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Incremental predictive validity of the Addiction Severity Index psychiatric composite score in a consecutive cohort of patients in residential treatment for drug use disorders

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HIGHLIGHTS

- Entering psychiatric care was common among patients in the years following residential treatment.
- Psychiatric care and suicide were associated with self-reported psychiatric symptoms on the ASI.
- Patients that entered psychiatric care had left treatment earlier, had fewer legal problems, and more alcohol problems.

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ABSTRACT

Background: The Addiction Severity Index (ASI) is a widely used assessment instrument for substance abuse treatment that includes scales reflecting current status in seven potential problem areas, including psychiatric severity. The aim of this study was to assess the ability of the psychiatric composite score to predict suicide and psychiatric care after residential treatment for drug use disorders after adjusting for history of psychiatric care.
Methods: All patients treated for drug use disorders in residential treatment centers in Denmark during the years 2000–2010 with complete ASI data were followed through national registers of psychiatric care and causes of death (N = 5825). Competing risks regression analyses were used to assess the incremental predictive validity of the psychiatric composite score, controlling for previous psychiatric care, length of intake, and other ASI composite scores, up to 12 years after discharge.
Results: A total of 1769 patients received psychiatric care after being discharged from residential treatment (30.3%), and 27 (0.5%) committed suicide. After adjusting for all covariates, psychiatric composite score was associated with a higher risk of receiving psychiatric care after residential treatment (subhazard ratio [SHR] = 3.44, $p < 0.001$), and of committing suicide (SHR = 11.45, $p < 0.001$).
Conclusions: The ASI psychiatric composite score has significant predictive validity and promises to be useful in identifying patients with drug use disorders who could benefit from additional mental health treatment.

1. Introduction

Substance use disorder is rarely the only problem identified in individuals presenting for treatment. Individuals seeking care for substance use disorders often experience financial difficulties, social and family troubles, general health problems, and legal issues (Kessler et al., 2012; Muller, Skurtveit, & Clausen, 2016; Scheurich et al., 2000). Furthermore, many patients experience comorbid mental health problems (Compton, Cottler, Jacobs, Ben-Abdallah, & Spitznagel, 2003; Grant et al., 2004). Traditionally, this overlap has been interpreted to reflect the negative effects of substances of abuse on mental health, a notion that is present in diagnostic manuals, clinical guidelines, and assessment interviews (Delgadillo, Bohnke, Hughes, & Gilbody, 2016). It is well established that substance use disorders may exacerbate and complicate mental health problems, and that patients with comorbid substance use disorders utilize much more treatment compared to patients with mental health problems only (Schmidt, Hesse, & Lykke, 2011). In addition, comorbid mental health problems are likely to increase the already high risk of suicide among individuals with substance use disorders (Darke et al., 2016). Therefore, it is important that clinicians are able to identify patients with co-morbid psychiatric disorders during routine intake assessment in treatment services for substance use disorders, so that appropriate additional treatment can be made available to patients.

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One strategy for identifying patients with such comorbidity is to assess them with comprehensive psychopathology screening instruments. However, given the many tasks facing substance abuse treatment staff, a time-saving solution may be to use data that are already available for identifying patients who may also need treatment for mental health problems. Such tools must be feasible to administer in clinical practice and have predictive validity in terms of outcomes that are relevant and of concern for this group of patients.

The Addiction Severity Index (ASI), a multi-dimensional tool, has been developed to assess problems commonly associated with substance use disorders and evaluates patients' recent and lifetime functional status within seven areas: general health, employment status, alcohol use, drug use, legal status, family and social relationships, and psychiatric health (Mclellan et al., 1992). The ASI is widely used and has been translated into a number of languages, including Japanese, (Ogai et al., 2015), Mandarin (Sun et al., 2012), German (Scheurich et al., 2000), and Danish (Pedersen, Hesse, & Thylstrup, 2013).

Among the most commonly used ASI metrics in the assessment of functional status are the composite scores (CSs). The CSs are sets of indices, which are calculated from the items within each of the seven ASI problem areas that refer to experiences in the past 30 days. CS scores range from 0.0 to 1.0, where higher scores represent more severe problems within the domain.

The ASI psychiatric CS has been shown to be associated with psychiatric status in a large number of cross-sectional studies. For instance, the ASI psychiatric CS is associated with lifetime stress (Mahoney, Newton, Omar, Ross, & De La Garza, 2013) as well as psychiatric diagnoses assessed by the Structured Clinical Interview for the DSM, Axis I disorders (Cacciola, Pecoraro, & Alterman, 2008), and also correlates highly with the similar domain in the SF-36 health survey (Calsyn et al., 2004). Verthein and colleagues reported that the ASI psychiatric CS correlated strongly with concurrent mental health symptoms, but also that CS scores decreased in the most severe group at four-year follow-up (Verthein, Degkwitz, Haasen, & Krausz, 2005).

However, few studies have assessed the predictive validity of the ASI psychiatric CS in terms of its capacity to predict outcomes such as need for psychiatric care or suicide. A study by Wryobeck and colleagues found that the ASI composite score predicted inpatient psychiatric episodes six months after admission to treatment, although after controlling for psychiatric diagnoses and demographic variables the results were no longer significant (Wryobeck, Chermack, Closser, & Blow, 2006). More recently, using a longitudinal design, Drymalski and Nunley were able to predict psychiatric inpatient admissions among a large group of substance use disorder patients from a single uptake area (Drymalski & Nunley, 2016). Based on a receiver operating characteristic analysis (ROC), they found that the ASI psychiatric CS significantly predicted inpatient treatment within 12 months of admission to drug treatment with an area under the ROC curve of 0.75. However, Drymalski and Nunley also noted that the specificity of the ASI psychiatric CS was poor regardless of cut-point, indicating that a large proportion of the patients who reported psychiatric symptoms were never admitted to inpatient psychiatric care after treatment for substance use disorders. Finally, Olsson et al. used individual items from the ASI to predict psychiatric hospitalizations in a sample of prison inmates (Olsson, Ojehagen, Bradvik, & Hakansson, 2015). They tested individual items from the psychiatric CS, and found that even individual items predicted psychiatric care.

To our knowledge, no studies have as yet assessed the ASI psychiatric CS as a predictor of completed suicide, despite that roughly 90% of those dying by suicide have been reported to have a psychiatric disorder at the time of their death (Hawton, Comabella, Haw, & Saunders, 2013). Furthermore, suicide has been associated with a large number of life-years lost (Darke et al., 2016), especially in younger individuals. Identifying patients with drug use disorders [DUD] who are also at high risk of suicide is an important public health task (Johnsson & Fridell, 1997). Although suicide rates have been steadily rising in some countries such as the US (Galynker et al., 2016), it presents a challenging task to study, as it is still a relatively rare event, and therefore requires relatively large samples and long follow-up times to adequately study such events. If patients with mental health needs can be easily identified using data that are available as part of routine intake assessment, including those at risk of suicide and/or in need of further mental health treatment, such analyses may help demonstrate the need for faster and more effective interventions that can both improve patients, quality of life, and reduce risks of early death and disability.

Building on the work of Wryobeck et al. (2006) and Drymalski and Nunley (2016), the present study uses a consecutive cohort of individuals undergoing residential treatment for drug use disorders [DUD]. The study elaborates upon the previous studies in three ways: first, it uses a longer period of observation of up to 12 years for time-to-event analyses; secondly, it increases the range of outcomes under study to include completed suicide in addition to psychiatric care; and thirdly it adjusts for previous history of hospital-based mental health care.

2. Methods

2.1. Study setting, data sources and sample

This retrospective cohort study used secondary data from DanRIS, the Danish national monitoring and quality assurance database for inpatient treatment of DUD (Pedersen et al., 2013). Patients were included if they received care within one of the 58 residential facilities, for which EuropASI data were available from 2000 to 2010, and were between 15 and 75 years of age at the time of admission. Patients were excluded if they did not have a valid Danish personal identification number, or if they did not have a valid date of admission or discharge from the unit at which they had been admitted for treatment.

The data for this study are stored on secure servers at Statistics Denmark, and all procedures were approved by the Danish Data Protection Agency. Since the data used for this study were collected and stored for monitoring and quality assurance, no ethics evaluation was needed under Danish law.

2.2. Registers

The DanRIS register is a national register of public and private inpatient treatment for DUD. The register began in 2000. All patients are registered by their personal identification number, and the register contains brief demographic information, the 30-day version of the EuropASI, as well as dates of admission and discharge. We continued to follow patients over the entire observation period beginning from their first admission to a residential treatment facility, although some patients may have been in in-patient treatment prior to the introduction of the DanRIS. If a patient had multiple episodes of treatment, we analyzed that patient's first episode.

The Danish Registry for Causes of Death was used to identify individuals who died of suicide. Since 1875, the Danish National Board of Health has maintained the registries covering deaths among all Danish residents dying in Denmark, and since 1970 such records have been computerized. ICD-10 codes were used to classify deaths (Helweg-Larsen, 2011).

The Danish Central Psychiatric Research Register has recorded episodes of psychiatric care since 1970. These records include dates of beginning and end of treatment, diagnoses, type of referral, place of treatment, place of residence, and mode of admission (Mors, Perto, & Mortensen, 2011). A dummy code was created to indicate whether a patient had been admitted to psychiatric care in the ten years leading up to admission to in-patient DUD treatment.