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Chronic Pain, TBI, and PTSD in Military Veterans: A Link to Suicidal Ideation and Violent Impulses?

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Abstract

The polytrauma clinical triad refers to the co-occurrence of chronic pain, traumatic brain injury (TBI), and posttraumatic stress disorder (PTSD). Despite research implicating dyadic relationships between these conditions and adverse outcomes, scant research has examined the polytrauma clinical triad's relation to suicide or violence. The present cross-sectional study was designed to examine whether this complex clinical presentation increases risk of suicidal ideation and violent impulses after accounting for other established risk factors. Veterans who served in the military since 9/11/01 ($N = 667$) who reported chronic pain completed an interview and self-report battery. Bivariate analyses showed that suicidal ideation and violent impulses both correlated with PTSD, TBI+PTSD, pain intensity and interference, drug abuse, and major depressive disorder (MDD). Multiple regression analyses showed that (a) race, chronic pain with PTSD, alcohol abuse, and MDD significantly predicted suicidal ideation, (b) pain interference, chronic pain with TBI, chronic pain with PTSD, chronic pain with TBI+PTSD, drug abuse, and MDD significantly predicted violent impulses, and (c) pain interference was a more critical predictor of suicidal and violent ideation than pain intensity. Implications for risk assessment and treatment are discussed.

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Keywords

chronic pain; traumatic brain injury; posttraumatic stress disorder; suicide; violence

Approximately 50% of United States (U.S.) military veterans experience chronic pain, making it one of the most common health complaints among this population.^{3,44} Rates of chronic pain are particularly high for U.S. veterans of Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn (OEF/OIF/OND).^{28,58} Chronic pain symptoms in this cohort are often comorbid with psychiatric conditions such as depression,⁶⁴ substance use disorders,¹⁶ and posttraumatic stress disorder (PTSD). Chronic pain in U.S. veterans leads to higher utilization of health care services and is also associated with increased suicide risk,^{15,41} psychological distress, poorer psychosocial functioning,^{33,34,37,64} functional disability, vocational issues, and the growing epidemic of prescription opioid abuse.^{44,46,76,81}

Co-occurring chronic pain and PTSD—which can exacerbate several adverse outcomes—is common among U.S. veterans.^{1,26,46,54,58,67} Traumatic brain injury (TBI) and chronic pain conditions are also closely linked.^{13,51} In fact, veterans with positive TBI screens are significantly more likely to meet diagnostic criteria for PTSD,⁴⁷ likely due to the combination of head and *psychological* trauma associated with blasts, motor vehicle accidents, and gunshot wounds occurring during OEF/OIF/OND conflicts.

Together, chronic pain, PTSD, and TBI form a “polytrauma clinical triad”⁴⁶ that is frequently encountered in clinical settings. For example, in a study of 340 veterans, chronic pain, TBI, and PTSD occurred much less frequently in isolation than in combination.⁴⁶ Veterans presenting with these co-occurring conditions report more severe psychopathology and increased healthcare utilization and costs,^{26,46,81} perhaps because chronic pain, TBI, and PTSD interact to aggravate symptoms. Delineating these three conditions may be especially difficult in routine medical settings, in which pain interference (versus intensity) and avoidance of intrusive memories (versus memory problems) are not regularly assessed.¹⁴

Substantial research indicates that veterans diagnosed with chronic pain, TBI, or PTSD in isolation are at increased risk of suicide attempts or ideation.^{10,30,36,59,78} Similarly, rates of aggressive behavior are higher among individuals with any one of these diagnoses.^{27,39,80} Yet despite the research implicating dyadic relationships between these conditions and several adverse outcomes, little research has examined the polytrauma clinical triad’s relation to suicide or violence. Considering that individuals with co-occurring chronic pain, TBI, and PTSD experience poorer physical, emotional, and psychological outcomes,^{26,60} it is possible that suicide and violence risk is greater for veterans presenting with the polytrauma clinical triad, relative to veterans with fewer than three of the component diagnoses.

One retrospective cohort study examining a VA patient chart review²⁶ found that combined chronic pain, TBI, and PTSD were significantly associated with suicidal ideation and attempts during a three-year period; however, this risk was not significantly greater for veterans with the polytrauma clinical triad relative to veterans with a diagnosis of PTSD,

depression, or substance abuse alone. Although this study's findings highlight the association between the polytrauma clinical triad and increased vulnerability to self-directed violence, the degree to which this clinical presentation increases the risk for violence directed toward *others* is currently undetermined. Given overlap between self- and other-directed violence documented in previous research in veteran samples,⁷⁵ an investigation aimed at examining the association between the polytrauma clinical triad and violent urges is warranted. Additionally, the method, accuracy, and reliability of clinical diagnoses analyzed Finley et al.'s study²⁶ are unknown, as findings were drawn from administrative data. A study using standardized diagnostic methods administered in person at the time of assessment would better help to elucidate the association between the polytrauma clinical triad and suicide and violence risk.

The present study was designed to examine whether the polytrauma clinical triad is associated with greater risk for suicide or violence among veterans using standardized and psychometrically validated assessment tools. Based on available related research, we hypothesized that relative to chronic pain co-occurring with either PTSD or TBI, the full polytrauma clinical triad would be associated with greater violent and suicidal urges. In an attempt to extend research on the link between pain-related features and these outcomes, we further hypothesized that pain interference (above and beyond pain intensity) would emerge as a significant unique predictor of violent and suicidal urges.

Methods

Participants and Procedure

Data from 667 OEF/OIF/OND U.S. veterans, active duty personnel, and National Guard and Reserve members with chronic pain who had served since 9/11/01 provided informed consent to participate in this study. Participants had to report experiencing consistent pain other than "everyday kinds of pain" for at least 7 months prior to assessment to be considered eligible.

Data were collected through the Post-Deployment Mental Health (PDMH) Study, a large, multi-site study conducted by the U.S. VA's Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC) at four VA medical centers located in North Carolina and Virginia. Participants were recruited via flyers, VA clinic referrals, and mailed invitations. The Institutional Review Board at each collaborating MIRECC site approved the study protocol, which involved completing a structured diagnostic interview and battery of self-report measures (described further below), typically within a single study visit.

Measures

Demographic information—We controlled for participant age, gender (female coded as 0, male coded as 1), and race (non-White coded as 0, White coded as 1) in all reported analyses.

Pain variables—The Brief Pain Inventory-Short Version¹⁸ was used to assess pain intensity and interference. First, participants were asked "Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have

you had pain other than these everyday kinds of pain today?” Participants who endorsed “yes” to this question were asked to report their pain intensity by circling “the one number that describes your pain on the average,” using a 0 (*no pain*) to 10 (*pain as bad as you can imagine*) scale. Participants also separately rated the degree to which their pain interfered with their “general activity,” “mood,” “walking ability,” “normal work (includes both work outside the home and housework),” “relations with other people,” “sleep,” and “enjoyment of life” on a 0 (*does not interfere*) to 10 (*completely interferes*) scale. An overall pain interference score was computed by calculating the mean interference rating across all seven domains. This measure has demonstrated good to excellent internal consistency (0.80 to 0.87 for the four pain severity items; 0.89 to 0.92 for the seven interference items) in previous work.¹⁸

Traumatic brain injury—Participants self-reported lifetime TBI history based on established definitions of TBI.^{38,42} Specifically, participants must have endorsed experiencing a head injury that was associated with loss of consciousness, loss of memory for events immediately after the head injury, and/or alteration in mental state at the time of injury (e.g., feeling dazed, disoriented, or confused) to meet screening criteria for TBI (no TBI history coded as 0, self-reported TBI history coded as 1) in the current study.

Clinical diagnoses—The Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I) was used to diagnose current PTSD (absent coded as 0, present coded as 1) and major depressive disorder (MDD; absent coded as 0; present coded as 1) according to DSM-IV criteria.⁶⁹ We controlled for MDD but not other DSM diagnoses based on accumulated research implicating MDD as a critical risk factor for our outcomes^{20,24} and in order to preserve statistical power to test our hypotheses. The SCID-I has been found to be both clinically sensitive and reliable, with good to excellent interrater reliability for current disorders and moderate test–retest reliability for lifetime disorders.⁷⁷ Trained research personnel administered the SCID-I to all participants. Research personnel included Bachelor’s level interviewers with at least 5 years of SCID or psychological assessment experience, Master’s level social workers with assessment background, and PhD-level clinical and research psychologists (including postdoctoral trainees). Regardless of level of experience and educational background, all interviewers completed a SCID training program and attended biweekly to monthly peer consultation as well as supervision with a licensed psychologist.⁹ Additional rater observations were conducted throughout the length of the study to evaluate and correct for any potential rater drift. The SCID has demonstrated good to excellent interrater reliability for current disorders and moderate test–retest reliability for lifetime disorders.⁶² Inter-rater reliability for any Axis I disorder among research personnel who scored a series of seven SCID-I-based training videos was excellent (Fleiss’ kappa = 0.94 for current diagnoses, 0.94 for lifetime, and 0.94 for both). Interviewers also demonstrated excellent mean interrater reliability specifically for current and lifetime PTSD (Fleiss’ kappa = 1.00), as well as for current MDD (Fleiss’ kappa = 1.00) and lifetime MDD (Fleiss’ kappa = 0.88).

Alcohol and drug abuse—The Alcohol Use Disorders Identification Test (AUDIT)² was used to screen for alcohol abuse. The AUDIT has demonstrated good internal consistency in

diverse samples.⁶⁵ Alcohol abuse (absent coded as 0, present coded as 1) was defined as scoring 8 or higher on the AUDIT, based on research demonstrating that a cutoff value of 8 on this measure yields excellent sensitivity and discriminates individuals with hazardous or harmful alcohol use from individuals with non-hazardous consumption.^{2,8,43,65} Drug abuse was measured with the Drug Abuse Screening Test (DAST),⁶⁸ which has also demonstrated good to excellent reliability and validity in past work.⁸² Drug abuse (absent coded as 0, present coded as 1) was defined as a score of 4 (“moderate” use) or higher, in line with previous work that has identified this level of use as an appropriate screening cutoff.⁶⁸

Suicidal ideation—Veterans completed two measures of suicide risk. Given the gravity of endorsing suicidal ideation, we elected to be conservative in the current study and therefore designated a participant as reporting current suicidal impulses (absent coded as 0, present coded as 1) if they scored *either* (a) 3 or higher on the Beck Scale for Suicidal Ideation,^{5,11} a cut-off previously recommended for this population,^{11,31} or (b) above a 0 on the suicidal ideation item of the Beck Depression Inventory-II.⁴ The BDI-II has demonstrated excellent ($\alpha = .90$) internal consistency and validity and the cut-off score of 1 is considered appropriate.^{4,11,19} Sixty-two veterans screened positive for suicidal ideation *via* their scores on both the BSS and BDI-II, 25 veterans screened positive for suicidal ideation on the BSS but not BDI-II, and 40 veterans screened positive for suicidal ideation on the BDI-II but not BSS.

Violent impulses—We designated veterans as endorsing violent impulses (absent coded as 0, present coded as 1) if they (a) reported experiencing “urges to beat, injure or harm someone” at least “quite a bit” of the time during the past week on the Symptom Checklist-90-R²¹ or (b) responded “yes” to a demographics form question, “During the past 30 days, have you had trouble controlling violent behavior (e.g. hitting someone)?” Although the psychometric properties of these internally developed items have not yet been evaluated, they have been used in other published studies on violent ideation within this population.^{23,66} Twenty-four veterans screened positive for violent impulses *via* their scores on both the Symptom Checklist-90-R and demographics form, 25 veterans screened positive for violent impulses on the Symptom Checklist-90-R but not the demographics form, and 33 veterans screened positive for violent impulses on the demographics form but not Symptom Checklist-90-R.

Response to Adverse Events

In cases where a participant endorsed an item indicating thoughts of self-harm, violent behavior, previous suicide attempt(s), or other verbal self-report of ideation regarding harm to self or others, a study alert prompted a mental health professional on the study staff to conduct further risk assessment.⁹ Emergency response procedures were implemented per the study site’s clinical and research IRB protocol. At one site, for example, a thorough homicidal/suicidal ideation risk assessment was developed to incorporate parallel (and sometimes-overlapping) violence and suicide risk assessment. This internally developed assessment and intervention instrument is currently being evaluated for its clinical and predictive properties.

Data Analytic Strategy

We first conducted Spearman correlations to examine bivariate relationships between study variables and outcomes (suicidal ideation and violent impulses). We then conducted two logistic regression models to examine the utility of pain interference and combinations of co-occurring chronic pain, TBI, and PTSD in the statistical prediction of suicidal ideation and violent urges. In each of these models, demographic and pain variables were entered in Step 1, polytrauma variables were entered in Step 2, and other clinical diagnoses known to relate to suicidal and violent urges were entered in Step 3. Our approach to building the regression models in this fashion mirrored our conceptual aims, in that we sought to (a) isolate pain interference from intensity in the link between chronic pain and self- and other-directed violence, and (b) examine whether chronic pain with co-occurring TBI and PTSD explained risk of self- and other-directed violence, controlling for pain-related variables and other established demographic (i.e., age, gender, and race) and clinical (i.e., alcohol abuse, drug abuse, and MDD) risk factors.

Results

Clinical Characteristics of the Sample

Nearly all participants ($n = 630$; 94.5%) reported chronic pain lasting more than 12 months. In addition to chronic pain, 20.69% ($n = 138$) also reported TBI, 17.39% ($n = 116$) also had PTSD, and 18.14% ($n = 121$) had co-occurring TBI and PTSD (i.e., the polytrauma clinical triad). Slightly less than half of the sample ($n = 292$; 43.78%) reported chronic pain without either TBI or PTSD. Regarding our outcome variables, approximately 19.04% ($n = 127$) of participants screened positive for current suicidal ideation and 12.29% ($n = 82$) of participants reported experiencing violent impulses in the 30 days prior to assessment. Descriptive data for study variables are presented in Table 1.

Spearman Correlation Analyses

As shown in Table 2, screening positive for current suicidal ideation was significantly associated with having chronic pain and co-occurring PTSD (with or without TBI), pain interference and intensity, alcohol and drug abuse, and MDD symptoms ($ps < .01$). These same variables except for alcohol abuse were also significantly associated with violent impulses ($ps < .01$). Further, there was a significant association between younger age and violent impulses ($p < .05$). Chronic pain with TBI (but no PTSD) was *not* significantly associated with either suicidal ideation or violent impulses.

Logistic Regression Analyses

Table 3 presents multivariate modeling of suicidal ideation. In Step 1, we found that race (identifying as White) and pain interference predicted suicidal ideation in veterans with chronic pain. After adding polytrauma variables in Step 2, race (identifying as White), pain interference, chronic pain with co-occurring PTSD or TBI+PTSD (but not chronic pain with TBI alone) emerged as significant predictors of suicide risk. Adding other clinical covariates in Step 3 showed that race (identifying as White), chronic pain with PTSD, alcohol abuse, and MDD all significantly predicted suicidal urges. After accounting for all model

predictors, pain interference ($p = .08$) and the polytrauma clinical triad ($p = .05$) no longer retained their statistical significance.

Table 4 shows multivariate modeling of violent impulses. In Step 1, we found that younger age and pain interference (but not intensity) predicted violent impulses. Adding polytrauma variables in Step 2 showed that younger age, pain interference, chronic pain with TBI, chronic pain with PTSD, and the polytrauma clinical triad accounted for significant unique variance in suicidal ideation. Finally, in Step 3, we found that pain interference, chronic pain with TBI, chronic pain with PTSD, the polytrauma clinical triad, drug abuse, and MDD significantly predicted violent impulses in veterans with chronic pain.

Discussion

The polytrauma clinical triad refers to the co-occurrence of chronic pain, TBI, and PTSD.⁴⁶ Despite research implicating dyadic relationships between these conditions and adverse outcomes, scant research has examined the polytrauma clinical triad's relation to self- or other-directed violence. The present study used standardized assessment methods to examine the degree to which the polytrauma clinical triad is associated with increased suicide and violence risk among U.S. OEF/OIF/OND veterans. We also sought to determine whether pain interference is a more critical predictor of suicide and violence risk than pain intensity.

Analyses showed that in a sample of veterans with chronic pain, both suicidal ideation and violent impulses were significantly associated with co-occurring PTSD (with or without TBI), pain intensity and interference, drug abuse, and MDD. Alcohol abuse was associated with suicidal ideation but not violent impulses, whereas age was associated with violent impulses but not suicidal ideation. In logistic regression analyses, only race, chronic pain with PTSD, alcohol abuse, and MDD emerged as significant unique predictors of suicidal ideation (pain interference and the polytrauma clinical triad approached statistical significance). In contrast, pain interference, the polytrauma clinical triad (as well as chronic pain paired with either TBI or PTSD), drug abuse, and MDD emerged as significant unique predictors of violent impulses. In fact, the polytrauma clinical triad was the strongest individual predictor of violent impulses in our sample. Thus, our primary hypothesis that the polytrauma clinical triad would be a stronger predictor of suicide and violence risk than dyadic combinations of chronic pain, TBI, and PTSD was only partially supported.

Results supported our second hypothesis, in that pain-related interference in daily, social, and occupational functioning was associated with greater suicide and violence risk than mere pain intensity. These findings complement a growing literature providing evidence for a direct relationship between pain interference and several adverse outcomes.^{53,61,70} However, the mechanism(s) through which pain interference—but not pain intensity—exacerbate suicidal ideation and violent impulses in veterans experiencing chronic pain are undetermined. Several etiological models of suicide and violence point to a number of potential pathways, including a lack of engagement in pleasurable and rewarding activities,⁴⁹ perceived burdensomeness on loved ones or society,⁴⁰ the combination of pain with a decreased inhibition of aggression,²⁵ or a disruption in neurotransmission that is distally

related to pain-related functional impairment.⁵⁷ The link between pain interference and self- and other-directed violence warrants additional research attention, given that individuals with chronic pain but without co-occurring psychiatric conditions may be less likely to be seen in mental health clinics, where risk for suicide and violence are regularly and systematically assessed. It will be imperative for primary care providers, pain specialists, and other medical providers who work with patients with chronic pain conditions assess for pain interference alongside intensity, as well as for other psychosocial risk factors of violence and suicide (e.g., PTSD, MDD, and alcohol/drug abuse). Similarly, it is critical that mental health professionals treating veterans assess for pain-related interference across emotional, occupational, and interpersonal domains when conducting suicide and violence risk assessment.

Our findings are consistent with a substantial body of research documenting the importance of PTSD, MDD, and substance abuse in self- and other-directed violence.^{26,39,48,59,72} Professionals working with patients with these conditions should routinely assess for suicide and violence risk, as these diagnoses increase the probability of either outcome. However, that is not to say that a negative PTSD, MDD, or substance abuse screen indicates that a veteran is at low risk of suicide or violence; additional established risk factors not included in the current investigation (e.g., anger, perceived burdensomeness) would also be important to assess.

Our findings underscore the need for interdisciplinary and/or coordinated care for veterans presenting with chronic pain or some combination of chronic pain, TBI, and PTSD to ensure that important suicide and violence risk factors are not overlooked by a patient's treatment team. Along these lines, integrated treatment protocols for these co-occurring conditions would also be helpful. Although some experts have developed treatments for dyadic combinations of these conditions^{17,54,74,79} and the U.S. Department of Veterans Affairs has taken steps to improve the integrated assessment and treatment of veterans with TBI and polytrauma,²² biopsychosocial treatment programs for the polytrauma clinical *triad* are still needed.^{28,55} Optimizing cognitive-behavioral and psychoeducational interventions for this clinical population and their caregivers might also reduce the need for prescription pain medications, which could help to ameliorate the ongoing epidemic of opioid abuse and dependence.^{6,35,50}

Many of our findings are consistent with suicide and violence risk assessment guidelines used in existing clinical practice; for instance, mental health and substance abuse disorders are commonly included in risk assessment tools. Still, although some suicide risk assessment instruments do prompt clinicians to ask about chronic pain,⁷ none specifically focus on pain interference, which appears important to add to clinicians' repertoires, given current findings. Further, to our knowledge, violence risk assessment tools do not typically ask about chronic pain or pain interference,³² which was found to be associated with violent impulses in the current sample. Finally, we are unaware that combined TBI and PTSD combined have been linked to suicidal ideation or violent impulses in a chronic pain sample even though their co-occurrence points to unique and critical diagnostic and treatment considerations.⁷³ For these reasons, current findings do elucidate some potentially new pathways for assessment and intervention of suicide and violence in veterans.

This study had a number of strengths, including the use of a large clinical sample, *in vivo* assessments of current conditions and symptoms, and standardized administration of a psychometrically sound clinical interview (i.e., the SCID-I). However, this study was also subject to a number of limitations. First, the cross-sectional nature of the data presented here precludes drawing causal inferences regarding the polytrauma clinical triad and adverse outcomes such as suicide and violence risk. Second, our primary outcomes were suicidal ideation and violent impulses, rather than suicidal or violent behaviors *per se*. As such, we do not know if separating active versus passive suicidal ideation would have yielded a different pattern of findings. At the same time, however, research indicates that nearly two-thirds of suicide attempts occur within a year following the first suicidal thought.^{45,52} Thus, our findings may assist early identification of suicidal ideation in those with chronic pain conditions in order to promote appropriate treatment referrals and reduce the risk of suicide attempt.

Third, although we assessed several established suicide and violence risk factors in the current study, we did not examine all possible predictors of suicide and/or violence in veterans.⁸⁰ A fourth limitation is our reliance on participant self-report rather than physician diagnosis in determining TBI history. Future research on the polytrauma clinical triad should incorporate a more rigorous TBI assessment. Fifth, all participants in this study had chronic pain, thereby limiting the potential to examine whether certain clinical comorbidities are associated with greater violence and suicide risk relative to *none* of the polytrauma clinical triad components. Finally, this study's participants were recruited from the Mid-Atlantic region of the country and therefore are not necessarily representative of all U.S. OEF/OIF/OND veterans. At the same time, however, the sample is representative of this region of the United States,⁹ there is substantial inclusion of non-White racial groups in the sample, and the gender breakdown of our sample does approximate the overall military.

In light of the growing prevalence of co-occurring chronic pain, PTSD, and TBI, improving assessment and treatment planning for this vulnerable and growing population represents an important clinical need. Future research should conduct prospective studies examining the relationship between the polytrauma clinical triad, pain-related variables, and adverse outcomes such as suicide and violent behavior using multimethod assessment. Research that employs more sophisticated analytic approaches (e.g., structural equation modeling) and examines the relationship between the polytrauma clinical triad and outcomes related to recovery and rehabilitation (e.g., improved wellbeing and a greater sense of purpose) would also be useful.

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Highlights

- The polytrauma clinical triad refers to co-occurring chronic pain, TBI, and PTSD
- The polytrauma clinical triad was associated with suicidal ideation
- The polytrauma clinical triad was associated with violent impulses
- Pain interference was a stronger predictor of outcomes than was pain intensity
- Chronic pain is relevant to suicide and violence risk assessment in veterans

Perspective

This article presents results from a study examining predictors of suicide and violence risk among a sample of post-9/11 United States Veterans with chronic pain. Healthcare professionals should assess for pain interference, TBI, posttraumatic stress disorder, depression, and alcohol/drug abuse when conducting risk assessments with this population.

Table 1

Descriptive clinical data in a sample of veterans with chronic pain

Study variable	<i>M (SD)</i>	<i>n (%)</i>
Age	37.82 (10.52)	-
Gender		
Female	-	127 (19.04)
Male	-	540 (80.96)
Race		
Non-white	-	309 (46.33)
White	-	358 (53.67)
Pain intensity	4.12 (2.25)	-
Pain interference	26.69 (20.19)	-
Alcohol abuse		
No	-	513 (76.91)
Yes	-	154 (23.09)
Drug abuse		
No	-	608 (91.15)
Yes	-	59 (8.85)
MDD		
No	-	498 (74.66)
Yes	-	169 (25.34)
Endorsed suicidal ideation		
Chronic pain only (<i>n</i> = 292)	-	27 (9.25)
Chronic pain with TBI (<i>n</i> = 138)	-	20 (14.49)
Chronic pain with PTSD (<i>n</i> = 116)	-	39 (33.62)
Chronic pain with TBI+PTSD (<i>n</i> = 121)	-	41 (33.62)
Endorsed violent impulses		
Chronic pain only (<i>n</i> = 292)	-	11 (3.77)
Chronic pain with TBI (<i>n</i> = 138)	-	16 (11.59)
Chronic pain with PTSD (<i>n</i> = 116)	-	26 (22.41)
Chronic pain with TBI+PTSD (<i>n</i> = 121)	-	29 (23.97)

Table 2

Spearman correlations with suicidal ideation and violent impulses

	Suicidal ideation	Violent impulses
Age	−0.03	−0.10 [*]
Gender (male)	−0.01	0.03
Race (White)	0.07	−0.04
Chronic pain with TBI	−0.06	−0.01
Chronic pain with PTSD	0.17 ^{**}	0.14 ^{**}
Chronic pain with TBI+PTSD	0.18 ^{**}	0.17 ^{**}
Pain intensity	0.14 ^{**}	0.17 ^{**}
Pain interference	0.22 ^{**}	0.25 ^{**}
Alcohol abuse	0.12 ^{**}	0.04
Drug abuse	0.14 ^{**}	0.16 ^{**}
MDD	0.34 ^{**}	0.26 ^{**}

TBI = Traumatic brain injury; PTSD = Posttraumatic stress disorder; MDD = Major depressive disorder;

^{*} significant at $p < .05$;

^{**} significant at $p < .01$.

Table 3

Logistic regression analyses predicting suicidal ideation in veterans with chronic pain

Variable	Step 1 Demographic and pain variables			Step 2 Polytrauma variables			Step 3 Other diagnostic variables		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
	$\chi^2(5) = 43.57, p < 0.001, R^2 = 0.10$			$\chi^2(8) = 68.48, p < 0.001, R^2 = 0.16$			$\chi^2(11) = 112.08, p < 0.001, R^2 = 0.25$		
Age	0.99	[0.97, 1.01]	0.27	0.99	[0.97, 1.02]	0.58	1.01	[0.98, 1.03]	0.65
Gender (male)	1.03	[0.61, 1.73]	0.92	0.92	[0.54, 1.58]	0.76	0.80	[0.45, 1.42]	0.44
Race (White)	1.97	[1.28, 3.04]	<.01	1.87	[1.20, 2.93]	0.01	2.00	[1.24, 3.21]	<.01
Pain Intensity	1.00	[0.89, 1.14]	0.96	1.00	[0.88, 1.14]	0.96	1.00	[0.87, 1.14]	0.94
Pain Interference	1.03	[1.02, 1.05]	<.001	1.02	[1.01, 1.04]	<.01	1.02	[1.00, 1.03]	0.08
TBI	-	-	-	1.34	[0.71, 2.54]	0.36	1.22	[0.63, 2.36]	0.56
PTSD	-	-	-	3.62	[2.02, 6.52]	<.001	2.24	[1.18, 4.24]	0.01
TBI+PTSD	-	-	-	3.13	[1.72, 5.68]	<.01	1.89	[0.99, 3.58]	0.05
Alcohol Abuse	-	-	-	-	-	-	1.06	[1.02, 1.09]	<.01
Drug Abuse	-	-	-	-	-	-	1.06	[0.98, 1.14]	0.18
MDD	-	-	-	-	-	-	3.76	[2.30, 6.14]	<.001

TBI = Traumatic brain injury; PTSD = Posttraumatic stress disorder; MDD = Major depressive disorder; OR = Odds ratio; CI = Confidence interval

Table 4

Logistic regression analyses predicting violent impulses in veterans with chronic pain

Variable	Step 1 Demographic and pain variables			Step 2 Polytrauma variables			Step 3 Other diagnostic variables		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
	$\chi^2(5) = 54.96, p < 0.001, R^2 = 0.15$			$\chi^2(8) = 74.22, p < 0.001, R^2 = 0.20$			$\chi^2(11) = 90.61, p < 0.001, R^2 = 0.24$		
Age	0.97	[0.94, 0.99]	0.01	0.97	[0.94, 1.00]	0.02	0.98	[0.95, 1.01]	0.11
Gender (male)	1.76	[0.89, 3.47]	0.10	1.48	[0.74, 2.97]	0.27	1.32	[0.65, 2.71]	0.44
Race (White)	1.07	[0.65, 1.78]	0.79	0.91	[0.54, 1.54]	0.73	0.89	[0.52, 1.52]	0.66
Pain Intensity	1.02	[0.88, 1.18]	0.84	1.01	[0.87, 1.18]	0.90	1.00	[0.85, 1.17]	0.97
Pain Interference	1.04	[1.03, 1.06]	<.001	1.03	[1.01, 1.05]	<.001	1.03	[1.01, 1.05]	0.01
TBI	-	-	-	2.93	[1.29, 6.68]	0.01	3.06	[1.32, 7.09]	0.01
PTSD	-	-	-	4.25	[1.94, 9.33]	<.001	3.26	[1.43, 7.44]	0.01
TBI+PTSD	-	-	-	4.47	[2.04, 9.79]	<.001	3.34	[1.47, 7.61]	<.01
Alcohol Abuse	-	-	-	-	-	-	1.01	[0.97, 1.05]	0.75
Drug Abuse	-	-	-	-	-	-	1.11	[1.02, 1.21]	0.02
MDD	-	-	-	-	-	-	2.45	[1.39, 4.31]	<.01

TBI = Traumatic brain injury; PTSD = Posttraumatic stress disorder; MDD = Major depressive disorder; OR = Odds ratio; CI = Confidence interval