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Quality of Life in Posttraumatic Stress Disorder: The Role of Posttraumatic Anhedonia and Depressive Symptoms in a Treatment-Seeking Community Sample

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Abstract: Posttraumatic stress disorder (PTSD) is associated with functional impairment and poor quality of life (QoL) across multiple domains, such as social functioning, occupational and educational attainment, physical health, and overall life satisfaction and wellbeing. Yet, there is limited evidence for which PTSD symptom clusters may be more strongly associated with functional impairment and decreased QoL. We used a seven-factor model of PTSD (re-experiencing, avoidance, negative alterations, anhedonia, externalizing, dysphoric arousal, and anxious arousal) to predict QoL using a latent regression model in a sample (N = 537) of adult patients participating in exposure-based PTSD partial hospitalization programs (PHP). QoL was measured by the Quality-of-Life Satisfaction Questionnaire—Short Form (Q-LES-Q-SF). Among posttraumatic symptoms, anhedonia emerged as the only significant predictor in the model ($\beta = -8.60$, $SE = 3.02$, $p = 0.004$), when controlling for depression scores. The overall model accounted for 40% of the variance in QoL. Depression was also significantly associated with QoL ($\beta = -1.67$, $SE = 0.15$, $p < 0.001$), controlling for PTSD symptoms. Our findings are congruent with prior research supporting the role of anhedonia and emotional numbing in functional impairment, yet differ in that other factors of PTSD (e.g., re-experiencing, avoidance, negative alterations) were not significant. Understanding which PTSD symptom clusters are more strongly associated with QoL may inform treatment approaches or allow clinicians to tailor treatments. We discuss implications for treatment and future research.

Keywords: anhedonia; quality of life; PTSD; posttraumatic stress

Citation: Miller, C.R.; McDonald, J.E.; Grau, P.P.; Wetterneck, C.T. Quality of Life in Posttraumatic Stress Disorder: The Role of Posttraumatic Anhedonia and Depressive Symptoms in a Treatment-Seeking Community Sample. *Trauma Care* **2024**, *4*, 87–97. https://doi.org/10.3390/traumacare4010008

Received: 1 December 2023
Revised: 26 January 2024
Accepted: 14 March 2024
Published: 20 March 2024

1. Introduction

Posttraumatic stress disorder (PTSD) is a clinical syndrome characterized by several clusters of symptoms that emerge in response to one or more traumatic events [1]. Symptoms of PTSD include intrusive, recurring, and unwanted reactions to the trauma (Cluster B), persistent avoidance of internal or external reminders of the trauma (Cluster C), negative cognitions and mood (Cluster D), and alterations in arousal, such as hypervigilance, poor concentration, or an exaggerated startle response (Cluster E) [1]. The estimated twelve-month prevalence of PTSD in the United States ranges from 3.6 to 4.7% [1,2], while lifetime prevalence ranges from 6.8 to 8.3% [3,4]. The lifetime prevalence for PTSD is greater among women (8.0–11.0%) than men (4.1–5.4%) [1,4].

Researchers have long noted that PTSD is associated with functional impairment and poor quality of life (QoL) across multiple domains [5–11]. These domains include social functioning [12], intimate partner, parental, and family relationships [13–15], and occupational and educational attainment [16,17]. PTSD may adversely affect QoL in these domains

in part because individual with PTSD may have difficulty trusting others, engaging in social or occupational activities, feel emotionally disconnected from others, and may have increased difficulty with cognitively demanding tasks [6,8]. Other domains affected by PTSD include adverse physical health-related outcomes, such as obesity, smoking, irritable bowel syndrome, bodily pain, negative perceived physical wellbeing [18–21], increased risk for disability in later life [22], increased risk for comorbid mental health and substance use disorders [23], and decreased overall life satisfaction and wellbeing [24,25]. While the connection between PTSD and impaired QoL has been well-established, there is limited research concerning the relationship between specific symptom clusters in PTSD and QoL, and whether certain PTSD symptom clusters may be more strongly associated with decreased QoL [26,27]. While there is strong evidence that QoL can be improved through PTSD treatment [28,29], effect sizes of treatments are smaller. Thus, a better understanding of the relationship between specific PTSD symptoms and QoL might help improve treatment targets and outcomes.

The findings regarding the association between specific PTSD symptom clusters and QoL have been widely varied [6]. Most studies have employed a three-factor model of PTSD symptoms under the pre-*DSM-5* nosology (i.e., re-experiencing, avoidance/numbing, and hyperarousal [30]). Some studies have found re-experiencing symptoms (e.g., intrusive memories, dreams, or flashbacks) and hyperarousal symptoms (e.g., sleep problems, hypervigilance, concentration difficulties) to be associated with functional impairment and deficits in QoL, including in psychosocial and role functioning and occupational impairment [31–33], as well as adverse health outcomes [34,35]. On the other hand, there is some evidence that avoidance and emotional numbing are less frequently reported than re-experiencing and hyperarousal symptoms among those with PTSD, but may be more strongly associated with functional impairment [30,32,36,37]. For example, North and colleagues [30] found that two-thirds of a trauma-exposed sample (N = 1187) reported intrusive and hyperarousal symptoms (77%, n = 916, and 74%, n = 877, respectively), with only 30% (n = 352) reporting avoidance and emotional numbing. However, avoidance/numbing (and numbing, specifically) were more strongly associated with impaired functioning than intrusive and hyperarousal symptoms, with 85% of those reporting avoidance/numbing also reporting impaired functioning, as measured by Criterion F (functional impairment) via the Diagnostic Interview Schedule for *DSM-IV-TR*. Other studies found evidence for avoidance and emotional numbing as uniquely predictive of deficits in QoL, including in quality of interpersonal relationships [38], role functioning [36], and adverse health outcomes [35,37]. Thus, taken together, prior research has varied with respect to which PTSD symptoms may be more strongly associated with functional impairment and QoL.

Several factors may account for these discrepant findings regarding the effects of specific PTSD symptom clusters on functional impairment and QoL. A wide variety of traumatic situations and populations have been studied, including motor-vehicle accident survivors [39], veterans [34,36], natural disaster survivors [31], and survivors of shootings and acts of terrorism [30]. There are also wide-ranging differences in outcome measures used for QoL, with some studies using a specific, validated measure (e.g., the Quality-of-Life Inventory [36]), while others used only individual items to measure psychosocial functioning or occupational impairment [30,32,33]. Further, as noted above, most studies to date have employed a three-factor structure of PTSD symptoms, which may prevent researchers from detecting relevant symptom cluster-based nuances that are apparent in more complex factor models (e.g., six- and seven-factor models), which have also shown improved fit over simpler factor structures [40–43]. Finally, the relationship between specific PTSD symptoms and decreased QoL may be confounded by the high rates of comorbidity between PTSD and other psychiatric disorders [2,44], particularly depression [45,46]. At the same time, evidence suggests that dysphoric mood (i.e., depressed or negative mood) and anhedonia (emotional numbing and loss of enjoyment) are overlapping yet distinct symptoms in PTSD [42,47], and thus may mediate the relationship between PTSD and QoL in different ways.

A better understanding of the association between symptom clusters in PTSD and QoL has important implications for treatment, such as what interventions are prioritized in the course of treatment, and could also further illuminate our understanding of the course and etiology of PTSD. Given the mixed findings from previous researchers on the relationship between PTSD symptom clusters and QoL, the current study sought to replicate and extend these findings by using a seven-factor model of PTSD symptoms in a community treatment-seeking population to investigate which PTSD factors were most associated with QoL.

2. Materials and Methods

2.1. Participants

We collected data from 537 adult patients participating in exposure-based PTSD partial hospitalization programs (PHP) aggregated across eight satellite locations across the Midwest US. Full sample demographics are included in Table 1.

Table 1. Participant Demographics.

Variables	N (%) or *M* (*SD*)
N	537
Female	446 (83%)
Male	90 (17%)
Race	
White	400 (75%)
Black	41 (8%)
Pacific Islander	4 (1%)
Native American	8 (2%)
Asian	6 (1%)
Unknown	46 (9%)
Ethnicity	
Hispanic or Latino	27 (5%)
Not Hispanic or Latino	457 (85%)
Age	36.10 (12.7); (Range: 17–79)
Education	
Some College	156 (29%)
Bachelor's Degree	90 (17%)
High School Degree	50 (9%)
Other	142 (26%)
Associate's Degree	32 (6%)
Master's Degree	43 (8%)
Marital Status	
Married	137 (26%)
Divorced	62 (12%)
Single	261 (49%)
Separated	24 (5%)
Widowed	11 (2%)
Unknown	19 (3%)
Sexual Orientation	
Heterosexual	183 (80%)
Gay, Lesbian, or Bisexual	31 (14%)
Did Not Indicate	14 (6%)
Psychiatric Comorbidities	
Major Depressive Disorder	258 (48%)
Bipolar Disorder	91 (17%)
Generalized Anxiety Disorder	70 (13%)
Alcohol Dependence	48 (9%)
Borderline Personality Disorder	32 (6%)
Panic Disorder	27 (5%)
Opioid Dependence	27 (5%)

We assessed trauma exposure using the Life Events Checklist (LEC [48]). The most common trauma events in this sample were physical assault (77%), sexual assault (74%), and

transportation accidents (72%), while the least common were combat/warzone exposure (25%), and causing serious injury to someone else (15%). In this sample, 97% of people experienced at least one interpersonal trauma. Notably, the LEC checklist does not measure the total number of trauma exposures, so it is likely that many respondents experienced multiple instances of a given trauma (e.g., multiple assaults). Over 95% of our participants also endorsed some form of childhood trauma. Based on anecdotal clinician reports, most participants also endorsed multiple, even dozens, of traumas in multiple categories. Particularly among participants with extensive trauma histories, a high number of traumatic events was the norm.

2.2. Procedure

Treatment in the participating PHP programs simultaneously focuses on symptom reduction (utilizing Prolonged Exposure for PTSD [49]) and fostering quality of life through engagement in a combination of elements from contextual behavior therapies, such as Acceptance and Commitment Therapy, Dialectical Behavioral Therapy, and Compassion-Focused Therapy. Upon admission, participants were screened by a psychologist and a psychiatrist, and also completed the Clinician-Administered PTSD Scale and the Mini-International Neuropsychiatric Interview to verify a primary diagnosis of PTSD. As these instruments were only approved for diagnostic purposes at the time of data collection, accompanying data were not available for analysis. Outside of having a primary diagnosis of PTSD, there were no strict exclusionary criteria for program participation. That said, active psychosis, significant cognitive impairment, and untreated substance use disorder generally resulted in admission to alternative treatment programs.

These data were collected during patients' first week in the program. Participants signed informed consent papers prior to beginning the program, indicating their consent to have their deidentified assessment data utilized for research purposes. IRB approval was obtained before any analyses were conducted (RBH-2022-05).

2.3. Measures

2.3.1. PTSD Checklist (PCL-5)

The PCL-5 is a 20-item self-report measure assessing symptoms of PTSD severity based on *DSM-5* PTSD criteria [48]. It is scored using a 5-point Likert scale (0 = Not at all, 4 = Extremely) where higher scores indicate greater symptom severity (Range = 0–80). The PCL-5 has demonstrated strong convergent validity, discriminant validity, and adequate interitem correlation [50]. The PCL-5 demonstrated good internal reliability in our sample ($\alpha = 0.88$).

2.3.2. Quality of Life Satisfaction Questionnaire—Short Form (Q-LES-Q-SF)

The Q-LES-Q-SF is a 16-item self-report measure examining quality of life and satisfaction [51]. The measure is scored using a 5-point Likert scale (1 = very poor, 5 = very good) where higher scores suggest greater life satisfaction and quality of life. Total scores range from 14 to 70 (the final two items are for clinical use only and are not included in the overall scoring) and are presented as a percentage based on the maximum total score of the items completed (0–100). The Q-LES-Q-SF has demonstrated strong convergent validity, discriminant validity, and interitem correlation [52]. In our sample, the Q-LES-Q-SF demonstrated good internal reliability ($\alpha = 0.86$).

2.3.3. Quick Inventory of Depressive Symptomology—Short Form (QIDS-SF)

The QIDS-SR-16 is a 16-item self-report measure used to examine symptoms of depression severity [53]. The measure is scored using a four-point scale (zero to three) where higher scores indicate elevated symptoms of depression. The QIDS-SF assesses 9 domains of depression, which rated from 0 to 3, yielding a score range of 0–27. The QIDS-SF has demonstrated strong convergent validity, discriminant validity, and interitem correlation [53]. The QIDS-SF demonstrated adequate internal reliability in our sample ($\alpha = 0.73$).

2.4. Data Analysis

We created a latent regression model with QoL entered as the dependent variable, accounting for depression using the QIDS. Previous research has found a seven-factor solution with the PCL-5 to have improved fit in modeling PTSD symptoms across multiple populations [40,42,43]. Thus, we included in our model seven predictor PTSD symptom factors: Re-experiencing, Avoidance, Negative Alterations, Anhedonia, Externalizing, Dysphoric Arousal, and Anxious Arousal (see Table 2 for a breakdown of the items contributing to each factor). We included total depression scores in the model to account for a potential independent effect of depression symptomology on quality of life.

Table 2. Seven-factor hybrid model of the PCL-5.

DSM-5 Symptom (PCL-5 Item #)	7-Factor Hybrid Model
1. Intrusive thoughts	Re-experiencing
2. Nightmares	Re-experiencing
3. Flashbacks	Re-experiencing
4. Emotional cue reactivity	Re-experiencing
5. Physiological cue reactivity	Re-experiencing
6. Avoidance of thoughts	Avoidance
7. Avoidance of reminders	Avoidance
8. Trauma-related amnesia	Negative Alterations
9. Negative beliefs	Negative Alterations
10. Blame of self or others	Negative Alterations
11. Negative trauma-related emotions	Negative Alterations
12. Loss of interest	Anhedonia
13. Detachment	Anhedonia
14. Restricted affect	Anhedonia
15. Irritability/anger	Externalizing
16. Self-destructive/reckless behavior	Externalizing
17. Hypervigilance	Anxious Arousal
18. Exaggerated startle response	Anxious Arousal
19. Difficulty concentrating	Dysphoric Arousal
20. Sleep disturbance	Dysphoric Arousal

PCL-5 refers to PTSD Checklist for DSM-5.

3. Results

The PCL-5 (M = 54.17, SD = 12.70), Q-LES-Q-SF (M = 42.10, SD = 16.13), and the QIDS-SF (M = 19.81, SD = 6.84) demonstrated adequate internal consistency in our sample. A latent regression model was estimated with QoL (as measured by the single factor model for the Q-LES-Q-SF) set as the outcome, and PTSD symptom severity (as measured by the seven-factor model for the PCL-5) set as the predictor, with the QIDS-SF included as a covariate. Model fit for the latent regression model was acceptable (χ^2 (182) = 591.408, RMSEA = 0.07 CI [0.06, 0.08], CFI = 0.90, TLI = 0.87, Gamma Hat = 0.93). The overall model containing QIDS-SF total scores and the seven-factor model of the PCL-5 explained 40% of the total variance in QoL (R^2 = 0.40). However, among the specific PTSD symptom factors, only the Anhedonia factor ($\beta = -9.19$, SE = 3.59, p = 0.010) was correlated with QoL. Further, total depression scores were also significantly correlated with QoL ($\beta = -1.68$, SE = 0.15, $p < 0.001$) in the model, when controlling for PTSD symptoms (see Table 3). The correlation between the Anhedonic factor and QIDS was r = 0.54, suggesting that these items are measuring two distinct, yet related constructs.

Table 3. Latent regression model.

Factor	Estimate (β)	Standard Error	p-Value
Depression	−1.68	0.15	<0.001
Re-experiencing	−3.77	3.03	0.213
Avoidance	3.77	2.25	0.093
Negative Alterations	0.57	1.59	0.721
Anhedonia	−9.19	3.59	0.010
Externalizing	0.08	1.39	0.956
Dysphoric Arousal	6.93	5.07	0.172
Anxious Arousal	−1.60	2.05	0.435

4. Discussion

Researchers have long found a robust, negative relationship between PTSD and QoL, including social functioning and relationships, occupational and educational attainment, physical health-related outcomes, and overall life satisfaction and wellbeing [6,8,20,24]. In the current cross-sectional study of a treatment-seeking community sample with a primary diagnosis of PTSD, we found the seven-factor PTSD symptom model, with depression included as a covariate, explained 40% of the variance in QoL, with anhedonia and depression being the only statistically significant correlates when accounting for the other symptom clusters. Given the high comorbidity between PTSD and depression [2,46], the fact that both variables emerged as significant is perhaps not surprising. At the same time, we also found that the anhedonia factor and depression were independently, positively associated with QoL, which is congruent with prior research finding anhedonia to be associated with outcomes of trauma exposure, above and beyond depression [47].

Our findings are congruent with the prior evidence for impaired functioning and diminished QoL among individuals with a diagnosis of PTSD. It was surprising, however, that anhedonia and depression emerged as the only significant correlates of QoL. On the one hand, some prior research has highlighted the relationship between the hyperarousal/re-experiencing symptom clusters and QoL [31–33], although these discrepant findings may be due to differences in measures used, variability among treatment populations, or lack of statistically accounting for other symptom clusters. On the other hand, our findings are congruent with prior evidence pointing to the relationship between emotional numbing and impaired QoL [27,30,36,38]. Moreover, a systematic review by Smith and colleagues [54] that investigated what facilitated people seeking treatment for PTSD offered further support for the hypothesis that anhedonia is particularly disruptive to QoL, as symptoms that interfered with daily and social functioning were particularly robust predictors for seeking help. Nevertheless, considering prior research, we expected other symptom clusters to also be associated with impaired QoL among our participants.

It is possible that these results are due in part to the cross-sectional research design, which does not allow for an investigation into the relationship between changes in symptoms and QoL over time. A longitudinal study investigating specific PTSD symptom clusters and QoL found the four-factor model of PTSD (i.e., re-experiencing, avoidance, emotional numbing, and altered arousal) was related to overall QoL in domains of achievement, self-expression, relationships, and surroundings at both pre- and posttreatment [36]. However, emotional numbing in the pretreatment group appeared to have predictive salience across all QoL factors, whereas some of the other domains of PTSD and QoL were not all significantly related [36], suggesting that anhedonia may be an important predictor for QoL, particularly in early stages of treatment.

Another possible explanation for the significance of anhedonia and depression symptoms on QoL in the context of PTSD is diminished reward functioning and sensitivity among our participants. Reward functioning is the ability to engage in reward anticipation (wanting) and enjoyment (liking), and has been linked to neurobiological functioning in PTSD [55,56]. Reward functioning is a key driver of behavior, through both the anticipation of future rewards that motivates engagement in potentially rewarding behaviors, as

well as the reinforcing effects of those rewarding behaviors increasing the likelihood for future reward seeking. Though, to date, less research has examined the effects of PTSD on reward processing than on other neurobiological circuits (e.g., fear conditioning leading to hyperarousal, intrusive symptoms, and avoidance [57,58]), it is likely that diminished reward functioning is closely related to anhedonia and emotional numbing symptoms in PTSD [55]. Anhedonia could significantly affect daily and social functioning because people may not be able to experience reinforcement from engaging in activities that used to be enjoyable (e.g., eating, socializing), which likely stymies previously effective coping methods. Further, diminished reward sensitivity has also been linked to a history of childhood trauma [59,60], commonly reported among our participants, which may produce lasting neurobiological effects—including reduced reward functioning—and which, in turn, may produce diminished enjoyment of and engagement in activities that promote quality of life [54,59]. Future research should further explore the effects of early trauma on reward functioning and anhedonia, as well as to what extent these may increase risk for PTSD.

Based on these findings, it may be clinically advantageous, on the one hand, to target symptoms of anhedonia and depression early in treatment to assist with engagement in care and to reinforce the benefits of early symptom reduction in other domains (e.g., feeling pleasure and satisfaction in reconnecting with others). On the other hand, it may also be advantageous to include treatment components that target anhedonia throughout treatment, as this may also have an important supportive effect on both symptom reduction and increase in QoL. This conclusion is further supported by evidence supporting the use of behavioral activation (BA) for depression as an adjunct [49] or stand-alone treatment for PTSD [61]. While the literature does not give a clear picture regarding the relative rates at which particular PTSD symptom clusters might reduce or remit, the effects of targeting anhedonia in PTSD treatment—as well as when to do so to maximize clinical benefits—are important areas of future research.

In reporting our results, we acknowledge several limitations. First, because our sample was largely homogeneous with respect to ethno-racial diversity, it is possible our results are not generalizable to a broader, more diverse population, and these results need to be replicated with a more diverse sample. Second, the programs from which the data were gathered were limited to partial hospitalization programs, and thus do not represent the full range of treatment-seeking individuals, including those seeking higher levels of care (i.e., residential or inpatient hospitalization programs) or lower levels of care (i.e., outpatient psychotherapy). Third, our data analysis was cross-sectional, and thus we cannot make causal inferences from these data. While the literature generally points to PTSD having an adverse effect on QoL and increasing functional impairment [10,11,30,62], it is also possible that impaired QoL—for example, poor social supports, poor self-concept, pre-existing comorbid diagnoses, or pre-existing health concerns—may contribute to the development of PTSD after a traumatic experience.

Fourth, while our data analysis was robust with respect to accounting for PTSD symptoms and depression symptoms, we were limited in other covariates included in the study. Thus, we did not include, for example, type of trauma or prior treatment experience, nor was our sample diverse enough to allow for meaningful comparisons across key demographic variables, such as race or ethnicity. Future studies should thus seek to replicate these findings with key covariates included to elaborate possible moderators for the effects of PTSD symptoms on QoL. Finally, we used a single measure of QoL—the Q-LES-Q-SF—which, despite having good psychometric properties, did not allow us to draw more specific conclusions with respect to the relationship between specific PTSD symptoms and specific domains in QoL. Further studies are warranted to explore whether specific PTSD symptom clusters are differentially associated with specific QoL indicators, such as social, familial, or occupational functioning [36].

Additional areas for future research include examining whether specific PTSD symptoms are more strongly associated with different domains of QoL and functional impairment, as these distinctions may have important implications for treatment. Additionally,

while there is mounting evidence that treatment for PTSD has positive effects on QoL, it is unclear whether treatments specifically aimed at improving QoL or increasing value-based choices (e.g., Acceptance and Commitment Therapy [63]) may show increased QoL in comparison to only addressing symptoms alone. Additionally, while some research has begun to examine the effects of PTSD symptoms on QoL over time [11,36], further research could explore how specific PTSD symptom clusters covary with specific QoL factors over time. Finally, qualitative research would help to elaborate how treatment-seeking individuals view the relationship between their own treatment course and perceived QoL, which could help identify barriers and facilitating factors in treatment implementation and adherence.

5. Conclusions

Researchers have documented a clear relationship between PTSD symptoms and reduced QoL across multiple domains [5,8,11]. Utilizing a seven-factor model of PTSD symptoms, we found the anhedonia factor and depression to be the only significant correlates of QoL in a treatment-seeking community sample. This finding aligns with what previous researchers have noted about the impacts of emotional numbing on QoL [30,36,37], yet it is surprising that other PTSD factors did not reach significance. These findings are of particular importance, given evidence that anhedonia and emotional numbing have been shown to predict help-seeking behaviors among trauma survivors [64]. Future research may further elucidate the effects of PTSD symptom clusters on specific subdomains of QoL, as well as whether targeting anhedonia specifically in treatment may increase trauma survivors' QoL.

Author Contributions: Conceptualization, C.R.M., J.E.M., P.P.G. and C.T.W.; methodology, C.R.M., J.E.M., P.P.G. and C.T.W.; formal analysis, P.P.G.; investigation, P.P.G. and C.T.W.; data curation, P.P.G. and C.T.W.; writing—original draft preparation, C.R.M., J.E.M. and P.P.G.; writing—review and editing, C.R.M., J.E.M., P.P.G. and C.T.W.; visualization, C.R.M. and P.P.G.; supervision, C.T.W. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Rogers Behavioral Health (RBH-2022-05 on 5 January 2018).

Informed Consent Statement: Written informed consent was obtained from all subjects involved in this study.

Data Availability Statement: The datasets presented in this article are not readily available because of institutional policies related to release of raw data. Requests to access the datasets should be directed to the fourth author (C.T.W.).

Conflicts of Interest: The authors declare no conflicts of interest.

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