



## Full length article

# Posttraumatic stress disorder and chronic pain are associated with opioid use disorder: Results from a 2012-2013 American nationally representative survey



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## ABSTRACT

**Background:** Chronic pain conditions and posttraumatic stress disorder (PTSD) commonly co-occur and are associated with opioid use disorder (OUD). The aims of this paper were to identify prevalence estimates of OUD among individuals with and without PTSD and assess independent and combined contributions of PTSD and chronic pain conditions on OUD in a nationally representative sample.

**Methods:** Data were extracted from 36,309 individuals from the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions. Past-year PTSD and OUD were assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-5 edition. Respondents reported physician-confirmed, past-year chronic pain conditions, categorized into musculoskeletal pain (e.g., arthritis), digestive pain (e.g., pancreatitis), and nerve pain (e.g., reflex sympathetic dystrophy). We examined the weighted prevalence of OUD among those with and without PTSD. Multiple logistic regressions examined the association between PTSD and chronic pain conditions on OUD.

**Results:** The prevalence of OUD was higher among those with PTSD than those without. Comorbid PTSD/musculoskeletal pain and PTSD/nerve pain conditions were associated with increased odds of OUD, compared to those with neither PTSD nor chronic pain conditions. Digestive pain conditions were not associated with OUD. Comorbid PTSD/musculoskeletal pain conditions demonstrated an additive relationship on OUD compared to musculoskeletal pain conditions and PTSD alone.

**Conclusions:** Results reveal that musculoskeletal pain and nerve pain conditions are associated with increased odds of OUD, but only musculoskeletal pain conditions display an additive relationship on OUD when combined with PTSD. These findings have implications for opioid management and screening among those with comorbid conditions.

## 1. Introduction

Chronic pain conditions are prevalent and debilitating, affecting over 100 million Americans annually (Institute of Medicine US Committee on Advancing Pain Research, Care, and Education, 2011). Chronic pain conditions are strongly associated with negative psychological and behavioral outcomes including emotional distress, anxiety, depression, impaired social and occupational functioning, sleep, and overall poor quality of life (Fine, 2011; Gureje et al., 1998; Holmes et al., 2013). Opioids are commonly prescribed as a treatment strategy for patients with chronic pain conditions (Centers for Disease Control

and Prevention, National Center for Health Statistics, 2014; Chou et al., 2009). However, extant research has revealed an association between chronic pain conditions and opioid misuse (Food and Drug Administration, 2013; Vest et al., 2016; Volkow and McLellan, 2016; Vowles et al., 2015), with rates of misuse adjusted for sample size and study quality ranging from 21% to 29% in chronic pain populations (Vowles et al., 2015). Opioid misuse is characterized by using opioids for therapeutic intent, but in ways that are different than those described, whereas abuse is characterized by using opioids for non-therapeutic reasons, such as euphoria. Opioid addiction, otherwise referred to as opioid use disorder (OUD), is characterized by compulsive opioid

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use despite negative consequences (Smith et al., 2013).

Researchers have recently examined opioid misuse in posttraumatic stress disorder (PTSD) and found that rates of misuse are dramatically higher in individuals with PTSD, as compared to those without PTSD (Cochran et al., 2015; Hall et al., 2016; Hassan et al., 2017; Kerridge et al., 2015; Smith et al., 2016). For example, work using nationally representative data revealed greater odds of non-medical opioid use (Kerridge et al., 2015; Smith et al., 2016) when past-year PTSD was present, even after controlling for sociodemographics, mental health conditions, medical conditions, and presence of current pain (Smith et al., 2016). Taken together, these findings suggest high comorbidity between opioid misuse/OD and PTSD.

There is growing recognition of a strong comorbid relationship between chronic pain conditions and trauma- and anxiety-related conditions including PTSD (Asmundson et al., 2002; Asmundson and Katz, 2009; Otis et al., 2003). For example, research has established high comorbidity rates between PTSD and chronic pain conditions in the general adult population (30%) (Amir et al., 1997; Asmundson et al., 2002; McWilliams et al., 2003) and in veteran populations (50–80%) (Asmundson et al., 2002; El-Gabalawy et al., 2015; Otis et al., 2003). However, despite high comorbidity rates of opioid misuse with chronic pain conditions (Vowles et al., 2015) and PTSD (Kerridge et al., 2015; Smith et al., 2016), along with the comorbidity between PTSD and chronic pain conditions, there is little research investigating the association between comorbid PTSD and chronic pain conditions with OUD. The mutual-maintenance model suggests PTSD and chronic pain conditions may influence each other in a way that exacerbates symptoms (Sharp and Harvey, 2001). The mutual maintenance can result in a person becoming stuck in a cycle of perpetuating distress (Asmundson and Katz, 2009), wherein symptoms of PTSD increase pain experiences and vice versa. The person may turn to opioids as a quick relief. It is important to understand the mechanism underlying these co-occurring conditions and, consequently, research is warranted to address this gap in the literature. Extant research has also largely relied on the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV criteria (American Psychiatric Association, 2000) and self-report of symptoms (Cochran et al., 2015; Hall et al., 2016; Mills et al., 2006), rather than the current DSM-5 diagnostic criteria, in which several changes were made to PTSD nomenclature (American Psychiatric Association, 2013). Similarly, the limited use of standardized clinical interviews for the diagnoses of PTSD and OUD, rather than self-report, is a major limitation to the currently available research (Cochran et al., 2015).

To the best of our knowledge, this is the first study to investigate OUD in chronic pain conditions with or without comorbid PTSD using a standardized clinical interview and the most up-to-date diagnostic criteria. Using a large, nationally representative United States (US) sample and DSM-5 criteria for PTSD and OUD, this study aims to: (1) identify prevalence rates of OUD among individuals with and without PTSD, and (2) assess the independent and combined contributions of PTSD and chronic pain conditions on OUD. Chronic pain conditions were divided into three classes, including musculoskeletal pain conditions (fibromyalgia, osteoporosis, arthritis), digestive pain conditions (pancreatitis, irritable bowel syndrome/inflammatory bowel disease), and nerve pain conditions (reflex sympathetic dystrophy/complex regional pain syndrome, other nerve pain in legs, arms, or back) to determine whether there were differential results across type of condition. The results of this research will provide a clearer understanding of the relationship between PTSD, chronic pain conditions, and OUD which may, in turn, help inform clinical interventions for these highly comorbid conditions.

## 2. Materials and methods

### 2.1. Sample

We analyzed data collected as part of the 2012–2013 National

Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III;  $N = 36,309$ ; response rate 60.1%), a cross-sectional, population-based survey conducted by the National Institute on Alcohol Abuse and Alcoholism. Data were collected from April 2012 to June 2013, and the sample comprised civilian, non-institutionalized residents from the US who were 18 years of age or older. Persons were excluded if they were an active member of the military, institutionalized, disabled, had an address that included a post office box or rural route, or lived in remote islands in Alaska and Hawaii. Data were weighted based on the American Community Survey (United States Census Bureau, 2013) to ensure national representativeness. Ethical approval was granted by the National Institutes of Health and Westat Institutional Board. Approval was also obtained from the University of Manitoba Research Ethics Board, along with approval from the NESARC-III Data Access Committee. More details on the exact NESARC-III protocol and methodology can be found elsewhere (Grant et al., 2014). The study conformed to STROBE guidelines as detailed in the supplementary file.

### 2.2. Variables

#### 2.2.1. Sociodemographic variables

We assessed age (continuously), sex (female, male), race/ethnicity (American Indian/Alaska native, Asian/Native Hawaiian/Other Pacific Islander, African American, Hispanic, White), education (less than high school, high school or equivalent, some college or more), marital status (married/common law, never married, widowed/separated/divorced), household income (\$0–\$19,999, \$20,000–\$34,999, \$35,000–\$59,999, \$60,000+), and military status (previously on active duty, training for reserves/national guard only, never served in military).

#### 2.2.2. Opioid use disorder (OUD)

Past-year OUD was assessed in the NESARC-III using the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS-5; Hasin et al., 2015). The AUDADIS-5 is a semi-structured clinical interview based on DSM-5 diagnostic criteria that can be administered by both clinicians and well-trained lay interviewers. It has been shown to have good reliability and validity across mental health conditions (Grant et al., 2015; Hasin et al., 2015). In the NESARC-III, OUD was diagnosed if two or more of the 11 DSM-5 criteria were present in the past-12 months (Grant et al., 2016; Kerridge et al., 2015). However, there was no information included to distinguish whether individuals with OUD were misusing opioids with or without a prescription.

#### 2.2.3. Posttraumatic stress disorder (PTSD)

In the NESARC-III, past-year PTSD was also assessed with the AUDADIS-5 based on respondents' most traumatic event

#### 2.2.4. Chronic pain conditions

We recoded the seven chronic pain conditions assessed in the NESARC-III into three variables based on clinical recommendations from the International Statistical Classification of Diseases and Related Health Problems (ICD-10; World Health Organization, 2004) and previous research (El-Gabalawy et al., 2014; Quirk et al., 2015). These variables were musculoskeletal pain conditions (fibromyalgia, osteoporosis, arthritis), digestive pain conditions (pancreatitis, irritable bowel syndrome/inflammatory bowel disease), and nerve pain conditions (reflex sympathetic dystrophy/complex regional pain syndrome, other nerve pain in legs, arms, or back). The chronic pain condition diagnoses were based on past-year self-reported physical conditions diagnosed by a health professional.

#### 2.2.5. Other mental health conditions

Additional mental health conditions assessed by the NESARC-III included in this study were: substance use disorders (cannabis, alcohol, sedative, cocaine, stimulant, hallucinogen, inhalant/solvent, club drug, heroin, other drug, tobacco), depressive/bipolar and related disorders

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