



Association of childhood abuse and neglect with prescription opioid misuse: Examination of mediation by adolescent depressive symptoms and pain

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ABSTRACT

Previous research has demonstrated an association between childhood abuse and neglect and prescription opioid misuse in adulthood. However, potential mechanisms underlying this association remain unclear. Based on the self-medication hypothesis and the existing research literature, we hypothesized that pain and depressive symptoms would mediate this association. Data were from Waves I (1994–1995) and III (2002) of the National Longitudinal Study of Adolescent to Adult Health (Add Health; N = 14,322). We conducted structural equation modeling to examine the association of childhood abuse and neglect with prescription opioid misuse in early adulthood and to assess for mediation by depressive symptoms and pain in adolescence. One in five respondents (20.1%) reported prescription opioid misuse in early adulthood. Childhood abuse and neglect was directly associated with an increase in the predicted probability of prescription opioid misuse ($\beta = 0.232$, $p < 0.001$). Pain, but not depressive symptoms, in adolescence was a significant mediator of this association ($\beta = 0.019$, $p < 0.001$). Pain may represent a complex stress-related response to early trauma among adolescents and may contribute to subsequent prescription opioid misuse as a coping mechanism. Results highlight the need to promote positive coping skills among adolescents who have experienced childhood abuse and neglect and underscore the importance of trauma-informed treatment services for individuals misusing prescription opioids.

1. Introduction

Childhood abuse and neglect is an important public health concern in the United States given its prevalence and association with adverse outcomes across the life course, including substance misuse and dependence (Anda et al., 2006; Dube et al., 2003; Fergusson, Boden, & Horwood, 2008; Gilbert et al., 2009; Hussey, Chang, & Kotch, 2006; Lo & Cheng, 2007; Spatz Widom, Marmorstein, & Raskin White, 2006). In particular, results from a few studies suggest an association between childhood abuse and neglect and opioid misuse in adulthood (i.e., using an opioid in a manner or dose other than prescribed, taking an opioid prescribed for someone else, or taking an opioid only for the feeling or experience it caused), including misuse of both illicit (i.e., heroin) and prescription (e.g., Oxycodone) opioids (Conroy, Degenhardt, Mattick, & Nelson, 2009; Heffernan et al., 2000; Kecojevic, Wong, Corliss, & Lankenau, 2015; Nelson et al., 2006; Quinn et al., 2016). The association between childhood abuse and neglect and prescription opioid misuse is of immediate relevance in the U.S. given the dramatic increase in rates of opioid use and opioid-related morbidity and mortality observed over the past two decades (Dart et al., 2015; Sairam Atluri,

Gururau Sudarshan, & Laxmaiah Manchikanti, 2014; Warner, Hedegaard, & Chen, 2014). From 1999 to 2012, the rate of prescription opioid-related mortality more than tripled (Warner et al., 2014) and in 2012–2013, self-reported lifetime prescription opioid misuse reached 11.3% among U.S. adults (Saha et al., 2016). Though heroin has increasingly contributed to adverse opioid-related outcomes in recent years, prescription opioids remain a major driver of the epidemic in the U.S. (Rudd, Aleshire, Zibbell, & Matthew Gladden, 2016).

While previous studies have found an association between childhood abuse and later opioid misuse (Conroy et al., 2009; Heffernan et al., 2000; Kecojevic et al., 2015; Nelson et al., 2006; Quinn et al., 2016), few have focused on prescription opioid misuse specifically, and the mechanisms through which this association occurs remain unclear. The self-medication hypothesis, in addition to the extant research literature regarding the negative consequences of childhood abuse and neglect, offer insights into the potential pathways through which childhood abuse and neglect may contribute to later prescription opioid misuse.

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1.1. The self-medication hypothesis

The self-medication hypothesis has been used in previous research to understand underlying motivations for prescription opioid misuse (Becker, Sullivan, Tetrault, Desai, & Fiellin, 2008; Young, Grey, Boyd, & McCabe, 2011; Young, McCabe, Cranford, Ross-Durow, & Boyd, 2012). The self-medication hypothesis posits that individuals attempt to cope with or reduce emotional distress through use of alcohol or drugs and the associated physiological and psychological effects (Khantzian, 1997; Khantzian & Treece, 1985). Contemporary conceptualizations of the self-medication hypothesis suggest that individuals also engage in alcohol or drug use as a method of coping with or self-treating physical experiences of pain (Young et al., 2012). Thus, based on the self-medication hypothesis, prescription opioid misuse may represent an attempt to alleviate adverse physical and psychological symptoms related to traumatic or stressful experiences, including childhood abuse and neglect.

1.1.1. The self-medication hypothesis: depressive symptoms

Numerous studies demonstrate that childhood abuse and neglect is associated with elevated depressive symptoms and the onset of major depressive disorder in adolescence and adulthood (Infurna et al., 2016; Lindert et al., 2014; Nemeroff & Binder, 2014). Accordingly, individuals who experienced childhood abuse and neglect may misuse prescription opioids, medications that exert both pain relieving and euphoric effects (Volkow & McLellan, 2016), in order to attain temporary relief of depressive symptoms. Results from several studies support the notion that individuals use prescription opioids to self-medicate negative emotional states (Becker et al., 2008; Edlund et al., 2015; Garland, Hanley, Thomas, Knoll, & Ferraro, 2015; Grattan, Sullivan, Saunders, Campbell, & Von Korff, 2012; Martins et al., 2012). For example, data from the National Epidemiologic Survey on Alcohol and Related Conditions found mood and anxiety disorders to predict later onset of prescription opioid misuse (Martins et al., 2012). In addition, among individuals in acute detoxification or intensive outpatient treatment for prescription opioid dependence, 84% reported use of prescription opioids to self-medicate depression or sadness (Garland et al., 2015). Thus, depressive symptoms may serve as a mediating factor (i.e., a factor on the pathway from the exposure to the outcome) in the association between childhood abuse and neglect and later prescription opioid misuse.

1.1.2. The self-medication hypothesis: pain

Previous research indicates that childhood abuse and neglect is associated with lower pain thresholds (Tesarz, Eich, Treede, & Gerhardt, 2016), changes in manifestations and expressions of pain (Drouineau et al., 2017), the development of chronic pain (Davis, Luecken, & Zautra, 2005), and alterations in emotional responses to pain (Meagher, 2004). Thus, individuals with a history of childhood abuse or neglect may experience or respond to pain differently than those without early trauma exposure, potentially altering their likelihood to seek out and misuse prescription opioids, medications that act on the regions of the brain regulating pain perception (Volkow & McLellan, 2016). Previous research provides empirical support for the notion that individuals misuse prescription opioids to cope with pain (Green, Black, Serrano, Budman, & Butler, 2011; McCabe, Cranford, Boyd, & Teter, 2007; McCabe, Teter, & Boyd, 2005; Young et al., 2012). For example, among college students, the most commonly cited reason for misuse of prescription opioids was to relieve pain (Young et al., 2012). Similarly, in a study of adults assessed for substance abuse treatment, the majority of those who were prescribed opioids and reported opioid misuse also reported a chronic medical or pain problem (97.1% (Green et al., 2011)). As such, pain, like depressive symptoms, may serve as a mediating factor in the association between childhood abuse and neglect and prescription opioid misuse.

1.2. Aims

The aims of the present study were to use a nationally-representative sample to examine the association of childhood abuse and neglect with prescription opioid misuse in early adulthood and to assess for mediation of this association by depressive symptoms and pain in adolescence. We hypothesized that childhood abuse and neglect would be significantly associated with prescription opioid misuse in early adulthood and that depressive symptoms and pain in adolescence would significantly mediate this association.

2. Methods

2.1. Data source

Data were derived from Waves I and III of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Add Health is a prospective study of a nationally-representative sample of U.S. adolescents in grades 7–12 during the 1994–1995 academic year (Wave I). A stratified random sample of 80 U.S. high schools and 52 middle schools was selected with probability of selection proportional to school size and stratification with respect to region of country, urbanicity, school size and type, and ethnic composition. From selected schools, a core sample of students was randomly selected with stratification by grade level and sex and over-sampling on the basis of ethnicity, genetic relatedness, adoption status, and disability. In total, 79% of selected students consented to complete the Wave I interview (N = 20,745). Sensitive questions were completed using audio-CASI technology (audio-computer assisted self-interview). Follow-up interviews with respondents were conducted in 1996 (Wave II; 88% response rate), 2001–2002 (Wave III; 77% response rate), and 2008 (Wave IV; 80% response rate). At Wave III, 15,170 young adults age 18–26 years participated. The final analytic sample was restricted to respondents who completed Waves I and III and had valid sampling weights (N = 14,322).

2.2. Measures

2.2.1. Childhood abuse and neglect

At Wave III, respondents were asked about childhood physical and sexual abuse and supervisory and physical neglect prior to 6th grade. Questions regarding abuse and neglect were modified versions of items from previous surveys (Finkelhor & Dziuba-Leatherman, 1994; Moore, 1995; Straus, Kinard, & Williams, 1995). Physical abuse was assessed with the question, “How often did your parents or other adult caregivers slap, hit, or kick you?” Sexual abuse was assessed with the question, “How often did one of your parents or other adult caregivers touch you in sexual way, force you to touch him or her in a sexual way, or force you to have sexual relations?” Supervisory neglect was assessed with the question, “How often did your parents or other adult caregivers leave you home alone when an adult should have been with you?” Physical neglect was assessed with the question, “How often did your parents or other adult caregivers not take care of your basic needs, such as keeping you clean or providing food or clothing?” Response options for each question ranged from “this has never happened” to “more than ten times”. Responses were coded into five categories (0 = never; 1 = once; 2 = twice; 3 = three to five times; 4 = six or more times).

2.2.2. Depressive symptoms in adolescence

At Wave I, adolescents responded to a 19-item modified version of the Center for Epidemiologic Studies Depression Scale (CES-D; (Radloff, 1977)). The CES-D is a widely-used instrument to measure depressive symptoms in population-based studies. The CES-D has been demonstrated to have high internal consistency and reliability (Garrison, Addy, Jackson, McKeown, & Waller, 1991; Roberts, Lewinsohn, &

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