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Pain Symptomatology and Pain Medication Use in Civilian PTSD

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Abstract

The comorbidity of pain syndromes and trauma related syndromes has been shown to be high. However, there have been limited data, especially in civilian medical populations, on the role of trauma related disorders such as Post Traumatic Stress Disorder (PTSD) on chronic pain and pain medication use. We analyzed 647 general hospital patients in primary care and obstetrics and gynecological waiting rooms for the experience of trauma and PTSD related stress disorders. PTSD symptoms were found to be significantly positively correlated with pain ratings ($r=.282$, $p<.001$) and pain related function impairment ($r=.303$, $p<.001$). Those with a current PTSD diagnosis had significantly higher subjective pain and pain related-impairment ratings than those with no PTSD. Furthermore, those with a current diagnosis of PTSD were significantly more likely to have used opioid analgesics for pain control compared to those without a diagnosis of PTSD ($\chi^2=8.98$, $p=.011$). When analyzing the separate PTSD symptom subclusters, (re-experiencing, avoidance and hyper-arousal), all symptom clusters were significantly related to pain and pain-related impairment ratings, but only the avoidance cluster was significantly related to prior opioid pain medication use. We conclude that PTSD and trauma-related disorders are common in impoverished medical populations and that their presence should be examined in patients with pain syndromes. Furthermore, these data suggest that PTSD and pain may share a vulnerability pathway including the endogenous opioid neurotransmission systems.

1. Introduction

Posttraumatic Stress Disorder (PTSD) is a debilitating psychiatric disorder that develops in some people exposed to traumatic events. The rate of lifetime PTSD in the general population is estimated to be approximately 8% [21] and chronic pain has been shown to be highly comorbid in patients with PTSD [4,13,34]. PTSD is associated with increased reporting of pain and pain-related disability, higher healthcare utilization, and lower quality of life [11,22,25,37]. This association has been found in both male and female veteran

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populations [6,34]. Among military veterans diagnosed with PTSD, a high percentage (66-80%) report chronic pain [7,34]. A similar relationship between PTSD and chronic pain has also been found in civilian populations[24,31] with PTSD diagnosis identified as a risk factor for headache chronicity[28], and higher levels of PTSD symptom severity correlate with increased pain intensity[16,19,33,36]. The frequent comorbidity of PTSD and chronic pain suggests a shared vulnerability pathway between the two disorders, as well as the potential for mutual maintenance/exacerbation of symptoms in individuals diagnosed with both of these disorders [3,4,32].

PTSD is characterized with three symptom clusters (re-experiencing, avoidance, and hyper-arousal)[2], which may have separate biological underpinnings[20,26]. Patients may present predominately with one of the symptom clusters, and treatments may need to be specifically tailored to the individual patient[27]. Notably, specific symptoms of PTSD have not previously been examined in relation to pain; it is possible that chronic pain is associated specifically with one particular symptom cluster, rather than the disorder itself. For example, the avoidance symptom cluster includes active avoidance of trauma reminders which may be associated with self-medication to alleviate intrusive memories and nightmares [23], in addition to pain.

We previously reported the use of analgesic medications in a clinical psychiatric population, with PTSD symptoms positively correlating with increased rates of analgesic prescriptions[31]. Similarly, significant PTSD symptoms or PTSD diagnoses are reported in up to 50% of patients with chronic pain, as compared to approximately 8% of the general population [1,5,8,14]. Due to the paucity of literature on the prevalence of chronic pain and PTSD in civilian and medical populations, we examined a general medical population composed of impoverished and traumatized individuals. We hypothesized that there would be a relationship between self reports of chronic pain, objective measures of pain medication prescriptions, and measures of current and past PTSD. We additionally hypothesized that PTSD symptom severity would be positively correlated with pain medication prescriptions. Specifically, we predicted that subjects with high avoidance symptoms would also have higher rates of prescribed opiate medication.

2. Method

Participant Recruitment

Participants were drawn from a larger sample enrolled in a study of risk factors for the development of PTSD in a low socioeconomic, urban population. Participants were recruited from the waiting rooms in the gynecology and primary care medical (non-psychiatric) clinics at Grady Memorial Hospital, a publicly funded hospital in Atlanta, Georgia. It is important to note that we did not narrow our recruitment to specific selection criteria, but approached any individual in the waiting room. Thus, this was a sample of convenience, and retrospective analyses are performed to confirm lack of recruitment bias. To be eligible for participation, subjects had to be at least 18 years of age, not actively psychotic, and be able to give informed consent. After signing the informed consent approved by the Emory Institutional Review Board, an initial interview was administered with questionnaires regarding trauma history, PTSD symptoms, and psychological variables. Trained research assistants or study physicians administered this interview, which took 45-75 minutes to complete (duration was largely dependent on the extent of the participant's trauma history and symptoms). All participants who completed the initial interview were asked if they would like to be contacted to be scheduled for a secondary phase of the study. If the participant consented, a research scheduler with a list of subject identification numbers (and without any knowledge of the participants' data) randomly called these participants to see if they would like to be scheduled. A study physician obtained the medical history and list of

current prescriptions from the sub-set of participants who chose to continue with the study. Subjective reports of pain were also obtained during the secondary phase of the study, within a clinical interview that took two to three hours to complete. While the clinical interview was lengthy and brought up sensitive subject matter, it was rare for participants to drop out, as they were largely aware of what to expect prior to returning for this phase of the study.

Study Samples

We included two datasets in the study: a larger sample (N=687) which included information on PTSD symptoms and pain ratings. This dataset was used to examine the relationship between these variables. A subset of patients returned for additional study procedures and a more in-depth medical evaluation (N=376), including information on pain medication use. The data for the entire study was collected over a span of five years. However, the two phases of the study were approximately a week apart. The first phase included the initial psychological assessments, while the second included the assessment of pain medications and the longer clinical interview.

Measures

Traumatic Events Inventory (TEI)—The TEI is a 14 item measure assessing the prevalence of trauma exposure in childhood and adulthood, and has been used extensively in this population by our study team[9,17,31]. The TEI includes a variety of questions addressing possible lifetime traumas (e.g. “Have you ever experienced a natural disaster (such as a tornado, hurricane, or flood)?” “Have you been attacked with a gun, knife, or other weapon?” “Has someone used physical force or threats of physical force to make you have some unwanted sexual contact with them?”) The TEI also assesses whether the trauma was witnessed or experienced, as well as the frequency and first age the particular type of trauma was experienced. In addition to assessing presence and absence of each type of trauma exposure, the TEI also assesses frequency of trauma exposure within each type of trauma. This instrument was administered in the initial interview. For the purposes of this paper, we selected only the subset of items within this measure assessing directly experienced traumas in order to control for potential physical injuries that could be related to the pain ratings. Although this instrument does not directly assess injury, it is more likely to overestimate than underestimate the impact on pain. We will refer to our control for these items as controlling for “trauma” in subsequent analyses.

Modified PTSD Symptom Scale (PSS)—The PSS is a psychometrically valid [12,15] 17-item measure assessing frequency of PTSD symptoms over the prior two weeks. It distinguishes among re-experiencing, avoidance, and hyper-arousal symptom clusters of PTSD. The PSS was used as a continuous outcome measure of PTSD symptom severity. This instrument was administered in the initial interview.

Clinician Administered PTSD Scale (CAPS)—The CAPS is an interviewer-administered PTSD measure with excellent psychometric properties[39]. The CAPS assesses current and lifetime PTSD, and was used for diagnostic purposes using DSM-IV criteria. The CAPS was used to categorize all subjects into three diagnostic groups according to PTSD status: those that never met criteria for PTSD (no PTSD), those who met a lifetime diagnosis, but not current PTSD (past PTSD), and those who met criteria for PTSD in the last month (current PTSD). This instrument was administered during the secondary phase of study within a clinical interview. Over the course of the study, the CAPS was administered by a mixture of clinical psychology graduate students and post-baccalaureate research personnel with supervised training.

SF-36 Health Questionnaire—In order to examine self-reported pain ratings, we utilized two questions from the SF-36 Health Questionnaire, a widely validated measure of pain and other health domains [38]. It includes questions regarding self-reported current pain ratings; specifically, to what degree the participant has experienced bodily pain in the past four weeks on a scale from one to six, with one being none and six being very severe. We also examined a rating of pain-related functional impairment; specifically, how much bodily pain interfered with the subject's normal work in the past four weeks on a scale from one to five with one being none and five being extremely interfering. This instrument was administered during the secondary phase of study within a clinical interview.

Medical Evaluation

During the secondary phase of the study, a medical evaluation was performed by a study physician, who performed a history and physical examination or, for a small percentage of participants, reviewed a medical exam performed by a hospital physician completed within two months of study participation. In either case, a list of self-reported current prescriptions was obtained, as well as other information regarding subjects' health history. The current study analyzed pain medication use and categorized analgesics into three groups: opioid analgesics, non-opioid analgesics, and second tier analgesics.

Medications coded as 'Opioid Analgesics' included the following trade and generic terms: codeine, hydrocodone, lorcet, lortab, methadone, MS Contin, oxycodone, parvocet, percocet, tylenol #3, tylox, vicodin, or tramadol. Note that tramadol/ultram were included as opioid analgesics for the purposes of this study due to their prior identification as acting, among other mechanisms, at the mu opiate receptors[29].

Medications coded as 'Non-Opioid Analgesics' included the following generic terms: ibuprofen, diclofenac, acetaminophen, acetaminophen-caffeine combinations, and naproxen.

Other medications which are used to treat patients with chronic pain, but that do not fit neatly into either above categories, were termed, 'Second Tier Analgesics', and included antidepressant, anticonvulsant, muscle relaxant, and steroid agents, including the following generic terms: amitriptyline, nortriptyline, gabapentin, baclofen, cyclobenzaprine, cortisone injections, and methylprednisone injections. We did not include aspirin in our analyses regarding analgesic use, as it may be administered for a number of reasons in addition to pain.

Statistical Analyses

In the first, larger dataset, we examined the relationship between PTSD symptoms and reports of chronic pain by performing bivariate correlations on the two pain outcome variables of interest from the SF-36: current pain ratings and ratings of pain-related functional impairment. In addition, we performed a linear regression in order to control for potential covariates, such as demographics and disability status (whether or not the participant was currently being supported by disability), with PTSD symptoms as predictors and pain variables as outcomes. In the second, more in-depth dataset, we categorized the participants into three diagnostic PTSD groups (never PTSD; past but not current PTSD; and current PTSD). A Pearson chi square test was used to compare demographic data as well as types of traumatic events experienced between these three groups, as assessed by the TEI (i.e. experiencing an accident, witnessing a murder, experiencing sexual abuse, etc.). In order to compare pain ratings across the three groups, a one way analysis of variance (ANOVA) was performed, followed by a Bonferroni post-hoc comparison. This analysis was followed by an analysis of covariance (ANCOVA) to control for covariates, such as demographics, trauma, and disability status. Participants were categorized according to type

of medication used: opioid analgesics, non-opioid analgesics, and second tier analgesics. Pain medication use categories were compared between the three PTSD groups with a chi square test. Finally, in order to compare PTSD symptom severity between the medication categories, we performed one way ANOVAs using PSS scores for each PTSD symptom cluster as dependent variables; this analysis was also followed-by Bonferonni post-hoc comparisons to examine differences between medication groups. We also performed ANCOVAs with the same variables, but also controlling for demographics, trauma, and disability status. All statistical analyses were performed using SPSS 17.0 for Windows, with an alpha level of .05.

3. Results

PTSD and Pain: Initial Sample

Sample Descriptives—The overall demographics and rates of trauma in this sample (N=647) were similar to those previously reported [17]. The mean subject age was 42.27 (SD=12.84) years. The sample was primarily female (62.1%) and self-identified race was largely African American (92.2%). Additionally, 27.3% of the sample was receiving current disability support. The prevalence of trauma exposure was high, as 69.3% of the population experienced two or more types of DSM-IV-TR PTSD criterion A level trauma exposure, 18.3% experienced one type of trauma, and only 12.4% experienced no trauma.

PTSD Symptoms and Pain—In the larger sample, PTSD symptoms were found to be significantly positively correlated with pain ratings ($r=.282$, $p<.001$) and pain-related functional impairment ratings ($r=.303$, $p<.001$). In order to examine the relationship between PTSD and pain while controlling for other factors, we performed a linear regression analysis with subjective pain ratings as the outcome variable and PTSD symptoms as predictors adding demographic data, trauma history (number of types of trauma experienced) and disability using a stepwise method. After controlling for sex, race, age, trauma, and disability status, PTSD symptoms continued to significantly predict subjective pain severity $F(6,640)=23.50$, $p<.001$. The summary model included all variables and accounted for 17.3% of the variance in pain ratings with post-traumatic stress symptoms (PSS) alone accounting for 5.8% of the variance, $F_{\text{change}}(1,640)=45.32$, $p<.001$, see Table 1a. Additionally, we performed a linear regression with pain-related functional impairment as the outcome with the above listed variables. In this analysis, PSS also significantly predicted functional impairment, $F(6,635)=21.21$, $p<.001$, with PSS alone accounting for 7% of the variance, $F_{\text{change}}(1,635)=53.13$, $p<.001$, see Table 1b.

PTSD and Pain: Medical History Sample

Sample Descriptives—In order to analyze this relationship between trauma exposure, PSS severity, and analgesic use in more detail, a follow up dataset including only participants with a full medical history and physical examination was analyzed (N=376). This subsample included 235 females (64.0%) and 132 males (36.0%), largely African American (90.8%) with a mean age of 42.56 (SD=12.64) (see Table 2). Poverty rates were also high in this population, with nearly half (45.5%) of all subjects reporting a household monthly income of less than \$500. We found that this subsample was representative of the larger sample, as PSS severity was positively correlated with reports of current levels of pain ($r=.206$, $p<.001$) and degree of pain-related functional impairment ($r=.228$, $p<.001$), as reported above.

Based on the CAPS, we categorized all subjects into three diagnostic groups according to PTSD status: those that never met criteria for PTSD (no PTSD); those who met a lifetime but not current diagnosis of PTSD (past PTSD); and those who met diagnostic criteria for

PTSD in the last month (current PTSD). To assess the relationship between PTSD diagnostic status and socioeconomic status, we performed a chi square analysis comparing the demographic data across PTSD groups (see Table 2). Race and education level were differentially distributed between the no PTSD group and the two PTSD positive groups, but the two PTSD groups did not differ from each other.

Trauma and PTSD Rates—Reported rates of trauma exposure were extremely high in this population, with 91.7% reporting at least one traumatic event, and a mean number of 3.71 (SD=2.60) different types of lifetime trauma exposures. PTSD rates were also high, with 25.3% of subjects meeting criteria for a past PTSD diagnosis and 21.0% meeting criteria for a current PTSD diagnosis. Traumas directly experienced by the participant were analyzed and a chi square test showed that trauma exposure differed across diagnostic categories (see Table 3).

Current PTSD Diagnosis and Pain—Pain ratings were compared across the three diagnostic PTSD groups. A one way ANOVA indicated that reports of current pain were significantly higher in those with PTSD than those without PTSD, $F(2,310) = 8.57, p < .001$, see Figure 1a. A Bonferroni post-hoc comparison showed that the current PTSD group had significantly higher pain ratings than the no PTSD group ($p < .001$). PTSD status was also associated with reports of pain-related functional impairment $F(2,309) = 8.93, p < .001$. A Bonferroni post-hoc comparison also showed that the current PTSD group had significantly higher impairment than the no PTSD group ($p < .001$), see Figure 1b.

The significant ANOVA was followed up with an ANCOVA, which included demographic data, trauma history, and disability status as covariates. The effect of PTSD on pain ratings remained significant after covarying for these variables: sex, race, age, trauma, and disability status. Both subjective pain ratings and pain related functional impairment ratings were still associated with PTSD status $F(2,278) = 4.78, p = .009$ and $F(2,277) = 4.25, p = .015$, respectively. To control for the physical experience of trauma as a potential cause of ongoing pain, we used trauma (the TEI scale) as a covariate in the analyses. Thus, these data suggest that the self-reported chronic pain was unlikely due to the injury caused directly by the experienced trauma.

Pain Ratings Across PTSD Symptom Subscales—Since there was an overall effect of PTSD diagnosis on subject pain ratings, we wanted to see if there was a significant relationship between specific symptom clusters and pain ratings. Current pain ratings and pain related functional impairment ratings were significantly related to all three symptom clusters (re-experiencing, avoidance, and hyper-arousal). An ANCOVA was repeated with the above listed covariates, with categorical definitions of symptom cluster frequency and pain ratings. Pain ratings were significantly related to only hyper-arousal symptoms $F(6,263) = 2.55, p = .021$. Pain related functional impairment ratings were still significantly related to both hyper-arousal symptoms $F(6,262) = 2.67, p = .016$ and re-experiencing symptoms $F(5,266) = 2.46, p = .033$, but not to avoidance symptoms.

Pain Medication Usage—In addition to looking at pain ratings, we also wanted to examine pain medication usage as a function of pharmacological category, specifically focusing on the use of opioid medications compared to other analgesics. 176 participants (48%) of the total sample were prescribed pain medications, including opioid (12.3%), non-opioid (25.1%) or 2nd tier (10.6%) analgesics. Pain medication rates were analyzed using a chi square test, and it was found that those subjects with a current diagnosis of PTSD were significantly more likely to report having an opioid prescription as compared to those without a diagnosis of PTSD, $\chi^2 = 8.98, p = .011$ (see Table 4). However, PTSD status was not associated with non-opioid analgesic use or 2nd tier analgesic use.

Opioid Use Across PTSD Symptom Subscales—We were interested in examining the association of different PTSD symptom clusters, (re-experiencing, avoidance, and hyper-arousal symptoms), with opioid medication use for pain control. Medication use status was associated with PTSD symptoms, both using the total PTSD symptom scale and the subscales for symptom clusters. Individuals using opioid pain medications had higher overall total PTSD symptoms $F(1,347) = 5.67, p = .018$. However, examining individual symptom clusters revealed that only the avoidance symptoms were significantly related to opioid medication use $F(1,347) = 11.79, p = .001$ (see Figure 2b). Re-experiencing and hyper-arousal symptoms were not related to opioid use (see Figure 2a and 2c, respectively). In order to control for the above listed covariates, we performed an ANCOVA on avoidance symptoms, which remained significant $F(1,317) = 4.42, p = .036$.

4. Discussion

In this study, we found that in a general medical population, PTSD symptoms were significantly positively correlated with pain ratings and pain-related functional impairment. After controlling for potential covariates in a linear regression, PTSD symptoms still significantly predicted pain ratings and pain-related functional impairment. When comparing pain ratings between individuals across the three diagnostic PTSD groups (subjects without past or current diagnosis of PTSD; subjects with past, but not current, PTSD; or subjects with current, but not past, PTSD), it was found that subjects with a current diagnosis of PTSD had significantly higher pain ratings and higher pain-related impairment ratings than the no PTSD group.

The current findings are in accordance with other research concerning the comorbidity of PTSD and chronic pain in civilian populations [13,32,40] as well as in veteran populations [34]. Notably, prior studies have not examined PTSD symptom clusters and they have not utilized general medical populations. After analyzing analgesic use across the PTSD diagnostic groups, it was found that those with a current diagnosis of PTSD were significantly more likely to use opioid analgesics as compared to those without a diagnosis of PTSD. This remained significant when we controlled for number of prior types of traumas experienced, suggesting that this relationship was not due to residual physical injury. However, the rates of non-opioid analgesic or second tier analgesic use did not differ amongst the three groups. Interestingly, although those using opioids had significantly higher PTSD symptoms, when we examined the symptom clusters, only the avoidance subcluster was significantly related to opioid use. These findings may suggest that those with high avoidance PTSD symptoms (who may utilize active avoidance coping strategies) are more likely to seek opiates as a means to avoid thoughts pertaining to traumatic events.

PTSD has been associated with increased rates of self-medication using illegal opioids, such as heroin [35] and misuse of prescribed medications [23]. In one study, self-medication independently predicted increased odds of suicide attempts [23], underscoring caution in prescribing pain medication to PTSD patients. On the other hand, opiate use may serve as a protective factor and decrease PTSD patients' current subjective pain ratings and pain related functional impairment ratings. Recently reported data has suggested that acute morphine administration may serve as a protective factor against the development of PTSD [18], and is associated with decreased number of PTSD symptoms [30] and decreased PTSD symptom severity [10]. Finally, it is possible that a similar dysregulation within the endogenous opiate system underlies both sensitivity to pain and avoidance behaviors, both of which are mediated, in part, through the amygdala and its limbic connectivity. Future research, particularly involving functional neuroimaging of pain and avoidance behaviors, may help to further elucidate these relationships.

In comparison to our previous work analyzing analgesic use in a highly traumatized psychiatric population[31], we found similar effects regarding PTSD and analgesic use, but found that a current PTSD diagnosis was specifically associated with greater opioid analgesic use. In an all-psychiatric population, we previously found increases in both opioid and non-opioid analgesic use in the PTSD population compared to psychiatric patients without PTSD [29]. The difference between these studies may be due to the fact that in order to analyze analgesic rates in the current study, we analyzed three diagnostic groups (never/past/current) using the CAPS instead of using a dichotomous PTSD diagnosis based on PSS. Furthermore, the current study was performed on a general medical population instead of a mental health outpatient population. The finding that the current vs. never PTSD groups were significantly different with respect to the rates of past opioid analgesic use and self-reported pain may reflect the differential severity of PTSD symptoms. As many of our subjects have chronic, persistent PTSD, those who meet criteria for a current diagnosis of PTSD at the time of the interview may represent a more severely ill population with more severe PTSD symptoms. Alternatively, this may represent an effect of active, but not remitted, PTSD on pain symptomatology.

The advantage of the current study is its large sample size drawn from non-psychiatric general medical clinics, as well as the wealth of information regarding clinical symptoms as well as trauma history. Thus these findings combine the strengths of both an epidemiological approach and in-depth medical examination of each participant. In order to control for the physical experience of trauma versus the first-hand witnessing of a traumatic event, we controlled for the number of prior traumatic experiences in all analyses, which indicated that the chronic pain was unlikely to be directly due to a past injury caused by the trauma itself. We also examined PTSD and chronic pain based on CAPS diagnostic groups, as well as PTSD on a continuous spectrum to analyze symptom clusters in closer detail.

Limitations of this study include its retrospective design and that pain ratings utilized in the study from the SF-36 Health Questionnaire were current (prior four weeks), which does not allow us to accurately differentiate between acute and chronic pain. Another limitation is that our sample was largely African American and should be replicated in other socioeconomic groups to ensure generalizable findings. However, the rather homogenous sample could also be considered a strength, as the findings were robust in this highly traumatized impoverished population. Furthermore, there is high comorbidity between depression and PTSD within this population. Since the comorbidity between chronic pain and depression has been widely analyzed in the literature, and its comorbidity with PTSD has been largely ignored, we chose to focus on this component of trauma-related sequelae. However, work examining interactions between PTSD, substance abuse, depression and other potential trauma-related psychopathology is ongoing and should also be analyzed.

An additional limitation is that the pain ratings were provided by subjective self-report of the participants; it is possible that PTSD is associated with a lower threshold for reporting pain, rather than a low pain threshold *per se*. In the first case, PTSD may sensitize the person to over-report their pain. In the second case, there may be a common physiological pathway mediating a covarying relationship between PTSD diagnosis and pain sensitivity, such as a dysregulated endogenous opioid system[13,30]. Increased prevalence of prescribed opioids, which we observed in the current study, may be a compensatory mechanism for such a putative dysregulation. Considering data reported by Holbrook and colleagues[18], it may be also argued that the endogenous opioid system is dysregulated in PTSD, which can enhance our understanding of PTSD and pain regulation.

Another possible hypothesis is that a third factor, such as disorders which are comorbid with PTSD, may mediate the relationship between PTSD and pain and/or opioid use. Given the

high prevalence of trauma and PTSD, along with the likely unrecognized comorbidity between chronic pain and PTSD in many urban hospitals, these data provide important implications for physicians treating patients in general medical populations. Additionally, there is high comorbidity between depression and PTSD within this population. Since depression has been highly focused on with pain ratings within the literature, while PTSD has been largely ignored, we chose to focus on this component of trauma-related sequelae. Work examining interactions between PTSD, substance abuse, depression and other potential trauma-related psychopathology is ongoing.

In summary, this work supports the field of literature that PTSD and trauma-related disorders are common and often comorbid with pain syndromes. Further, these data suggest the possibility of increased opioid seeking behavior within a medical population in patients who also have undiagnosed PTSD. The association between PTSD, pain syndromes, and opioid use provides further evidence that there may be shared neurobiology between the fear and pain pathways that is relevant in PTSD and chronic pain. Finally, these data offer the hypothesis that avoidance symptoms in PTSD may be uniquely associated with increased pain medication use. Overall, our data suggest that increased awareness, diagnosis and treatment of civilian PTSD in medical populations may improve management of chronic pain syndromes.

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Summary

Participants with PTSD had higher self-reported pain and were significantly more likely to have used opioid analgesics for pain control compared to those without PTSD.

Fig. 1. Pain and Pain-Related Impairment as a function of PTSD status. (A) Pain Ratings across the three PTSD groups. (B) Pain Related Functional Impairment across the three PTSD groups. All bar graphs represent mean + sem.

Fig. 2. PTSD subscale symptoms by history of opioid analgesic use. (A) PTSD re-experiencing symptoms related to presence or absence of opioid analgesic use. (B) PTSD avoidance symptoms related to opioid analgesic use. (C) PTSD hyper-arousal symptoms related to opioid analgesic use. All bar graphs represent mean $\pm$ sem.

Table 1

Linear Regressions with PTSD Symptoms Predicting Pain Ratings (A) and Pain-Related Functional Impairment (B)

A				
Outcome Variable: Pain Ratings				
Stepwise Model	R²	R² change	F change	p
1. Age, sex, race	.10	.10	23.77	<.001
2. Demographics + total adult trauma experienced	.12	.02	10.86	<.001
3. Demographics + trauma + disability status	.12	.01	5.64	.02
4. Demographics + trauma + disability + Posttraumatic Stress Symptom total	.18	.06	45.32	<.001

Final Model	Beta	t	p
Age	.28	7.33	<.001
Sex	.08	2.22	.03
Race	.04	.98	.33
Total adult trauma experienced	.05	1.28	.20
Disability status	.09	2.49	.01
Posttraumatic Stress Symptom total	.25	6.63	<.001

B				
Outcome Variable: Pain-Rated Impairment				
Stepwise Model	R²	R² change	F change	p
1. Age, sex, race	.07	.07	16.48	<.001
2. Demographics + total adult trauma experienced	.09	.02	12.49	<.001
3. Demographics + trauma + disability status	.10	.01	5.26	.02
4. Demographics + trauma + disability + Posttraumatic Stress Symptom total	.17	.07	53.13	<.001

Final Model	Beta	t	p
Age	.24	6.24	<.001
Sex	.05	1.21	.23
Race	-.03	-.83	.41
Total adult trauma experienced	.03	.76	.45
Disability status	.10	2.47	.01
Posttraumatic Stress Symptom total	.28	7.29	<.001

Table 2

Demographics of Participants by PTSD Status

Demographic	No PTSD (N), %	Past PTSD (N), %	Current PTSD (N), %	Total Sample (N), %	P value
Gender					
Male	(78), 39.6%	(31), 33.3%	(23), 29.9%	(132), 36.0%	0.266
Female	(119), 60.4%	(62), 66.7%	(54), 70.1%	(235), 64.0%	
Self Identified Race/Ethnicity					
African American	(179), 94.7%	(77), 82.8%	(68), 90.7%	(324), 90.8%	0.009 ^a
Caucasian	(6), 3.2%	(12), 12.9%	(3), 4.0%	(21), 5.9%	
Other	(4), 2.1%	(4), 4.3%	(4), 5.3%	(12), 3.4%	
Education Level					
<12th grade	(40), 20.9%	(21), 22.6%	(24), 32.0%	(85), 23.7%	0.029 ^d
High School Graduate or GED	(97), 50.8%	(36), 38.7%	(24), 32.0%	(157), 43.7%	
Some college or technical school	(33), 24.7%	(23), 24.7%	(22), 29.3%	(78), 21.7%	
College graduate or above	(21), 11.0%	(13), 14.0%	(5), 6.7%	(39), 10.9%	
Household Monthly Income					
\$0-499	(86), 45.7%	(42), 45.7%	(33), 44.6%	(161), 45.5%	0.083
\$500-999	(48), 25.5%	(34), 37.0%	(23), 31.1%	(105), 29.7%	
\$1000-1999	(41), 21.8%	(7), 7.6%	(14), 18.9%	(62), 17.5%	
\$2000 or more	(13), 6.9%	(9), 26.0%	(4), 5.4%	(26), 7.3%	

^aNo PTSD vs. 2 PTSD groups

Table 3

Percent of sample reporting lifetime exposure to traumatic experiences assessed by traumatic events inventory

Trauma type experienced	No PTSD (N, %)	Past PTSD (N, %)	Current PTSD (N, %)	P value
Experienced a natural disaster	(47), 26.1%	(33), 38.4%	(28), 38.4%	0.054
Experienced serious accident or injury	(68), 42.2%	(50), 64.9%	(48), 66.7%	<.001 ^a
Witnessed serious accident or injury	(55), 31.1%	(36), 42.9%	(31), 42.5%	0.089
Experienced sudden life-threatening illness	(40), 22.3%	(27), 32.9%	(25), 33.8%	0.079
Military combat	(4), 2.2%	(3), 3.6%	(6), 8.1%	0.088
Sexual contact before 13	(28), 16.3%	(24), 30.0%	(32), 45.7%	<.001 ^b
Sexual contact between 14 and 17 with physical force	(14), 8.1%	(16), 20.0%	(18), 26.1%	.001 ^b
Sexual contact 17 years and older with physical force	(13), 7.9%	(12), 15.4%	(11), 18.0%	0.062
Witnessed murder of friend or family member	(21), 11.7%	(10), 12.3%	(14), 19.2%	0.275
Attacked with a gun, knife or other weapon by a non-romantic partner	(66), 38.4%	(31), 37.3%	(35), 49.3%	0.229
Attacked with a gun, knife or other weapon by a romantic partner	(31), 18.8%	(33), 40.7%	(29), 46.8%	<.001 ^a
Attacked by non-romantic partner without a weapon	(46), 26.4%	(29), 35.4%	(33), 45.2%	.014 ^b
Attacked by a romantic partner without a weapon	(44), 27.3%	(36), 45.0%	(37), 58.7%	<.001 ^b
Beaten as a child	(33), 19.8%	(25), 30.9%	(30), 43.5%	0.001 ^b
Emotionally abused as a child	(18), 31.6%	(10), 47.6%	(15), 60.0%	0.046 ^b

^aNo PTSD vs. 2 PTSD groups^bNo PTSD vs. Current PTSD

Table 4

Posttraumatic Stress Disorder (PTSD) Diagnosis and Analgesic Use

	PTSD Diagnosis				P value
	No PTSD	Past PTSD	Current PTSD	Total	
	(N), %	(N), %	(N), %	(N), %	
<i>Opioid analgesics</i>					0.011 ^a
Yes	(15), 7.6%	(15), 16.1%	(15), 19.5%	(45), 12.3%	
No	(182), 92.4%	(78), 83.9%	(15), 19.5%	(322), 87.7%	
<i>Non-opioid analgesics</i>					0.868
Yes	(49), 24.9%	(25), 26.9%	(18), 23.4%	(92), 25.1%	
No	(148), 75.1%	(68), 73.1%	(59), 76.6%	(275), 74.9%	
<i>2nd tier analgesics</i>					0.746
Yes	(20), 10.2%	(9), 9.7%	(10), 13.0%	(39), 10.6%	
No	(177), 89.8%	(84), 90.3%	(67), 87.0%	(328), 89.4%	

^aNo PTSD vs. Current PTSD