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Prospective validation of substance abuse severity measures from administrative data☆

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Abstract

Background: Severity measures for clients in substance abuse treatment programs are becoming increasingly important as funders adopt payment systems linked to agency performance. Recently, two severity measures based on administrative data have been developed. This study validated these measures using prospective data.
Methods: Subjects were participants in the Drug Abuse Treatment Outcomes Study (adult or adolescent components) or the Substance Abuse and Mental Health Services Administration Medicaid Managed Behavioral Healthcare and Vulnerable Populations project (adult or adolescent chemical dependency components). Severity measures were calculated based on data obtained at entry into substance abuse treatment. The baseline severity measures were included along with age, gender, and race/ethnicity in logistic regression models predicting abstinence at follow-up for alcohol use, marijuana use, cocaine use, or heroin use.
Results: For adults, the severity measures were highly statistically significant ($p < 0.001$) for all models in both data sets, indicating that adults with higher severity were more likely (and much more likely in many cases) to use alcohol, marijuana, cocaine, or heroin at the follow-up interview than were those with lower severity. For adolescents, the severity measure was highly statistically significant ($p < 0.001$) for marijuana in both data sets and for alcohol in the Medicaid data set.
Conclusions: Baseline severity measures were powerful predictors of abstinence at follow-up. These measures, derived from routinely available electronic records, appear to have noteworthy predictive validity. The severity indicators can be used for administrative purposes such as risk-adjustment when examining treatment agency performance.

Keywords: Services; Assessment; Treatment; Severity scale

1. Introduction

Severity measures pertaining to substance abuse have important administrative applications. For example, severity measures can be used to set capitated payment rates for pre-paid behavioral health care (McFarland et al., 1995). In addition, because client acuity affects choice of treatment setting (see, e.g. Duffy et al., 2004) and treatment outcomes (see, e.g., Alemi et al., 1995), severity measures are important components of risk adjustment strategies needed to compare client outcomes among providers (Shwartz et al., 1997). This latter consideration has become especially significant as the US federal government implements its "Performance Partnership Program" for financing public sector substance abuse treatment services (Gallant, 2003; SAMHSA, 2003a,b; SAMHSA, 2005). If providers are to be compared with one another based on performance, then it is essential that the comparisons account for variation in client acuity (Shwartz et al., 1997). Severity measures can also be used to examine claims that providers may selectively "cream skim" clients with relatively low acuity while avoiding provision of care to more impaired individuals (Deck and McFarland, 2002; Werner and Asch, 2005). These and other administrative applications generally require large sample sizes and usually make use of electronic administrative data systems (McCarty et al., 1998).

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Of course, there are numerous structured interviews that generate indicators of client severity. For example, the Addiction Severity Index (ASI) (McLellan et al., 1992) and the Global Appraisal of Individual Needs (GAIN) (Dennis et al., 2004) are well known interview protocols that yield several measures pertaining to severity. On the other hand, instruments like the ASI and the GAIN require trained interviewers as well as considerable time to administer. In some sense, the American Society of Addiction Medicine (ASAM) Patient Placement Criteria (Mee-Lee et al., 2001) can be considered a severity measurement system. A computer program is available to assist clinicians in generating the ASAM measures (Turner et al., 1999). However, the ASAM data may or may not be found in administrative records. There are also instruments that focus on specific substances such as the Lifetime Severity Index for Cocaine Use Disorder (Hser et al., 1999). Here, too, the items used to create these substance-specific measures may or may not be routinely recorded in electronic data systems (McCarty et al., 1998). In addition, many self-administered questionnaires such as the Alcohol Use Disorders Identification Test (AUDIT, Allen et al., 1997) can be used to produce indicators of severity. Again, these standardized instruments are not necessarily found in typical administrative databases.

Recently, two substance abuse severity measures have been developed for use with information routinely found in large administrative databases. Caspi et al. (2001) designed measures based on administrative data that predicted concurrent Addiction Severity Index component scores for public sector substance abuse treatment clients in Massachusetts. Deck (Deck and McFarland, 2002; McFarland et al., 2005) constructed a severity measure from administrative data that could predict concurrent Addiction Severity Index total scores and American Society of Addiction Medicine Patient Placement Criteria scores. Both severity instruments are based on items generally available in administrative information systems pertaining to public sector substance abuse treatment clients. The Caspi et al. (2001) measures (henceforth called the Caspi severity measures) generate scores pertaining to alcohol, cocaine, and heroin, respectively, for adult clients. The Deck (Deck and McFarland, 2002; McFarland et al., 2005) measure (henceforth called the Deck severity measure) generates one overall severity score.

These two measures showed good concurrent (criterion) validity (Nunnally and Bernstein, 1994) when they were compared with scores generated from the Addiction Severity Index and/or the American Society of Addiction Medicine Patient Placement Criteria. However, little information is available about the predictive (prospective) validity (Nunnally and Bernstein, 1994) of these severity measures. The purpose of the present project was to examine the prospective validity of the Caspi and Deck severity measures, respectively.

2. Methods

Information was obtained from large national databases in the US pertaining to substance abuse treatment. The databases were selected because they: (a) represented several sites across the country and (b) had baseline (typically substance abuse treatment intake) and follow-up data. The data sets are described briefly here.

2.1. Data sets

The Drug Abuse Treatment Outcome Study (DATOS) was designed to determine the outcomes of drug abuse treatment delivered in typical, stable, community-based programs (Fletcher et al., 1997; Flynn et al., 1997; Hubbard et al., 1997; Simpson and Brown, 1997; Simpson et al., 1999, 2002). DATOS was also designed to provide comprehensive information about the effectiveness of drug abuse treatment available in a variety of publicly funded and private programs. A total of 10,010 clients from 96 treatment programs participated in the intake interview. The present study also employed data from the 12-months post-treatment follow-up interview. For the 12-month sample, 4229 of the eligible clients who completed the two-stage intake interviews were selected for follow-up using a stratified random design. Of these respondents, 70% ($n = 2966$) were successfully followed. Gender, ethnicity, and average age were not significantly different between the intake and follow-up samples. The follow-up interview repeated many of the intake questions and focused on key behaviors in the year following treatment. Of the 2966 follow-up subjects, 2900 had valid data and were included in the present analysis.

The Drug Abuse Treatment Outcome Studies for Adolescents (DATOS-A) was a comprehensive, multiyear, multi-site prospective cohort study of clients entering treatment from 1993 to 1995 (Grella et al., 2001; Hser et al., 2001, 2003; Kristiansen and Hubbard, 2001). It was designed to evaluate the effectiveness of adolescent drug treatment by investigating the characteristics of the population, the structure and process of drug abuse treatment in youth programs, and the relationships of these factors with outcomes. A total of 3382 clients participated in the intake interview. Of those, 60% ($n = 1785$) were successfully followed. Gender, ethnicity, and average age were not significantly different between the intake and follow-up samples. The follow-up interview repeated many of the intake questions and focused on key behaviors in the year following treatment. Of the 1785 subjects, 1541 had valid data and were included in the present analysis.

The Substance Abuse and Mental Health Services Administration Medicaid Managed Behavioral Health Care and Vulnerable Populations adult chemical dependency study (SAMHSA adult) was designed to determine the effects of managed care on the use, cost and outcomes of substance abuse treatment services for Medicaid adults (Carlson and Gabriel, 2001; Larson et al., 2005). Data from this national multi-site project came from four states and featured a prospective study of adult Medicaid clients participating in substance abuse treatment. A total of 2424 people participated in the intake interview with 1531 of these participating in the 12-month follow-up. The study assessed these individuals via face-to-face interviews at treatment entry and 12 months later using a standardized interview protocol that featured the Addiction Severity Index (ASI; McLellan et al., 1992) at each point in time.

The Substance Abuse and Mental Health Services Administration Medicaid Managed Behavioral Health Care and Vulnerable Populations adolescent chemical dependency study (SAMHSA adolescent) was designed to determine the effects of managed care on the use, cost and outcomes of substance abuse treatment services for adolescent Medicaid clients. Using methodology similar to that of the SAMHSA Adult study, this multi-site study included adolescents receiving substance abuse treatment services in six states and one US territory. Some 1568 adolescents were interviewed at baseline with 1237 of these participating in the 6-month follow-up. A principal assessment tool was the CASI-A, the Comprehensive Addiction Severity Index for Adolescents (Meyers et al., 1995), which included outcome domains similar to those of the Adult ASI.

2.2. Severity measure construction

These data sets provided sufficient information to compute the Caspi and Deck severity measures. Severity measure computations are summarized here. However, considerable re-coding was required to translate the DATOS and SAMHSA responses into the components of the Caspi and Deck severity measures. Details about re-coding are available from the authors (see title footnote). Re-coding summaries are provided here.