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Is Clinical Assessment of Addiction Severity of Individuals with Substance Use Disorder, Using the Addiction Severity Index, A Predictor of Future Inpatient Mental Health Hospitalization? A Nine-Year Registry Study

Mojgan Padyab, PhD, Bengt‐Ake Armelius, Kerstin Armelius, Siv Nystrom, PhD, Björn Blom, Ann-Sofie Grönlund, BSc, and Lena Lundgren

ABSTRACT
Objective: In Sweden, the Addiction Severity Index (ASI) is the Swedish National Board of Health and Welfare’s recommended substance use disorder assessment tool and used routinely for patient intakes. Our study of 213 individuals assessed for substance use disorder with the ASI used nine years of the National Patient Register and examined whether clinical social workers’ assessments of addiction severity at baseline were associated with later hospitalizations for mental health disorder (MHD). Methods: ASI composite scores and interviewer severity rating were used to measure clients’ problems in seven areas (mental health, family and social relationships, employment, alcohol, drug use, health, and legal) at baseline. A stepwise regression method was used to assess the relative importance of ASI composite scores, MHD hospitalization two years prior to baseline, age, and gender for MHD hospitalization seven years post-baseline. Results: Almost two-thirds of the individuals (63%) were hospitalized at least once for MHD in the seven years post-baseline. At the multivariable level, MHD hospitalization prior to baseline was the strongest predictor of future MHD hospitalization, followed by ASI composite scores for drug use, employment, mental health and, last, male gender. Conclusions: A key finding is that higher ASI composite scores for drug use and mental health are predictors of future need for MHD treatment. Future studies will replicate this effort with a national population of individuals with substance use disorder.

Introduction
The psychometric properties of the Addiction Severity Index (ASI) have been tested extensively, with a large number of studies having demonstrated good to excellent reliability and validity for the instrument and other studies finding that the reliability of the ASI composite scores (CS) ranges from high to low (Armelius, Nystrom, Engstrom, & Brannstrom, 2009; Makela, 2004; Nystrom, Andre, Zingmark, & Bergman, 2010; Pankow et al., 2012; Samet, Waxman, Hatzenbuehler, & Hasin, 2007). Some studies, however, suggest that underreporting of mental health disorder (MHD) is likely (Dahlberg, Waern, & Runeson, 2008), mainly due to stigma, misinformation, or recognition (i.e., whether a person recognizes his or her problem as a mental disorder). Help-seeking behavior is complex and recognition is an important part of it. Dahlberg et al. (2008) found that only about a third of those with a personal history of treatment for mental illness recognized depression, a proportion similar to that observed among persons with no such history. Hence, these studies argue that the ASI-CS, especially for MHD, may not be a useful tool.

To expand on prior Swedish research on the usefulness of the ASI as an assessment tool for mental health, we used Swedish registry data to identify whether there is a significant relationship among the ASI-CS, the ASI interviewer (clinical social workers) severity rating, and post-baseline MHD hospitalization. Factors such as family and social relationships, employment, alcohol and drug use, health status, age, and gender are consistently found to be associated with mental health and mental health services use in Sweden as well as in many other countries (Kawachi & Berkman, 2001; Koskinen, Lohonen, Koponen, Isohanni, & Miettunen, 2009; McCreadie, 2002; Paul and Moser, 2009). This is why we
included these factors in our analysis to assess whether they could be predictive of future mental health hospitalization. Further, given that in Sweden there is some disagreement regarding whether to use the ASI-CS or the interviewer severity ratings, the authors determined it was important to test both sets of variables as possible predictors of future inpatient hospitalization due to mental health. It should be noted that, originally, the interviewer severity ratings were only provided for clinical convenience and were never intended for research use.

The study presented here is unique, as it is one of few studies in Sweden that uses 9 years of longitudinal registry data in the context of substance use disorder.

**Methods**

**Population**

The present study included 233 adults assessed for substance use disorder in five Swedish municipalities from 2002 to 2007. Nine clients had missing demographic data and 11 died prior to the end of the observation period, leaving an analytic sample of 213 participants.

At baseline, all participants were assessed by clinical social workers using the ASI (McLellan et al., 1992). This study relies on ASI interviews made by social workers in daily work. In Sweden, a systematic training is required for certification as an ASI interviewer. It should be noted that we did not conduct an assessment of interviewer reliability, and a prior study by Nyström, Andren, Zingmark, and Bergman (2010) showed good reliability for ASI interviews made by the same Swedish professional group.

ASI baseline data were merged with the National Patient Register and Cause of Death Register available at the Swedish National Board of Health and Welfare (NBHW). The study received Institutional Review Board ethics approval from both the NBHW and the Regional Ethical Review Board at Umeå University. Written consent was obtained from all participants.

**Independent variables**

For ASI-CS, each CS is the sum of answers to several questions within an ASI problem area. The intention has been to give equal weight to all questions within a CS, and we have adjusted each composite for the answer range of each item and for the total number of items in the composite. The answer to each question is divided by the highest possible response and by the total number of questions in the composite. This is the standard manner for how to calculate the scores (McGahan, Griffith, & McLellan, 1986; McLellan et al., 1992).

The mental health CS combined different measures including psychiatric symptoms, importance of getting help, how bothered the client was by the symptoms, and the number of days during the past 30 days the client was bothered by the symptoms.

The family and social relationships CS was measured in terms of satisfaction with marital status and relationships with others, how bothered the client was by his or her family and social situation, and the client’s report on how much help was needed for these issues. The employment CS encompasses both the ability to get to work (e.g., access to car) and number of days worked in the past 30 days and amount of money earned. The alcohol CS and drug use CS each focused on use, how bothered the client felt by the problems arising from alcohol and/or drug use, and how important the client felt it was to get help to address those problems. The health CS measured the number of days of health problems in the past 30 days and the client’s sense of being bothered and needing to get help to address health concerns. The legal CS measured the client’s self-reported involvement with the criminal justice system and how bothered and how in need of help the client reported feeling about legal issues.

In addition, we used the ASI interviewer severity ratings, which originate from the ASI baseline assessment interview. These are based on a 10-point scale (0–9), which allows for the interviewer to determine the seriousness of a client’s problem in seven problem areas. The higher the score is, the greater the problem and need for treatment or services in each area.

**Control variables**

The variable “prior MHD inpatient hospitalization” (yes/no) was obtained using the date of ASI baseline interview and the date of hospitalization. Prior MHD hospitalization was scored “yes” if the client had been hospitalized during the last two years before the ASI baseline interview. Age at first enrollment was a continuous variable (years). Gender had two categories: male and female.

**Dependent variable**

The dependent variable was any occurrence of inpatient hospitalizations due to MHD within a seven-year interval after the first ASI interview date. Inpatient hospitalization data were extracted from the National Patient Register.

International Classification of Diseases (ICD-10) primary diagnosis codes were used to identify individuals with inpatient hospitalization due to mental health using the following codes: mental and behavioral disorders due
to psychoactive substance use (F10-F19); schizophrenia, schizotypal, and delusional disorders (F20-F29); mood (affective) disorders (F30-F39); neurotic, stress-related, and somatoform disorders (F40-F48); behavioral syndromes associated with physiological disturbances and physical factors (F50-F59); disorders of adult personality and behavior (F60-F69); mental retardation (F70-F79); disorders of psychological development (F80-F89); behavioral and emotional disorders with onset usually occurring in childhood and adolescence (F90-F98); and unspecified mental disorder (F99-F99).

Statistical analysis

Univariate descriptive methods were used to describe the sample. Due to the skewed distribution of both CS and interviewer severity ratings, we applied two-samples Wilcoxon rank sum (Mann–Whitney) test to compare with and without MHD inpatient hospitalizations. Bivariate analyses examined the association between continuous (t test) and categorical (chi-square) independent variables and MHD hospitalization. The ASI interviewer severity ratings were not statistically associated with future MHD hospitalization and therefore the findings are presented only at the bivariate level. To investigate whether ASI-CS were associated with MHD hospitalizations post-baseline, we used stepwise Cox proportional hazards regression modeling to estimate hazard ratios (HRs) with 95% confidence intervals. Clients were followed until date of first MHD hospitalization or the latest date for which they were known to be alive through December 31, 2013, whichever came first. Those who were alive and did not have hospitalization during the course of the study were treated as censored data. Statistical analyses were done with Stata version 15.1 (StataCorp, College Station, TX, USA). Statistical significance was defined as p < .05.

Results

The study population consisted of 213 clients for whom mean age was 42 ± 12 years and ranged from 20 to 75 years. Table 1 shows the distribution of baseline characteristics of the population.

About three-quarters of the participants were men (n = 165, 77.5%) and 36% had MHD inpatient hospitalization in the two years prior to ASI assessment.

With respect to bivariate results, the CS for mental health (0.34 ± 0.23 vs. 0.24 ± 0.19, respectively), employment (0.86 ± 0.21 vs. 0.71 ± 0.31, respectively) and drug use (0.21 ± 0.18 vs. 0.12 ± 0.13, respectively) were significantly higher for those with subsequent MHD hospitalization (Table 2). Also, the ASI interviewer severity rating for mental health (3.99 ± 2.53 vs. 3.39 ± 2.36, p = .08) and for drug use (4.10 ± 3.02 vs. 3.34 ± 3.06, p = .08) were higher among those with subsequent MHD hospitalization than those without (Table 2).

The results from stepwise multivariable Cox proportional hazards regression identified that prior MHD hospitalization was the most significant predictor of future MHD hospitalization, followed by ASI-CS for drug use, employment, mental health, and male gender. The multivariable analysis showed that after controlling for all significant variables at the bivariate level, those with prior MHD hospitalization had three times (HR = 3.35, p < .001) and males had about two times (HR = 1.68, p < .05) more likelihood for later MHD hospitalization. Those with higher ASI-CS for drug, employment, and mental health (HR = 6.68, HR = 3.06, and HR = 3.51, respectively, p < .01) were more likely to be hospitalized (Table 3).

Discussion

In summary, our study identified that having an MHD hospitalization two years prior to the ASI baseline assessment; higher CS on drug use, employment, and mental health; and male gender were significant predictors of future MHD hospitalization seven years post–ASI assessment. Similar to previous studies in the general population and among those who have been sentenced to

<table>
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<th>Dependent variable</th>
<th>Yes</th>
<th>No</th>
<th>Chi-square</th>
<th>p</th>
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<td>Mental health disorder hospitalization within 7-year follow-up</td>
<td>134</td>
<td>79</td>
<td>63</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note. ASI = Addiction Severity Index; SD = standard deviation.

Table 1. Univariate Descriptive Statistics: Factors Associated with Mental Health Disorder Inpatient Hospitalization Post Baseline (n = 213).
compulsory forensic psychiatric treatment in Sweden, one consistent predictor of MHD hospitalization is a person’s history of past psychiatric hospital admissions (Degl’Innocenti et al., 2014; Montgomery & Kirkpatrick, 2002). A specific concern is that drug problem was the variable with the highest HR of future MHD hospitalization, suggesting that many individuals being assessed for drug use have serious co-occurring mental health and substance use disorder and should be prioritized in the treatment process. Study results also suggest that if a client scores higher on the ASI-CS for mental health, they should be referred for further mental health assessment and possible treatment given the likelihood of future hospitalization. The positive association between being employed and reduced likelihood of future MHD hospitalization simply suggests that employed individuals who have substance use–related problems are less likely to have an MHD severe enough to require hospitalization. Men had higher risk of long-term MHD inpatient hospitalization, which is a surprising finding given that Swedish national data suggests a much higher number of women than men with an MHD. This finding may indicate that men are less likely to seek early treatment for their mental health problems compared to women. As a result, their MHDs may become so severe that they are then hospitalized.

The relatively small sample size is a limitation in this pilot study, and a larger study including 20,000 individuals will retest the relationships.

### Conclusions

In Sweden clinical staff conducting assessments using the ASI, use the interviewer ratings as the main summary variables for assessment of the clients’ problems and need for help. Given the positive relationship between ASI-CS and future mental health hospitalization, it seems safe to assume that ASI as used in Sweden is a useful tool and that those conducting these assessments, social workers, use these tools appropriately. This is not surprising given that the Swedish national government spends significant funds for ongoing training of the nationwide workforce using the ASI. The ASI-CS is not used in the clinical setting at all, only the interviewer severity ratings. However, the directionality of the ASI mental health CS and the interviewer severity rating of mental health to predict MHD hospitalization was consistent between the two measures. Future
research needs to focus on efforts to estimate cutoffs for ASI-CS, which would be as easy to apply as interviewer severity ratings.

**Disclosures**

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**References**


