Journal of Psychiatric Research 107 (2018) 28–33

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/jpsychires

Prospective prediction of first lifetime onset of suicidal ideation in a national study of substance users

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ARTICLE INFO

Keywords:
Longitudinal study
Suicide
Suicidal ideation
Substance use

ABSTRACT

Suicide rates have increased over the past several decades. Prior research has evaluated risk factors for suicidal behavior, but much of this work does not adequately differentiate between risk factors for suicidal ideation (SI) and suicide attempts, nor does it differentiate between first-onset SI and recurrent ideation. This study seeks to identify risk factors for first-onset SI among a high-risk group: individuals receiving treatment for substance use disorders. Data were drawn from the National Treatment Improvement Evaluation Study, a prospective study examining the impact of addiction treatment programs. Patients with no lifetime history of suicide attempts or ideation (n = 2560) were assessed at baseline and one year later for prospectively-occurring SI. Sociodemographic variables, mental health indices, interpersonal factors, and substance use severity indicators were evaluated as prospective predictors of first-onset SI in linear regression models. Current mental health problems (OR = 1.54, 95% CI = 1.19–2.01), current substance use problems (OR = 1.33, 95% CI = 1.04–1.70), and difficulty accessing treatment for substance use problems (OR = 1.90, 95% CI = 1.16–3.11) emerged as significant predictors of first-onset SI in a multivariate analysis, suggesting that individuals with current mental health or substance use related symptoms are among the most at risk for developing SI. Difficulty obtaining treatment remained significant, highlighting the importance of treatment accessibility. Future clinical work and research would benefit by addressing these issues, potentially by focusing on mental health treatment in substance abuse programs and evaluating barriers to treatment.

1. Introduction

Suicide is a major public health concern. While the prevalence of conditions such as cancer and heart disease has declined considerably over the past several decades, rates of suicide have increased (Centers for Disease Control and Prevention, 2016a). A major antecedent of death by suicide is suicidal ideation. However, much of the suicide research either focuses on risk factors for suicide attempts alone or does not cleanly differentiate between risk factors for suicide attempts and suicidal ideation, often not excluding the former in assessing risk for the latter construct (Klonsky et al., 2016; Klonsky and May 2014). Consequently, in these studies of suicidal ideation, it is often unclear to what degree any observed association with this outcome is in part a function of its frequent co-occurrence with suicide attempts. It is important to cleanly differentiate risk factors for ideation and attempts, given the common view that they differ notably in etiology (Klonsky et al., 2016; O'Connor and Nock, 2014). In fact, there has been considerable theoretical and empirical work supporting the view that risk factors for ideation and attempts are not necessarily predictive of each other (e.g. Cheek et al., 2015; Van Orden et al., 2010). Therefore, although suicidal ideation is associated with future attempts (Reinherz et al., 2006), it is also an important clinical condition in and of itself, and warrants investigation for this reason.

Furthermore, when trying to identify who is most at risk for experiencing suicidal ideation, a potentially important distinction is between first-onset ideation and recurrent ideation, as it cannot be assumed that the mechanisms of risk for first-onset and recurrent ideation are the same (Everitt and Robbins, 2013; Monroe and Harkness, 2005). Indeed, for several other psychiatric conditions such as depression and substance use disorders, there is theoretical and empirical support for differences in underlying mechanisms of the first-onset and the recurrence of these clinical phenomena (Burcusa and Iacono, 2007; Everitt and Robbins, 2013). Such may similarly be the case for suicidal ideation. Elucidating risk factors specifically for first-onset suicidal ideation is important for informing preventive intervention efforts for this clinical phenomenon before it can develop a recurrent course and

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https://doi.org/10.1016/j.jpsychires.2018.09.019
Received 19 June 2018; Received in revised form 24 September 2018; Accepted 28 September 2018

before potential transition to suicidal behavior.

There is a notable paucity of studies predicting first-onset of ideation. This is in large part due to the considerable methodological challenges involved in conducting such studies. First, it is impossible to study risk factors in cross-sectional studies (Kraemer, 1997), necessitating a prospective design and attendant increases in sample size. Studying risk for suicidal ideation is particularly challenging because its low base rate (i.e., 12-month prevalence of 2.8–3.3% in epidemiological samples; Kessler et al., 2005) increases the required sample size considerably more to achieve adequate statistical power for analyses (Brent, 1989; Goldsmith et al., 2002; Prinstein, 2008; Prinstein et al., 2008). This challenge is magnified even more in the case of prospectively predicting first lifetime onset of suicidal ideation, particularly unconfounded with suicide attempts.

In addition to drawing on large samples, a strategy to address this challenge of ensuring adequate prospective rates of first-onset suicidal ideation for statistically powered analyses is to sample from high-risk populations (e.g., substance users; Nock et al., 2008a). There are also clinically important reasons for adopting this strategy. First, even among high-risk populations, most individuals do not go on to experience suicidal ideation or behavior, and it remains difficult to accurately predict risk in these populations (Jacobs and Brewer, 2004; Liu et al., 2012; Yen et al., 2013). Second, it is important to distinguish risk factors for non-clinical or community samples from risk factors for clinical populations, as they are not necessarily the same (King et al., 2015; Yen et al., 2013). Third, clinicians most frequently assess suicide risk in at-risk or treatment-seeking samples, making risk factors derived from clinical samples of particularly value. Identifying the specific constructs that convey risk for first-onset ideation within a clinical sample could allow clinicians to intervene while a patient's general clinical presentation is less severe, and thus reduce the likelihood of suicidal ideation, and ultimately, the transition to suicidal behavior.

This study aims to address the need in the empirical literature to characterize risk factors for first-onset suicidal ideation among a large high-risk sample of substance users. In particular, the National Treatment Improvement Evaluation Study (NTIES) offers a rare opportunity to study the first onset of ideation prospectively over a one-year follow up, unconfounded by prospectively occurring suicide attempts. Drawing on prior literature to identify specific candidate risk factors, we hypothesized that several sociodemographic characteristics (i.e., sex; Nock et al., 2008b), mental health indices (i.e., depression; Nock et al., 2008a; Troister et al., 2013), interpersonal factors (i.e., partner or spousal physical abuse; Heru et al., 2006; McLaughlin et al., 2012), indicators of substance use severity (Borges et al., 2008; Cheek et al., 2015; Liu et al., 2014), and psychiatric treatment utilization (Luoma, 2002) conveyed risk for first-onset suicide ideation.

2. Methods

2.1. Participants and procedures

Data were obtained from the National Treatment Improvement Evaluation Study (NTIES; Gerstein et al., 1997), a five-year (1992–1997) longitudinal, multi-site study of publicly-funded addiction treatment programs. NTIES is comprised of 4526 patients who consented to participate and completed the intake, discharge, and one-year follow-up interviews. Participants were recruited from 78 clinical service delivery units and data were collected by the National Opinion Research Center at the University of Chicago with assistance from the Research Triangle Institute, Research Triangle Park, NC. Although the sample is generally comparable to those found in other large-scale treatment follow-up studies in terms of distributions in sex, educational attainment, prior treatment experience, NTIES includes a higher representation of traditionally underserved and vulnerable populations (e.g., minorities, pregnant women, welfare recipients, and individuals in the criminal justice system). It also includes a higher proportion of minorities, specifically African Americans and Hispanics (Gerstein et al., 1997; Gerstein and Johnson, 2000). The sample for the present study consisted of a subset of individuals who reported no lifetime history of suicide ideation or suicide attempts at the intake assessment.[1] Additionally, to assess risk factors for first-onset suicidal ideation unconfounded by risk for suicide attempts, we also excluded individuals with prospectively occurring suicide attempts during follow-up.

Data were collected at treatment intake, treatment exit, and a year after treatment completion. Participants completed structured, computer-assisted, study specific survey protocols, which were administered by trained NTIES staff at each time point. At treatment intake, data were collected on sociodemographic characteristics, indices of mental health, interpersonal factors, substance use severity, and lifetime history of suicidal ideation and suicide attempts. At post-baseline assessments, participants reported on any suicidal ideation (and suicide attempts, in the case of the present study to screen out prospective attempters) since the prior assessment.

2.2. Measures

2.2.1. Sociodemographic characteristics

At intake, participants reported on their sex, age, race and ethnicity, along with the highest education level they had attained (i.e., responses ranged on a scale from “6th grade or lower” to “4 years of college/technical school or more”), in addition to marital status (currently married versus not currently married).

2.2.2. Mental health

Current psychiatric distress was assessed by the question “Right now, how troubled or bothered are you by your emotions, nerves, or mental health?” Responses were on a three-point Likert scale (i.e., “*not at all,*” “*somewhat*”, or “*very much*”). To evaluate lifetime history of depressive symptoms, participants were asked whether they had ever experienced a period of at least two weeks when they felt: (1) very sad or depressed, or (2) had lost interest and pleasure in things that they used to care about. Individuals that endorsed either of these items were then classified as having a lifetime history of depressive symptoms. Depressive symptoms were operationalized in this way following the precedence of previous studies that have used these data (Bohnert et al., 2011; Trout et al., 2017). A history of intensive or outpatient psychiatric treatment was assessed using the following two items: “Have you ever stayed somewhere for at least 24 h for professional treatment of problems with your emotions, nerves, or mental health?” and “Have you ever received outpatient treatment for problems with your emotions, nerves, or mental health?”

2.2.3. Substance use severity

Two measures of substance use were assessed, including lifetime history of injection drug use and polysubstance use. To measure lifetime injection drug use history, participants were asked “Have you ever, even one time, used a needle to inject drugs to get high or for other non-medical effects?” Lifetime polysubstance use was generated by summing affirmative responses to items asking if they have ever tried any one of the twelve categories of substances including inhalants, marijuana/hashish, crack, cocaine, PCP/angel dust, hallucinogens, heroin, illegal methadone, other narcotics, illegal uppers, other downers or any other drugs besides alcohol. Problems getting treatment for substance use was determined with an item asking “Is there anything that might make it hard for you to get treatment or counseling here, such as getting time off from work or school, getting child care, not being able to find a way to get here, or something else?” Hospitalizations resulting from

[1] A comparison of this subset of individuals to all remaining NTIES patients (which included those with a baseline history of suicidal ideation and attempts) on baseline study variables is presented in Supplemental Table 1.