TRAUMA MANAGEMENT THERAPY: A PRELIMINARY EVALUATION OF A MULTICOMPONENT BEHAVIORAL TREATMENT FOR CHRONIC COMBAT-RELATED PTSD

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Summary—The development and initial evaluation of a new, comprehensive and multicomponent behavioral treatment (Trauma Management Therapy, or TMT) for chronic combat-related Post-Traumatic Stress Disorder (PTSD) is described. The program utilizes elements of intensive exposure therapy, programmed practice, and structured social and emotional skills training to target the multiple aspects of chronic combat-related PTSD. The treatment was found to be effective in alleviating a broad spectrum of difficulties in combat veterans with chronic PTSD, most of whom had co-occurring Axis I and/or Axis II disorders. The results are discussed with respect to the implementation of the new treatment and the general need for a comprehensive approach to treating combat-related PTSD. Implications for the potential cost-effectiveness of the treatment program also are discussed. Copyright © 1996 Elsevier Science Ltd.

Since its formal recognition as an Axis I anxiety disorder (American Psychiatric Association, 1980), much data has accumulated regarding the complex and chronic nature of Post-Traumatic Stress Disorder (PTSD) in combat veterans. Although PTSD is specifically defined by three clusters of symptoms (reexperiencing, avoidance/numbing, arousal; American Psychiatric Association, 1994), reexperiencing (vivid nightmares, intrusive memories, and/or dissociative flashbacks), along with the associated physiological reactivity and emotional distress, are what best distinguish PTSD from other affective or anxiety disorders (Foa & Riggs, 1995; Orr, Claiborn, Altman, Forgue, de Jong, Pitman & Herz, 1990). Combat-related PTSD is also associated with a diverse set of secondary symptoms, including impaired concentration, sleep disturbance, social avoidance, dissociation (Bremner, Southwick, Brett, Fontana, Rosenheck & Charney, 1992), memory disruption (Bremner, Krystal, Southwick & Charney, 1995), guilt (King & King, 1994; Kubany, 1994), anger (Chemtob, Hamada, Roitblat & Muraoka, 1994; Kubany, Gino, Denny & Torigoe, 1994), and other debilitating behavioral features, such as unemployment, impulsive or violent behavior, and family discord (Jordan, Marmar, Fairbank, Schlenger, Kulka, Hough & Weiss, 1992; Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar & Weiss, 1988; Nezu & Carnevale, 1987).

Combat-related PTSD often is accompanied by multiple comorbid Axis I and II disorders including Substance Abuse (73–84%), Major Depression (26–68%), Antisocial Personality Disorder (26–31%), Dysthymia (21–34%; Keane, Gerardi, Lyons & Wolfe, 1988; Keane & Wolfe, 1990; Sierles, Chen, McFarland & Taylor, 1983), and Borderline Personality Disorder, up to 76% (e.g. Southwick, Yehuda & Giller, 1993). Although epidemiological estimates vary somewhat, most put the lifetime prevalence of PTSD between 15% and 30% for male veterans exposed to combat trauma (Center for Disease Control, 1988; Kulka et al., 1988), and there is strong evidence of symptom chronicity (e.g. Frueh, Mirabella, Chobot & Fossey, 1994; Oei, Lim & Hennessy, 1990; Sutker, Winstead, Galina & Allain, 1990).

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A robust finding is the psychophysiological reactivity of combat veterans with PTSD. Combat veterans with PTSD show significantly larger BP and HR responses during traumatic cue exposure than do combat veterans without PTSD (Blanchard, Kolb & Prins, 1991; McFall, Murburg, Roszell & Veith, 1989; Orr, 1990; Orr et al., 1990; Pitman, 1993), although electromyogram (EMG) and galvanic skin response (GSR) have proved less reliable (e.g. Blanchard, Kolb, Gerardi, Ryan & Pullmeyer, 1986; Orr, Pitman, Lasko & Herz, 1993; Pitman, Orr, Forgue, Altman, de Jong & Herz, 1990; Shalev, Orr & Pitman, 1993). Sensitivities and specificities for HR reactivity ranged from 70 to 90 and 80 to 100, respectively. In fact, the specificity of HR reactivity in PTSD patients appears quite similar to that of individuals with simple phobia (McNeil, Vrana, Melamed, Cuthbert & Lang, 1993) and different from the lack of responsiveness to feared imagery found in those with panic disorder (Cook, Melamed, Cuthbert, McNeil & Lang, 1988). Additionally, there is evidence to suggest that measurement of HR reactivity may provide relatively good discrimination even when individuals are attempting to exaggerate or disguise their responses (Gerardi, Blanchard & Kolb, 1989; Orr & Pitman, 1993).

Treatments for PTSD have developed slowly, and a range of psychosocial and pharmacological strategies have been suggested (e.g. Foy, 1992; Friedman, 1988; Hyer, McCranie & Peralme, 1993; Solomon, Gerrity & Muff, 1992). However, no clear consensus has emerged regarding the most efficacious approach for addressing the myriad symptoms associated with this disorder, and few existing studies represent carefully controlled clinical outcome trials (Frueh, Turner & Beidel, 1995b; Motta, 1993). Among the extant treatment strategies, behavioral treatments, emphasizing various methods of intensive exposure (e.g. flooding or implosive therapy), have been the most carefully studied and show considerable promise. Unfortunately, the literature is underdeveloped, with only a handful of existing empirical studies and many uncertainties regarding the parameters of successful exposure therapy with combat veterans suffering from PTSD (Frueh, Mirabella & Turner, 1995a). Several single case (Black & Keane, 1982; Fairbank & Keane, 1982; Frueh, 1995; Keane & Kaloupek, 1982; Mirabella. Frueh & Fossey, 1995; Mueser, Yarnold & Foy, 1991) as well as a small number of group outcome studies (Boudewyns & Hyer, 1990; Boudewyns, Hyer, Woods, Harrison & McCranie, 1990; Cooper & Clum, 1989; Keane, Fairbank, Caddell & Zimering, 1989) have demonstrated the efficacy of intensive exposure therapy. Although limited, results from these group comparison outcome studies indicate that exposure therapy is efficacious, resulting in reduction in nightmares and intrusive symptoms. Imaginal exposure is associated with a reduction of psychophysiological parameters, which is especially important since reduction of HR reactivity has been associated with improvement at post-treatment and long-term follow-up, regardless of the treatment strategy used (Boudewyns et al., 1990b).

Although intensive exposure to trauma-related cues helps alleviate the hallmark features of PTSD (e.g. symptoms of intrusion and physiological reactivity), the data do not indicate that exposure therapy has a significant effect on the 'negative' symptoms of PTSD (e.g. avoidance, social withdrawal, and emotional numbing), nor on certain aspects of emotion management (e.g. anger control; Frueh et al., 1995b). One possible explanation for this is that exposure in some cases was not implemented in an optimal fashion (e.g. short duration of exposure, use of relaxation techniques). Hence, the findings with exposure to date may not reflect the extent of possible efficacy that can be achieved (Frueh et al., 1995b).

A second possible reason for the failure of exposure treatment to address the entire PTSD syndrome might be that it simply is too narrow to eliminate the pervasive features of the disorder. Several authors have suggested that a treatment program, targeting specific areas of dysfunction via different behavioral strategies and treatment phases, probably is necessary to address the complex and myriad symptoms associated with this condition (Cooper & Clum, 1989; Frueh et al., 1995b; Keane, 1995).

Based on the rather limited efficacy of exposure treatment in addressing the full clinical syndrome of PTSD, the need for a more comprehensive treatment seemed evident. Although extant studies show that current exposure treatment leads to reduction in several symptoms (intrusion and physiological reactivity), difficulties in interpersonal relations, social withdrawal and avoidance, expression of anger, numbing of affect, and unemployment remain relatively unaffected (Frueh et al., 1995b). Thus, we have developed a multicomponent behavioral treatment incorporating exposure, but also designed to address these remaining areas of difficulty.
The new treatment, Trauma Management Therapy (TMT) (Turner, Beidel & Frueh, 1996) is a multicomponent behavioral program. The treatment is designed to reduce emotional and physiological reactivity to traumatic cues, reduce intrusive symptoms and avoidance behavior, improve interpersonal skills and emotion modulation (e.g. anger control), restore or improve occupational adjustment, and increase the range of enjoyable social activities. Trauma Management Treatment was modeled after an effective comprehensive treatment for social phobia (Social Effectiveness Training; Turner, Beidel, Cooley, Woody & Messer, 1994), and adapted to target the specific problematic facets of combat-related PTSD. The present study reports results of the initial evaluation of the efficacy of this new treatment with a sample of chronic combat PTSD patients.

METHOD AND PROCEDURE

Subjects

The sample consisted of 15 male Vietnam combat veterans referred to a VA Medical Center outpatient PTSD clinic who met the DSM-III-R (American Psychiatric Association, 1987) criteria for PTSD. Diagnoses were assigned by clinical staff consensus (a clinical psychologist, social worker, and psychiatrist) after a thorough evaluation, which included a chart review, a psychosocial history interview, a military history interview, and the Clinician-Administered PTSD Scale (CAPS-I) (Blake, Weathers, Nagy, Kaloupek, Klauminzer, Charney & Keane, 1990; Weathers & Litz, 1994). Diagnoses for other DSM-III-R Axis I and II disorders were made using the Structured Clinical Interview for DSM-III-R (SCID) (Spitzer, Williams, Gibbon & First, 1990) and the Structured Clinical Interview for DSM-III-R Axis II (SCID-II) (Spitzer & Williams, 1986). Although the decision guidelines for the use of exposure therapy suggested by Litz, Blake, Gerardi and Keane (1990) were generally followed, the inclusion criteria were broadened somewhat to allow for the inclusion of more patients as suggested by Frueh et al. (1995a). Those who met criteria for an Axis I thought disorder or current substance abuse/dependence, or Axis II criteria for Antisocial Personality Disorder, were excluded from the study. Additionally, veterans with a history of heart disease (angina, myocardial infarction, and severe hypertension) were excluded.

Of the 15 veterans who entered treatment, six were African American (40%) and nine were Caucasian (60%). The mean age of the sample was 47.9 (SD = 2.1; range = 44–52 yr), mean education level was 12.7 (SD = 1.2), eight (53%) were married, six (40%) were employed full-time, five (33%) had a prior history of arrests, seven (47%) had a prior history of psychiatric hospitalization, seven (47%) received some level of VA disability payments for PTSD prior to treatment, and 11 (73%) currently were seeking disability payments or increases in existing disability payments. Axis I diagnoses other than PTSD included: Major Depression, Dysthymia, Panic Disorder, Generalized Anxiety Disorder, Social Phobia, and Obsessive–Compulsive Disorder. Axis II diagnoses included Borderline, Avoidant, Histrionic, and Schizoid Personality Disorders. Overall, 15 (100%) were diagnosed with a concomitant Axis I disorder, and 11 (73%) with a concomitant Axis II disorder, a pattern consistent with the comorbidity rates typically found in this population (e.g. Keane & Wolfe, 1990). All but two (13%) of the patients were taking some form of antidepressant medication (fluoxetine, paroxetine, sertraline, or trazodone) during their treatment, but none was taking benzodiazepines.

Assessment

Veterans were assessed with a comprehensive battery of measures at pre- and post-treatment. Clinician ratings. Three clinician ratings scales were used: the Hamilton Rating Scale for Anxiety (HAMA) (Hamilton, 1959), the Clinical Global Impressions (CGI) severity of illness rating (Guy, 1976), and the Clinician-Administered PTSD Scale (CAPS-1) (Blake et al., 1990; Weathers & Litz, 1994).

Patient symptom ratings (self-monitoring). Each patient kept a daily log to monitor the number of nightmares, total hours of sleep, number of flashbacks, and number of social activities engaged in for a one-week period at each assessment point. In addition, at post-treatment each patient
evaluated his treatment experience, rating the extent to which he felt he improved on a 4-point scale (e.g. ≥ 75%, ≥ 50%, ≥ 25%, < 25%)

Physiological reactivity. A heart rate (HR) probe assessment technique was used to assess physiological reactivity to traumatic cues (e.g. Fairbank & Keane, 1982). Individual exposure scenes were constructed for each patient prior to exposure therapy, and these imaginal scenes were used for the probe assessment conducted at each assessment point. Three measures of HR were taken during exposure to the traumatic scene at 7-minute intervals, and the average of these scores was used.

Self-report inventories. Self-report inventories included the Social Phobia and Anxiety Inventory (SPAI) (Turner, Beidel, Dancu & Stanley, 1989), Beck Depression Inventory (BDI) (Beck & Steer, 1987), and Spielberger Anger Expression Inventory (AX) (Spielberger, Johnson, Russell, Crane, Jacobs & Worden, 1985).

Treatment
The TMT consisted of 29 treatment sessions administered over a period of 17 weeks. After the initial education meeting, sessions were held three times a week during the exposure phase, and then once a week during the social and emotional rehabilitation phase. Education and exposure were implemented individually, while social and emotional rehabilitation was administered in small group sessions (two to five people). The treatment program as a whole consisted of approximately 43.5 hr of therapist contact for each patient. See Table 1 for a complete overview of TMT sessions.

Education. Patients were provided with a general overview of combat-related PTSD, including common patterns of expression, issues of diagnosis, comorbidity, and a review of current treatment strategies. Additionally, this phase was important in ensuring that patients developed a realistic understanding about treatment prognosis and in fostering an overall positive expectancy regarding the efficacy of the treatment program. Finally, this phase was used to educate veterans about the treatment they would be receiving and what would be expected from them regarding their participation. This phase consisted of one individually administered 90-min session.

Exposure therapy. Exposure consisted of individually administered flooding and was conducted imaginally in all cases. For this purpose, individual scenes were constructed for each patient. These scenes contained the elements that were considered to constitute the patient’s ‘core fear’. Thus, exposure was not merely to a specific event (e.g. death of a friend) but to the specific features deemed to constitute the primary basis of the fear. After careful examination of the history, and in consultation with the patient, decisions were made on the core material. This material was then made into a scene (see Table 2 for an example) for use in flooding. In the sample exposure scene, for a patient distressed about his failure to prevent the death of others, the elements judged to constitute the ‘core fear cues’ were the inability to control actions (i.e. helplessness) combined with the feeling of responsibility for others. Ancillary material was used primarily to enhance imagery. In some cases, adjustments and alterations were made in the exposure scenarios during the first few sessions, especially as the patients learned to effectively imagine the scenes. Thus, exposure cues

<table>
<thead>
<tr>
<th>Week</th>
<th>Session No.</th>
<th>Format</th>
<th>Duration</th>
<th>Treatment component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1–3</td>
<td>Individual</td>
<td>90 min</td>
<td>Education/exposure</td>
</tr>
<tr>
<td>2</td>
<td>4–6</td>
<td>Individual</td>
<td>90 min</td>
<td>Exposure</td>
</tr>
<tr>
<td>3</td>
<td>7–9</td>
<td>Individual</td>
<td>90 min</td>
<td>Exposure + prog. practice</td>
</tr>
<tr>
<td>4</td>
<td>10–12</td>
<td>Individual</td>
<td>90 min</td>
<td>Exposure + prog. practice</td>
</tr>
<tr>
<td>5</td>
<td>13–15</td>
<td>Individual</td>
<td>90 min</td>
<td>Exposure + prog. practice</td>
</tr>
<tr>
<td>6</td>
<td>16–17</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
<tr>
<td>7</td>
<td>18–19</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
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<tr>
<td>8</td>
<td>20</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
<tr>
<td>9</td>
<td>21</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
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<tr>
<td>10</td>
<td>22</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
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<tr>
<td>11</td>
<td>23</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
<tr>
<td>12</td>
<td>24</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
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<tr>
<td>13</td>
<td>25</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
<tr>
<td>14</td>
<td>26</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
<tr>
<td>15</td>
<td>27</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
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<tr>
<td>16</td>
<td>28</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
<tr>
<td>17</td>
<td>29</td>
<td>Group</td>
<td>90 min</td>
<td>SER</td>
</tr>
</tbody>
</table>
"It is night and you are flying on a helicopter with your Company near the DMZ, heading toward LZ Sixer. Although you have been told that it is not likely to be a hot LZ, you and the other soldiers with you are prepared for anything. As you approach the LZ you can hear the sound of gunfire and explosions and you realize that the Company that preceded you to the LZ is coming under attack, which means that you will have a hot landing when you arrive. Immediately your heart rate accelerates and your mouth becomes dry. As you approach, the battle sounds grow louder and you see the muzzle flashes along the treeline. The helicopter touches down briefly and everyone jumps out. The air is thick with the sounds of battle: gunfire, explosions, shouts of wounded men. The soldier right behind you is hit in the shoulder and falls back into the helicopter, which takes off with him still in it. It occurs to you that it could have been you that got hit. Amidst the chaos of battle you're ordered to a position on the south side of the LZ. For the next three hours you and your Company are fighting for your lives. The firing is very heavy, and you can smell the odors of gunshot and burnt flesh around you. You feel angry because your commanders did not warn you that LZ Sixer was under attack. At some point they start walking mortar rounds into the camp. They have you pinned down and you are helpless at this point to do anything other than bury your head deep into your shallow foxhole and hope that none land near you. You feel helpless and terrified, and you wonder if you will ever see your family again.

You raise your rifle to fire, but it jams. Again you feel helpless and frightened as you prepare to meet their attack with nothing but your knife. Suddenly a grenade explosion wipes out the approaching enemy soldiers, scattering you with debris and body parts. You are horrified at the carnage but are powerless to stop it. For the remainder of the night, even for several hours after the firing dies down you must keep your position. You feel very distressed as you listen to the moans and cries of wounded and dying soldiers, but there is nothing you can do.

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Table 2. Sample exposure scene

<table>
<thead>
<tr>
<th>Scene Description</th>
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<tbody>
<tr>
<td>&quot;It is night and you are flying on a helicopter with your Company near the DMZ, heading toward LZ Sixer. Although you have been told that it is not likely to be a hot LZ, you and the other soldiers with you are prepared for anything. As you approach the LZ you can hear the sound of gunfire and explosions and you realize that the Company that preceded you to the LZ is coming under attack, which means that you will have a hot landing when you arrive. Immediately your heart rate accelerates and your mouth becomes dry. As you approach, the battle sounds grow louder and you see the muzzle flashes along the treeline. The helicopter touches down briefly and everyone jumps out. The air is thick with the sounds of battle: gunfire, explosions, shouts of wounded men. The soldier right behind you is hit in the shoulder and falls back into the helicopter, which takes off with him still in it. It occurs to you that it could have been you that got hit. Amidst the chaos of battle you're ordered to a position on the south side of the LZ. For the next three hours you and your Company are fighting for your lives. The firing is very heavy, and you can smell the odors of gunshot and burnt flesh around you. You feel angry because your commanders did not warn you that LZ Sixer was under attack. At some point they start walking mortar rounds into the camp. They have you pinned down and you are helpless at this point to do anything other than bury your head deep into your shallow foxhole and hope that none land near you. You feel helpless and terrified, and you wonder if you will ever see your family again. You feel the swell of panic and anxiety. Your heart is racing, your breathing is rapid, and you are sweating heavily as you worry about your own and your friends. At one point you look up and see several Vietnamese soldiers charging your position and you realize that you are on the verge of being overrun. You raise your rifle to fire, but it jams. Again you feel helpless and frightened as you prepare to meet their attack with nothing but your knife. Suddenly a grenade explosion wipes out the approaching enemy soldiers, scattering you with debris and body parts. You are horrified at the carnage but are powerless to stop it. For the remainder of the night, even for several hours after the firing dies down you must keep your position. You feel very distressed as you listen to the moans and cries of wounded and dying soldiers, but there is nothing you can do to help them. You must keep your post. You feel responsible to help them, but there is nothing you can do. Again, you feel the growing surge of anxiety and you fear that it is almost too much to bear. You want to do something, but you are powerless.&quot;</td>
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</tbody>
</table>

should be considered dynamic, often being narrowed to focus almost exclusively on the core fears. Exposure sessions were terminated following a 50% reduction in within-session reactivity to the traumatic cues (i.e. within-session extinction was achieved). Reactivity was monitored physiologically (i.e. heart rate) and by patient ratings of subjective distress. There were 14 exposure sessions conducted in three sessions per week that averaged approximately 90 min each. Total therapist time for the exposure component was approximately 21 hr.

Programmed practice. The programmed practice component of TMT was implemented during the final seven individual exposure therapy sessions. Programmed practice was designed to allow the veteran to take partial responsibility for planning and extending the exposure sessions to real-life situations in the natural environment, thus assuming some control over and responsibility for treatment, and facilitating maintenance and increasing the likelihood of generalization. Although the therapists provided some advice in the planning of these activities, the primary planning responsibility was the patient's, and the exposure was self-conducted. Examples of programmed practice exercises included self-directed imaginal sessions at home (where the veteran reviewed the same imaginal scene used with the therapist), watching movies such as Platoon or Hamburger Hill, visiting war memorials or museums, speaking with other veterans or loved ones about war experiences, visiting airfields or helicopter pads, and attending social events.

Social and Emotional Rehabilitation (SER). Social and Emotional Rehabilitation was implemented in small group sessions (two to five patients) and designed to serve multiple functions. One purpose was to teach veterans the requisite skill foundation for effective and rewarding social interactions. Although veterans with PTSD vary widely with respect to basic social skill, virtually all have room for improvement, possibly due to lack of use in many cases. Rehabilitation was divided into three interrelated components.

The first component was Social Skills Training (SST), which was further divided into two sections. The first was Social Environment Awareness, which involved teaching the nuances of when, where, and why to initiate and terminate interpersonal interactions. Veterans were taught the verbal and nonverbal mechanics of successful social encounters, including identification of appropriate conversation topics, specific exercises designed to enhance attention and listening skills, and effective topic transitions. The second SST section, Interpersonal Skills Enhancement, was devoted to teaching patients how to establish and maintain friendships, appropriate telephone skills, and assertive communication. This component was designed to help patients learn those skills that are necessary to engage in new and diverse social activities in order to increase their social repertoires and the likelihood that social interactions would become intrinsically rewarding.

The second SER component was Anger Management, which taught veterans how to better manage anger and other intense emotions, and was designed to reduce temper outbursts and the problematic expression of anger. Specifically, this component was designed to give patients a range of strategies for expressing their anger, problem solving, improving their emotional modulation,
Table 3. Mean scores for clinician ratings at pre- and post-treatment

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<thead>
<tr>
<th></th>
<th>Pre-</th>
<th>Post-</th>
<th>N</th>
<th>t</th>
<th>P</th>
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<tr>
<td>HAMA</td>
<td>33.91 (9.38)</td>
<td>23.26 (4.20)</td>
<td>11</td>
<td>4.88</td>
<td>0.0006</td>
</tr>
<tr>
<td>CGI</td>
<td>6.09 (0.70)</td>
<td>4.00 (0.78)</td>
<td>11</td>
<td>6.10</td>
<td>0.0001</td>
</tr>
<tr>
<td>CAPS</td>
<td>82.46 (19.23)</td>
<td>65.55 (8.51)</td>
<td>11</td>
<td>2.77</td>
<td>0.0198</td>
</tr>
</tbody>
</table>

and communicating assertively, so that verbal and physical violence do not continue to disrupt their relationships with others.

In the final component, Veterans’ Issues Management, patients learned to improve communication regarding combat trauma and military issues with non-veterans, so as to increase the understanding of significant others. They were also taught how to assertively communicate when they were unable/unwilling to talk to others about certain issues. In addition, they were taught to identify and challenge negative and dichotomous thinking patterns (e.g. the belief that all civilians must be distrusted because they have not been to war) that limit their quality of life by reducing their involvement with others.

Social and Emotional Rehabilitation included instruction, modeling, behavioral rehearsal, feedback, reinforcement, and homework assignments. It was conducted in 90-min group sessions held twice a week for the first two weeks, then once per week for 10 weeks. Following each SER session, veterans were given homework assignments to allow further practice of newly acquired skills.

RESULTS

Dropouts

Eleven patients were included in the analyses, because four of the 15 (27%) dropped out during the course of treatment. One veteran discontinued after a few sessions of exposure treatment without giving a reason. The remaining three dropped out after successfully completing the exposure phase and all reported benefiting from the treatment; two of these veterans dropped out because their employment took them to another city, and the other cited transportation problems and ‘personal concerns’ for not being able to participate in the SER phase. Of the four dropouts, two were Caucasian and two were African American.

Post-treatment outcome

Because the small sample size did not provide sufficient power for a multivariate analysis, correlated two-tailed t-tests were used to evaluate change in patient status from pre- to post-treatment on each outcome measure. In order to reduce family-wise error rates, a conservative alpha level of P < 0.01 was set for post-treatment analyses.

Clinician ratings. From pre- to post-treatment there was significant improvement on the CGI and HAMA (both Ps < 0.01; see Table 3); and there was a trend toward significant improvement on the CAPS [t(10) = 2.77; P < 0.02].

Patient symptom ratings (self-monitoring). From pre- to post-treatment patients reported a significant increase in total hours of sleep and number of social activities, as well as a decrease in frequency of nightmares (all Ps < 0.01; see Table 4); and although not significant, there was a trend toward positive improvement for flashbacks [t(10) = 2.95; P < 0.02].

Table 4. Mean scores for patient symptom ratings (self-monitoring) and heart rate reactivity at pre- and post-treatment

<table>
<thead>
<tr>
<th></th>
<th>Pre-</th>
<th>Post-</th>
<th>N</th>
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<td>Patient symptom ratings:</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep</td>
<td>30.55 (8.64)</td>
<td>36.09 (8.85)</td>
<td>11</td>
<td>4.45</td>
<td>0.0012</td>
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<td>Nightmares</td>
<td>9.73 (5.12)</td>
<td>5.55 (3.14)</td>
<td>11</td>
<td>4.44</td>
<td>0.0013</td>
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<tr>
<td>Social activities</td>
<td>0.55 (0.69)</td>
<td>2.55 (0.93)</td>
<td>11</td>
<td>8.56</td>
<td>0.0001</td>
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<tr>
<td>Flashbacks</td>
<td>9.00 (5.53)</td>
<td>6.27 (4.65)</td>
<td>11</td>
<td>2.95</td>
<td>0.0146</td>
</tr>
<tr>
<td>Heart rate:</td>
<td>89.73 (9.81)</td>
<td>77.00 (8.65)</td>
<td>11</td>
<td>5.34</td>
<td>0.0003</td>
</tr>
</tbody>
</table>
Table 5. Mean scores for African American and Caucasian patients at pre- and post-treatment

<table>
<thead>
<tr>
<th></th>
<th>Pre-</th>
<th>Post-</th>
<th>N</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>African American:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGI</td>
<td>6.00 (0.82)</td>
<td>3.75 (0.96)</td>
<td>4</td>
<td>3.58</td>
<td>0.0374</td>
</tr>
<tr>
<td>HAMA</td>
<td>30.50 (12.01)</td>
<td>22.50 (5.07)</td>
<td>4</td>
<td>1.83</td>
<td>0.1651</td>
</tr>
<tr>
<td>CAPS</td>
<td>76.25 (12.55)</td>
<td>70.50 (9.11)</td>
<td>4</td>
<td>1.00</td>
<td>0.3910</td>
</tr>
<tr>
<td>HR</td>
<td>85.75 (11.64)</td>
<td>76.00 (10.30)</td>
<td>4</td>
<td>2.73</td>
<td>0.0718</td>
</tr>
<tr>
<td>Nightmares</td>
<td>9.50 (5.00)</td>
<td>5.25 (2.87)</td>
<td>4</td>
<td>2.67</td>
<td>0.1007</td>
</tr>
<tr>
<td>Sleep</td>
<td>24.00 (3.56)</td>
<td>29.00 (2.94)</td>
<td>4</td>
<td>2.81</td>
<td>0.0673</td>
</tr>
<tr>
<td>Nightmares</td>
<td>6.25 (4.27)</td>
<td>4.50 (3.11)</td>
<td>4</td>
<td>1.70</td>
<td>0.1881</td>
</tr>
<tr>
<td>Social activities</td>
<td>0.75 (0.96)</td>
<td>2.75 (0.50)</td>
<td>4</td>
<td>4.90</td>
<td>0.0163</td>
</tr>
<tr>
<td><strong>Caucasian:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGI</td>
<td>6.14 (0.69)</td>
<td>4.14 (0.69)</td>
<td>7</td>
<td>4.58</td>
<td>0.0038</td>
</tr>
<tr>
<td>HAMA</td>
<td>35.86 (7.88)</td>
<td>23.86 (3.98)</td>
<td>7</td>
<td>4.98</td>
<td>0.0025</td>
</tr>
<tr>
<td>CAPS</td>
<td>86.00 (22.30)</td>
<td>62.71 (7.2)</td>
<td>7</td>
<td>2.79</td>
<td>0.0315</td>
</tr>
<tr>
<td>HR</td>
<td>92.00 (8.72)</td>
<td>77.57 (8.40)</td>
<td>7</td>
<td>4.59</td>
<td>0.0037</td>
</tr>
<tr>
<td>Nightmares</td>
<td>9.86 (5.58)</td>
<td>5.71 (3.50)</td>
<td>7</td>
<td>3.92</td>
<td>0.0078</td>
</tr>
<tr>
<td>Sleep</td>
<td>34.29 (8.56)</td>
<td>40.14 (8.57)</td>
<td>7</td>
<td>3.32</td>
<td>0.0160</td>
</tr>
<tr>
<td>Nightmares</td>
<td>10.57 (5.87)</td>
<td>7.29 (5.28)</td>
<td>7</td>
<td>2.45</td>
<td>0.0497</td>
</tr>
<tr>
<td>Social activities</td>
<td>0.43 (0.54)</td>
<td>2.43 (1.13)</td>
<td>7</td>
<td>6.48</td>
<td>0.0006</td>
</tr>
</tbody>
</table>

**Patient overall ratings.** Veterans completed an evaluation of their treatment experience at post-treatment: two (18%) rated themselves as at least 75% improved, five (45%) as 50% improved, and three (27%) as 25% improved. Furthermore, 10 (91%) of the patients reported that they would encourage other veterans with PTSD to participate in the treatment program, indicating that they considered their overall treatment experience as positive.

**Physiological reactivity.** Heart rate reactivity to traumatic cues showed significant improvement from pre- to post-treatment ($P < 0.01$; see Table 4).

**Self-report inventories.** There was no significant improvement from pre- to post-treatment in clinical status as assessed by the SPAI, BDI, or AX (all $P$ s > 0.01).

**Functional indicators.** None of the 11 patients required psychiatric hospitalization or incurred any new legal charges during their involvement in the treatment program. Furthermore, none of the veterans who were employed at the start of treatment lost or quit their jobs during treatment; and one patient who was initially unemployed, returned to work during the SER phase of treatment.

**Analysis of treatment components**

For purposes of examining component efficacy, mid-treatment measures were administered after completion of exposure therapy (session 15) but prior to the commencement of SER. Analysis of these data indicated that patients showed significant improvement from pre- to mid-treatment on the CGI ($t(10) = 6.25; P < 0.01$), the HAMA ($t(10) = 4.03; P < 0.01$), total hours of sleep ($t(10) = 3.55; P < 0.01$), and HR reactivity ($t(10) = 5.36; P < 0.01$). In addition, patients showed significant improvement from mid- to post-treatment on the CGI ($t(10) = 2.21; P < 0.05$), the HAMA ($t(10) = 2.33; P < 0.05$), and social activities ($t(10) = 8.03; P < 0.01$). These data indicate that veterans responded with significant improvement after completion of the exposure therapy phase, and incremental improvement upon completion of SER in a manner consistent with the rationale for each of the components. In particular, it is important to note that significant improvement in social activities occurred only after the implementation of SER.

**Analysis of effects by race**

Pre- and post-treatment data for Caucasian and African Americans on clinician ratings, HR reactivity, and patient ratings are presented in Table 5. Because the sample in each group was small, no comparative analyses were conducted. Examination of within-group changes showed that Caucasians improved significantly on all variables. African Americans improved significantly on the CGI and social activities, with a trend toward positive improvement for most other variables. Although there was significant change on more variables for Caucasians, this might be due to the larger sample for that group. At this point, the data suggest that TMT should be efficacious for both African American and Caucasian veterans.
DISCUSSION

The initial findings from this preliminary study of TMT suggest that it is an efficacious treatment for combat-related PTSD. The findings are particularly impressive because the Ss are chronic VA patients and the sample is similar to the typical PTSD patient in treatment at VA clinics. The goal of developing a treatment capable of addressing the pervasive features associated with PTSD was achieved. Over a relatively short period of time (four months), significant improvement was made on most of the critical features of PTSD, including general anxiety, flashbacks, heart rate reactivity, nightmares, sleep disturbance and overall social functioning. In general, the results achieved with TMT appear to be superior to those reported for exposure alone, although no direct comparison was made here. Importantly, patient ratings indicate overall acceptance of the treatment, and only one patient dropped out because of therapy dissatisfaction. Furthermore, although the sample is small, results of the exploratory analysis suggest that TMT is efficacious for both Caucasian and African Americans. Finally, the significant reduction achieved in heart rate reactivity is particularly important because this variable has been proven to have good discriminative ability, even when individuals attempt to exaggerate or disguise their response (Gerardi et al., 1989; Blanchard & Kolb, 1989; Orr & Pitman, 1993).

Analysis of pre- to mid-treatment results with those of mid- to post-treatment directly supports the contention that exposure alone is insufficient as a treatment for chronic combat-related PTSD. Although symptoms associated with emotional overarousal were decreased at mid-treatment (i.e. after exposure treatment), indications of improvement in social activities are not evident until post-treatment (i.e. following social and emotional rehabilitation).

Although the results achieved with TMT are impressive given the chronicity and level of comorbidity among those treated, a number of important areas of functioning did not appear to improve. For example, the data indicate that the expression and experience of anger did not improve over treatment. At this point, it is unclear why improvement was not noted, but one possible explanation is the assessment method. The only anger measure used was a self-report inventory (AX), which may not be a particularly sensitive or valid way of assessing therapeutic change in this population. In ongoing efforts, we are using self-monitoring strategies (e.g. daily logs of explosive episodes and anger ratings) that might prove more satisfactory. Our clinical impression is that TMT did, in fact, have some positive effect on anger because many of the veterans anecdotally reported having more control of their anger at post-treatment.

The fact that improvements were not found on veterans' responses to self-report inventories (e.g. SPAI, BDI, AX) is disappointing, especially because these data were incongruent with those collected by other measurement methods. It is important to note that nine (82%) of the veterans included in the analysis were seeking VA disability compensation for PTSD during their treatment, and this may have influenced their performance on self-report inventories. This possibility is supported by the widely reported phenomena of symptom overreporting on self-report measures in this population (e.g. Fairbank, Keane & Malloy, 1983; Hyer, Boudewyns, Harrison, O'Leary, Bruno, Saucer & Blount, 1988), as well as the recent finding that compensation-seeking veterans represent themselves very differently from non-compensation-seeking veterans on self-report measures (Frueh, Smith & Barker, 1996). Another possibility is that, although veterans were able to recognize some of their treatment gains (e.g. symptom reductions), they were not able to internalize these specific benefits when responding to more global questionnaires. In other words, the self-perceptions developed over 25-30 yr of PTSD suffering may be slower to change than overall emotionality, a question that can be answered with long-term follow-up studies.

There are several other limitations to the findings presented here (e.g. small sample size, lack of comparison groups, non-blind clinician ratings), many of which are common for a pilot study. Nevertheless, the encouraging results support the further study of TMT using a controlled comparison design, as well as studies designed specifically to determine the extent to which the SER and programmed practice components enhance the treatment efficacy of traditional exposure therapy.

There are a number of issues regarding the successful implementation of TMT that merit comment. The current study began with intensive exposure therapy, administered in individual sessions. We believe achieving within-session extinction for each intensive exposure session is
crucial. The SER component was not implemented until after each veteran had successfully completed exposure, and this sequencing is thought to be important. Many patients likely would not be able to engage in the intensive structured SER phase before their chronic overarousal is reduced. In general, treatment non-compliance (i.e. failure to complete homework assignments) was found to be one of the most challenging aspects of treatment. Some veterans may require some degree of individual attention to maximize their participation. Finally, it is unclear from the current data what type of follow-up treatment or relapse prevention, if any, is necessary upon completion of TMT. In the present sample, four of the patients were discharged from the clinic upon successful completion of the treatment, while the remaining seven remained involved in various clinic activities on at least a semi-regular basis. One of the SER groups asked to continue with weekly sessions to provide further training in social skills. Unfortunately, the issue of patient discharge with this population is confounded by compensation-seeking in that many patients have an incentive to continue treatment for purposes of acquiring or maintaining disability pay.

Finally, because we do not have follow-up data, one major question is whether the treatment gains will be maintained over time. In an era of changing health care priorities (e.g. Yates, 1994), it will be important to consider the cost-effectiveness of different treatment strategies for PTSD using available economic analytical techniques (e.g. Eisenberg, 1989; Warner & Luce, 1982). Assuming strict adherence to the TMT treatment protocol, with four veterans and one therapist in each SER group, this treatment program provides 43.5 hr of therapist contact per patient, while requiring only a total of 27.75 therapist hours per patient (because a portion of the treatment is administered in a group format). From a time perspective, this is not necessarily any more intensive than what is typically offered to this population (e.g. 'standard care' at a VA facility), and may be substantially less in many cases. If TMT proves to provide adequate symptom reduction for a significant percentage of patients, it would constitute a dramatic reduction in the amount of therapist time (and other resources) required for PTSD treatment in most VA settings. Considering that none of the patients examined in this study required psychiatric hospitalization during their care, TMT may actually be significantly more cost-effective than its more conventional alternatives. Furthermore, it is interesting that at least one patient who did not have a job at the beginning of treatment obtained one during the course of treatment, and no one quit a job or became functionally more impaired during treatment.

A treatment guide (Turner et al., 1996) and patient handbook for TMT have been developed and are available from the authors.

REFERENCES


