



RESEARCH BRIEF

Impact of Emotional Distress on Prescription Opioid Abuse in a Rural Juvenile Drug Court Sample

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ABSTRACT

Background: Ohio is at the epicenter of the opioid epidemic, and the current crisis disproportionately burdens rural areas. The Self-Medication Hypothesis and work examining adverse childhood experiences posit that drug use may be understood as a coping strategy to address emotional distress.

Methods: Juvenile drug court participants in a Northwest Ohio county were administered a standardized biopsychosocial assessment. Intake interviews from January 2010 and November 2018 were used to evaluate the relationship between emotional distress reported using the Emotional Problem Scale (EPS) and lifetime nonmedical use of prescription opioids. Linear regression was used to examine temporal trends in EPS scores. Logistic regression was used to examine the relationship between EPS scores and prescription opioid misuse, controlling for temporal trends.

Results: Linear regression showed a significant increase in emotional distress over the study period for both prescription opioid users and nonusers. Average scores increased 29.5 points (on a 100 point scale) over the duration of the study ($P < 0.0001$). A 10-point increase in EPS score was associated with a nearly 50% increase in the lifetime odds of prescription opioid misuse (OR = 1.46, 95% CI: 1.19-1.82, $P = 0.0004$). The odds of prescription opioid misuse declined each year (OR = 0.63, 95% CI: 0.48-0.81, $P = 0.0006$).

Conclusion: Rates of prescription opioid misuse have decreased over time despite a significant association between emotional distress and opioid misuse and trend toward increasing EPS scores. While efforts to reduce prescription opioid misuse appear to have been effective in this population, significant work is needed to reduce underlying risk factors.

Keywords: Opioid abuse, Prescription painkillers, Emotional distress, Juveniles

INTRODUCTION

The opioid epidemic gripping the United States constitutes an unprecedented public health crisis. In 2017, more than 72000 Americans lost their lives to drug overdoses, the vast majority of which involved opioids.¹ Currently, drug overdoses are the most common cause of accidental death in the United States (US), accounting for more fatalities than gun violence, suicide, or motor vehicle accidents.^{2,3} The estimated yearly costs of the opioid crisis, including health care, criminal justice, lost lives and productivity, are over \$500 billion.⁴

Ohio is an epicenter of this epidemic, with opioid mortality rates increasing an astonishing 918% since the early 2000s.⁵ In 2015, Ohio had the highest heroin overdose death rate in the country.⁶ In 2017, Ohio had 4854 drug overdose deaths, a 20% increase from 2016.⁷ In Ohio, drug overdoses now kill more than 2.5 times as many people as automobile accidents.⁸ The deadly synthetic

opioid fentanyl now drives the increase in overdose deaths. An examination of unintentional drug overdose deaths from 24 Ohio counties in January and February of 2017 revealed that approximately 90% involved fentanyl, its analogs, or both.⁹

However, the current drug crisis differs from well-established historical trends, with rural communities suffering a disproportionate burden.^{10,11} Compared to urban areas, rural areas have higher rates of opioid-related overdoses and deaths.^{12,13} These problems are exacerbated because rural areas are “treatment deserts” for opioid abusers.¹⁰ Compared to urban and suburban areas, rural areas have fewer inpatient detoxification,⁴ rehabilitation,^{5,12,14} and medication assisted treatment (MAT) programs providing drugs like methadone and buprenorphine.^{4,8,12,15} Furthermore, rural areas have a general shortage of behavioral health professionals including clinical psychologists, psychiatrists, psychiatric nurse practitioners, and social workers.^{14,16} Whites have



been disproportionately impacted in the current opioid crisis, with racial disparities in opioid prescription rates hypothesized as a contributing factor.¹⁷

Youth misuse of prescription opioids may act as a stepping-stone to eventual heroin use, which in recent years has led in turn to increased risk of fentanyl exposure and overdose.^{18,19} Individuals abusing prescription opioids are several times more likely than their peers to turn to heroin use,²⁰ and the vast majority of heroin users report first abusing prescription opioids.^{21,22} Unfortunately, rural youth are at a greater risk of prescription opioid abuse than their suburban and urban peers.^{23–27}

The current opioid epidemic traces to a complex interplay between personal, social, cultural, and economic factors.¹⁵ While understanding higher-level factors is key to addressing the epidemic as a public health crisis, it is also invaluable to understand individual factors leading to the initiation and maintenance of opioid abuse, especially for those in treatment and enforcement settings.

While biological explanations elucidate the physiological and genetic factors leading certain substances to be addictive, dramatic changes in addiction rates over time suggest that environmental factors likely play a key role in shaping addiction. People may turn to opioid abuse to alleviate suffering as opposed to seeking pleasure or a “high” from the drugs.²⁸ Opioid abusers generally have extensive psychological and emotional distress.²⁹ Qualitative studies have found that opioid abusers indicate the drugs provide them with an escape from various types of psychological and emotional discomfort.^{30–32} These problems include stress,^{33,34} emotional trauma,^{31,33} symptoms of comorbid psychological conditions,³⁰ and a general discontentment with life.³⁵

Two related theories envision drug taking behavior as a coping mechanism. The Self-Medication Hypothesis of drug addiction posits that specific classes of drugs are used by addicts as a means of modifying specific negative affective states.^{36,37} The theory complements physiological and sociological perspectives on addiction with a psychological explanation. Closely related is the body of literature exploring the impact of adverse childhood experiences (ACEs), including neglect, abuse, and other trauma, on drug addiction. In fact, the strong relationship between ACEs and substance abuse has been cited as supporting evidence for the Self-Medication Hypothesis,²⁸ though some have questioned whether ACEs are truly a causal risk factor or merely a risk marker associated with underlying psychological pathology.³⁸ Adverse childhood experiences have been found to predict multiple potential mediators leading to more serious opioid use including anxiety, delinquency, depression, impulsivity, risk-taking, and suicidality.³⁹ Childhood exposure to abuse and neglect has consistently been associated with psychological distress,⁴⁰ illicit drug use, generally,⁴¹ injection drug use and opioid dependence, specifically,^{42–44} and more severe opioid abuse.⁴⁵

METHODS

Setting and Design

The setting for this study was a juvenile drug court in a predominantly white (>96%), rural county in Northwest Ohio between January 2010 and November 2018. We conducted a secondary analysis of data previously collected by the court and provided to the researchers as part of an ongoing evaluation process.

Participants

All juvenile court participants were interviewed as part of the standard intake procedures. For individuals with more than one contact with the court, only the most recent intake interview was included in the analysis to ensure the independence of observations.

Procedures

The analysis examines pooled data from the Global Appraisal of Individual Needs (GAIN),⁴⁶ a standardized biopsychosocial assessment interview that has 8 core sections including mental health and substance use indicators, with these items combined into more than 100 indexes, scales, and subscales.⁴⁷ The GAIN is administered by court staff trained by Chestnut Health Systems and the procedures are done in strict accordance with HIPAA (Health Insurance Portability and Accountability Act) rules (45 CFR Parts 160 and 164, Subparts A and E).⁴⁸ Use of this data for secondary analysis is allowed by Chestnut Health Systems as it is conducted with general consent under federal guidelines (42 CFR Part 2) that allow record abstraction for program evaluation and development as long as the data is deidentified and kept confidential. The pooled data provided by Chestnut Health Systems for this study included no identifying information for any individual.

The study was determined to be exempt from further review by the Ohio Northern University Institutional Review Board as it involved the analysis of existing data, and information was recorded in such a way that individual subjects cannot be identified.

Measures

The main mental health scales have outstanding internal consistency ($\alpha \geq 0.9$) and subscales have very strong internal consistency ($\alpha \geq 0.7$).^{47,49} The scales were developed using Rasch measurement analysis and normed using over 100,000 subjects.⁵⁰ The specific mental health questions are largely based on various DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) criteria.⁵¹

The independent variable, emotional distress, was measured using the Emotional Problem Scale (EPS) which measures mental health functioning and functional impairment.⁵² The EPS is a 7-item scale that measures: proportional days of the previous 90 the subject was bothered by psychological problems, traumatic memories, and difficulty with self-control; the number of days these mental health issues interfered with the subject's daily responsibilities;



and the recency of the respective mental health issues.⁵³ Lifetime prescription opioid misuse was measured by asking subjects to indicate whether they had ever used prescription opioids in any manner that was not under the direction of a medical professional.

Statistical Analysis

The impact of emotional distress on prescription opioid misuse was evaluated using a logistic regression model in R (version 3.2.1) using the `glm()` function using the binomial family type and logit link function.

RESULTS

During the study period 174 assessments were conducted involving 158 unique individuals. Participants ranged from 12 to 17 years of age. Descriptive statistics are presented in **Table 1**. The EPS scores were available for all but 1 individual, who was excluded from the analysis. Information on prescription pill use was available for the full sample. Only the most recent assessment was analyzed for the 17 repeat offenders completing 2 assessments (duration between: range = 45 days-3.8 years, mean = 1.4 years). The EPS scores for the second assessment were higher for 11 repeat offenders and lower for the remaining 6 (mean change = +7.3).

A scatterplot of EPS scores shows an increase in the average score among individuals taken into the program over time (**Figure 1**). A linear regression model was fit to evaluate temporal trends in EPS score while controlling for prescription opioid misuse. Average scores increased 29.5 points (on a 100 point scale) over the duration of the study ($P < 0.0001$), controlling for use of prescription pills. Prescription drug misuse was associated with a 19.8 point higher EPS score compared with nonuse.

In a logistic regression model, both EPS score ($P = 0.0004$) and time ($P = 0.0006$) were significant predictors of opioid misuse. An individual with an EPS score 10 points higher than someone in the same time frame had 1.46 times the odds of lifetime prescription opioid misuse (95% CI: 1.19-1.82). An individual interviewed at one point in the study was predicted to have 0.63 times the odds of opioid misuse compared with someone with the same EPS score interviewed one year earlier (95% CI: 0.48-0.81).

DISCUSSION

Both the Self-Medication Hypothesis and theories of adverse childhood experiences posit that adult drug abuse may be a coping mechanism for negative events early in life and their sequelae. The

Table 1. Descriptive Statistics for Participants in a Juvenile Court in Northwest Ohio, 2010-2018, by Lifetime Prescription Opioid Misuse

	Full Sample n = 157 Mean±SD/%	Opioid misusers n = 23 Mean±SD/%	Nonmisusers n = 134 Mean±SD/%	Repeat offenders n = 17 Mean±SD/%
Dependent Variable				
Lifetime Opioid Misuse	14.5%	100.0%	0.0%	17.6%
Independent Variable				
Emotional Problem Scale Score	37.3±24.0	50.0±22.0	35.1±25.1	33.9±13.6
Sociodemographic Factors				
Race/Ethnicity				
Non-Hispanic white	86.0%	95.7%	84.3%	82.4%
Non-Hispanic black	0.6%	0.0%	0.7%	0%
Hispanic	1.9%	0.0%	2.2%	5.9%
Two or More Races	7.0%	0.0%	8.2%	11.8%
Other	4.5%	4.3%	4.5%	0%
Age	15.4±1.4	15.4±1.4	15.3±1.4	14.5±1.6
Gender				
Male	59.9%	52.2%	61.2%	70.6%
Female	40.1%	47.8%	38.8%	29.4%

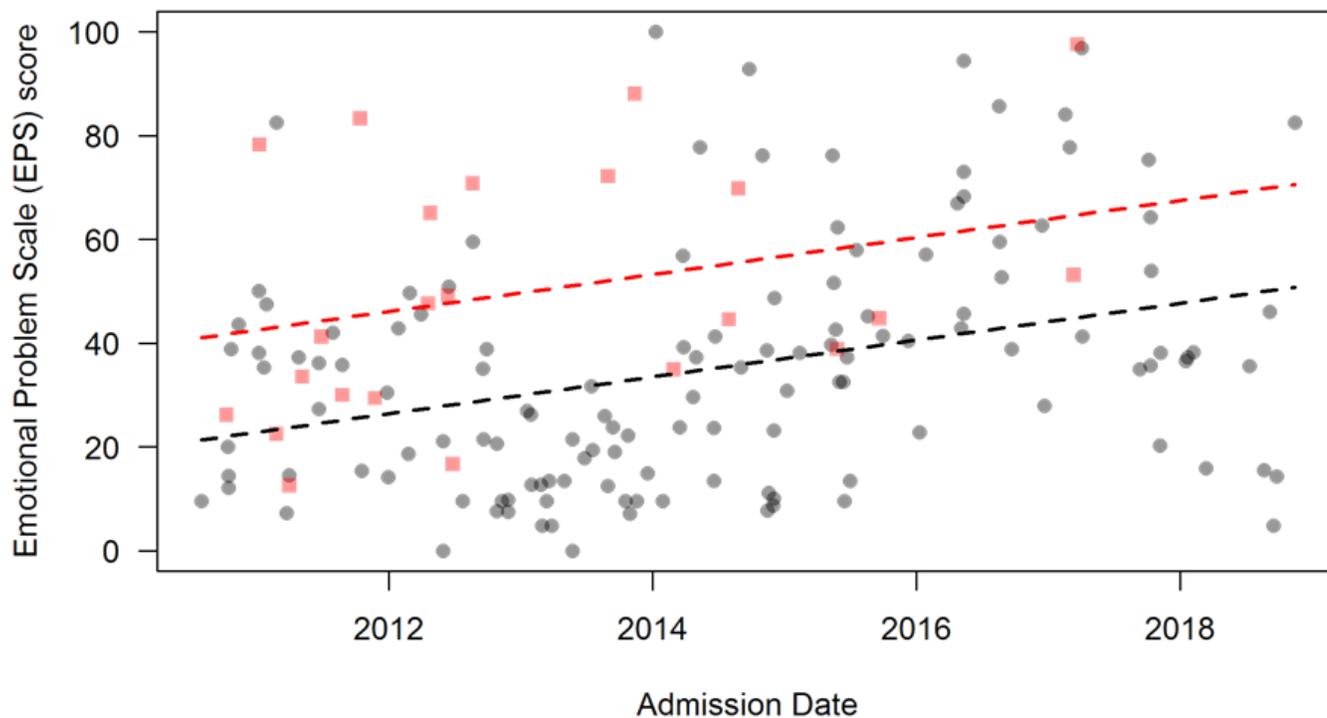


Figure 1. Trend in Emotional Problem Scale (EPS) Score Over Time Among Prescription Opioid Misusers (red squares) and Nonusers (black circles) in a Northwest Ohio County

current work supports such claims by demonstrating an association between emotional distress, as measured by the EPS, and prescription opioid misuse, while simultaneously documenting secular trends in drug selection. The significant drop in the likelihood of opioid misuse over the study period corresponds with current understandings of the opioid epidemic. The first wave of the opioid crisis, marked by the rise of prescription opioid abuse, is generally cited as running from the late 1990s until 2010, the year that the current study began.¹⁵ Starting in 2010, a policy emphasis on reducing prescription opioid overdose reduced supply, increasing the cost of prescription opioids and encouraging many with opioid abuse disorder to transition to cheaper heroin.

The reduction in the frequency of opioid misuse in the sample, though unquestionably a good sign, is offset by a troubling trend toward higher reported EPS scores among all study participants. This mirrors broader trends among US adolescents.⁵⁴ The available data does not give clear evidence for the cause of this trend, though the impacts of the opioid epidemic on families in rural Northwest Ohio may be an important component.

The national epidemic of opioid overdose deaths appears to be part of a broader pattern termed “deaths of despair.”⁵⁵ Deaths of despair are associated with a sense of hopelessness, fatalism, perceived helplessness and deprivation. This concept has been used to account for the increasing mortality in the US from opioid over-

doses, suicides, and liver disease among noncollege educated middle-aged whites. Such deaths noticeably increased around the time of the economic downturn in the mid-2000s.¹⁵ There has been a recent trend of disengagement in institutional engagement among groups particularly hard hit by opioid abuse (eg, rural residents; working-class white).⁵⁵ This involves a decreasing rate of participation in family, work, and religion.^{56,57} It also includes declining rates of participating in labor unions, fraternal organizations, and other voluntary associations.⁵⁸

The ideas of sociologist Emile Durkheim are useful in interpreting these trends.^{59–61} Durkheim noted that societies need to provide social integration and moral regulation to constrain the individual. He believed that unbridled individual passions could result in a state of normlessness or anomie. In turn, this anomie can translate into self-destructive behavior such as suicide. Case and Deaton have claimed the current decline in institutional participation among working-class whites creates a Durkheimian recipe for individual self-destruction.⁵⁵ Due to an increasing absence of stable institutional bonds (eg, work, family, religion), there are insufficient social supports to prevent the individual from falling into despair. Believing that their situation is hopeless, they may turn to opioids as a temporary reprieve from their fatalistic despair. Tragically, this temporary reprieve from this anomic condition all too often turns into a life-threatening addiction.



PUBLIC HEALTH IMPLICATIONS

Data from this sample of juvenile offenders suggest that efforts to reduce access to prescription opioids have successfully decreased lifetime risk of prescription opioid misuse by adolescents in this rural, Northwest Ohio county. This study lends still more support to the well-documented association between emotional problems and prescription drug misuse, and finds that rates of emotional problems among high-risk adolescents are climbing at an alarming rate. Identifying ways to respond to emotional problems and prevent the traumatic events that contribute to them should be a key public health priority.

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