7.62	56.93 ± 7.01
	PET	41.52 ± 1.44	55.26 ± 8.74	56.98 ± 9.26
	Control	45.44 ± 1.55	41.44 ± 1.08	38.94 ± 8.52
Physical functioning	MCT	35.33 ± 1.30	54.33 ± 1.01	56.33 ± 6.39
	PET	38.21 ± 1.38	53.57 ± 1.16	57.85 ± 9.94
	Control	39.73 ± 1.36	38.68 ± 1.05	40.26 ± 9.78
Role limitation due to physical health	MCT	36.66 ± 1.59	57 ± 8.61	57.66 ± 6.51
	PET	37.50 ± 1.62	54.64 ± 9.89	56.07 ± 9.64
	Control	43.42 ± 1.83	39.47 ± 1.25	35.78 ± 9.16
Pain	MCT	35.66 ± 2.06	50.10 ± 1.27	50.10 ± 1.27
	PET	35.17 ± 2.12	49.28 ± 1.50	49.28 ± 1.50
	Control	38.15 ± 2.07	34.65 ± 1.69	34.65 ± 1.69
General health	MCT	31.66 ± 1.55	51 ± 9.48	52 ± 9.21
	PET	33.57 ± 1.76	49.64 ± 9.08	51.42 ± 1.11
	Control	36.05 ± 1.75	31.57 ± 1.04	32.89 ± 8.71
Energy/fatigue	MCT	34.66 ± 1.71	54.66 ± 1.35	56.66 ± 1.14
	PET	45.35 ± 1.63	57.14 ± 1.03	60 ± 1.27
	Control	49.73 ± 1.82	43.42 ± 1.23	38.15 ± 8.85
Social functioning	MCT	35.83 ± 1.99	50.50 ± 1.48	52.36 ± 1.44
	PET	51.78 ± 1.88	59 ± 1.37	59.14 ± 1.42
	Control	53.94 ± 1.86	47.47 ± 1.49	43.07 ± 9.41
Role limitation due to emotional problems	MCT	31.11 ± 2.66	66.66 ± 2.18	71.11 ± 2.13
	PET	42.85 ± 1.56	61.90 ± 1.78	64.28 ± 1.58
	Control	47.36 ± 1.69	43.85 ± 1.94	42.10 ± 2.17
Emotional well-being	MCT	36.53 ± 2.23	57.53 ± 1.28	59.26 ± 1.29
	PET	48.42 ± 1.55	56.85 ± 9.22	57.85 ± 1.09
	Control	55.15 ± 1.44	48.94 ± 1.09	45.15 ± 9.65

QoL: Quality of life; MCT: Metacognitive therapy; PET: Prolonged exposure therapy

(Table 5). The observed difference between MCT and PET groups, in terms of total quality of life score, at posttest (P = .644) or follow-up (P = .646) were not significant.

Compared with the Control group, the MCT group was found to have a significantly greater total quality of life, both at posttest (P < .001) and follow-up (P = .001), while the same held true for the PET group at posttest (P < .001) and follow-up (P = .001). These results were repeated for every subscale of quality of life, with the exceptions of energy/fatigue and role limitation due to emotional problems; these variables were not significantly different between the PET and Control groups at posttest (energy/fatigue, P = .051; role limitation due to emotional problems, P = .083), or follow-up (energy/fatigue, P = .102; role limitation due to emotional problems, P = .078).

Discussion

The current study was aimed at comparing the efficacy of PET with MCT, based on the quality of life scaling in war-related PTSD patients. Compared with the control group, both therapeutic intervention groups were found to experience an increase in their general quality of life, with adequate reliably; however, no significant difference in terms of treatment response (posttest or at 3-month follow-up quality of life) was observed between the PET and MCT groups, signifying that both interventions are effective for war-related PTSD treatment. These findings are mostly in agreement with many of the previous reports (Bardeen & Fergus, 2018; Bennett & Wells, 2010; Foa et al., 2018; Goodson et al., 2013; Koven, 2018; S. A. M. Rauch et al., 2019; Schnurr et al., 2009; Wells & Sembi, 2004a).

The metacognition therapeutic approach for PTSD is focused on the process of handling post-traumatic thoughts, rather than the contents of such thoughts, and generally consists of two major aspects: forming a cognitive structure to guide thoughts and behaviors when encountering trigger stimulants; and enhancing the flexibility of metacognition in a safe environment, when effective trauma processing is hindered by coping strategies (Wells & Sembi, 2004b). Based on these fundamentals, our therapeutic process involved presenting patients with a metacognitive trauma processing model, while challenging their negative beliefs about symptoms and self-blame about dysfunctional coping mechanisms; patients were taught to exercise detached mindfulness (Matthews & Wells, 2016), and delay meta-worry. Moreover, the advantages and disadvantages of mind rumination, worry, and threat monitoring were explored in therapy sessions. As it has been thoroughly demonstrated by many others (Bennett & Wells, 2010; Koven, 2018), our results also signify the positive effects of MCT on the quality of life for PTSD patients.

Table 4. Multivariate analysis of variance for quality of life among the study groups.

Time	Variable	Mean square	F	Significance	Partial eta squared (η^2) effect size	Observed power
Posttest	Total QoL	1320.170	40.64	0.001	0.69	1.00
	Physical functioning	935.970	10.08	0.001	0.36	0.987
	Role limitation due to physical health	1502.04	15.86	0.001	0.47	0.999
	Pain	1980.55	20.24	0.001	0.53	1.00
	General health	1717.69	23.94	0.001	0.57	1.00
	Energy/fatigue	1353.10	22.32	0.001	0.56	1.00
	Social functioning	860.88	25.72	0.001	0.59	1.00
	Role Limitation due to emotional problems	1884.44	5.47	0.009	0.23	0.817
	Emotional well-being	1012.74	27.57	0.001		1.00
3-month follow-up	Total QoL	1854.00	52.01	0.001	0.75	1
	Physical functioning	1146.176	18.04	0.001	0.51	1
	Role Limitation due to physical health	2096.652	35.54	0.001	0.67	1
	Pain	1988.330	20.45	0.001	0.54	1
	General health	1558.05	17.11	0.001	0.50	0.99
	Energy/fatigue	2259.017	29.80	0.001	0.63	1
	Role Limitation due to emotional problems	1884.44	5.47	0.009	0.23	0.817
	Emotional well-being	1012.74	27.57	0.001		1.00
3-month follow-up	Total QoL	1854.00	52.01	0.001	0.75	1
	Physical functioning	1146.176	18.04	0.001	0.51	1
	Role Limitation due to physical health	2096.652	35.54	0.001	0.67	1
	Pain	1988.330	20.45	0.001	0.54	1
	General health	1558.05	17.11	0.001	0.50	0.99
	Energy/fatigue	2259.017	29.80	0.001	0.63	1
	Social functioning	1321.226	22.01	0.001	0.56	1
	Role limitation due to emotional problems	3372.03	7.76	0.001	0.31	0.93
	Emotional	1889.310	44.01	0.001	0.72	1

QoL: Quality of life

Some have even shown that the lack of metacognitive capacity, as measured by the post-traumatic cognition inventory (PTCI) or the abbreviated metacognition assessment scale (MAS-A), is associated with more severe PTSD symptoms, greater demonstrations of self-blame, distress, and hyperarousal (Davis et al., 2016; Lysaker et al., 2015). A 2015 clinical trial on 32 PTSD patients, showed that both PET and MCT are effective at follow-up; however, they concluded that MCT results in a more rapid, and greater, decline of PTSD symptoms (Wells et al., 2015).

On the other hand, prolonged exposure therapy deals with acquired coping behaviors, often intended to ameliorate the effects of a potentially traumatizing event and prevent its recurrence; however, these behaviors can at the same time conceal the opportunity for desensitization to harmless stimuli. Even though we aimed to limit the overlapping of PET and MCT approaches, exposure therapy may also pave the way for more effective employment of the metacognitive model, by providing a safe environment for processing traumatic thoughts, memories, and emotions. Furthermore, Foa et al. have shown that PET can help PTSD patients with internal narratives of the traumatic events (focusing on feelings and emotions rather than details), signifying that this change in narratives, between the first and last sessions, is associated with a positive therapeutic response (Foa et al., 1995), a result which has been replicated in more recent years (Van Minnen et al., 2002).

There exists a consensus about the efficacy of PET on PTSD (Foa et al., 2018, 1995, 1991; Nacasch et al., 2010). Studies indicate that it not only PET is effective in war-related PTSD (S. A. Rauch et al., 2009), but also in rape victims (Foa et al., 1995); such that it provides results

Table 5. Paired comparison of variables between groups.

Variable	Time	MCT vs. Control P*	PET vs. Control P*	MCT vs. PET P*
Total QoL	Posttest	<0.001	<0.001	0.644
	3-month follow-up	0.001	0.001	0.646
Physical functioning	Posttest	0.004	0.002	0.907
	3-month follow-up	0.003	0.017	0.910
Role limitation due to physical health	Posttest	0.001	0.001	0.409
	3-month follow-up	0.001	0.001	0.358
Pain	Posttest	<0.001	0.002	0.894
	3-month follow-up	0.001	0.001	0.891
General health	Posttest	<0.001	0.002	0.890
	3-month follow-up	0.001	0.002	0.892
Energy/fatigue	Posttest	0.001	0.051	0.436
	3-month follow-up	0.004	0.102	0.435
Social functioning	Posttest	0.003	0.001	0.971
	3-month follow-up	0.003	0.013	0.973
Role limitation due to emotional problems	Posttest	0.003	0.083	0.466
	3-month follow-up	0.003	0.078	0.472
Emotional well-being	Posttest	0.001	0.028	0.577
	3-month follow-up	0.001	0.029	0.583

QoL: Quality of life; MCT: Metacognitive therapy; PET: Prolonged exposure therapy
*Fisher's least significant difference test (LSD)

similar to eye movement desensitization and reprocessing (EMDR) intervention (Rothbaum et al., 2005).

Nonetheless, even with the general success of clinical psychology in treating PTSD (PET, MCT, and EMDR) (McNally, 2007), major residual symptoms still exist in many patients post-treatment (Bradley et al., 2005).

A limitation of our study was that we only recruited male patients with war-related PTSD, which makes it hard to generalize our findings to the female population/gender and sexual minority participants. Moreover, a larger sample size is required to provide a more representative sample of patients with war-related PTSD. Future studies with larger and more inclusive sampling (sex and regions) are recommended to extend our results. It is also suggested to use non-homogeneous samples that have been exposed to different types of psychological stressors (such as natural disasters, accidents, victims of rape or violence, and other traumatic events) in future studies. Considering that in the present study, the effect of therapeutic interventions in PTSD patients with different severities (mild, moderate, and severe) was not compared, it is suggested to calculate and control the effect of this variable in future studies. Considering that in this study, the follow-up period was three months, it is suggested to use longer follow-ups in future studies.

Conclusion

The findings of this study signify that MCT and PET are effective interventions for the alleviation of war-related PTSD symptoms and the improvement of patient's quality of life. In this study, the effectiveness of both interventions on the mentioned variables was almost the same. Our results extend the current evidence of PET and MCT efficacy.

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Data availability statement

The datasets generated and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

Ethics approval

Baqiyatallah University of Medical Sciences, reference number: IR.BMSU.REC.1396.567.

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