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Sexual Problems Predict PTSD and Depression Symptom Change Among Male OEF/OIF Veterans Completing Exposure Therapy

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Abstract

Objective—A growing literature documents frequent sexual problems among Operations Enduring/Iraqi Freedom (OEF/OIF) veterans with posttraumatic stress disorder (PTSD). However, there has been no examination of how 1) sexual problems may be affected by evidenced-based psychotherapy for PTSD, or 2) how the presence of sexual problems might impact effectiveness of evidenced-based psychotherapy for PTSD. As such, the present study investigated associations among symptoms of PTSD, depression, and problems with sexual desire and arousal among 45 male OEF/OIF veterans receiving Behavioral Activation and Therapeutic Exposure (BA-TE), an evidence-based behavior therapy targeting co-occurring symptoms of PTSD and depression.

Method—Participants completed clinical interviews and several questionnaires including measures of sexual arousal, sexual desire, PTSD symptoms, and depression symptoms at baseline and after completion of 8-sessions of BA-TE treatment. A records review was also conducted to assess for relevant medication use.

Results—Overall, sexual desire and sexual arousal problems did not improve during the course of treatment. Moreover, veterans with co-occurring sexual problems at baseline evidenced significantly less improvement in symptoms of PTSD and depression across treatment as compared to veterans without sexual problems.

Conclusions—These findings suggest that veterans with co-occurring symptoms of PTSD and sexual problems may require additional assessment and treatment considerations in order to improve their treatment outcomes for both primary psychiatric symptoms as well as sexual problems. Future research on combination treatments of medication for sexual problems and psychotherapy for PTSD is needed.

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Conflicts of Interest

The authors have no conflicts of interest to disclose.

Keywords

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Veterans returning from Operations Enduring/Iraqi Freedom (OEF/OIF) display high rates of both post-traumatic stress disorder (PTSD) and depression (Hoge, Auchterlonie, & Miliken, 2006; Vaughan, Schell, Tanielian, Jaycox, & Marshall, 2014). Symptoms of PTSD and depression among OEF/OIF veterans have been linked to a range of problems with interpersonal functioning, including deficits in perceived social support, lower rates of satisfaction in intimate relationships, poorer family cohesion, and difficulty with role adjustment (Goff, Crow, Reisbig, & Hamilton, 2007; Sayers, Farrow, Ross, & Oslin, 2009; Tsai, Harpaz-Rotem, Pietrzak, & Southwick, 2012). Problems with interpersonal functioning are linked to greater PTSD and depression symptom severity, lower rates of improvement during treatment, and treatment discontinuation among OEF/OIF veterans (DeBeer, Kimbrel, Meyer, Gulliver, & Morissette, 2014; Gros, Price, Yuen, & Acierno, 2013; Sayers et al., 2009).

Sexual dysfunction; including difficulties with sexual desire, arousal, and orgasm, as well as pain during intercourse among female veterans; is an area of growing interest for understanding intimate relationship functioning among OEF/OIF veterans with PTSD and depression. Large-scale medical record reviews suggest the prevalence of any type of sexual dysfunction diagnosis is between 5.5 and 7% for male OEF/OIF veterans seeking treatment within the Department of Veterans Affairs (VA) healthcare system (Hosain et al., 2013; Turchik et al., 2012). Sexual dysfunction is more common among males, older veterans (> 40 years: 15.7% vs. 18–40 years: 3.6%), those who are separated/divorced/widowed, and those with hypertension (Hosain et al., 2013; Turchik et al., 2012). In both of these studies, diagnoses of PTSD and depression were linked to higher prevalence of sexual dysfunction; however, Hosain and colleagues (2013) found that the relationship between depression and sexual dysfunction was moderated by age, such that depression was only linked to sexual dysfunction among younger veterans. More recently, Breyer and colleagues (2014) completed a retrospective cohort study of over 400,000 veterans of OEF/OIF and found that those with PTSD were more likely to have a sexual dysfunction, be prescribed medication for a sexual dysfunction, or both (10.6%), when compared to OEF/OIF veterans with a non-PTSD psychiatric diagnosis (7.2%) or without any psychiatric diagnosis (2.3%).

Researchers are also beginning to examine sexual problems among OEF/OIF veterans seeking treatment for psychiatric diagnoses. For example, problems with sexual desire, ED, or ejaculatory delay/anorgasmia were reported by 88.7% of OEF/OIF veterans in a residential PTSD treatment program (Hirsch, 2009). It was hypothesized that autonomic arousal, anger/hostility, and relationship difficulties were most associated with sexual problems in this sample. In a second study, 12% of OEF/OIF veterans with subthreshold or full criteria PTSD participating in a psychotherapy trial had been previously diagnosed with ED (Badour, Gros, Szafranski, & Acierno, 2015). Among the subsample of veterans in this study who reported being in an intimate relationship at the time of assessment, 72% reported at least some sexual desire problems, and 62% reported problems with sexual arousal.

Minority status, severity of combat exposure, and lack of social support were all positively associated with sexual desire and arousal problems. After controlling for these factors, severity of PTSD avoidance/numbing symptoms also significantly predicted sexual desire problems. This finding is consistent with previous work suggesting that emotional numbing may impede intimacy and attachment within romantic relationships, thus serving as a potential mechanism through which symptoms of PTSD may drive problems in sexual functioning among younger veterans (Nunnink, Goldwaser, Afari, Nievergelt, & Baker, 2010). Although neither of these studies focused explicitly on depressive symptoms, etiological links between depression and sexual dysfunction have received significant attention in the literature (Laurent & Simons, 2009; Makhoul, Kparker, & Niederberger, 2007).

Taken together, a mounting body of evidence supports a relation between sexual problems and both PTSD and depression among OEF/OIF veterans. Despite this, far less research has focused on the treatment of these co-occurring conditions (Kotler et al., 2000; Orr et al., 2006; Safarinejad, Kolahi, & Ghaedi, 2009). Selective serotonin reuptake inhibitors (SSRIs) are a common class of medications prescribed to treat symptoms of both depression and PTSD (Kupfer, Frank, & Phillips, 2012; Steckler & Risbrough, 2012). Unfortunately, sexual problems are a well-documented and common side effect reported in patients treated with SSRIs for depression (Sidney & Sakina, 2009). In comparison, there have been relatively few studies examining the impact of SSRI use on sexual functioning among patients with PTSD. In one such study, Kotler and colleagues (2000) demonstrated that patients with PTSD evidenced poorer sexual functioning compared to healthy controls, and treatment of PTSD symptoms via SSRIs further exacerbated sexual dysfunction in comparison to participants with PTSD who had not been treated with SSRIs.

Several studies support the use of medications designed specifically to treat ED (e.g., sildenafil citrate, tadalafil) in patients with mild to moderate depression, as well as to treat SSRI-induced ED (Fink, Mac Donald, Rutks, Nelson, & Wilt, 2002; Segraves et al., 2007). In contrast, only two studies have examined the impact of ED medication use among patients with PTSD and sexual dysfunction. Orr and colleagues (2006) investigated 21 veterans with PTSD and ED symptoms in a 4-week double-blind crossover design for sildenafil citrate and placebo. Results demonstrated significant improvements in ED symptoms, but not ED diagnosis (Orr et al., 2006). In the second study, Safarinejad and colleagues (2009) investigated 266 veterans with PTSD who were randomized into either the sildenafil citrate or placebo groups for 16 doses/attempts. At the end of the trial, sildenafil citrate did not result in significant improvements in erectile function, successful attempts at sexual intercourse, frequency of intercourse, patient and partner satisfaction, or quality of life.

To our knowledge, there has been no examination of the association between sexual problems, PTSD symptoms, and/or depression symptoms among individuals receiving evidence-based exposure therapy. As such, the goal of the present study was to investigate relations among symptoms of PTSD, depression, and sexual problems within a sample of OEF/OIF veterans receiving a course of evidence-based psychotherapy. The treatment examined in the present study, Behavioral Activation and Therapeutic Exposure (BA-TE;

Gros et al., 2011, 2012) is an eight-session exposure-based therapy designed to treat patients with PTSD and co-occurring symptoms of depression. Given that depression is highly comorbid with both PTSD (Campbell et al., 2007) and sexual dysfunctions (Atlantis & Sullivan, 2012), this approach allowed for a more externally valid examination of the interrelations among common symptoms experienced by OEF/OIF veterans seeking psychotherapy in a VA outpatient setting.

First, we investigated the influence of BA-TE on self-reported PTSD and depression symptoms among veterans with subthreshold and full diagnoses of PTSD and co-occurring symptoms of depression. Second, we examined whether baseline sexual problems affected treatment outcome of BA-TE for PTSD and depression symptoms. Given previous associations between sexual dysfunction and a number of problematic outcomes (Meuleman, 2002), as well as the fact that other indices of impairment in interpersonal relationship functioning have been linked to poorer outcomes in PTSD treatment (Evans, Cowlshaw, & Hopwood, 2009; Price, Gros, Strachan, Ruggiero, & Acerino, 2013), we hypothesized that veterans with sexual problems would demonstrate smaller improvements in PTSD and depressive symptoms during the course of BA-TE. Finally, we examined whether self-reported sexual problems improved during BA-TE. Although BA-TE was not specifically designed to address sexual problems, we might expect improvements in PTSD and depression symptoms to correlate with improvement in sexual problems.

Method

Participants

Participants were drawn from a larger study of combat veterans recruited from mental health clinics in a large southeastern VA Medical Center to participate in a randomized controlled trial comparing in person and telehealth delivered Behavioral Activation and Therapeutic Exposure (BA-TE), an exposure-based therapy designed to improve treatment outcome in patients with PTSD and co-occurring symptoms of depression (Gros et al., 2011, 2012; Strachan et al., 2012). Participants in the larger trial were required to meet diagnostic criteria for combat-related PTSD or subthreshold PTSD, the latter of which was defined as meeting Criterion A (traumatic event), Criterion B (re-experiencing), and either Criterion C (avoidance) or D (hyperarousal; Grubaugh et al., 2005) on the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). Severity of co-occurring depression symptoms were allowed to vary in this study. Participants with active psychosis, acute suicidality, or alcohol/substance dependence, as assessed by the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-IV; First et al., 1996), were excluded from the study. Participants on active medications were required to maintain current dosages for the duration of treatment. Participants in the current investigation were limited to a subsample of male OEF/OIF veterans enrolled in the trial ($n = 102$) who reported being in a relationship at treatment baseline ($n = 46$), and who completed an assessment of sexual problems (final $N = 45$).

Seventy-one percent of the sample met full diagnostic criteria for current PTSD at baseline ($n = 32$), while the remainder met criteria for sub-threshold PTSD ($n = 13$). Twenty-one percent also met diagnostic criteria for a current major depressive episode ($n = 9$). Information regarding current major depressive episode was unavailable for four participants

at the baseline assessment. The sample had a mean age of 35.47 years ($SD = 9.14$). Racial breakdown was White ($n = 28$; 62.2%), Black ($n = 16$; 35.6%), or Other ($n = 1$; 2.2%). The majority of participants were married ($n = 31$; 68.9%) and employed ($n = 31$; 68.9%). Participants served in the Army ($n = 26$; 57.8%), Air Force ($n = 9$; 20.0%), Navy ($n = 5$; 11.1%), or Marines ($n = 5$; 11.1%). Participants reported an average of 13.17 years of education ($SD = 2.69$), and 2.68 ($SD = 2.66$) deployments during the five years preceding the study.

Measures

PTSD diagnosis and symptoms—Past-month PTSD diagnostic status was measured via the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). The CAPS is a semi-structured clinical interview that is considered to be a highly reliable and valid diagnostic measure for assessing PTSD as defined by the fourth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; American Psychiatric Association, 1994). This measure evidences excellent psychometric properties including strong convergent and discriminant validity, and adequate test-retest and interrater reliability.

Self-reported PTSD symptom severity was assessed via the PTSD Checklist-Military Version (PCL-M; Weathers, Huska, & Keane, 1991) at baseline and post-treatment. The PCL-M is a self-report measure that assesses past-month severity of distress associated with each of the 17 symptoms of PTSD on a five-point scale (1 = *Not at all*, 5 = *Extremely*). This measure has good convergent and discriminant validity and demonstrates adequate test-retest reliability and internal consistency among veteran samples.

Major depressive disorder (MDD) diagnosis and symptoms—Presence of comorbid past-month MDD diagnosis was assessed via the MDD module of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-IV; First, Spitzer, Gibbon, & Williams, 1996). The SCID-IV demonstrates adequate to strong validity and reliability, and is typically considered a highly reliable and valid diagnostic assessment of MDD.

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess self-reported symptoms of depression at baseline and post treatment. The BDI-II is a 21-item measure designed to assess the cognitive, affective, behavioral, motivational, and somatic symptoms of depression in adults and adolescents. Respondents indicate the severity of current depressive symptoms on a four-point Likert-type scale (0 to 3). The BDI-II has been shown to provide excellent test-retest reliability, internal consistency, and convergent and discriminant validity in multiple samples (Beck et al., 1996).

Sexual Problems—Consistent with the approach of Badour and colleagues (2015), problems with sexual desire and sexual arousal in the context of a current relationship were assessed at baseline and post-treatment via two items from the romantic relationship scale of the Inventory of Psychosocial Functioning (IPF; Rodriguez, Holowka, & Marx, 2011): Desire—"I was interested in sexual activity with my spouse or partner" and Arousal—"I had trouble becoming sexually aroused with my spouse or partner". Items were rated on a seven-point Likert-type scale (1 = *Never*, 7 = *Always*). The IPF is an 87-item self-report measure that assesses seven domains of functional impairment: romantic relationships, family

relationships, work, friendships and socializing, parenting, education, and self-care. The IPF subscales demonstrate good internal consistency and scores on the IPF romantic relationships scale have been shown to correlate with other measures of social functioning (Rodriguez et al., 2011). The IPF-Desire item has also been shown to correlate strongly with other self-report indices of sexual desire problems, and the IPF-Arousal item has been shown to correspond with diagnostic history of erectile dysfunction (Badour et al., 2015).

Social support—Perceived social support was indexed by averaging scores across the 19-items of the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne & Stewart, 1991). The MOS Social Support Survey is a questionnaire that assesses five dimensions of social support including emotional (e.g., empathetic understanding), informational (e.g., offering of advice or guidance), tangible (e.g., material aid), and affectionate support (e.g., availability of expressions of love and affection), as well as positive social interactions (e.g., availability of shared positive experiences). Items are rated on a six-point scale (1 = *All of the time*, 6 = *None of the time*). This measure evidences good convergent and discriminant validity, as well as adequate to strong internal consistency and test-retest reliability (Sherbourne & Stewart, 1991). Higher scores represent greater problems with social support.

Combat exposure—Combat exposure was assessed using the 7-item Combat Experiences Scale (CES; Keane et al., 1989). The CES, which evidences adequate internal consistency and test-retest reliability, assesses both duration and intensity of combat exposure.

Medication use—A review of VA Computerized Patient Record System electronic medical records was conducted to determine whether veterans in the sample were taking any SSRI/SNRI medications (yes/no) or any medications for ED (e.g., sildenafil, tadalafil; yes/no) during treatment. Permission to review electronic medical records was obtained as part of the informed consent procedure in order to review current and historical medical information relevant to the research study and ongoing clinical care.

Procedures

The university-affiliated institutional review board and the local VA Office of Research and Development approved all procedures and participants were provided written informed consent prior to participating. A full description of the treatment protocol is published elsewhere (Gros et al., 2011, 2012). In brief, BA-TE includes eight weekly 90-minute sessions of individual manualized treatment that integrates behavioral activation (sessions 1–3), with both situational and imaginal exposures (sessions 4–8). The treatment was delivered by masters-level therapists who met weekly with the principal investigator for supervision throughout the duration of the study. Sessions were audio-recorded and monitored by an independent rater to ensure treatment fidelity. Patients were randomized to receive treatment in-person ($n = 28$) or via telehealth technology ($n = 17$). Consistent with the primary findings of the larger trial (Gros et al., 2012; Strachan et al., 2012), there were no differences on any of the study variables reported in the present investigation as a function of treatment delivery format. Participants completed baseline and post-treatment assessments that included interview administrations of the CAPS and select modules from the SCID-IV.

Participants also completed a number of self-report measures including a brief demographics questionnaire, the PCL-M, BDI-II, IPF, CES and MOS Social Support Survey.

Data Analysis

Zero-order correlations were used to examine relations among key baseline variables among the full intent-to-treat (ITT) sample. The sample was then split into participants endorsing significant sexual problems, defined as reporting sexual arousal problems *sometimes* to *always* (4 for IPF-Arousal) or sexual desire *never* to *sometimes* at baseline (4 for IPF-Desire; Badour et al., 2015), versus those without. Chi-square or independent-samples *t*-tests were then used to examine differences between these groups on demographic factors (i.e., age, race, education, marital status), other baseline characteristics (i.e., SSRI/SNRI or ED medication use, PCL-M, BDI-II, MOS, CES), and the proportion of participants who discontinued treatment prematurely.

All remaining analyses were conducted among treatment completers. Change scores for PCL-M, BDI-II, IPF-Desire, IPF-Arousal, and MOS were calculated by subtracting baseline scores from post-treatment scores. Zero-order correlations were then examined among change scores and between baseline scores and change scores. Next, paired-samples *t*-tests were used to examine change in PTSD symptoms, depression symptoms, and sexual problems (sexual desire, sexual arousal) from pre- to post-treatment among all treatment completers.. Finally, independent-samples *t*-tests were used to compare change scores between treatment completers with significant sexual problems at baseline versus those without such problems.

Results

Baseline Data

The majority of the total sample ($n = 24$; 53.3%) reported significant sexual problems at baseline. Specifically, 33.3% endorsed problems with desire, 40.0% endorsed problems with arousal, and 20.0% identified problems with both desire and arousal. Table 1 presents comparisons between those with versus without baseline sexual problems on demographic and clinical factors in the full ITT sample. Participants with sexual problems reported higher depression symptoms at baseline. No other comparisons reached the threshold for statistical significance (all $p > .05$).

Medication use was unavailable for three participants. Of participants whose records were available, 50.0% had been prescribed a SSRI/SNRI and 14.3% had been prescribed a medication for ED. Of note, there were no differences between those with versus without significant sexual problems at baseline in terms of SSRI/SNRI [$\chi^2(1) = .86, p = .36$] or ED medication [$\chi^2(1) = .00, p = 1.00$] use. Independent samples *t*-tests demonstrated that baseline depression symptoms on the BDI-II were higher among participants prescribed SSRI/SNRIs, [$t(40) = -2.10, p = .04$]. There were no differences in severity of baseline PTSD symptoms, sexual arousal or sexual desire problems, social support problems, or combat exposure as a function of SSRI/SNRI or ED medication use (all $p > .05$). Depression severity also did not differ as a function of ED medication use ($t(40) = .89, p = .38$).

Table 2 presents zero-order correlations among baseline variables (above the diagonal). Depression symptoms and social support problems were negatively correlated with sexual desire at baseline, while severity of combat exposure was positively related to baseline sexual desire.

Treatment Completion

Sixty-four percent ($n = 29$) of participants in the sample were classified as treatment completers (i.e., attended the full eight sessions). Treatment discontinuation did not differ as a function of baseline sexual problems [sexual problems ($n = 11$), no sexual problems ($n = 5$); $\chi^2(1) = 2.37, p = .12$]. Given primary interests in predicting change across treatment, remaining analyses were conducted among treatment completers only. Post assessment data were unavailable for one participant who completed all eight sessions, resulting in complete data for 28 treatment completers. Similar to the ITT sample, there were no significant differences in terms of age, marital status, race, education, medication use, severity of combat exposure, baseline social support, or baseline PTSD symptom severity between completers who reported significant sexual problems at baseline ($n = 12$) versus those who did not ($n = 16$; all $p > .05$). However, baseline differences in depression symptom severity observed in the ITT sample, were no longer significant among treatment completers [$t(26) = -1.64, p = .11$].

Pre-Post Treatment Change

PTSD—Overall, PTSD symptoms improved significantly across treatment (see Table 3). Baseline social support was associated with change in PTSD symptoms ($r = .37, p = .04$), such that participants with better social support at baseline evidenced greater improvements in PTSD symptoms across treatment. Degree of change in PTSD symptoms was unrelated to SSRI/SNRI [$t(27) = .85, p = .40$] or ED medication use [$t(27) = .09, p = .93$]. There was a trending association between baseline IPF-Desire and change in PCL-M ($r = -.35, p = .06$) and between baseline IPF-Arousal and change in PCL-M ($r = .36, p = .06$), such that PTSD symptoms trended toward improving less among participants with greater problems with sexual desire or sexual arousal at baseline. There were no significant correlations between any other baseline characteristic and PTSD symptom change.

As displayed in Table 3, independent-samples t -tests revealed that participants classified as having significant sexual problems at baseline demonstrated less PTSD symptom improvement across treatment as compared to those without significant baseline sexual problems.

Depression—Depression symptoms also improved significantly across treatment (see Table 3). Degree of change in depression symptoms was unrelated to SSRI/SNRI [$t(27) = -.31, p = .76$] or ED medication use [$t(27) = -.80, p = .43$]. Baseline IPF-Arousal was also significantly correlated with change in BDI-II scores ($r = .40, p = .03$) such that depression symptoms improved less across treatment for participants reporting greater problems with sexual arousal at baseline. There were no other significant correlations between baseline characteristics and depression symptom change.

As displayed in Table 3, independent-samples *t*-tests revealed that participants classified as having significant sexual problems at baseline demonstrated less depression symptom improvement during treatment as compared to those without significant baseline sexual problems.

Sexual problems—Post treatment IPF-Desire and IPF-Arousal scores were available for 21 participants (4 participants were no longer in a relationship at post-treatment and data regarding relationship status at post-treatment was missing for 3 participants). Among the eight treatment completers with significant sexual problems at baseline who were still in a relationship at the end of treatment, 37.5% ($n = 3$) no longer reported significant sexual problems post-treatment, 62.5% ($n = 5$) continued to report significant sexual problems.

Sexual desire: Paired-samples *t*-tests revealed that pre-post differences in IPF-Desire were not significant, suggesting that sexual desire problems did not improve significantly across treatment among the entire subsample with complete data ($n = 28$; Table 3). However, baseline IPF-Desire was significantly correlated with change in IPF-Desire ($r = -.47$, $p = .02$), suggesting that sexual desire improved more across treatment among participants with lower sexual desire at baseline. Similarly, an independent-samples *t*-test (Table 3) showed that participants with significant sexual desire problems at baseline trended toward experiencing greater improvement in sexual desire across treatment relative to those without sexual desire problems at baseline ($p = .09$). Degree of change in sexual desire was unrelated to SSRI/SNRI [$t(20) = -.64$, $p = .76$] or ED medication use [$t(20) = .62$, $p = .54$], and there were no other significant correlations between baseline characteristics and change in sexual desire.

Sexual arousal: Paired-samples *t*-tests demonstrated that pre-post differences in IPF-Arousal were non-significant, suggesting that sexual arousal problems did not improve significantly across treatment among the entire subsample with complete data ($n = 28$; Table 3). However, similar to sexual desire problems, baseline IPF-Arousal correlated with change in IPF-Arousal ($r = -.61$, $p = .002$), suggesting that sexual arousal problems improved more across treatment among participants who were higher in sexual arousal problems at baseline. Similarly, an independent-samples *t*-test (Table 3) showed that participants with significant sexual desire problems at baseline experienced significantly greater improvement in sexual arousal across treatment relative to those without sexual arousal problems at baseline. Degree of change in sexual arousal was unrelated to SSRI/SNRI [$t(20) = .47$, $p = .64$] or ED medication use [$t(20) = -.92$, $p = .37$]. There were no other significant correlations between baseline characteristics and change in sexual arousal.

Correlations among domains of symptom change—Zero-order correlations among change scores (Table 2, below the diagonal) demonstrated that change as PTSD symptoms improved during treatment, depression also improved (and vice versa). Of note, change in PCL-M was positively correlated with change in BDI-II scores suggesting that as PTSD symptoms improved, depression symptoms also improved (and vice versa). Change in IPF-Desire was also negatively correlated with change in IPF-Arousal suggesting that as sexual desire increased across treatment, problems with sexual arousal decreased (and vice versa).

Discussion

The present study investigated relations among symptoms of PTSD, depression, and sexual problems in veterans of OEF/OIF during the course of BA-TE. Veterans with significant sexual problems at baseline evidenced less treatment improvement with respect to symptoms of both PTSD and depression compared to veterans without significant baseline sexual problems. Although no significant changes were found in terms of sexual problems in the overall sample during the course of BA-TE, participants reporting significant sexual problems at baseline reported more improvement in these areas compared to participants without baseline sexual problems. At baseline, sexual desire problems were associated with greater depression severity, and problems with social support. In contrast with previous findings; however, depression severity was unrelated to sexual arousal problems, and PTSD symptom severity was unrelated to either sexual desire or arousal problems at baseline. Although these findings might seem surprising at first glance, this may be due to the restricted range of variability in PTSD and depression symptoms at baseline. Surprisingly, participants with more severe combat exposure reported fewer baseline problems with sexual desire. It is unclear what may be driving this relation, and future investigations should endeavor to isolate the relative contribution of combat (and other types of traumatic events) from associated symptomatology when exploring links with sexual functioning.

Although the BA-TE model moves beyond traditional treatments aimed at improving symptoms of a single disorder by targeting reductions in PTSD and depression symptoms simultaneously, this treatment was not designed to specifically target sexual problems. The finding that overall problems in sexual functioning did not improve during BA-TE is consistent with the persistence or exacerbation of sexual problems seen among patients with PTSD treated with SSRIs or sildenafil citrate (Kotler et al., 2000; Orr et al., 2006; Safarinejad et al., 2009). Although participants with significant sexual problems at baseline did report greater improvements (particularly in terms of sexual arousal) as compared to those without sexual problems at baseline, the small overall effect on sexual problems suggests that these issues may require additional attention among veterans presenting for treatment of PTSD and depression symptoms.

Interestingly, participants with sexual problems demonstrated more severe depression at baseline assessment as well as less improvement in symptoms of depression and PTSD across treatment. It is possible that the presence of sexual problems at baseline reflects generalized impairment in interpersonal functioning, and this impairment is interfering with treatment gains for PTSD and depression symptoms. However, if this were the case, we would expect problems with social support at baseline as indexed by the MOS to predict poorer treatment outcomes for PTSD and depression symptoms. Indeed, this pattern has been observed in previous studies (Evans et al., 2009; Price et al., 2013). Although inclusion of a general social support measure was considered a strength of this study, it would have been ideal to also include a measure specific to intimate relationship functioning in order to allow for an examination of the specificity of these findings.

Despite the need for additional research to fully understand the mechanisms underlying these findings, several significant clinical implications remain. First, due to the more severe

symptomatology and resistance to standard treatment approaches, OEF/OIF veterans with PTSD and depression should be screened for sexual problems. Although these symptoms are typically outside the standard PTSD scope of assessment, assessments could include simple probes from the interviewer and/or select sexual dysfunction items from related measures to reduce potential stigma or patient embarrassment. In addition to assessing these symptoms, once identified, veterans with co-occurring PTSD, depression, and sexual problems may require a higher level of intervention for their symptoms. They may benefit from adjunctive treatments that explicitly focus on couples-based sexual functioning (Chudakov, Cohen, Matar, & Kaplan, 2008; Metz & McCarthy, 2007), or from integrative treatment approaches that directly address the impact of PTSD and depression symptoms on interpersonal relationships (e.g., Cognitive Behavioral Conjoint Therapy for PTSD; Fredman, Monson & Adair, 2011; Monson, Fredman, & Adair, 2008). Further, identification of shared transdiagnostic factors involved in the maintenance of PTSD, depression, and sexual problems may yield promise. For example, emotional numbing (Badour et al., 2015; Nunnink et al., 2010), and experiential avoidance more broadly may be potential targets for treatment.

It may be that a combination of evidence-based psychotherapy and medication for sexual dysfunction, such as sildenafil citrate, could be more effective. As stated previously, treatment with SSRIs may exacerbate sexual problems and should be considered carefully before prescribing to veterans to address PTSD or depression symptoms (Kotler et al., 2000). Although use of SSRI/SNRI and ED medication was unrelated to change in symptoms of PTSD, depression or sexual problems in this study, medication use was uncontrolled and the number of participants receiving medication was too small to draw meaningful conclusions regarding medication-related changes in symptoms across treatment. This will be an important future aim, as many patients seeking treatment for PTSD and depression may receive both pharmacotherapy and psychotherapy interventions.

Limitations in the present study warrant discussion. The sample size of treatment completers was small compared to larger randomized controlled trials. Attrition in the study was also relatively high. As noted previously, the measures used in the study were not solely developed for the assessment of sexual dysfunction and thus did not allow for an assessment of clinical sexual dysfunction diagnostic criteria. The items also were limited to sexual problems within the context of an intimate relationship, rather than general sexual problems including those occurring during self-stimulation. Future studies should include multi-item measures of sexual functioning that index a broader range of possible sexual health problems (e.g., premature/delayed ejaculation, anorgasmia) as well as perceived sexual satisfaction. Findings should be replicated using interview and physiological assessments (e.g., plethysmography) as well as ongoing self-monitoring of sexual behavior. Finally, assessment of PTSD and depression were based on DSM-IV diagnostic criteria. Given significant revisions in DSM-5, particularly to the diagnosis of PTSD, it will be important to replicate these findings using updated assessment approaches. Finally, nearly 70% of current sample of veterans were employed at the time of the study, suggesting the possibility of higher functioning at baseline compared to other treatment-seeking samples. It will be important to examine generalizability of these findings to other veteran samples.

These limitations notwithstanding, the present study adds to a growing literature documenting the importance of assessing for and understanding sexual problems and sexual dysfunction among OEF/OIF veterans. This study further represents a significant advancement in our currently limited understanding of the effects of evidenced-based psychotherapy on the interrelations among symptoms of PTSD, depression and sexual problems among this group. These findings suggest that veterans with co-occurring symptoms of PTSD, depression, and sexual problems may require additional assessment and treatment considerations in order to improve their treatment outcomes.

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Table 1

Demographic and Clinical Differences Among the Intent to Treat Sample a Function of Baseline Sexual Problems

	Sexual Problems <i>n</i> = 24	No Sexual Problems <i>n</i> = 21		
	<i>M(SD)</i> or <i>n</i>(%)	<i>M(SD)</i>	χ^2, Fisher's exact test, or <i>t</i>	<i>p</i>
Age	35.25 (9.37)	35.71(9.09)	<i>t</i> = .17	.87
Marital Status			<i>Fisher's</i> = 1.30	.57
Never Married	4 (16.7)	3 (15.0)		
Married	18 (75.0)	13 (65.0)		
Separated/Divorced	2 (8.3)	4 (20.0)		
Race			χ^2 = 3.27	.07
White	12 (23.8%)	16 (76.2%)		
Nonwhite	12 (58.3%)	5 (25.0%)		
Education (years)	13.32 (3.14)	13.00 (2.15)	<i>t</i> = -.38	.71
SSRI/SNRI	9 (42.9%)	12 (57.1%)	χ^2 = .86	.36
ED Medication	3 (14.3%)	3 (14.3%)	χ^2 = .00	1.00
CES	18.38 (5.84)	21.19 (5.56)	<i>t</i> = 1.60	.12
Baseline PCL-M	56.88 (14.84)	54.71 (14.98)	<i>t</i> = -.49	.63
Baseline BDI-II	26.04 (12.14)	18.76 (8.48)	<i>t</i> = -2.30	.03
Baseline MOS	51.92 (22.96)	41.19 (16.20)	<i>t</i> = -1.55	.13

Note: BDI-II = Beck Depression Index-II; CES = Combat Exposure Scale; ED = erectile dysfunction; MOS = Medical Outcomes Study Social Support Survey; PCL-M = PTSD Checklist-Military; SSRI/SNRI = selective serotonin reuptake inhibitor/selective norepinephrine reuptake inhibitor

Table 2

Bivariate Correlations Among Baseline (above the diagonal; N = 45) and Pre-Post Change (below the diagonal; n = 28) Variables

	1	2	3	4	5	6
1. PCL-M	--	.76***	.20	-.15	.13	-.05
2. BDI-II	.78***	--	.43**	-.43**	.27	-.12
3. MOS	.23	.32	--	-.35*	.17	-.11
4. IPF-Desire	-.16	-.24	-.30	--	-.40**	.37*
5. IPF-Arousal	-.05	.08	.31	-.50*	--	.14
6. CES	--	--	--	--	--	--

Note: BDI-II = Beck Depression Index-II; CES = Combat Exposure Scale; MOS = Medical Outcomes Study Social Support Survey; IPF = Inventory of Psychosocial Functioning; PCL-M = PTSD Checklist-Military

Table 3
Pre-Post Treatment Change in PTSD and Depression Symptoms, Sexual Problems, and Social Support

	All Treatment Completers <i>n</i> = 28 ⁺		Baseline Sexual Problems <i>n</i> = 12 ⁺		No Baseline Sexual Problems <i>n</i> = 16 ⁺	
	<i>M</i> (<i>SD</i>)	<i>Paired-samples t</i>	<i>M</i> (<i>SD</i>)	<i>t</i>	<i>M</i> (<i>SD</i>)	<i>Independent-samples t</i>
Change in PCL-M	-11.64 (11.64)	5.29 ***	-6.33 (6.41)		-15.63 (13.20)	-2.46 *
Change in BDI-II	-5.25 (6.98)	3.98 ***	-1.83 (6.56)		-7.81 (6.31)	-2.44 *
Change in IPF-Desire	-.19 (1.47)	.59	.50 (1.41)		-.62 (1.39)	-1.78
Change in IPF-Arousal	-.43 (2.31)	.85	-2.00 (2.45)		.54 (1.66)	2.83 *
Change in MOS	-.62 (19.66)	.16	.09 (17.60)		-1.13 (21.63)	-.15

Note:

* $p < .05$,

$p < .001$

⁺ *n* for IPF-Desire and IPF-Arousal was 21 for all treatment completers, 8 with baseline sexual problems, and 13 without baseline sexual problems; BDI-II = Beck Depression Index-II; CES = Combat Exposure Scale MOS = Medical Outcomes Study Social Support Survey; PCL-M = PTSD Checklist-Military