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Does Psychosocial Functioning Improve with Prolonged Exposure in Veterans with PTSD? Exploring Traditional and Home-Based Telehealth Delivery Methods

Kristina Reich

A dissertation submitted to the faculty of the Medical University of South Carolina in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Nursing.

*March 2020*

**Approved by:**

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## **Abstract**

### **Purpose**

This dissertation compendium includes an integrative literature review, an evolutionary concept analysis, and findings from a secondary data analysis. The literature review explores the effects of evidence-based interventions on psychosocial functioning in veterans with combat-related Post Traumatic Stress Disorder (PTSD). The concept analysis examines psychosocial functioning comprehensively to develop a clear understanding of this concept and its relationship to veterans with combat-related PTSD. The secondary analysis study compares the impact of Prolonged Exposure (PE) on psychosocial functioning outcomes in two groups: PTSD diagnosed, treatment seeking combat veterans who receive PE in-person compared to those receiving PE via home-based telehealth. Additional aims in that study were as follows: determine whether race, type of war conflict and service connection disability rating (SC%) moderate and whether PTSD, anxiety, and depression mediate the effect of PE on psychosocial functioning.

### **Problem**

PTSD is linked to maladaptive or impaired psychosocial functioning, including functioning in the following domains: romantic relationships with spouse or partner, family, work, friendships, parenting, and education. Many combat veterans are unemployed, are divorced, or express dissatisfaction with their interpersonal relationships. Some research has demonstrated that treating PTSD symptoms can improve psychosocial functioning as well, yet the focus of PTSD treatment remains primarily on PTSD symptomology itself. Veterans with combat-related PTSD are being treated via telehealth modality at higher rates; however, this modality may contribute to isolation and, in turn, result in poor outcomes in functioning.



## **Aims**

To evaluate treatment and delivery methods for improving psychosocial functioning in veterans with combat-related PTSD. We completed the following studies: first, an integrative review evaluated evidence-based therapies (EBT) and their treatment effects on psychological functioning. Second, an evolutionary concept analysis examined the phenomenon of psychosocial functioning in this population. Finally, a secondary analysis investigated whether PE was associated with improvement in psychosocial functioning, and whether the telehealth treatment modality may be an acceptable alternative to in-person treatment modality.

## **Design**

Whittemore and Knafel's (2005) framework informed the integrative review, while Rodger's (2000) framework guided the evolutionary concept analysis. Using a correlational design for the secondary analysis, we investigated relationships between PE treatment delivery methods and potential reduction in psychosocial functioning symptoms. The socio-interpersonal framework of PTSD was used throughout the dissertation, guiding the conceptualization and analysis of psychosocial functioning in relation to veterans with combat-related PTSD.

## **Findings**

The integrative review produced several important results. We found that literature in this area is limited and more research is warranted. We concluded that treating avoidance and numbing can improve functioning; furthermore, treating veterans until they no longer qualify for a PTSD diagnosis can be beneficial in functional improvement. However, the terminology and assessment tools used to assess

psychosocial functioning lacked consistency and therefore may produce confusion for treating providers.

The evolutionary concept analysis identified combat exposure as well as PTSD symptoms such as emotional numbing and withdrawal as main antecedents. Psychosocial functioning environments/domain and psychosocial functioning status were the leading attributes associated with this concept. Social support emerged as an influencing factor in alleviating PTSD symptoms, thus improving functioning. Discussion in the literature mainly focused on functioning in the romantic partnership domain, and further research is necessary to address functioning in other important domains.

The results from the secondary analysis illustrate that race, type of war conflict, and SC% did not moderate the effect of PE on psychosocial functioning. Likewise, PTSD, depression, and anxiety did not mediate the effects of PE on psychosocial functioning. However, we observed a positive correlation between depression, PTSD, and anxiety mean scores in relation to psychosocial functioning mean scores. This finding demonstrates that as depression, PTSD, and anxiety improved, so did psychosocial functioning.

The parent study's main purpose was to investigate PTSD outcomes with a non-inferiority design, the current study used a standard superiority design, therefore a conclusion of no difference between the modalities cannot be drawn at this time. The findings do provide an indication and preliminary evidence that both treatment delivery methods may be acceptable options related to psychosocial functioning outcomes. Similarly, it is too soon to formulate conclusions on the effects of PE on psychosocial functioning based on our results. Although some improvement post-treatment was

evident, most results were not statistically significant, and mean scores mostly remained in the same functional impairment category. Nevertheless, we remain encouraged based on some promising findings that were identified. Notably, the family domain showed possible clinically significant improvement across treatment groups, and in the home-based telehealth group, the parenting domain results had a similar pattern. Moreover, the family domain in home-based telehealth group had statistically significant improvement as well.

### **Conclusion**

Veterans with combat-related PTSD struggle in various social environments. Impairment in work, romantic partnerships, parenting, and education domains are debilitating consequences for veterans with combat-related PTSD. Although the overall results of this dissertation indicate that some evidence-based therapies (EBTs) may improve psychosocial functioning, and both modalities may be used, more research is warranted to confirm those promising preliminary findings. In conclusion, psychosocial functioning is a multidimensional concept that may affect the quality of life of veterans with combat-related PTSD, thus requiring more attention in the scientific community.

**Keywords:** PTSD, Veterans, combat, psychosocial functioning, telehealth

## **Introduction**

### **Background**

Military service members experience potentially traumatizing events at high frequencies. After completing military service, veterans may continue to experience negative symptoms as a result of trauma, such as post-traumatic stress disorder (PTSD) (5). The rate of PTSD among Vietnam veterans is estimated to be 15% to 31% (6). Statistics for the Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans are disturbing as well, with an estimated 10 to 18% experiencing PTSD (7). Combat exposure such as near-death experiences or “close calls,” involvement in firefights, direct killing/witnessing killing, losing close friends, injury, experiencing an explosive device blast, or recovering dead bodies are risk factors for developing PTSD (8, 9). Moreover, combat veterans report a high rate of moral injury manifesting as guilt and shame, which can increase PTSD symptoms (10). For example, killing another human being can contradict the moral/ethical beliefs of military personnel, thus resulting in moral injury (10, 11).

PTSD symptoms are divided into four distinct criteria: avoidance, negative alterations in cognition and mood, alteration in arousal and reactivity, and intrusive thoughts (4, 12). Veterans often avoid trauma-related reminders or thoughts, feel isolated or experience exaggerated blame, report irritability and poor concentration, or encounter flashbacks and nightmares (12). PTSD symptomology is associated with psychosocial functioning impairment in this population, affecting various daily activities related to marriage, parenting, employment, education, friendships, and family relationships (4, 13-15).

Veterans with PTSD who identify combat as their worst trauma typically report greater impairment in psychosocial functioning versus veterans who identify other forms of trauma as most disturbing (16, 17). Combat veterans' family members often exhibit greater depression and anxiety symptoms, and children of combat veterans have demonstrated elevated risks of depression, anxiety, and behavioral problems (16). Additionally, reintegration into society post-deployment involves interacting with family, friends, coworkers, children, and romantic partners, which may be especially challenging for veterans with combat-related PTSD (18). Family roles can change during deployment, and those who stay behind often become more involved and function as the dominant household member (19). After deployment, the family unit must once again readjust family roles, which can become problematic and lead to functional impairment (19).

Combat veterans are more likely to be violent towards their partners and to be unemployed (16), and divorce and frequent arguments are all part of marital dysfunction associated with PTSD (20). Dysfunctional parenting manifests as difficulty in communication, decreased parenting satisfaction, withdrawal from parenting responsibilities, and inability to express empathy (21).

In the domains of work and academic functioning, poor satisfaction, inadequate performance, unemployment, financial difficulty, inability to form relationships with peers or faculty, and stress are evident (1, 9, 22). PTSD symptomology can also affect friendships, mainly manifesting as emotional distance, discomfort in sharing feelings and difficulty in being a supportive friend (1).

Current literature suggests that impaired psychosocial functioning is associated with impaired health-related quality of life, increased health morbidity and mortality, and elevated use of various healthcare services (23).

### **Aims/Manuscript Overview**

This dissertation consists of three manuscripts that together add to the current knowledge in this area of study. Impairment in psychosocial functioning is a notable consequence of combat-related PTSD; therefore, this phenomenon warrants scientific investigation. This dissertation aimed to explore the phenomenon of psychosocial functioning, EBTs that may improve psychosocial functioning, and home-based telehealth treatment modality for EBTs.

The following specific aims guided this dissertation:

*Aim 1a: To investigate whether EBTs improve psychosocial functioning in veterans with combat-related PTSD.*

*Aim 1b: To investigate the existence of influencing factors.*

The first manuscript describes an integrative review conducted to provide a better understanding of the effects of available EBTs on psychosocial functioning in various domains in the veteran population with combat-related PTSD (50). An additional aim was to evaluate factors that can facilitate improvements in psychosocial functioning.

*Aim 2: To develop a comprehensive understanding of psychosocial functioning in veterans with combat-related PTSD.*

The second manuscript depicts an evolutionary concept analysis to clarify the inconsistencies and ambiguity of psychosocial functioning, which were, in part, identified in manuscript one. The concept analysis focuses on the identification of attributes, antecedents, consequences, and surrogate terms.

*Aim 3a: To test the hypotheses and concepts formulated in the first two manuscripts by examining whether PE is associated with psychosocial functioning improvement.*

*Aim3b: To explore home-based telehealth as a delivery method for Prolonged Exposure.*

The third manuscript describes a secondary analysis of data from a previously conducted non-inferiority trial with combat veterans comparing in-person versus home-based telehealth-delivered PE in terms of PTSD symptom outcomes (42). The purpose of the third manuscript is to examine and compare the impact of PE on general psychosocial functioning in combat veterans related to treatment delivery modality (in-person vs. home-based telehealth). An additional purpose is to explore whether race, type of war conflict, and service-connected disability rating moderate, as well as, whether depression, anxiety, and PTSD mediate the effects of PE on psychosocial functioning.

### **Treatment Recommendations and Gaps in Literature**

The Illness Management and Recovery (IMR) movement, spearheaded by the Substance Abuse and Mental Health Service Administration (SAMHSA), recognizes the

importance of psychosocial functioning (24, 25). IMR underscores the significance of community, close relationship, and work functioning (26). The United States Department of Veterans Affairs (VA) and the Department of Defense (DOD) VA/DOD treatment guidelines recommend a thorough evaluation of psychosocial functioning in veterans with PTSD (1, 27), and initiation of evidence-based psychotherapy as first-line treatment for PTSD (27). Available research suggests a link between PTSD symptom reduction and improvement in psychosocial functioning (28, 29).

Most PTSD research with veterans focuses on improving specific PTSD symptoms. Few studies go beyond symptom reduction to investigate psychosocial functioning in the veteran population (13, 14, 30, 31), and some of the most frequently cited studies to date lack comprehensive assessments of psychosocial functioning, focusing instead on one domain or on the overall representation of functioning (14).

### **Prolonged Exposure Therapy**

Prolonged Exposure (PE) therapy, developed by Foa and colleagues (32), is an evidence-based psychotherapy that has been used effectively to treat symptoms of PTSD (33, 34). It has extensive empirical support from randomized controlled trials and meta-analyses (33), and the VA recommends PE as a first-line treatment for PTSD (34, 35). The main component of this therapy is gradual exposure to trauma-related memories, thoughts, triggers, and everyday life circumstances. Exposure is imagined and then re-experienced in vivo, and both techniques are utilized to assist in trauma processing (36). Individuals with PTSD spend a considerable amount of time and effort avoiding the aforementioned symptoms; however, reprocessing distributing memories and beliefs results in decreased fear response (37). Approximately 8 to 15 individual sessions are



conducted by trained therapists and can be 60 to 90 minutes long (38). PE is an effective treatment, is well tolerated, and does not contribute to long lasting exacerbation of PTSD symptoms (37). However, PE and other evidence-based therapies remain underutilized due to multiple barriers experienced by the veteran population (39); therefore, telehealth is a treatment modality worth examining.

### **Telehealth Treatment Modality**

Access to care, which includes access to EBTs, remains a top priority for the VA. Common barriers to access include perceived stigma, geographic location, transportation, or childcare costs (40), and the main tool used to address these barriers has been telehealth, including home-based delivery (41). Home-based telehealth has a high patient and clinician satisfaction rating, is cost effective, and is currently used to offer several evidence-based mental health treatments (42, 43). For example, PE has effectively treated PTSD-specific symptoms when delivered via home-based telehealth technology (42). This modality allows veterans to receive treatment in the convenience of their homes (44); however, less is known about the impact of this treatment delivery modality on general functioning, specifically whether this modality unintentionally promotes isolation and avoidance in veterans with PTSD (45).

### **Design and Method**

This dissertation includes an integrative literature review of therapies and their effects on psychosocial functioning, guided by Whittemore and Knafl's (46) design, a concept analysis of psychosocial functioning, which incorporated Rodger's (46) evolutionary concept analysis design, and a secondary analysis that utilized the correlational design. To produce rigorous integrative reviews, Whittemore and Knafl

proposed five stages of analysis: 1) identification of the problem, 2) literature search, 3) evaluation of data, 4) analysis of data, and 5) presentation of data (46). Similarly, Rodgers developed six stages that should be followed in an evolutionary concept analysis; 1) selecting a concept of interest; 2) formulation of data collection design; 3) data collection/analysis; 4) identifying attributes, antecedents, consequences, and surrogate terms; 5) describing a case exemplar; and 6) present findings (47). Lastly, to explore associations between treatment modality and psychosocial functioning in veterans with combat-related PTSD, we used a correlational design to investigate home-based telehealth and face-to-face PE delivery methods.

### **Theoretical Framework**

Individuals with PTSD live in a world of various social interactions and commitments, and the same is true for combat veterans who attempt to assimilate into the civilian world they left behind while deployed. Thus, the theoretical underpinnings for manuscript 1 and 3 are derived from the socio-interpersonal framework for PTSD proposed by Maercker and Horn (48). In this framework, PTSD is theorized to be heavily influenced by socio-interpersonal aspects surrounding the individual with PTSD (49). Thus, the concept of psychosocial functioning is addressed by this theory. Veterans are expected to function in their previous roles as parents, partners, employees, and so on; however, as described above, PTSD symptoms can negatively influence such functioning. Furthermore, positive social relationships can facilitate PTSD symptom improvement (48). In order to develop effective treatment, the socio-interpersonal view must be taken into account.

Three specific socio-interpersonal levels are conceptualized by Maercker and Horn: 1) the individual, 2) close relationship, and 3) distant social levels (49). The individual level recognizes the way individuals with PTSD interact in social contexts; for example, anger can lead to aggression toward romantic partners. To enhance recovery, such individual level factors need to be considered. The close relationship level explains the critical nature of close relationships within a marriage, family, or friendships. The distant social level involves social reintegration and belonging to a specific social group, for example identifying as a veteran (48). In this dissertation, this level is expanded to include work and student functioning as important factors for veterans with combat-related PTSD. The Socio-Interpersonal Framework of PTSD is used in manuscript 1 and 3 of this dissertation. Each manuscript provides a more comprehensive explanation of the application of this theory.

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**MANUSCRIPT # 1**

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Evidence-Based Psychotherapy Interventions to Improve Psychosocial Functioning in  
Veterans with PTSD: An Integrative Review

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## **Abstract**

Post-Traumatic Stress Disorder (PTSD) is a prevalent diagnosis among veterans and is linked to psychosocial functioning impairment across various domains, including marriage, employment, parenting, family, and education. Veterans are more likely to be divorced, unemployed, and experience difficulties with parenting. Some research has suggested that improvement in PTSD specific symptoms can also improve psychosocial functioning. Using the methodology of Whitemore and Knafl, an integrative review was conducted to a) explore the content and effectiveness of evidenced-based psychotherapy interventions to improve psychosocial functions and b) to investigate conditions for symptom change. The Socio-Interpersonal Framework Model of PTSD was used to synthesize and organize findings. MEDLINE, CINAHL, and PsychINFO databases were searched and 7 articles met inclusion criteria. The main results indicate that evidence-based psychotherapy interventions can improve psychosocial functioning in veterans with PTSD. Another key finding is that treating veterans until they no longer meet diagnostic criteria for PTSD may be beneficial to improve psychosocial functioning. Overall, this review revealed that this area is neglected in research.

**Keywords** veterans, psychosocial functioning, evidence-based interventions, PTSD, Post-traumatic Stress Disorder

## Evidenced Based Psychotherapy Interventions to Improve Psychosocial Functioning in Veterans with PTSD: An Integrative Review

The overall prevalence of Post-Traumatic Stress Disorder (PTSD) in the veteran population across different war eras is 5 to 30% (Acierno et al., 2017). Per the Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> edition (American Psychiatric Association, 2013) individuals with PTSD experience impairing symptoms such as intrusive thoughts, avoidance, negative alterations in mood, alteration in arousal, and reactivity. PTSD symptomology negatively influences psychosocial functioning (Fang et al., 2015), and interactions by individuals within their environments, as well as their ability to fulfill roles within environments such as work, social activities, and relationships with partners and family (Bosc, 2000).

Schnurr, Lunney, Bovin, and Marx, (2009) note that PTSD is linked to problems in psychosocial functioning in marital, parental, family, and occupational domains. For example, patients with PTSD are more likely to miss work and report reduced work productivity. These work-related issues contribute to loss of income and homelessness (Rodriguez, Holowka, & Marx, 2012). Furthermore, veterans with PTSD are twice as likely as veterans without PTSD to divorce, and three times as likely to experience multiple divorces (Rodriguez et al., 2012). PTSD may also negatively impact parenting ability, which can lead to impaired attachment with children, child behavioral problems, and family violence (Rodriguez et al., 2012; Sherman, Gress Smith, Straits-Troster, Larsen, & Gewirtz, 2016). Veterans with PTSD typically avoid crowds and may abruptly leave social events, creating discomfort for their partners and others in their social

groups. Veterans often have limited friendships, within which they cannot share feelings, show emotional support or settle arguments in productive ways (Rodriguez et al., 2012).

Both the United States Department of Veterans Affairs (VA) and the Department of Defense (DOD) recognize the importance of addressing psychosocial functioning in PTSD treatment. The current VA/DOD practice guidelines for management of PTSD accordingly advise clinicians to assess functioning in the aforementioned areas and monitor progress after treatment (Rodriguez et al., 2012). In addition, the guidelines recommend using evidence-based psychotherapy (EBP) as first-line treatment for PTSD (The Management of Posttraumatic Stress Disorder Work Group, 2017). Treating symptoms that affect psychosocial functioning can significantly improve quality of life for the veteran population (Schnurr, Hayes, Lunney, McFall, & Uddo, 2006). Moreover, improvement in PTSD symptoms may also improve psychosocial functioning (Galovski, Sobel, Phipps, & Resick, 2005; Schnurr et al., 2006).

Despite the recognized importance of addressing psychosocial functioning in PTSD, the impact of EBP interventions for PTSD on psychosocial functioning has not been adequately investigated. Most PTSD intervention studies focus only on PTSD symptom change, considering psychosocial functioning as a secondary or indirect variable, or these studies fail to address psychosocial functioning (Frueh, Turner, Beidel, & Cahill, 2001). Therefore, an integrative literature review was conducted to investigate, through the lens of the Socio-Interpersonal Framework Model of PTSD (Maercker & Horn, 2013; Maercker & Hecker, 2016), that which is known from the current research about the content and effectiveness of EBP PTSD interventions to improve psychosocial

functioning in the veteran population. Additionally, this review explored whether specific factors (e.g. age, race, sex,) can facilitate such improvement.

### **Theoretical Framework**

The Socio-Interpersonal Framework Model of PTSD (Maercker & Horn, 2013) guided this integrative literature review. This model addresses complex relationships within the PTSD structure and emphasizes the socio- interpersonal aspect of PTSD (Maercker & Horn, 2013). For example, family, peers and society as a whole are deemed important and can influence PTSD symptomology (Maercker & Hecker, 2016). For this integrative literature review, results were synthesized utilizing the framework's 3-level approach.

The model's 3-level approach includes individual, close relationship, and distant social levels. The first, or individual level, addresses the interactive styles of persons with PTSD. For example, the model identifies affective reactions to other people, close friends or groups as "social affects." Specifically, anger, shame/guilt, and aggression can lead to interpersonal avoidance, social withdrawal, and partner violence (Maercker & Hecker, 2016). The second, or close relationship level, concentrates on intimate relationships, such as romantic and family relationships. The social interaction within this level can be supportive or maladaptive. Finally, the third, or distant social level, involves societal and cultural belonging within groups (Maercker & Horn, 2013).

### **Methods**

#### **Design**

This review followed the well-established methodological framework for integrative reviews developed by Whittmore and Knafl, (2005) using the models 5

stages 1) problem identification, 2) literature search, 3) data evaluation, 4) data analysis, and 5) presentation. The first stage involved clearly formulating and stating the question framing the review. Stage 2 was addressed using a systematic literature search. Study quality and level of evidence were then evaluated during stage 3 using standardized tools. To finalize stage 4 of the methodological framework, the publications were presented in a table after data reduction. Finally, stage 5 involved synthesis of findings, implications and discussion of limitations (Hopia, Latvala, & Liimatainen, 2016).

### **Search Methods**

To develop an effective literature search strategy for this integrative review, a medical reference librarian was consulted, and the PRISMA statement was applied to guide the conduction and reporting of the search process. A PRISMA flow-chart is presented in Figure 2 to illustrate this procedure (Moher, Liberati, Tetzlaff, & Altman, 2009). The search was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE and PsycINFO electronic databases and included Boolean operators. In addition, bibliographies of publications included in the sample were examined manually to identify any articles that were not captured in the electronic database search.

The following key terms were used to conduct the search: *interpersonal functioning, psychosocial functioning, social adjustment, social cognition, social competence, social outcomes, social skills, social functioning, marriage functioning, marriage satisfaction, romantic relationships, work functioning, work satisfaction, employment, parenting, education, school functioning, family functioning, family members, friendship, friendship satisfaction, relationship quality, close relationships,*

*Post Traumatic Stress Disorder, PTSD, veteran, soldier, military, veterans, evidenced based interventions, therapy, and intervention.* The search terms *moderator, mediator,* and *predictor* were included to explore the conditions under which PTSD treatment is effective as it related to psychosocial functioning.

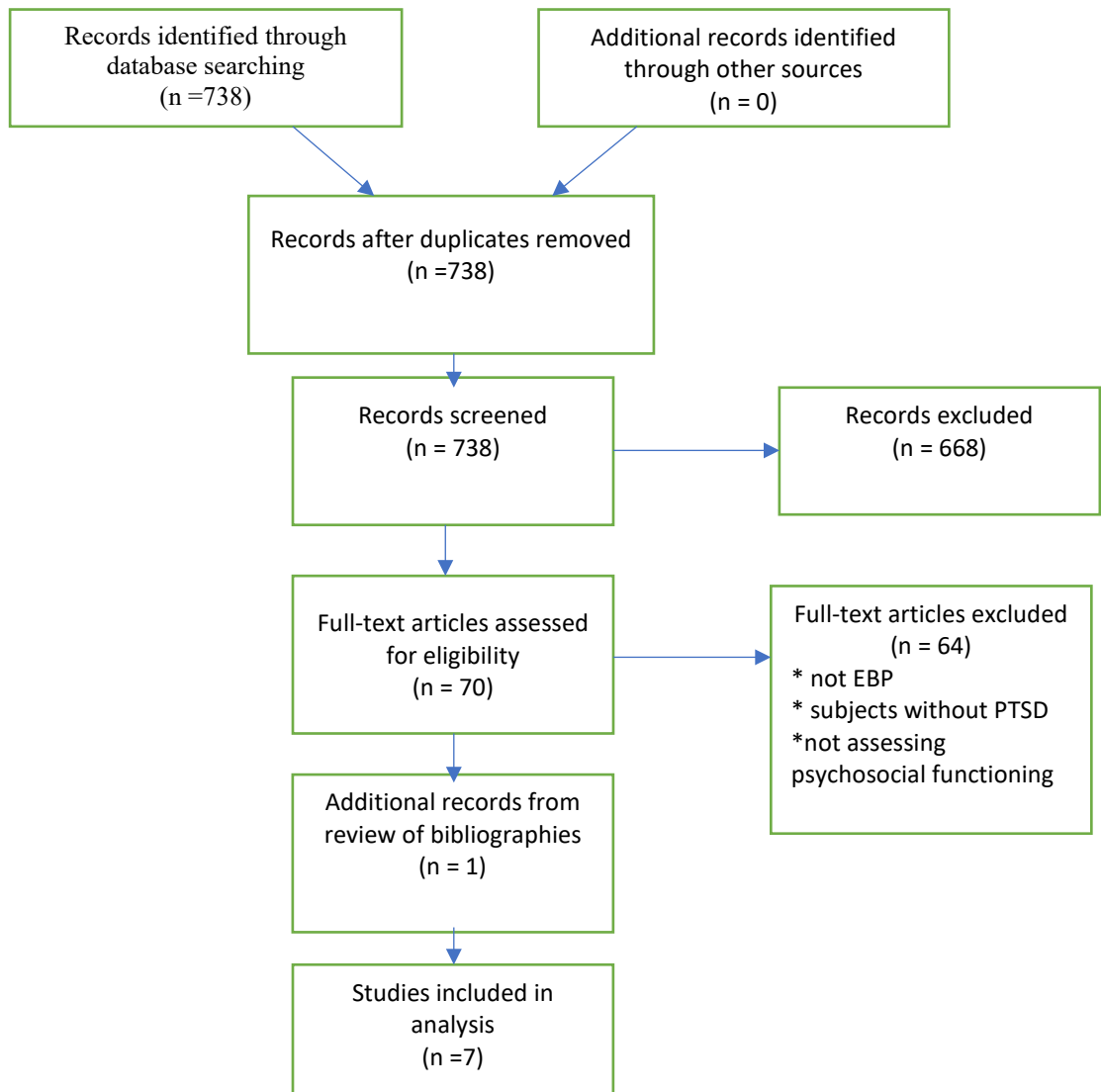
Inclusion criteria included 1) studies that investigated psychosocial functioning as a primary or secondary outcome; 2) studies conducted with veterans diagnosed with PTSD; 3) studies that tested evidenced-based psychotherapy interventions (e.g. Prolonged Exposure, Cognitive Behavioral Therapy, and Cognitive Processing Therapy); 4) studies examining predictors, moderators, and mediators of treatment; and 5) research conducted with adult subjects (> 18 years old). Exclusion criteria included 1) non-English articles, 2) articles not published in peer-reviewed journal, 3) pharmaceutical interventions, 4) traumatic brain injury diagnosis, 6) dissertations, and 7) literature reviews. Furthermore, because the primary interest is in the most recent research studies and evidence, a 10-year limit was applied.

### **Search Outcomes**

The literature search in MEDLINE, CINAHL, and PsychINFO resulted in 18 articles, none of which were relevant manuscripts. To expand the search, the search terms: *predictor, moderator, and mediator* were removed. The revised search resulted in 738 publications with no duplicates. All 738 articles were screened for eligibility by reading titles and abstracts, leaving 70 full-text articles for additional review. Sixty-four articles were removed because they did not meet inclusion criteria. Five articles presented reports of studies in which researchers investigated various domains of psychosocial functioning. There was limited discussion on the conditions of effective PTSD treatment

to improve psychosocial functioning; therefore, one article in which the researchers evaluated PTSD symptom improvement and aspects of psychosocial functioning as associated factors was retained. Six articles were selected, and an additional article was added from manual reviews of the bibliographies. A total of 7 articles were included in this review.

Figure 2. PRISMA flow chart



## Results

### Data Presentation

Relevant publications were arranged in a matrix as follows: author and year, intervention and population, study method/design, relevant outcomes and measures, relevant findings, and level of evidence (Table 1). The Critical Appraisal Skills Programme (CASP) criteria was used to evaluate the quality of the studies, and level of evidence (LOE) was evaluated using the Oxford Center for Evidence-Based Medicine criteria (Center for Evidence-Based Medicine, 2011). The sample studies varied in quality and level of evidence. However, overall, studies met criteria for most of the required components of the chosen appraisal tools. Table 2 presents the Socio-Interpersonal Framework Model of PTSD levels included in each of the sample studies.

Table 1. *Integrative Review Outcomes*

Author & year	Intervention & Population	Study Method Design	Relevant Outcomes & Measures	Relevant Findings	CASP LOE
Beidel et. al., 2011	PE vs TMT  N=49 male	RCT	Social and emotional functioning  Patient ratings CAPS subset of 4 item subset	PE & TMT showed decrease in weekly episodes of verbal rage and Improved social and emotional functioning	8  1b
Ehlers et. al., 2014	7 Day CBT vs CBT vs emotion focused supportive therapy  N=121 female & male	RCT	Psychosocial related disability (difficulty in work, social life, leisure activities, family life & home)  Sheehan Disability Scale	Intensive 7-day CBT & standard CBT delivered over 3 months, improved psychosocial functioning.	10  1b
Holliday et. al., 2015	CPT vs PCT	RCT	Psychosocial & health	CPT & PCT improved social functioning domain	9



	N=45 male & female		functioning domains  SF36 Health Survey	(symptoms interfere with social activities) and role emotional domain (work and daily activities issue due to emotional problems)	1b
Monson et. al., 2012	CPT vs waitlist  N=46 male & female	Retrospective Cohort	Social adjustment (spouse, family, extended family, housework, work, & Social/leisure activities domains)  PTSD symptom clusters associations with changes in social adjustment domains  SAS	CPT improved extended family relationships, and housework completion  Improvements in emotional numbing are associated with improvement in overall, extended family, & housework adjustment.  Improvement in avoidance was associated with decline in extended family adjustment, but improvement in housework	12  1b
Myers et. al., 2018	CPT individual vs CPT group vs PE  N=82 male	Retrospective Chart review	Predisposing characteristics (sex, age, race)  Enabling resources (treatment format, student status, distance to the VA)  Needs factors (reporting problems to their provider about work, family or significant others, sleep, anger) as predictors of	CPT or PE Individual therapy showed significant improvement in PTSD symptoms  Veterans who completed EBP and identified as students showed greater reduction in PTSD symptoms compared to vets who were not students  Veterans who reported problems with family members or significant others	12  2b

			PTSD symptom improvement and treatment completion	were more likely to complete treatment  Age, gender, ethnicity, race did not predict treatment response	
Schnurr et. al., 2012	PE vs PCT  N= 218 female	Secondary analysis  Retrospective Cohort	Occupational impairment  Occupational satisfaction  CAPS QOLI	PE & PCT showed no significant change in occupational satisfaction, but significant reduction in work impairment  Participants who no longer met PTSD criteria had greater improvements	12  2b
Schnurr et.al., 2016	PE vs PCT  N=235 female	Secondary analysis  Retrospective Cohort	PTSD Symptom change groups: no respond, response, loss of diagnosis, & remission  Clinician-rated social & occupational impairment self-reported functional impairment (role emotional, role physical, social functioning scale)  SF36 CAPS	No differences were found between PE and PCT on outcome  Loss of PTSD diagnosis is associated with improvement in clinician rated social and occupational impairment.  PTSD symptom change: showed improvement between groups; improvement from no change to remission: suggesting, as PTSD symptoms decreased psychosocial functioning improved.	11  2b

CAPS: RCT: 0-10 rating scale, with 10 being the highest quality. Cohort: 0-12, 12 being the highest quality

Level of Evidence (LOE) 1a: systematic reviews of randomized controlled studies. 1b: individual randomized controlled trials. 1c: all or none randomized controlled studies. 2a: systematic reviews of cohort studies, 2b: individual cohort study or low quality randomized controlled trials.

2c: “outcomes” research; ecological studies. 3a: systematic reviews of case control studies. 3b: individual case-control study. 4: case-series. 5: expert opinion

Table 2. *Socio-interpersonal framework model of PTSD levels included in studies*

Study	Individual level	Close Relationship Level	Distant Social Level
Beidel et. al., 2011	X		X
Ehlers et. al., 2014		X	X
Holliday et. al., 2015			X
Monson et. al., 2012	X	X	
Myers et. al., 2018			X
Schnurr et. al., 2012			X
Schnurr et.al., 2016			X

Table 3. *Evidence-based psychotherapy interventions included in the review*

Intervention	Description
Prolonged Exposure (PE)	Concentrates on repetitive imagined and/or in vivo exposure to the traumatic event.
Cognitive Processing Therapy (CPT)	Involves modifying maladaptive cognitive coping strategies related to traumatic events.
Cognitive Behavioral Therapy (CBT) for PTSD	Works on restructuring negative cognitions to decrease the ongoing sense of threat. Based on Ehlers and Clark’s model of PTSD.
Present Centered Therapy (PCT)	Focuses on issues experienced by the Veteran at the time of treatment as a result of PTSD.

Adapted from the VA/DOD practice guidelines and Ehlers et. al., 2014

### **Socio-interpersonal Framework Model of PTSD**

None of the studies in the sample utilized the socio-interpersonal framework model for PTSD. Only one study, the exploratory chart review, described using a theoretical framework: the Anderson Behavioral model. For this integrative review, the formulation of the distant social relationship level of the Socio- Interpersonal Framework Model of PTSD was expanded to include work-related functioning, student status, social

activities, and social detachment because each of these factors were applicable to the third level of societal and cultural sphere (Maercker & Hecker, 2016). Among the studies in this review's sample, factors at the distant social level were most commonly addressed (See Table 2).

### **Individual Level**

The Clinician Administered PTSD Scale (CAPS) four-item subset was administered to measure social and emotional functioning in one of the sampled studies; two items on the CAPS subset addressed the individual level, including range of affect and anger control. In addition, written self-reports were used to record and measure the number and severity of anger, rage, and anxiety episodes (Beidel et al., 2011). In this study, veterans received PE alone or Trauma Management Therapy (TMT), which incorporates PE and Social Emotional Rehabilitation training (SER). Participants in both groups had lower PTSD symptomology after treatment and showed a reduction in self-reported weekly episodes of verbal rage. Furthermore, participants in both treatment groups showed improvement in emotional functioning as measured by the CAPS (Beidel et al., 2011).

### **Close Relationship Level**

Two instruments were used to assess psychosocial functioning at the close relationship level. The Social Adjustment Scale (SAS) was used to measure overall social adjustment, which assesses multiple domains, including spouse (e.g. role as a spouse), family (e.g. being a member of a family unit), extended family (e.g. relationship with extended family members), housework, schoolwork, work, social and leisure activities, parenting and income (Monson et al., 2012). The Sheehan Disability Scale measures

impairment/disability in various psychosocial functioning domains; a portion of the scale measures second-level factors by assessing family life and home life (Ehlers et al., 2014).

In one study, clients who received CPT showed significant improvement in overall social adjustment compared to those on a wait list to receive treatment (Monson et al., 2012). In addition to improvements in overall social adjustment, improvements in extended family relationships and housework scores were also noted. When standard CBT and intensive 7-day CBT were compared, both treatments were effective in improving overall psychosocial functioning-related disability as measured by the Sheehan Disability Scale (Ehlers et al., 2014).

### **Distant Social Level**

The following instruments were used to assess psychosocial functioning at this level: 1) CAPS, 2) Investigator-designed self-reports 3) Quality of life Inventory (QOLI), 4) Sheehan Disability Scale and 5) the Short Form 36 health survey (SF36). Social functioning, defined as interest in social activities and social detachment, was measured by a subset of questions on the CAPS tool. Participants completed self-reports to record information related to social activities. Occupation-related outcomes were measured via clinician-rated occupational impairment with CAPS and by the occupational satisfaction item on the QOLI. The Sheehan Disability Scale in part assesses work, leisure activities, and the social life of participants (Ehlers et al., 2014) . The Short Form 36 health survey assesses psychosocial and health functioning domains such as social functioning, work, social and daily activities (Holliday et al., 2015).

Improvement in social functioning occurred with both PE and TMT interventions (Beidel et al., 2011). However, the group that received TMT demonstrated greater

improvements in self-reported frequency and duration of social activities. Occupational impairment improved following both PE and PCT; however, occupational satisfaction showed no significant improvement with these treatments (Schnurr & Lunney, 2012). CBT was effective in improving overall work and social life (Ehlers et al., 2014). Both CPT and PCT improved functioning in the psychosocial domains related to problems with social, work, and daily activities as measured by Short Form 36 health survey (Holliday et al., 2015).

### **Conditions for Symptom Change**

CPT improved the core PTSD symptom emotional numbing (individual level factor), which was associated with improvements in overall social, extended family, and housework adjustment (Monson et al., 2012). Further, participants who received CPT demonstrated improvements in the core PTSD symptom effortful avoidance (individual level factor), which was associated with an improvement in housework adjustment, but with a decline in extended family adjustment (Monson et al., 2012). Improvements in various aspects of psychosocial functioning, such as occupational impairments, were reported when participants no longer met PTSD diagnostic criteria (Schnurr & Lunney, 2012; Schnurr & Lunney, 2016). Veterans who identified as students (distant social level factor) and completed EBP (PE or PCT) had greater PTSD symptom reduction as compared to non-students (Myers et al., 2018). Additionally, experiencing problems with family members or significant others was associated with completion of EBP treatment. Thus, the relationship between social and treatment success may be bidirectional. Predisposing factors (sex, gender, race, ethnicity, and military sexual trauma history

experience) were not associated with improvements in PTSD or completion of EBP treatment.

## **Discussion**

This integrative review had several aims. The first was to gain a better understanding of EBP interventions and their effect on psychosocial functioning among veterans diagnosed with PTSD. The second aim was to explore factors that may facilitate improvement in this area. In addition, the Socio-Interpersonal Framework Model of PTSD was utilized to synthesize and organize findings.

All sampled studies used quantitative methods; three studies were randomized controlled trials (RCT), three were secondary analyses of RCTs conducted by the parent study's author, and one was an exploratory chart review. Six studies were conducted in the United States, and one study was conducted in the United Kingdom.

The term, *psychosocial functioning* was not always mentioned directly, and terminology associated with this concept varied. Studies examined multiple domains of psychosocial functioning. For example, in one study, the researchers measured psychosocial functioning related to disability (Ehlers et al., 2014), while in another study the researchers assessed occupational satisfaction and impairment (Schnurr & Lunney, 2012). Other investigated domains included social adjustment, as well as psychosocial and health functioning (Beidel, Frueh, Uhde, Wong, & Mentrikoski, 2011; Holliday, Williams, Bird, Mullen, & Surís, 2015; Monson et al., 2012). Researchers in one study explored the association among PTSD symptom improvement, status as a student, and family relationship status (Myers, Haller, Angkaw, Harik, & Norman, 2018). Additionally, sampled studies explored conditions in which aspects of psychosocial

functioning showed the greatest improvement (Monson et al., 2012; Schnurr & Lunney, 2016). Most studies also measured additional variables such as quality of life (QOL), depression, and anxiety. Evidence-based psychotherapy interventions included: Cognitive Processing Therapy (CPT), Prolonged Exposure (PE), Cognitive Behavioral Therapy (CBT), and Present Centered Therapy (PCT).

One main purpose of this review was to explore conditions that may facilitate improvements related to psychosocial functioning after EBP. However, identifying these conditions was challenging due to limited available literature. Despite the scarcity of data, results indicated that addressing the core PTSD symptoms of emotional numbing and effortful avoidance can improve select psychosocial functioning domains such as social and extended family adjustment. These findings are in line with other research studies that report emotional numbing is negatively associated with psychosocial functioning related to relationship satisfaction (Campbell & Renshaw, 2013).

Loss of PTSD diagnosis can improve psychosocial functioning as well, and researchers suggest that treating veterans until they no longer meet diagnostic criteria for PTSD is beneficial. Myers et al., (2018) suggested that being a student can be helpful and produce a better response because students are familiar with homework and following instructions. This study also determined that experiencing an issue with family or significant others is associated with EBP treatment completion, suggesting that this factor is an important motivator to improve. Although predisposing factors such as gender and ethnicity did not contribute to treatment outcomes, it is important to mention, that the authors evaluated only one such study in this review.



Although most of the framework factors were explored across the sample studies, factors associated with the individual and close relationship level are under-investigated in the literature. Factors at the distant social level were dominant among the sample studies. Parenting and marital functioning domains were not thoroughly evaluated in any of the studies. Yet current evidence shows these two domains are significantly affected by PTSD symptomology, suggesting a crucial area for future research (Rodriguez et al., 2012; Sherman et al., 2016).

Overall, sample study results suggest PTSD symptoms improve following EBP, which can lead to improvement in certain aspects of psychosocial functioning.

### **Limitations**

This integrative review had several limitations. The articles selected may not include all of the available published studies because of the 10-year search limit and did not include grey literature. In addition, the integrative review was conducted by a single reviewer. To enhance validity of this review, an additional reviewer would have been beneficial. Very few studies addressed the conditions under which psychosocial functioning symptom improved after EBP in the veteran population, which limits possible recommendations and conclusions. Studies exploring improvement in psychosocial functioning domains following EBP are similarly promising but limited in number. None of the studies integrated the complete Socio-Interpersonal Framework Model of PTSD. To minimize these limitations, a medical reference librarian was consulted to assist with the search strategy. Additionally, a methodological and theoretical framework was used to carry out this integrative review.

Another limitation of this integrative review is the lack of consistency associated with the measuring tools and terminology researchers used to assess psychosocial functioning. The CAPS measuring tool was frequently used in various ways to measure multiple psychosocial functioning factors. However, the CAPS tool only provides a general assessment of occupational and social domains (Rodriguez et al., 2012). Only one study utilized a comprehensive measuring tool (SAS) to evaluate multiple factors simultaneously (Monson et al., 2012). Other research has demonstrated the benefits of a more comprehensive approach that evaluates multiple domains of psychosocial functioning (Rodriguez et al., 2012).

### **Conclusion and Implications**

The diagnosis of PTSD and associated symptoms places veterans at risk for impaired psychosocial functioning in various domains (Fang et al., 2015; Rodriguez et al., 2012). The results of his integrative review supported the theory that EBP can improve psychosocial functioning resulting from PTSD. Moreover, this review determined that this area is neglected in the current literature. Thus, further research into improvements in psychosocial functioning following EBP is necessary.

This review explored conditions that facilitate improved psychosocial functioning. It provides support for addressing core PTSD symptoms and treating veterans until they no longer exhibit PTSD symptoms (Monson et al., 2012; Schnurr & Lunney, 2012; Schnurr & Lunney, 2016). Additionally, more research is necessary to determine the best psychosocial functioning instrument that can present more uniform and comprehensive results (Fang et al., 2015; Rodriguez et al., 2012).

Although impaired marital functioning, parenting, and parent-child relationships are associated with PTSD, a limited number of studies were identified in these areas, warranting further research (Rodriguez et al., 2012). Additional research should thus focus on parenting and marital domains at the individual and close relationship levels. The Socio-Interpersonal Framework Model of PTSD provides an effective guide in this integrative review and can be applied in subsequent studies related to psychosocial functioning. Overall, EBP demonstrated effectiveness in improving various aspects of psychosocial functioning.

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**MANUSCRIPT # 2**

Psychosocial Functioning in Veterans with Combat-related PTSD: An Evolutionary  
Concept Analysis

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## Abstract

**Background:** Veterans returning from combat have a greater risk for developing PTSD and greater severity of psychosocial functioning impairment. Previous research has demonstrated the strong association between PTSD and psychosocial functioning impairment. Psychosocial functioning is an ambiguous term often used in the literature to discuss PTSD-associated consequences, intervention response, and symptom progression.

**Methods:** Rodger's method for an evolutionary concept analysis was used to examine the concept of psychosocial functioning in veterans with combat-related PTSD. A literature search using the CINAHL and SCOPUS databases and subsequent screening yielded twenty articles meeting established criteria for analysis.

**Results:** The analysis highlights significant attributes, antecedents, consequences, and implications for future concept development. Two main attributes were identified: psychosocial functioning environments/domain and psychosocial functioning status. Combat exposure itself, social support, and various PTSD symptoms are related antecedents. Consequences such as decreased intimacy, decreased work function, low parenting satisfaction, and inadequate productivity in educational settings are all components of this concept.

**Conclusion:** The concept of psychosocial functioning is meaningful in the everyday lives of United States combat veterans with PTSD and requires special consideration in treatment planning by healthcare providers.

**Keywords:** PTSD, veterans, concept analysis, combat, psychosocial functioning

## Psychosocial Functioning in Veterans with Combat-related PTSD: An Evolutionary Concept Analysis

Combat veterans experience distinct traumatizing events during military service, which can affect them post-deployment and eventually may lead to Post-traumatic Stress Disorder (PTSD) (Fang et al., 2015; Yeterian, Berke, & Litz, 2017). For example, one in seven combat veterans who served in the Iraq and Afghanistan war conflicts has PTSD (Schnurr & Lunney, 2012). Combat-related trauma may include threats to life, debilitating injury, loss of close friends, and moral and ethical offenses (Yeterian et al., 2017). Veterans returning from military service report PTSD symptoms such as hyperarousal, avoidance, intrusive memories, and re-experiencing of trauma (Fang et al., 2015).

Psychosocial functioning is a vague term used to discuss the impact of PTSD or its associated consequences. The concept remains somewhat broad with overlapping terminologies, including *social functioning*, *functional impairment*, and *social adjustment* (Campbell & Renshaw, 2013; Flanagan et al., 2017; Monson et al., 2012). One source defined social functioning as the ability to function in specific environmental roles, such as at work or in a marriage; however, Bosc (2000) based the explanation in the context of depression. The concept of psychosocial adaptation was evaluated by Londono & McMillan (2015) but without consideration of exclusive aspects associated with combat veterans with PTSD. The concept remains ambiguous due to the conflation of terms and the lack of a conceptual exploration of psychosocial functioning as it relates to combat veterans. Therefore, an evolutionary concept analysis was conducted to clarify understanding of psychological functioning in this distinct population.

Developing a clear conceptualization of psychosocial functioning is a critical step towards accurate assessment, effective intervention development, and treatment planning related to combat veterans with PTSD. Guidelines developed by the Department of Defense and the Department of Veteran Affairs (VA) indicate the importance of psychosocial functioning assessment when treating PTSD (Rodriguez et al., 2012). Further, in order to assign a PTSD diagnosis, PTSD symptoms must affect functioning, which may be identified via clinical judgment (American Psychiatric Association, 2013).

## **Methods**

### **Design**

Rodgers' (2000) evolutionary concept analysis was utilized as a methodology to derive a meaningful conceptualization of psychosocial functioning within the context of PTSD resulting from combat exposure (Toftthagen & Fagerstrom, 2010). According to Rodgers' theory, concepts evolve and are affected by the context in which they are used (Toftthagen & Fagerstrom, 2010). Rodgers' method outlines six distinct steps to concept analysis : 1) identify a significant concept and similar terms; 2) determine the data collection plan; 3) collect data ; 4) inductively analyze data to specify attributes, antecedents, consequences, surrogate terms and related concepts ; 5) present a case exemplar; and 6) describe implications of findings (Toftthagen & Fagerstrom, 2010). To identify key psychosocial functioning components, we used thematic analyses as follows: a) thoroughly reading the literature, b) identifying common themes, and c) organizing similar ideas under categories (e.g., attributes, antecedents and consequences). During this phase the first author kept detailed notes which were used to establish patterns across the sampled literature (Toftthagen & Fagerstrom, 2010: Rodgers, 2000).

## Data Collection

A medical reference librarian assisted in the formulation of the search strategy. A Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow chart (Figure 1) illustrates the search process (Moher, Liberati, Tetzlaff, & Altman, 2009). Data collection concentrated on two electronic databases: The Cumulative Index to Nursing and Allied Health Literature (CINAHL: CINAHL Complete, PsycINFO, Military and Government collection, and MEDLINE), and SCOPUS. The following terms were deemed relevant and were included in the search: *psychosocial functioning*, *social functioning*, *social adjustment*, *interpersonal functioning*, *veteran*, *veterans*, *combat veteran*, *post-traumatic stress disorder*, and *PTSD*.

Articles were selected based on the following inclusion criteria: 1) studies involving United States veterans with combat-related PTSD, 2) studies with adult subjects (> 18 years old), and 3) discussion or assessment of psychosocial functioning. Criteria for exclusion were: 1) non-English articles, 2) studies conducted outside of United States, 3) articles not published in a peer-reviewed journal, and 4) dissertations. To capture the maximum quantity of pertinent data and examine concept evolution, no date limit was established for this search. The literature search in CINAHL resulted in 202 articles and the search in SCOPUS resulted in 82 articles (N=284). After accounting for duplicate publications, the remaining 223 articles were screened by reading titles and abstracts, leaving 95 full text articles for additional review. Additionally, a bibliography search was conducted. The final selection of articles was based on the following exclusion criteria: 1) focus was not on combat veterans, 2) non-US veterans were the

primary sample, and 3) no clear representation of psychosocial functioning assessment or results was included. A total of 20 articles was selected for final analysis.

## **Results**

### **Attributes**

Attributes are a meaningful array of characteristics relevant to the concept, and Rodgers (2000) maintains that one of the main contributions of evolutionary concept analysis is to establish attributes of the concept which is being investigated. The systematic analysis of selected literature on psychosocial functioning in veterans with combat-related PTSD produced two main attributes: *psychosocial functioning environment/domain*, and *psychosocial functioning status*.

The psychosocial functioning environment incorporates various domains in which veterans returning from deployment must function. In the reviewed literature, common themes included functioning in family, work, and education-related environments (Table 1). The family environment can be further divided into intimate relationships with the spouse/partner and parenting domains. The most prominent domain within the psychosocial environment deals with interpersonal relationships with spouse/partner. The post-deployment period is often a critical time for couples to reconnect and reestablish roles (Sayers, Farrow, Ross, & Oslin, 2009). Parenting is an important functional element for the combat veteran as well; thus, development of a healthy parenting practice is necessary to maintain a strong bond with children post-deployment (Kozel et al., 2016; Samper, Taft, King, & King, 2004; Sayers et al., 2009). Many returning veterans return to work or enroll in college, and they must maintain productive functioning in educational

and work environments to maintain financial stability (Erbes, Kaler, Schult, Polusny, & Arbisi, 2011; Reddy, Meis, Erbes, Polusny, & Compton, 2011).

Psychosocial functioning status refers to how well or how poorly the veteran is able to function within the identified psychosocial environments. The overwhelming commonality described in the literature is the high psychosocial functioning impairment combat veteran's experience post-deployment (Miller, Wolf, Martin, Kaloupek, & Keane, 2008). Additional specific considerations of this attribute are explored in the "consequence" subsection.

### **Antecedents**

For the concept of psychosocial functioning in combat veterans, combat exposure itself and various PTSD symptoms are related antecedents. Combat exposure is a general term encompassing diverse combat experiences one may encounter while deployed to a war zone (Table 1), notably, receiving incoming enemy fire, seeing or handling dead bodies, and killing are consistently reported by veterans (Fredman, Monson, & Adair, 2011; Hassija, Jakupcak, & Gray, 2012). Combat exposure is a considerable risk factor for PTSD and is strongly related to psychosocial functioning status in veterans (Renshaw, Rodrigues, & Jones, 2009). The consensus emerging from this concept analysis is that combat-related PTSD is the main determinant of impaired psychosocial functioning status, not combat exposure alone (Beckham, Feldman, Kirby, Hertzberg, & Moore, 1997; Carroll, Rueger, Foy, & Donahoe, 1985; Elbogen, Johnson, Wagner, Newton, & Beckham, 2012; Miller et al., 2008; Renshaw et al., 2009). However, the act of direct or indirect killing specifically, may influence psychosocial functioning independently (Maguen et al., 2010). In one study, combat exposure was linked to increased levels of

interpersonal violence, but it was specified this result was in contrast to previous research (Beckham et al., 1997), therefore, combat exposure and a PTSD diagnosis must be considered together and not as stand-alone antecedents of psychosocial functioning status.

The combat-related PTSD symptoms (Table 1) receiving the most attention due to their association with psychosocial functioning included emotional numbing, avoidance, withdrawal, anger, and irritability (Beckham et al., 1997; Carroll et al., 1985; Foy, Carroll, & Donahoe, 1987; Frueh, Henning, Pellegrin, & Chobot, 1997; Hassija et al., 2012; Miller et al., 2008; Samper et al., 2004). Additionally, PTSD symptom severity and length of deployment are antecedents which may result in psychosocial functioning status change (Beckham et al., 1997; Davis, Hanson, Zamir, Gewirtz, & DeGarmo, 2015; Miller et al., 2008; Samper et al., 2004).

Social support can be conceptualized as an antecedent as it contributes to PTSD resiliency and thus productive psychosocial functioning, while the lack of social support can contribute to a PTSD diagnosis and impaired psychosocial functioning (Table 1) (Pietrzak et al., 2010). For example, spousal support and being in a relationship can be a protective aspect for combat veterans (Pietrzak & Southwick, 2011), and can facilitate a decrease in the development of problematic coping mechanisms such as avoidance, thus leading to improved psychosocial functioning (Pietrzak et al., 2010).

### **Consequences**

For combat veterans with PTSD, psychosocial functioning is disturbingly negative (Table 1). Veterans regularly report marital problems such as decreased intimacy, poor sexual function, hostility toward partner, and divorce (Davis et al., 2012;



Hassija et al., 2012; Scaturo & Hardoby, 1988). Decreased work function, low parenting satisfaction, and inadequate productivity in educational settings are all prevalent in this population (Erbes et al., 2011; Miller et al., 2008; Plach & Sells, 2013; Samper et al., 2004). Additionally, some veterans can expect to have lower quality of life (QOL) and overall life satisfaction when psychosocial functioning is impaired (Hassija et al., 2012; Kozel et al., 2016); however, PTSD treatment may influence psychosocial functioning impairment and contribute to positive outcomes (Davis et al., 2012; Fredman et al., 2011).

### **Surrogate Term/Related Concepts**

Seven surrogate terms were identified: interpersonal functioning, psychosocial adjustment, psychosocial readjustment, social functioning, global functioning, post-deployment functioning, and occupations of daily living (Erbes et al., 2011; Fredman et al., 2011; Frueh et al., 1997; Hassija et al., 2012; Miller et al., 2008; Plach & Sells, 2013; Renshaw et al., 2009; Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). Each term can be used interchangeably with psychosocial functioning in the context of combat-related PTSD in the veteran population (Rodgers, 2000).

Concepts related to psychosocial functioning consist of overall QOL, life satisfaction, and reintegration into civilian life (Erbes et al., 2011; Frueh et al., 1997; Hassija et al., 2012; Pietrzak & Southwick, 2011; Plach & Sells, 2013; Shea et al., 2010; Tuerk et al., 2010; Worthen & Moering, 2011). Elements of psychosocial functioning influence outcomes/constructs of QOL, post-deployment reintegration, and life satisfaction for combat veterans (Hassija et al., 2012; Plach & Sells, 2013). For example, it is evident QOL or life satisfaction may be poor if the veteran is struggling with

marriage, work, or parental functioning. Maladaptive psychosocial functioning may also contribute to dysfunctional post-deployment reintegration (Plach & Sells, 2013; Renshaw et al., 2009).

### **Exemplar**

A distinct aspect of evolutionary concept analysis is demonstrating the concept by presenting a case exemplar (Rodgers, 2000). A relevant case study is discussed by Fredman and colleagues (2011) and portions serve as a case exemplar for this analysis.

“Martin” is a 27-year old combat veteran who served two tours in the Iraq war and has a diagnosis of PTSD. He developed PTSD due to his combat experiences in Iraq while working as a Special Forces communications sergeant. Martin frequently saw dead bodies, was fired on by missiles, and witnessed a soldier shot in the head. During his second deployment, his job was to locate the manufacturing sites of explosives, and he believed he would be killed in action. It was common for him to engage in recovering dead bodies of Iraqis who helped Americans, including children, and car bombings were a frequent occurrence.

Martin’s PTSD symptoms included intrusive thoughts, nightmares, anger/irritability, avoidance, social withdrawal, and emotional numbing. Emotional numbing interferes with disclosure of emotions, and experience of positive emotions, as well as poor QOL (Shea et al., 2010). Intimacy in romantic relationships is sustained with empathic communication and emotional disclosure (Campbell & Renshaw, 2013), therefore, emotional numbing is an important symptom in PTSD.

Martin’s symptoms contributed to impaired marital functioning. He did not engage in an emotional or physical relationship with his wife, and often resorted to verbal

abuse, calling his wife fat, ugly, and stupid. He expressed guilt for this behavior, but at the same time was not willing to stop. He also increased his alcohol intake to manage his PTSD symptoms. Veterans often use substances like alcohol to self-medicate in order to find relief from PTSD symptoms (Schaumberg et al., 2015); however, substance use disorders are positively associated with PTSD and contribute to more severe PTSD symptomology (Bowe & Rosenheck, 2015).

To improve their relationship, the veteran and his wife participated in cognitive-behavioral conjoint therapy (CBCT) for PTSD (Fredman et al., 2011). Their mutual goals for treatment centered on improving communication, intimacy, and incorporating shared activities. Additionally, Martin identified his individual goals to reduce irritability and emotional numbing and improve his comfort level in crowded, public places.

At the end of treatment, both partners had significant improvements in their overall marital functioning. Martin reported that he feels like he is married again and no longer feels like he and his wife are just roommates, and his wife endorsed having a better understanding of his PTSD symptoms (Fredman et al., 2011). Although, Martin did not meet the diagnostic criteria for PTSD any longer, he continued to exhibit hyperarousal and avoidance post-treatment. Moreover, Martin admitted he did not disclose the full extent of his traumatic events, and mentioned one of them involved actions which contradicted his moral values. The event was particularly bothersome for Martin and he declined to discuss it further (Fredman et al., 2011). Such events are referred to as *moral injury* and are frequently reported by veterans who experience shame, guilt, and existential dilemmas related to combat exposure (Yan, 2016). This also suggests ongoing treatment may be necessary in his case.

This case exemplar illustrates combat exposure as a contributing factor for PTSD, which progressed to impaired marital functioning for this veteran. PTSD symptoms such as emotional numbing resulted in disfunction. In this case, including the veteran's wife in treatment was beneficial and improved his prognosis. This also speaks to the issue of social support as an influencing factor in functional improvement. Active participation in PTSD treatment is critical to symptom and psychosocial functioning improvement (Fredman et al., 2011).

### **Implications**

Another major outcome of this type of analysis is the formulation of implications which can guide further concept development and analysis (Rodgers, 2000). Psychosocial functioning in combat veterans with PTSD did not significantly evolve as a concept over time. Combat exposure was continuously reported as a risk factor for development of PTSD, and its effects on psychosocial functioning remained significant (Renshaw et al., 2009). Research on psychosocial functioning in this group of veterans has concentrated on the maladjustment veterans faced post-deployment. Marital relationships consistently remained the dominant psychosocial realm of focus. A notable trend was the expanded interest in the National Guard veterans due to their increased deployment into combat zones (Davis et al., 2015; Erbes et al., 2011; Fredman et al., 2011; Renshaw et al., 2009). A subtle trend appearing in several studies mentioned depression as a contributing factor, which warrants further exploration (Carroll et al., 1985; Erbes et al., 2011; Kozel et al., 2016). Additionally, income and employment status were identified as influencing factors (Davis et al., 2015; Frueh et al., 1997). For example, higher income was associated with veterans' positive involvement with their children (Davis et al., 2015). Overall, the most

compelling implication to assist in additional concept development includes concentrating on various overlooked or minimally discussed psychosocial functioning domains such as education and friendships.

### **Discussion**

The evolutionary concept analysis designed by Rodgers (2000) provides guidance for concept clarification. Several attributes, antecedents, and consequences related to the concept of psychosocial functioning in veterans with combat-related PTSD are clarified. Veterans returning home from combat deployments function within numerous environments associated with family, parenting, work, and education (Scaturo & Hardoby, 1988; Shea et al., 2010). Romantic partnerships appear most often in the literature related to the family domain of combat veterans. The education and parenting domains were not sufficiently discussed and should be included in future concept development. Moreover, friendship, was only mentioned as part of the global psychosocial functioning assessment; therefore, it was not possible to evaluate specific friendship effects in this population.

Combat exposure, PTSD symptoms, and social support were the antecedents primarily affecting psychosocial functioning. Most commonly, numbing and withdrawal symptoms were linked to the concept of psychosocial functioning (Hassija et al., 2012; Miller et al., 2008; Shea et al., 2010). Veterans with these symptoms have difficulties in being open, maintaining intimacy, and forming emotional connections (Scaturo & Hardoby, 1988; Shea et al., 2010). There was a minor contradiction in findings related to the effects of combat exposure versus PTSD effects on psychosocial functioning. Whether the main antecedent is combat exposure alone, or PTSD and combat exposure

combined, requires further investigation, although in our conceptualization, a pathway from combat-related PTSD to psychosocial functioning can be confidently established.

Anger and hostility were associated with impaired psychosocial functioning with violence toward family members. Providers must be mindful of this finding and incorporate anger management and family therapy in treatment planning. Impaired functioning status was central to the analysis. Improvements and productive functioning are possible with treatment; however, a review of available treatments is beyond the scope of this analysis. Social support was identified as an important antecedent in this concept analysis as it serves as protective factor for veterans experiencing PTSD symptoms and thus can facilitate psychosocial functioning improvement (Pietrzak et al., 2010; Renshaw et al., 2009). Research with veterans who experienced military sexual trauma related PTSD has led to similar conclusions, notably, that veterans with social support were less likely to be unemployed (Mondragon et al., 2015). To facilitate change in functioning, providers may want to assess social/family support and include family members in treatment.

Not surprisingly, QOL and reintegration into civilian life were found to be related concepts of psychosocial functioning. Conceivably, veterans who function poorly at work and have relationship difficulties (e.g., not getting along with their children) also experience poor QOL and cannot effectively reintegrate into civilian society. Clinicians can include QOL assessments into their practice to obtain a comprehensive evaluation and understanding of psychosocial functioning when working with this population. Altogether, findings indicate healthy psychosocial functioning can facilitate veterans'

successful reintegration into civilian society and their ability to sustain a satisfactory QOL.

Two trends worth exploring as contributors to understanding psychosocial functioning are depression and income/employment status. Whether depression and income/employment status mediate or moderate psychosocial functioning should be addressed. The knowledge gained could advance evidenced-based treatment planning. For example, including treatment for depression may produce better psychosocial functioning outcomes in this population.

To our knowledge, this is the first evolutionary concept analysis of psychosocial functioning in veterans with combat-related PTSD. A general concept analysis of psychosocial adaptation was conducted by Londono & McMillan (2015), and some of those results corroborate our findings. The authors also identified QOL as a related concept and similar consequences were noted, such as impaired education, work, and relationships. Other similarities included social support and socioeconomic status as influencing factors (Londono & McMillan, 2015).

There are noted limitations of this concept analysis. First, only one reviewer was involved in article selection and evaluation. To enhance validity, it would be beneficial to include multiple reviewers in the future. Second, at times it was difficult to distinguish which domain constituted the most relevance to veterans with combat-related PTSD because some articles included global functioning measurement incorporating multiple domains. It is our recommendation that in addition to overall psychosocial functioning, future research should assess each domain individually.

## **Conclusion**

The presented clarification of the concept of psychosocial functioning in veterans with combat-related PTSD highlights significant attributes, antecedents, consequences, and implications for future concept development. Combat exposure such as direct killing, witnessed killings, working with dead bodies, and PTSD symptoms such as numbing, withdrawal, and anger, are the main antecedents. In contrast, social support can mitigate PTSD development and in turn produce a positive influence on psychosocial functioning (Pietrzak et al., 2010); therefore, evaluating social support availability should be incorporated into assessment by every practitioner.

One important aspect that emerged is the need for future research into the influencing effects of depression and income status on psychosocial functioning. Looking at specific psychosocial domains individually could provide additional clarity of the concept. Furthermore, it is imperative to recognize the psychosocial functioning of veterans returning from combat deployments is markedly impaired and appears to influence QOL and successful reintegration into the civilian world. Providers should include interventions such as anger management and depression treatment to increase the likelihood of psychosocial function improvement. Overall, this concept is meaningful in the everyday lives of veterans with combat-related PTSD and requires special consideration in treatment planning by healthcare providers.



Figure 1.

PRISMA flow chart

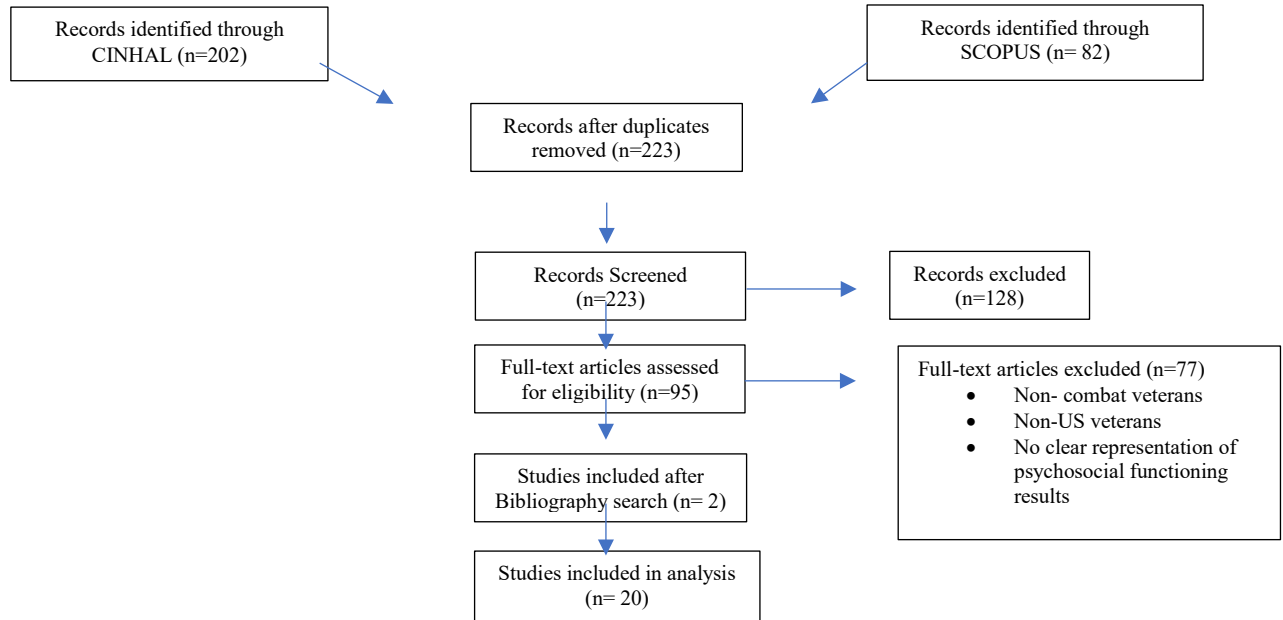


Table 1.

Concept Analysis of Psychosocial Functioning in Veterans with Combat-Related PTSD

Attributes	References
Psychosocial functioning environments/domains	Beckham et al., 1997; Carrol et al., 1985; Davis et al., 2012; Erbes et al., 2011; Fredman et al., 2010; Frueh et al., 1997; Kozel et al., 2016; Glynn et al., 1999; Hassija et al., 2012; Pietrzak et al., 2010; Plach et al., 2013; Renshaw et al., 2009; Maguen et al., 2010; Miller et al., 2008; Sampler et al., 2004; Sayers et al., 2009; Scaturro et al., 1988; Shea et al., 2010
Antecedents	References
Combat exposure	All*
PTSD symptomology	Beckham et al., 1997; Carroll et al., 1985; Frueh et al., 1997; Hassija et al., 2012; Miller et al., 2008; Samper 2004; Shea et al., 2010; Scaturro et al., 1988
PTSD severity & length of deployment	Beckham et al., 1997; Davis et al., 2015; Sampler et al., 2004; Miller et al., 2008
Social support	Pietrzak et al., 2010; Pietrzak et al., 2011

Consequences	References
Romantic relationship-related impairment	Carroll et al., 1985; Beckham et al., 1997; Davis et al 2012; Fredman et al., 2010; Glynn et al., 1999; Frueh et al., 1997; Maguen et al., 2010; Plach et al., 2013; Sayers et al., 2009; Scaturro et al., 1988; Renshaw et al., 2009
Work-related impairment	Erbes et al., 2011
Education-related impairment	Plach et al., 2013
Parenting-related impairment	Davis et al 2015; Sampler et al., 2004; Sayers et al., 2009
Global functioning (including multiple domains of functioning)	Hassija et al., 2012; Kozel et al., 2016; Miller et al., 2008; Pietrzak et al 2010; Shea et al, 2010

Note. References listed provide the data used in this concept analysis

\*All = 20 articles included

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**MANUSCRIPT # 3**

Does Psychosocial Functioning Improve with Prolonged Exposure in Veterans with PTSD: Exploring Traditional and Home-based Telehealth Delivery Methods

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## Abstract

Combat veterans with PTSD report high levels of functional impairment across multiple areas of life. For example, many veterans report dysfunctional marriages, unemployment, or difficulty with parenting. Some research indicates that improving PTSD symptoms with evidence-based treatment such as prolonged exposure (PE) can also improve psychosocial functioning. We used data from a previously conducted large clinical trial to explore whether PE, delivered in person or via home-based telehealth, had a therapeutic effect on psychosocial functioning in 150 combat veterans with PTSD. The effects of home-based telehealth on these metrics were evaluated as well. Additionally, we examined whether race, type of war conflict, and service-connected disability rating moderated the effect of PE on psychosocial functioning and whether PTSD, anxiety, and depression mediated the effect of PE on psychosocial function. We did not find moderating or mediating effects in our study. However, improvements in PTSD ( $r = .456$ ,  $p = .000$ ), depression ( $r = .426$ ,  $p = .001$ ), and anxiety ( $r = .29$ ,  $p = .023$ ) were associated with improvement in psychosocial functioning. We did not identify statistically significant differences in scores representing change in overall and each domain of psychosocial functioning between groups. Within-group analysis indicated psychosocial functioning improved in both groups but was mostly not statistically significant, and mean scores remained in the same impairment category. Yet some clinically relevant improvement may have occurred in the family domain; across groups, the mean scores, post treatment, moved from the severe impairment to the moderate impairment category. In the home-based group, mean scores in the parenting domain moved from the moderate to the mild impairment category. Notably, only the family domain in the home-based telehealth group had both statistically significant and clinically relevant results. Overall, our results are promising; we remain encouraged and recommend further research on this important topic.

**Keywords:** PTSD, Veterans, combat, psychosocial functioning

## Does Psychosocial Functioning Improve with Prolonged Exposure in Veterans with PTSD: Exploring Traditional and Home-based Telehealth Delivery Methods

Veterans are at high risk for developing Post Traumatic Stress Disorder (PTSD) (Arenson, McCaslin, & Cohen, 2019) and PTSD symptomology such as hyperarousal, hypervigilance, and avoidance can directly impact occupational, academic, marital, family, and parental functioning (Fang et al., 2015; Rodriguez, Holowka, & Marx, 2012). A major contributing factor for developing PTSD is combat-related trauma that includes threats to life, violent and sudden loss of friends, personal injury, and witnessed death (Hoge et al., 2004; Yeterian, Berke, & Litz, 2017). Veterans with combat-related trauma are at greater risk of interpersonal conflicts and overall impairment in psychosocial functioning areas of employment, marriage, and partner violence (Renaud, 2008).

Evidence-based psychotherapies for PTSD, such as Prolonged Exposure (PE), effectively reduce PTSD-specific symptomology (Foa et al., 2005; Nacasch et al., 2011); however, less is known regarding PE's impact on general psychosocial functioning (Monson et al., 2012; Rauch et al., 2009). Some evidence indicates improvement in PTSD symptoms can also improve psychosocial functioning (Galovski, Sobel, Phipps, & Resick, 2005; Monson et al., 2012; Reich, Nemeth, & Acierno, 2019), which can further lead to the additional benefit of improved quality of life (QOL) for this population (Schnurr, Hayes, Lunney, McFall, & Uddo, 2006; Schnurr & Lunney, 2012). However, despite significant PTSD treatment outcome research, PTSD symptom-specific outcomes are the focus of PTSD research studies, with less attention directed towards how PTSD symptom reduction affects psychosocial functioning (McKnight & Kashdan, 2009; Monson et al., 2012; Schnurr & Lunney, 2012, 2016; Yeterian et al., 2017).

There are multiple barriers to accessing psychotherapy treatment for PTSD, including social stigma associated with PTSD, living in a rural setting, travel cost, and taking time away from work (Acierno et al., 2017; Cully, Jameson, Phillips, Kunik, & Fortney, 2010; Gros, Strachan, et al., 2011). As such, available treatments like PE are underutilized and often not completed or even available to rural residents (Acierno et al., 2017). Telehealth technology, including home-based telehealth, is increasingly used to address barriers to care and improve access to mental health treatment (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011; Tuerk et al., 2010). Current literature suggests PE can be successfully delivered via home-based telehealth to treat symptoms of PTSD (Acierno et al., 2017; Chakrabarti, 2015); however, as increasing proportions of veterans with PTSD are treated via telehealth (Gros, Yoder, et al., 2011), concerns are emerging that the home-based telehealth modality itself may facilitate social withdrawal and promote avoidance, hence interfering with psychosocial functioning (McLean, Protti, & Sheikh, 2011; Whealin, Jenchura, Wong, & Zulman, 2016).

The present study used data from a previously conducted non-inferiority randomized controlled trial comparing PE delivered in person vs. PE delivered via telehealth (Acierno et al., 2017) to examine relationships between psychosocial functioning symptom reduction following PE, with additional analysis to determine if treatment delivery method affected this relationship. We also examined whether PTSD (as measured by the PCL-M), depression (as measured by BDI-II) and anxiety (as measure by the BAI), acted as potential mediators, and explored the potential moderating effect of race/ethnicity, war conflict and service-connected disability percentage (SC%).

### **Theoretical Framework**

The socio-interpersonal framework of PTSD shifts attention from the primarily individualistic perspective of PTSD to a more social-interpersonal perspective and conceptualizes the environment of the traumatized individuals across three levels: individual, close relationship, and distant relationship (Maercker & Hecker, 2016; Maercker & Horn, 2013). The framework was used to guide assessment of PTSD treatment effects (Maercker & Hecker, 2016).

In this study, the outcome variables measured by the Inventory of Psychosocial Functioning (IPF) (Rodriguez, Holowka, & Marx, 2012) correspond to two levels (Table 1), and the education and work domains were theorized to be part of the distant relationship level because of that level’s emphasis on group inclusion. The framework was used to inform the initial research question and suggested important variables to assess and test.

Table 1.

*Theoretical Framework Levels and Variable Representation*

Levels	Description of each level	Psychosocial Functioning Domains
Close Relationship Level	Intimate relationships	<ul style="list-style-type: none"> <li>• parenting</li> <li>• family</li> <li>• romantic relationships</li> <li>• Friendships</li> </ul>
Distant Relationship Level	Societal and cultural groups	<ul style="list-style-type: none"> <li>• education</li> <li>• work</li> </ul>

Note. Maercker & Hecker, 2016; Maercker & Horn, 2013

## Methods

### Participants

The parent study used provider referrals to recruit eligible subjects from the Ralph. H. Johnson VA Medical Center and Medical University of South Carolina

(MUSC). The Clinician-administered PTSD Scale (CAPS) was used to establish a PTSD diagnosis and participant eligibility. Veterans were eligible to participate if their traumatic event was determined to be combat related. Veterans from the Vietnam, Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), and Operation New Dawn conflicts were part of the study sample. Exclusion criteria included veterans having active psychotic symptoms, suicidal ideations and intent, or a current substance-dependence diagnosis (Acierno et al., 2017).

### **Procedures**

The present study received an exemption status from the institutional review board at Medical University of South Carolina (MUSC) and was approved by the VA Research and development committee. The parent study was also approved by the two aforementioned agencies. In this paper, an overview is provided by the authors to illustrate the basic procedural plan.

Consent was obtained from all of the participants, who were then randomized into one of two groups: PE in-person and PE via home-based telehealth. Clinicians with a master's degree in counseling were responsible for treatment and assessment and received the full training workshop on PE. Enrolled veterans participated in 10 to 12 therapy sessions. Dependent measures discussed in the next section were administered by blinded study personnel post treatment (Acierno et al., 2017). The same PE manual was used by clinicians in both treatment groups, with 20% of session recordings randomly assessed for treatment fidelity. Home-based telehealth treatment was delivered via encrypted VA software adhering to the HIPAA guidelines. In-person PE treatment

followed standard VA office visit procedures. See Acierno et al (2017) for details of study procedures.

## **Measures**

### **Psychosocial Functioning**

Level of psychosocial functioning was assessed using the Inventory of Psychosocial Functioning (IPF) self-report measure (Bovin et al., 2018). This scale measures level of functioning across romantic relationships with spouse or partner, family, work, friendships and socializing, parenting, education, and general self-care domains within the last 30 days. Answer options are scaled from 0 to 6, where 0 corresponds to “*never*” and 6 corresponds to “*always*” (Rodriguez et al., 2012). Scores can be calculated for each domain and for overall functioning level; higher scores indicate a higher level of functional impairment, with overall scores ranging from 0-100. This scale has excellent psychometric properties, including internal consistency (Cronbach alpha 0.93) (Rodriguez et al., 2012), and the total score correlates with other measures with similar constructs (Bovin et al., 2018). The IPF scale outcome measures have been shown to accurately represent the level of functioning in the psychosocial domains of interest. In the present study, we used the total IPF score and total scores for each domain.

### **PTSD**

PTSD severity was measured by the PTSD checklist-military version (PCL-M), which is a self-report measure that evaluates symptoms over the past month (Wilkins, Lang, & Norman, 2011). The checklist has 17 Likert style questions, where 1 correlates to “*not at all*” and 5 correlates to “*extremely*.” The instrument exhibits good



psychometric properties, including test-retest reliability, internal consistency, and convergent and discriminant validity. In this study, we used the total PCL-M score, which can range from 17 to 85, and is obtained by adding all the response scores.

### **Depression**

Data on depression severity were collected via the Beck Depression Inventory (BDI-II), that measures symptoms over the past two weeks (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This measure has 21 questions with excellent test-retest reliability and internal consistency (Strachan, Gros, Ruggiero, Lejuez, & Acierno, 2012). The responses are rated on a 4-point Likert scale and measure the level of depression. Total BDI-II score, which can range from 0 to 65, and is obtained by adding the 21 response scores.

### **Anxiety**

Anxiety severity was measured by the Beck Anxiety Inventory (BAI), that measures symptoms over a week (Beck, Epstein, Brown, & Steer, 1988). This scale has 21 items with good psychometric properties. For example, it showed high internal consistency ( $< 0.92$ ) and showed a moderate correlation with the Hamilton Anxiety Rating Scale. The responses are rated on a 4-point Likert scale, ranging from 0 (not at all) to 3 (severely) (Stulz & Crits-Christoph, 2010). We used the total BAI score, that is obtained by adding all the response scores, and ranges from 0 to 65 (Julian, 2011).

### **Statistical Analysis**

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS), version 25, and results were deemed statistically significant when the p value was  $< 0.05$ . Multiple imputation (MI) was used to handle missing values. Based on

recommendations in the literature, we used 10 imputations in our MI procedure (Stephens et al., 2018). Assumptions of normality and linearity were examined before beginning the data analysis. To represent change in scores after treatment, baseline scores were subtracted from post treatment scores. We did not report findings for the educational domain due to the small sample size for that specific domain across both groups (n=17).

First, the effects of depression, anxiety, and PTSD on psychosocial functioning was explored using simple linear regression. This analysis provided information on psychopathology variables and their effect on IPF scores individually (Table 2).

Second, we compared baseline characteristics between the two groups by conducting independent groups t-test and chi-square tests. Next, to examine whether the effect of PE differed between the two groups, we conducted independent groups t-tests. To examine whether there was a change from baseline within PE groups, we conducted paired t-tests. To test whether race, war conflict, and SC% moderated the effect of PE (home-based telehealth vs. in-person) on psychosocial functioning (as measured by the IPF), we conducted moderation analysis by including the interaction term of the potential moderator with PE in the linear regression models. Moderation is identified if the interaction term is statistically significant.

Additionally, we conducted mediation analysis to investigate whether PTSD, anxiety, or depression mediated the effect of PE (home-based telehealth vs. in-person) on psychosocial functioning (as measured by the IPF). Our plan for mediation analysis was guided by the model proposed by Baron and Kenny (1986).

Variables of interest in the study are as follows: a) baseline demographic characteristics including, race, war conflict (Vietnam, OIF/ OEF, and Operation New

Dawn), and SC % ; b) psychopathology related factors including depression total scores measured by the BDI, anxiety total scores measured by the BAI, and PTSD symptoms as measured by the PCL-M); c) psychosocial functioning across several areas, including romantic relationships with spouse or partner, family, work, friendships and socializing, and parenting, measured by the IPF; and d) PE treatment delivery modality (in-person vs home-based telehealth). The VA R&D committee classified age as an identifying variable; therefore, it could not be included in the analysis.

## Results

Outliers were within acceptable ranges and were retained in the dataset. No violations of normality or linearity assumptions were found. The sample (N=150) included mostly male veterans (n= 144), from the OEF/OIF conflicts (n=95) with a mean age of 42 (Acierno et al., 2017), who were white (n= 89), married (n=80) and employed (n= 61).

Change in PTSD scores was positively correlated with change in the overall psychosocial functioning scores ( $r = .456, p < .001$ ) and explained 20% of the variance in the overall psychosocial functioning. When PTSD symptoms decreased, impairment of psychosocial functioning decreased. Similarly, change in depression scores was positively correlated with change in the overall psychosocial functioning scores ( $r = .426, p = .001$ ) and explained 18% of its variance. Although, change in anxiety scores was also positively correlated with change in the overall psychosocial functioning score ( $r = .29, p = .023$ ), the correlation was moderate and anxiety change scores explained only 9 % of variance in the overall psychological functioning. We can also report that PTSD change scores ( $B=.389, p=.001$ ), depression change scores ( $B=.555, p= .001$ ), and anxiety change

scores ( $B=.325$ ,  $p = .033$ ) were all statistically significant predictors of IPF change scores. The IPF changes scores increased by .389 for every 1 point increase on PTSD change scores, by .555 for every 1 point increase on depression change scores, and by .033 for every 1 point increase on anxiety change scores.

Table 2.

*Simple linear regression analysis: Evaluating the total IPF change scores*

Variable	B coefficient	t statistic	p value	R <sup>2</sup>
PTSD	.389	3.9	.001	.20
Depression	.555	3.7	.001	.18
Anxiety	.325	2.1	.033	.09

Demographic variables, baseline PTSD, anxiety, depression and the overall psychosocial functioning scores were not significantly different for the two treatment groups. Detailed information on sample characteristics and baseline scores are presented in Table 3 and Table 4.

Table 3.

*Baseline sample characteristics*

	N (%) or mean (SD)	PE-IP n (%) or mean (SD)	PE-HBT n (%) or mean (SD)	x <sup>2</sup> /t statistic	p value
Number of participants	N = 150	n = 76 (50.7)	n = 74 (49.3)		
Race				.091	.763
White	89 (59.3)	46(60.5)	43(58.1)		
Non-white	61(40.7)	30(39.5)	31(41.9)		
Gender*				1.74	.367
Male	144 (96.0)	72(94.7)	72(97.3) *		
Female	5 (3.3)	4(5.3)	1(1.4)		
Marital status **				.145	.735
Never married	34 (23.1)	18 (24.3)	16(21.9)		
Married	80 (54.4)	40 (54.1)	40(54.8)		
Sep./Divorced	29 (19.7)	14(18.9)	15(20.5)		
Widowed	4 (2.7)	2(2.7)	2(2.7)		

Education (years)	12.1(4.7)	12.2 (4.5)	11.9(5.0)	.295	.769
Employed	61(40.7)	31(47.7)	30(48.4)	.028	.867
Service Connection (%)	54.2(37.5)	51.6 (39.2)	56.9 (35.2)	-.742	.459
War Conflict				.016	.992
OEF/OIF	95 (63.3)	48(63.2)	47(63.5)		
Persian Gulf	24 (16)	12(15.8)	12(16.2)		
Vietnam	31 (20.7)	16(21.1)	15(20.3)		

*Note.* Sep: Separated; OEF: Operation Enduring Freedom; OIF: Operation Iraqi Freedom; PE-IP: Prolonged Exposure-In Person; PE-HBT: Prolonged Exposure-Home Based Telehealth; PCL: Post-traumatic Stress Disorder Checklist; BDI: Beck Depression Inventory; BAI: Beck Anxiety Inventory; IPF: Inventory of Psychosocial Functioning. \*information is missing for one participant, \*\* information is missing for 3 participants.

Table 4. *Baseline PTSD, depression, anxiety and the total IPF scores*

	Total	PE-IP	PE-HB		
	mean (SD)	mean (SD)	mean (SD)	t statistic	p value
Baseline PCL score	62.7(12.3)	62.1(12.2)	63.4(12.3)	.662	.508
Baseline BDI score	28.2(12.5)	28.0(11.7)	28.5(13.3)	-.233	.816
Baseline BAI score	26.5(13.2)	27.0(13.3)	26.5(13.0)	.410	.508
Baseline IPF score	45.6(17.5)	46.7(17.2)	44.4(17.8)	.764	.445

*Note.* PE-IP: Prolonged Exposure-In Person; PE-HBT: Prolonged Exposure-Home Based Telehealth; PCL: Post-traumatic Stress Disorder Checklist; BDI: Beck Depression Inventory; BAI: Beck Anxiety Inventory; IPF: Inventory of Psychosocial Functioning.

When we compared psychosocial functioning *between* PE treatment modalities, there were no significant differences on IPF pre, post treatment, and change scores between groups. When we compared change from baseline to post treatment psychosocial functioning *within* treatment modalities, the overall and the individual domain scores improved with both in-person and home-based telehealth delivery of PE; however, the improvement was mostly not statistically significant (Table 5). There were three exceptions, for the home-based treatment group, only the family domain showed statistically significant improvement. For the in-person group, the overall psychosocial functioning, and the relationship domain showed statistically significant improvement. Even though we noted some statistically significant improvement, most veterans remained in the same functional impairment category post treatment. However, in the

family domain; across groups, the mean scores moved from the severe impairment to the moderate impairment category post treatment. In the home-based telehealth group, mean scores in the parenting domain moved from the moderate to the mild impairment category. An interesting finding was noted for the home-based telehealth group; the improvement in the family domain mean scores improvement was considered both statistically significant and clinically relevant.

Table 5.

*Comparison of treatment effect on psychosocial functioning between and within PE-HBT and PE-IP groups*

IPF		PE-IP mean (SD)	PE-HBT mean (SD)	Mean difference mean (SD)	95% CI lower/upper	t statistic	p value
Total IPF	Pre	46.7 (17.2)	44.4 (17.9)	2.4 (3.06)	-3.7/8.3	.764	.445
	Post	42.3 (15.7)	40.0 (15.9)	2.4 (2.83)	-3.2/7.9	.827	.410
	Change	4.4 (15.1)	-4.4(14.5)	.00 (3.00)	-5.9/5.9	.00	1.00
	t statistic	2.0	1.8				
	p value	.049	.088				
Relationship	Pre	49.0 (3.19)	40.9 (3.4)	8.1 (4.68)	-1.1 /17.2	1.725	.084
	Post	40.0 (3.01)	37.9 (3.6)	2.1 (4.72)	-7.1/11.2	.448	.654
	Change	-9.4	-1.9 (13.9)	-7.4 (5.63)	-18.5/3.6	-1.39	.187
	t statistic	(17.72)	.53				
	p value	2.4	.595				
		.015					
Family	Pre	53.7 (3.02)	56.3 (3.5)	-2.6 (4.59)	-11.6/6.4	.561	.575
	Post	48.2 (3.11)	41.1 (3.5)	7.2 (4.81)	-2.2/16.6	1.493	.135
	Change	-4.2	-10.2 (14.3)	6.0 (6.05)	-5.8/17.9	.998	.318
	t statistic	(21.67)	2.9				
	p value	1.0	.004				
		.293					
Work	Pre	34.3 (3.13)	28.9 (3.1)	5.3 (4.61)	-3.7/14.3	1.147	.251
	Post	30.6 (3.51)	21.7 (2.8)	8.8 (4.87)	-0.6/18.1	1.842	.066
	Change	-4.0	-1.4 (12.6)	-2.6 (5.69)	-13.7/8.6	.449	.653
	t statistic	(14.51)	.36				
	p value	1.1	.719				
		.253					
Friendship	Pre	50.6 (4.23)	46.8 (3.2)	3.7 (5.39)	-6.8/14.3	.695	.487
	Post	46.5 (3.58)	38.3 (3.6)	8.2 (5.26)	-2.1/18.5	1.550	.121
	Change	-7.2	-2.0 (15.7)	-5.1 (6.57)	-18.0/7.7	.782	.434
	t statistic	(21.96)	.53				
	p value	1.4	.596				
		.152					
Parenting	Pre	34.8 (4.43)	31.3 (3.8)	3.4 (6.01)	-8.3/15.2	-.764	.445
	Post	31.4 (3.36)	23.3 (3.6)	7.9 (4.94)	-1.7/17.6	1.609	.108
	Change	-2.6	-4.8 (18.5)	2.3 (7.97)	-13.3/17.9	.283	.777
	t statistic	(17.96)	.87				
	p value	.46	.384				
		.648					

Note. PE-IP: Prolonged Exposure-In Person; PE-HBT: Prolonged Exposure-Home Based Telehealth; IPF: Inventory of Psychosocial Functioning. Pre: score before interventions; Post: scores after interventions; Change: change scores.

No significant results were found when examining race, type of war conflict, and SC %, indicating that no moderation effects were present. The final step in the analytical plan was to examine the mediation effect of PTSD, anxiety, and depression; however, there were no grounds for full mediation analysis since the first condition of a direct effect of the treatment modality on psychosocial functioning scores was not met.

### **Discussion**

The study incorporated the principles of the socio-interpersonal framework of PTSD (Maercker & Horn, 2013) and sought to investigate whether PE as PTSD treatment had a therapeutic effect on psychosocial functioning. Moreover, home-based telehealth was evaluated as a potential treatment delivery method. We used the framework's key attributes regarding the importance of the interpersonal processes occurring after trauma to guide our research question and in the selection of psychosocial functioning domains that would be meaningful to our study population.

The comparison between in-person and home-based telehealth groups among a sample of 150 combat veterans with PTSD did not result in statistically significant changes in IPF scores. Our exploration of PE expands the use of this treatment to psychosocial functioning and exposes the current gap in literature related to telehealth delivery methods and the possible association with conditioning avoidance that may obstruct psychosocial functioning (McLean et al., 2011; Whealin et al., 2016). Our findings indicate both modalities might be possible options; however, this should be confirmed in studies specifically designed to examine the effects of these modalities on psychosocial functioning. Studies comparing the same treatment modalities in terms of PTSD outcomes illustrate both are acceptable and effective. Notably, the parent study

did not find home-based telehealth inferior to the in-person delivery method when used to treat PTSD (Acierno et al., 2017).

Race, type of war conflict, and SC% rating did not moderate the effects of PE on psychosocial functioning suggesting these demographic characteristics were not factors in the direction of our intervention response. One study also did not observe a difference in the effects of PE on PTSD outcomes, delivered via telehealth, did not differ between groups of veterans with various demographic characteristics: age, race, type of war conflict, and disability status (Gros, Yoder, et al., 2011). In the future, it would also be of value to investigate whether there are psychosocial functioning outcome differences between demographic groups and further examine if both (in-person and telehealth) modalities may be used to deliver PE to various groups of combat veterans.

Veterans in both groups experienced a decrease in their overall and individual domains post treatment scores, suggesting that veterans' psychosocial functioning improved after participating in PE. However, this finding should be judged with caution as the functional improvement findings largely lacked statistical significance. When evaluating these findings, we considered the clinical relevance of our results. In the literature, the discussion is currently moving towards determining clinically relevant improvement in addition to, or regardless of, statistically significant improvement (Page, 2014). We did not find guidelines for evaluating clinically important improvement for the IPF scale; however, we argue that movement between impairment categories signifies clinical relevance and speaks to the effect size of our intervention. Therefore, detected movement from a higher impairment to a lower impairment category is an important finding on its own and supports further examination of this topic.



Although no mediation was found, as expected, PTSD improvement contributed to improvement in psychosocial functioning. This finding supports the rationale for this study and the main hypothesis of using evidence-based treatment such as PE to influence psychosocial functioning impairment. Similarly, improvement in depression contributed to improvement in psychosocial functioning. This finding is in line with other studies identifying depression as a contributing factor to poor psychosocial functioning (Kozel et al., 2016), therefore, treating depression as well as PTSD should be considered during the treatment planning phase for veterans with psychosocial functional impairment. Anxiety on the other hand, accounted for the smallest percentage of the variance explained in psychosocial functioning improvement. This finding suggests improvement in anxiety does not influence psychosocial functioning improvement to the same extent as improvements in depression or PTSD, but all of the tested psychopathology variables had correlations in the moderate range which provides additional evidence of their importance and association with psychosocial functioning improvement. Overall, the goals for treatment should include assessment and treatment of all associated conditions, not just PTSD alone.

It is imperative to discuss the limitations of our study. One major limitation is the lack of an established criterion for assessing clinical relevance using the IPF measure. Without that information, it is not possible to determine how much meaningful improvement actually occurred. Moving forward, it will be important to establish a minimum clinical improvement criterion in order to evaluate improvement according to clinical relevance.

With any research study, one goal is to generalize findings to the larger population; therefore, we must bring attention to the overwhelmingly white male study sample. This is not a very representative sample of the veteran population, and we advise that future studies include a more ethnically and gender diverse sample. Another limitation is the use of secondary analysis, as the focus of the parent study was not on psychosocial functioning. Thus, we recommend conducting an adequately powered, randomized controlled trial with a control group to establish PE's ability to improve psychosocial functioning. In the education domain, impairment is clearly evident; however, we were not able to formulate conclusions or evaluate this domain due to limited data. Future research is recommended in this important domain for veterans.

To conclude, although we did not observe statistically significant differences between groups, we cannot draw a definitive conclusion on whether there is truly no difference between the two modalities. Future research studies should include a design with psychosocial functioning as the primary focus and be sufficiently powered. Furthermore, based on the findings in our sample population, it would be premature to draw conclusions about the efficacy of PE in relation to psychosocial functioning improvement after PE delivery via home-based telehealth or in-person, but the results remain promising. We identified improvements indicating potential clinical relevance in two domains and in overall functioning. Additionally, the family domain not only had statistically significant improvement but also clinically relevant improvement in the home-based telehealth group. However, while researchers have examined PTSD outcomes and concluded that home-based telehealth and in-person modalities of PE are

effective (Acierno et al., 2016; Acierno et al., 2017), more research on psychosocial functioning outcomes is necessary.

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## Summary

Veterans are diagnosed with PTSD at higher rates than the general population (1). One explanation may be the traumatic nature of combat exposure, which is associated with an elevated risk of PTSD symptom development (2). Psychosocial functioning is often impaired for these veteran's post-deployment and contributes to poor QOL (3, 4). Treatment is critical for PTSD symptom resolution, and multiple effective options of EBTs exist. PE is one EBT that is used and recommended as a first-line treatment for PTSD (5). One concern with EBT treatment is the suboptimal utilization by veterans. To counteract this problem, the VA promotes telehealth as a delivery method for EBT, concentrating on the home-based approach (5).

This dissertation focused on psychosocial functioning in veterans with combat-related PTSD and the effects of EBT's used to treat PTSD on functioning in associated domains. It also addressed questions related to the home-based telehealth treatment modality, specifically, whether there are differences in psychosocial functioning outcomes when compared to face-to-face treatment modality. Three manuscripts comprise this dissertation; together they accomplished the stated goals, identified gaps in the literature, and produced future research recommendations.

The integrative review begins the investigation by synthesizing literature on EBTs effects on psychosocial functioning in veterans with combat-related PTSD (6). In this first manuscript, the interest is on current literature and evidence; therefore, the search date established had a 10-year limitation. Seven articles met the inclusion criteria and were reviewed using the CASP and LOE appraisal tools.

The findings showed that various assessment tools were used to measure psychosocial functioning outcomes, indicating a lack of consistency and comprehensive assessment. For example, while some tools assessed the overall functioning, others concentrated on selected domains. Terminology to represent psychosocial functioning was inconsistent as well, including terms such as *social functioning*, *social adjustment*, *disability (in specific domains)*, *social impairment*, and *functional impairment*.

Main results showed that therapies such as PE, CPT, PCT, and CBT successfully improved PTSD symptoms and had a therapeutic effect on psychosocial functioning as well. However, more research is indicated. Parenting and marriage domains require further exploration as they were not regularly investigated as outcomes from EBT's for PTSD, nor grouped into the total functioning assessment. Although limited data were reviewed, results showed that targeting avoidance, emotional numbing symptoms, and continuing treatment until the patient no longer meets diagnostic criteria produces additional benefits of psychosocial functioning improvement (6). The integrative review exposed inconsistencies and questions needing clarification, as well as the lack of comprehensive understanding of this phenomenon in the context of combat exposure and PTSD.

Rodgers (2000) evolutionary concept analysis design was used to develop the second manuscript. One limitation in manuscript one was the limiting search date; therefore, in the concept analysis no date was specified. This resulted in a more representative sample of articles. A systematic database search and bibliography evaluation resulted in twenty articles being incorporated in the analysis.

The results demonstrated that the psychosocial functioning phenomenon consists of multiple domains of functioning that veterans encounter post-combat deployment. The domains represent the complex world the veteran is expected to function in even when experiencing PTSD symptoms. Psychosocial functioning status for veterans with combat-related PTSD is, unfortunately, vastly dysfunctional. As expected, and corroborated by other literature, combat-related PTSD, not combat exposure by itself, contributes to impaired functioning, which suggests the possibility that EBT geared to treat PTSD may also affect psychosocial functioning. The results from manuscript 1 showed similar associations. Other similarities between results reported in manuscript 1 and 2 include the emphasis of emotional numbing and avoidance as important symptoms contributing to functioning status, and additional antecedents, in particular, anger and irritability. Social support is an influencing factor that can both assist in PTSD improvement and subsequently functional status, as well as the development of PTSD and maladaptive coping skills when social support is lacking. Trends such as comorbid depression, income, and employment status as influencing factors necessitate further examination in future research.

The concept of psychosocial functioning can be further expanded to include quality of life, life satisfaction, and the reintegration process for this population, as they are closely related. Interestingly, the concept analysis identified marriage as one of the most frequently discussed domains in the literature; however, the integrative review reported this domain is not frequently included as an outcome post EBT for PTSD. This is a significant gap in the literature, and marriage functioning should be studied as an outcome post EBT for PTSD treatment. Overall, the phenomenon of interest is an

intricate mix of attributes, antecedents, and consequences that together produce a comprehensive picture of factors that affects veterans with combat-related PTSD.

The secondary analysis study aimed to provide evidence on hypothesis, which were in part formulated as the result of the first two manuscripts. The examination of home-based telehealth broadened the investigation to help explain its role in treatment delivery associated with psychosocial functioning. Rather than isolating one functioning domain, this study evaluated the level of functioning in romantic relationships, family, work, friendships and socializing, and parenting domains. In manuscript 1, PE was identified as an effective treatment to improve function, and since it is the gold standard, PE was an obvious choice for our investigation and one of the reasons we selected the parent study. It was also determined that focusing on one EBT would be appropriate as the beginning steps for research development for the new Principal Investigator. Data for this study were retrieved from a data set from a previously conducted study of combat veterans diagnosed with PTSD (7). Psychosocial functioning, potential moderators (race, war conflict, and service-connected disability rating) and potential mediators (PTSD, depression, and anxiety) were all part of the data analysis.

One finding from the literature review was the association of PTSD symptom improvement with psychosocial functioning improvement (6); therefore, it was important to explore PTSD as a mediator. Additionally, depression and anxiety are frequent comorbid conditions (8) and were deemed important and necessary to include in the mediation analysis. To better inform treatment planning and to provide greater understanding of psychosocial functioning, race, type of war conflict and service-connected disability percentage rating were included in the moderation analysis.

Although, PTSD, depression, and anxiety did not mediate the effects of PE on psychosocial functioning, improvements in the presented psychopathology were associated with improvement in IPF scores. This finding further demonstrates the importance of associated psychopathology and its treatment in order to improve functioning for veterans with combat-related PTSD. Race, type of war conflict, and service-connected disability rating did not prove to be moderators in our study.

We detected that post treatment mean scores decreased in both groups, but the decreases in scores post treatment were mostly not statistically insignificant, with a few exceptions. However, despite statistical significance noted in the family domain (home-based group), overall psychosocial functioning, and the relationship domain mean change scores (in-person group), the scores largely remained in the same impairment category, suggesting these results do not indicate a clinically important change. Of note, we observed encouraging findings in the family domain. Mean scores moved from the severe to the moderate impairment category in both groups, and in the home-based telehealth group, mean scores moved from the moderate to the mild impairment category in the parenting domain. Additionally, it is worth emphasizing that in the home-based group, the family domain had both statistically significant and clinically relevant outcomes. These findings are preliminary in nature and provide information for future studies that should be designed to exclusively evaluate psychosocial functioning, include a control group, and be sufficiently powered.

### **Importance of Framework**

The socio-interpersonal framework for PTSD was critical in directing the PI when a) deciding which aspect of PTSD was in need of investigation; b) formulating the

literature search strategy of manuscripts 1 and 2; c) developing outcomes for study; and d) organizing findings. Although most research has primarily centered on the individual with PTSD, this framework illustrates the significance of the social structure in the PTSD affected population (9). It is evident that PTSD symptomology can lead to psychosocial dysfunction, and this framework also suggests impaired psychosocial functioning in various domains can contribute to the maintenance of PTSD (10), thus justifying the importance of research of this phenomenon. Using the socio-interpersonal framework for PTSD together with the findings from available literature, we established psychosocial functioning as an important phenomenon to study and theorized that treating PTSD symptomology may positively affect psychosocial functioning. The combined product of this dissertation provides a comprehensive assessment of the phenomenon of interest in veterans with combat-related PTSD.

### **Limitations and Future Research**

In the first manuscript, one important limitation is the 10-year limit criterion established for the literature search. Although the emphasis was on current evidence/literature, this limitation potentially excluded relevant articles. Future literature reviews should establish a more liberal criterion, perhaps eliminating a date limit altogether. More research is indeed warranted as only seven studies were included in the review, and the results should be considered with that limitation in mind.

Only one reviewer was involved in the selection and appraisal of studies which potentially affected the validity of the review. The evolutionary concept analysis used one reviewer as well, and a future concept analysis would benefit from several investigators during the process of article selection and determination of results.



The secondary analysis study did not have a no treatment control group due to its non-inferiority design; therefore, only a comparison of psychosocial functioning from one EBT via two different modalities was possible. Future, study designs should include a control group or wait list conditions in order to assess a potential cause and effect relationship between EBT and psychosocial functioning outcomes. The study sample was predominantly white and male which affects generalizability of results and must be mitigated in future research. One strategy to consider may be oversampling female and non-white participants to meet the goal of generalizability. Furthermore, only one geographic location served as recruitment area, which limits generalizability as well. Finally, because this was a secondary analysis study, the PI had no control over recruitment, data collection, or choice of assessment questionnaires; therefore, a randomized controlled study designed to examine this topic should be conducted.

Future studies may expand this topic and investigate PTSD caused by other traumatic events. For example, military sexual trauma is experienced by male and female veterans in the military and linked to high rates of PTSD (11, 12). Additionally, other EBTs should be tested as potential options for improvement of psychosocial functioning. In the reviewed literature, most researchers presented quantitative results. To fully understand the concept of psychosocial functioning in this population, examining the lived experience of veterans would be beneficial, and various qualitative and mixed methods approaches should be implemented in the future. Another important consideration is the longitudinal perspective of findings. It would be beneficial to evaluate whether the effects of PE on psychosocial functioning are sustained over several months.

## **Contribution of Research**

This dissertation brings attention to the concept of psychosocial functioning in veterans with combat-related PTSD, which is closely intertwined with PTSD symptomology. It underscores the significance of this concept and the need for further study as a primary outcome. As previously mentioned, gaps in the literature were identified, and those dictate a future research trajectory.

The examination of telehealth technology also adds knowledge to the current state of science in this area of study. The modernization of treatment delivery methods allows providers greater reach. Although definitive conclusions are premature, our findings suggest that both home-based telehealth and in-person delivery of PE may be feasible options; however, corroboration with future research is needed. Our preliminary results also suggest PE may contribute to clinically relevant changes in certain domains of psychosocial function; however, yet again this should to be confirmed.

Additionally, this dissertation highlights aspects of clinical practice that can be implemented by healthcare providers. Including family members and romantic partners in PTSD treatment and treatment planning may improve outcomes. Our findings encourage providers to encompass psychosocial functioning assessment before and after EBT delivery as standard practice. This dissertation also contains a concept analysis that healthcare providers can use to enhance their understanding of psychosocial functioning specific to this population.

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## Appendices

### Appendix A



**Institutional Review Board for Human Research (IRB)  
Office of Research Integrity (ORI)  
Medical University of South Carolina  
Harborview Office Tower  
19 Hagood Ave., Suite 601, MSC857  
Charleston, SC 29425-8570  
Federal Wide Assurance # 1888**

June 24, 2019

To: Kristina Reich  
College of Nursing

From: Katherine Bright  
Administrator, Board I

Re: Not Human Subjects Determination

This memo is in response to the submitted Not Human Research (NHR) application, **“Does Psychosocial Functioning Improve with Prolonged Exposure in Veterans with PTSD? Exploring Traditional and Home-Based Telehealth Delivery Methods (Pro00089635)”**. Based on your application, this project meets the Not Human Research criteria set forth by the Code of Federal Regulations (45CFR46) of:

- a. The Specimens and/or private information/data were not collected specifically for the currently proposed research project through an interaction/intervention with living individuals **AND**
- b. The investigator(s) including collaborators on the proposed research cannot readily ascertain the identity of the individual(s) to whom the coded private information of specimens pertains.

Therefore, this project has been deemed not to be human research and is not subject to oversight by the Medical University of South Carolina IRB. If there are any changes to the application you provided, please resubmit for a NHR determination.

## Appendix B

Department of Veterans Affairs

MEMORANDUM

**R&DC Approval Date:** November 7, 2019

**From:** ACOS for Research & Development (151)

**Subject:** Research & Development Committee Approval of Research Proposal

**To:** Ronald Acierno, Ph.D.

1. Your research proposal entitled “*Does Psychosocial Functioning Improve with Prolonged Exposure in Veterans with PTSD: Exploring Traditional and Home-based Telehealth Delivery Methods*” has been reviewed by the Research & Development Committee and found to be satisfactory. We acknowledge that the IRB determined that this project is “non-human subjects research. Your study is now activated at the Ralph H. Johnson Medical Center. **You must submit an expenditure report to the Research Office on a yearly basis. You must also inform the R&D office when this study ends, and forward the subcommittee termination paperwork to the R&D Program Manager.** If for any reason the status of this project or your role in the project changes, please notify the VA Research Office immediately in writing. Should you have any questions, please contact Rudell Ryant, R&D Program Manager, at 789-6711.
2. You, the Principal Investigator, are responsible for notifying your Service Chief, Impacted Services/Clinics and Pharmacy Service (if applicable) of IRB and R&D approval. You, the Principal Investigator, are also responsible for notifying your Service Chief, Impacted Services/Clinics and Pharmacy Service (if applicable) when a study has been terminated.
3. Please take the time to read the attached VHA Directive 1200.19, dated May 10, 2019. It describes VA policy regarding acknowledgment of Department of Veterans Affairs affiliation and research support in presentations and publications. In publications, the proper terminology is: This work is supported by the Office of Research and Development, Medical Research Service, Department of Veterans Affairs.
4. **All research staff that are not VA employees must be registered as WOC employees and their credentials confirmed.**



R. Amanda C. LaRue, Ph.D.

Attachment: VHA Directive 1200.1

## Appendix C



August 15, 2019

Kristina Reich, PMHNP-BC, RN  
College of Nursing  
Medical University of South Carolina  
99 Jonathan Lucas Street, MSC 160  
Charleston, SC 29425

**Material Requested:** Evidence-Based Psychotherapy Interventions to Improve Psychosocial Functioning in Veterans With PTSD: An Integrative Review

**Usage Requested:** Inclusion in dissertation compendium

**Citation:** Reich, K., Nemeth, L., & Acierno, R. (2019). Evidence-based psychotherapy interventions to improve psychosocial functioning in Veterans with PTSD: An integrative review. *Journal of Psychosocial Nursing and Mental Health Services*. Advance online publication. doi:10.3928/02793695-20190531-04

Dear Ms. Reich,

Permission is granted for the requested materials and usage listed above, subject to the following conditions:

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Sincerely,  
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FAX 856 - 848 - 6091

## Appendix D

SID# \_\_\_\_\_

### IPF

**INSTRUCTIONS:** Answer the questions at the beginning of each section to determine which sections apply to you. Then, within the sections that apply to you, read each statement and rate how often you have acted like that over the past 30 days. Circle only one number for each statement.

#### **Romantic Relationship with Spouse or Partner**

Have you been in a romantic relationship with a spouse or partner in the past 30 days?  Yes  No

**If you have not been in a romantic relationship with a spouse or partner during the past 30 days skip this section** and continue with the next section. Otherwise, please answer the following questions.

**Over the past 30 days...**

	Never		Sometimes		Always
1. When necessary, I cooperated on tasks with my spouse or partner.	0	1	2	3	4 5 6
2. I shared household chores or duties with my spouse or partner.	0	1	2	3	4 5 6
3. I had trouble sharing thoughts or feelings with my spouse or partner.	0	1	2	3	4 5 6
4. I showed interest in my spouse or partner's activities.	0	1	2	3	4 5 6
5. I had trouble settling arguments or disagreements with my spouse or partner.	0	1	2	3	4 5 6
6. I was patient with my spouse or partner.	0	1	2	3	4 5 6
7. I had trouble giving emotional support to my spouse or partner.	0	1	2	3	4 5 6
8. I was affectionate with my spouse or partner.	0	1	2	3	4 5 6
9. My partner or spouse and I did activities that brought us closer together.	0	1	2	3	4 5 6
10. I was interested in sexual activity with my spouse or partner.	0	1	2	3	4 5 6
11. I had trouble becoming sexually aroused with my spouse or partner.	0	1	2	3	4 5 6

#### **Family**

**In this section, family refers to all relatives other than your spouse/partner or children (for example, parents, brothers, sisters, grandparents, etc). Do not answer these questions in reference to your spouse/partner or children.**

Have you been in contact with family members (parents, brothers, sisters, grandparents, etc.) in the past 30 days?  Yes  No

**If you have not been in contact with family during the past 30 days skip this section** and continue with the next section. Otherwise, please answer the following questions.

**Over the past 30 days...**

	Never		Sometimes		Always
12. I stayed in touch with family members (e.g. phone calls, e-mails, texts).	0	1	2	3	4 5 6
13. My family and I did activities that brought us closer together.	0	1	2	3	4 5 6
14. I was affectionate with my family members.	0	1	2	3	4 5 6
15. I had trouble being patient with family members.	0	1	2	3	4 5 6
16. I had trouble communicating thoughts or feelings to family members.	0	1	2	3	4 5 6
17. I had trouble giving emotional support to family members.	0	1	2	3	4 5 6
18. I had trouble settling arguments or disagreements with family members.	0	1	2	3	4 5 6

**Work (including home-based work)**

Have you worked (either for pay or as a volunteer) in the past 30 days?

Yes  No

**If you have not worked either for pay or as a volunteer during the past 30 days skip this section** and continue with the next section. Otherwise, please answer the following questions.

**Over the past 30 days...**

	Never	Sometimes			Always	
19. I had trouble showing up on time for work.	0	1	2	3	4	5 6
20. I reported for work when I was supposed to.	0	1	2	3	4	5 6
21. I got along well with others at work.	0	1	2	3	4	5 6
22. I stayed interested in my work.	0	1	2	3	4	5 6
23. I had trouble being patient with others at work.	0	1	2	3	4	5 6
24. I performed my job to the best of my ability.	0	1	2	3	4	5 6
25. I completed my work on time.	0	1	2	3	4	5 6
26. I had trouble settling arguments or disagreements with others at work.	0	1	2	3	4	5 6
27. I solved problems or challenges at work without much difficulty.	0	1	2	3	4	5 6
28. I maintained a reasonable balance between work and home.	0	1	2	3	4	5 6
29. I was able to perform my work duties without needing any extra help.	0	1	2	3	4	5 6
30. When necessary, I cooperated on work-related tasks with others.	0	1	2	3	4	5 6
31. I showed my skills and knowledge of the job.	0	1	2	3	4	5 6
32. I showed others at work that they could depend on me.	0	1	2	3	4	5 6
33. I came up with ideas and put them into action at work.	0	1	2	3	4	5 6
34. I took responsibility for my work.	0	1	2	3	4	5 6
35. I prioritized work-related tasks appropriately.	0	1	2	3	4	5 6
36. I worked hard every day.	0	1	2	3	4	5 6
37. I made sure that the work environment was pleasant for others.	0	1	2	3	4	5 6
38. I had trouble expressing my ideas, thoughts or feelings to others at work.	0	1	2	3	4	5 6
39. I had trouble being supportive of others at work.	0	1	2	3	4	5 6

**Friendships and Socializing**

Have you been in contact with friends in the past 30 days?  Yes  No

**If you have not been in contact with friends during the past 30 days skip this section** and continue with the next section. Otherwise, please answer the following questions.

**Over the past 30 days...**

	Never	Sometimes			Always	
40. I was willing to meet new people.	0	1	2	3	4	5 6
41. I stayed in touch with friends (returning phone calls, emails, visiting).	0	1	2	3	4	5 6
42. My friends and I did activities that brought us closer together.	0	1	2	3	4	5 6
43. I had trouble being patient with my friends.	0	1	2	3	4	5 6
44. I had trouble settling arguments or disagreements with my friends.	0	1	2	3	4	5 6
45. I had trouble sharing my thoughts or feelings with my friends.	0	1	2	3	4	5 6
46. I had trouble giving emotional support to my friends.	0	1	2	3	4	5 6
47. I showed affection for my friends.	0	1	2	3	4	5 6



**Parenting**

**In this section, children refers to anyone for whom you had parenting responsibilities.**

Do you have children with whom you lived or had regular contact during the past 30 days?

Yes  No

**If you do not have children with whom you lived or had regular contact during the past 30 days skip this section** and continue with the next section. Otherwise, please answer the following questions.

**Over the past 30 days...**

	Never		Sometimes			Always	
48. My children were able to depend on me for whatever they needed.	0	1	2	3	4	5	6
49. I was interested in my children's activities.	0	1	2	3	4	5	6
50. I had trouble communicating with my children.	0	1	2	3	4	5	6
51. I was affectionate with my children.	0	1	2	3	4	5	6
52. I appropriately shared thoughts or feelings with my children.	0	1	2	3	4	5	6
53. My children and I did activities that brought us closer together.	0	1	2	3	4	5	6
54. I talked with, or taught, my children about important life issues.	0	1	2	3	4	5	6
55. I was a good role model for my children.	0	1	2	3	4	5	6
56. I had trouble giving emotional support to my children.	0	1	2	3	4	5	6
57. I had trouble settling conflicts or disagreements with my children.	0	1	2	3	4	5	6

**Education (including distance learning)**

Have you been involved in a formal educational experience, either in or outside of the school setting, during the past 30 days?

Yes  No

**If you have not been involved in an educational experience during the past 30 days skip this section** and continue with the next section. Otherwise, please answer the following questions.

**Over the past 30 days...**

	Never		Sometimes			Always	
58. I attended classes regularly.	0	1	2	3	4	5	6
59. I stayed interested in my classes and schoolwork.	0	1	2	3	4	5	6
60. I arrived on time for my classes.	0	1	2	3	4	5	6
61. I had trouble being supportive of my classmates' achievements.	0	1	2	3	4	5	6
62. I turned in assignments late.	0	1	2	3	4	5	6
63. I solved problems and challenges in class without much difficulty.	0	1	2	3	4	5	6
64. I took responsibility for my schoolwork.	0	1	2	3	4	5	6
65. I was patient with my classmates and/or instructors.	0	1	2	3	4	5	6
66. I had trouble settling disagreements or arguments with instructors and/or classmates.	0	1	2	3	4	5	6
67. I had trouble remembering what the instructor said.	0	1	2	3	4	5	6
68. I could easily remember what I read.	0	1	2	3	4	5	6
69. I understood course material.	0	1	2	3	4	5	6
70. When necessary, I cooperated with classmates.	0	1	2	3	4	5	6
71. I got along with classmates and/or instructors.	0	1	2	3	4	5	6
72. I completed my schoolwork to the best of my ability.	0	1	2	3	4	5	6

<b>Self Care</b>								
<b>Over the past 30 days...</b>								
	<b>Never</b>		<b>Sometimes</b>			<b>Always</b>		
73. I had trouble keeping up with household chores (for example, cleaning, cooking, yard work, etc).	0	1	2	3	4	5	6	
74. I maintained good personal hygiene and grooming (for example, showering, brushing teeth, etc).	0	1	2	3	4	5	6	
75. I had trouble managing my medical care (for example, medications, doctors' appointments, physical therapy, etc).	0	1	2	3	4	5	6	
76. I ate healthy and nutritious meals.	0	1	2	3	4	5	6	
77. I had trouble keeping up with chores outside the house (shopping, appointments, other errands).	0	1	2	3	4	5	6	
78. I had trouble managing my finances.	0	1	2	3	4	5	6	
79. I was physically active (for example, walking, exercising, playing sports, gardening, etc).	0	1	2	3	4	5	6	
80. I spent time doing activities or hobbies that were fun or relaxing.	0	1	2	3	4	5	6	