

Validating the Alcohol Use Disorders Identification Test With Persons Who Have a Serious Mental Illness

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Objective/Method: The use of brief, reliable, valid, and practical measures of substance use is critical for conducting individual assessments and program evaluation for integrated mental health–substance abuse services for persons with serious mental illness. This investigation examines the internal consistency reliability, concurrent validity, and receiver operating characteristics of the Alcohol Use Disorders Identification Test (AUDIT) with 149 mentally ill adults in community programs. Results/Conclusions: Results suggest that the AUDIT is a reliable screening tool and shows good concurrent validity with other measures of alcohol abuse and psychosocial difficulties. In addition, receiver operating characteristics suggest that, for this population, a lower cutoff score (≥ 3) leads to more accurate detection of an alcohol use disorder (based on the Alcohol Use Scale) than the traditional cutoff (≥ 8). This article discusses implications for using screens routinely as part of assessment and evaluation with this population.

Keywords: *the Alcohol Use Disorders Identification Test (AUDIT); Psycho-Social Wellbeing Scale (PSWS); serious mental illness; co-occurring mental health and substance abuse; substance abuse screening*

The abuse of alcohol and other drugs has come to be seen as a major co-occurring problem for persons with serious mental illness. There is growing recognition of the need to improve detection of substance use as part of assessment and treatment evaluation efforts within integrated mental health and substance abuse services (Brems & Johnson, 1997; Drake et al., 1998; Drake & Mueser, 2000; Drake, Rosenberg, & Mueser, 1996; O'Hare, 2002). Although a number of reliable and valid instruments are available for capturing substance abuse data, few have been validated for use with persons who experience major mental illness, and practical problems make it difficult to incorporate them into routine practice. For example, the well-respected Addiction Severity Index (ASI) (McLellan, Luborsky, Woody, & O'Brien, 1980) covers

the multidimensional spectrum of problems often associated with substance abuse, but it also requires considerable training and takes at least an hour to complete. Although this may be adequate for an agency exclusively focused on substance abuse, it would demand considerable effort in a broader psychosocial assessment for persons also suffering from many other difficulties. In addition, instruments such as the ASI, although they have a proven track record with primary substance abuse populations, have not been shown to be as valid with persons who suffer from severe mental illness (e.g., Zanis, McLellan, & Corse, 1997).

Other well-known screening tools such as the CAGE (Cut down, Annoyed, Guilty, Eye opener) and the Michigan Alcoholism Screening Test (MAST) are limited in their application to monitoring and evaluation instruments because they are used to query lifetime drinking and, thus, are not sensitive to detecting change in a client's behavior over time. However, one of the most effective methods for detecting substance abuse problems in health and mental health treatment populations has

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proven to be the simple paper-and-pencil screening tool (Babor, Kranzler, & Lauerma, 1989; Wolford et al., 1999). Evidence for the interrater reliability, validity, and utility of simple substance abuse indexes such as the 1-item Alcohol Use Scale (AUS) and Drug Use Scale (DUS) has been demonstrated with more extensive standardized instruments (Barry et al., 1995; Carey, Cocco, & Simons, 1996; Drake et al., 1998).

Another brief alcohol screening instrument with a growing track record of reliability and validity across different populations and clinical settings is the Alcohol Use Disorders Identification Test (AUDIT) (Babor & Grant, 1989; Bohn, Babor, & Kranzler, 1995). In an international (10 nations) study of alcohol abusers in a primary healthcare setting, the AUDIT was demonstrated to have good reliability, concurrent validity, and good to excellent sensitivity and specificity ratings for problem drinking (Saunders, Aasland, Babor et al. 1993). Barry and Fleming (1993) found the AUDIT to be internally reliable (α .85) and more efficient (at ≥ 8) than the Short MAST in detecting problem drinking among rural primary care patients. Other comparisons to common screening devices demonstrated that the AUDIT generally performed better (i.e., more optimal balance of sensitivity and specificity) than the CAGE and the Short MAST (Cherpitel & Clark, 1995). In a recent study of family medical practice patients, the receiver operating characteristics of the AUDIT were tested using the Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS), which is derived from the Diagnostic and Statistical Manual of Mental Disorders (DSM), as criterion measure (Volk, Steinbauer, Cantor, & Holzer, 1997). Results indicated that the accuracy (i.e., area under the curve) of the AUDIT for detecting dependent clients ranged from .90 to .96 across male, female, White, and African American groups; sensitivity and specificity for detecting "at-risk" drinking (i.e., dependent, problem, and hazardous drinking) were good at a cutoff score of 4 (.85 and .84 for specificity and sensitivity, respectively). Recent investigations with both college studies (O'Hare & Sherrer, 1999) and outpatient mental health clients (Karno, Granholm, & Lin, 2000) demonstrated very good internal consistency reliability (.89), but factor analytic techniques did not support the hypothesized three-factor structure (consumption, dependence, consequences). The AUDIT appears to be better defined as having a two-factor structure of consumption (items 1-3 on the AUDIT) and alcohol-related problems and dependence symptoms (items 4-10). Item 9 (caused injury to self or others), however, appeared to be problematic (i.e., ambiguous factor loadings) in Karno et al.

(2000) and Dawe, Seinen, and Kavanagh (2000). A recent investigation also supported a two-factor structure for the AUDIT (Maisto, Conigliaro, McNeil, Kraemer, & Kelly, 2000).

Only recently, however, have the psychometric properties of the AUDIT been analyzed with mentally ill persons. In one study, 71 persons (53 men, 18 women) with a serious mental illness (Dawe et al. 2000) were assessed with the AUDIT and the Composite International Diagnostic Interview as criteria. The AUDIT showed excellent sensitivity (.87) and specificity (.90) at a cutoff of ≥ 8 (surpassing the performance of all screens reviewed in Wolford et al., 1999), and it demonstrated very good internal consistency (.85) as a paper-and-pencil self-report instrument. Maisto, Carey, Carey, Gordon, and Gleason (2000) interviewed psychiatric outpatients (93 men, 69 women) with serious mental illness to test the performance of the AUDIT against DSM-IV-structured interview criteria and found that an AUDIT score of ≥ 8 showed the highest sensitivity and specificity when judged against diagnostic criteria (i.e., an alcohol use disorder). When alcohol use disorder symptoms were used as criteria, an AUDIT score of ≥ 6 appeared to have the highest sensitivity. Positive predictive values appeared to be considerably higher when using lower cut scores. The authors suggested that the results be viewed with caution due to the low positive predictive value of the AUDIT in this sample, and they recommended that practitioners be concerned about any reported use of alcohol or other drugs by clients who have a serious mental illness.

Brief, reliable, valid, and practical screening methods should be incorporated into routine clinical assessment and program evaluation efforts in programs that serve mentally ill persons. Social workers, case managers, and other practitioners often collect these data, which play an increasingly essential role in coordinating community-based mental health and substance abuse services (Mueser, Bond, Drake, & Resnick, 1998; Scott & Dixon, 1995). They are in a uniquely advantageous position to assess and evaluate clients more frequently in their own environment. However, to better capitalize on this evaluative function, practitioners need valid, reliable, and practical instruments to capture basic substance abuse data. This study examines data collected by line clinicians employed by two mental health centers in Rhode Island as part of initiatives to develop outcome evaluation protocol. This study examines the reliability, validity, and receiver operating characteristics (ROC) of the AUDIT using the DSM-based Alcohol Use Scale as criterion. Receiver operating characteristics (i.e., sensitivity, specificity, positive predictor value, and area under the curve)

(Griner, Mayewski, Mushlin, & Greenland, 1981; O'Hare, Cohen, & Sherrer, 1997) represent the most straightforward way of comparing a test scale against a criterion scale by combining "sensitivity and specificity in a manner that allows examination of the ability of tests to discriminate between two populations regardless of the cutoff level or weighting selected" (Wolford et al., 1999, p. 320). ROC data are more compelling than correlational analyses because those who deny substance abuse on both the AUDIT and the criterion variable (in this case, the AUS) would artificially inflate the correlation and, thus, erroneously suggest greater concurrent validity (Wolford et al., 1999).

METHOD

Sample

This investigation is based on combined samples ($N = 149$) from two community mental health centers in Rhode Island. The sample from agency #1 ($n = 100$) was derived from a systematic random sample of clients selected proportionately from several sites in the Northeast from a total of 580 clients. Clients interviewed in agency #2 ($n = 49$) were voluntary participants of a pilot investigation focused on treating mentally ill clients with substance abuse problems. Data in both samples were collected by line clinicians (bachelor's- and master's-level case managers and clinicians) in face-to-face interviews as part of routine service delivery contacts, and quality assurance officers approved the use of the instruments for this voluntary survey. These secondary data were not collected to compare the two programs in any way but were later combined to purposefully achieve a complement of clients with and without substance abuse problems. All clients received services from programs that treat persons with major mental illness, and, generally, client characteristics from both settings are very similar. Notable differences in background client descriptors are mentioned below.

Background data from the combined sample are as follows: 89 (59.7%) were male, median age was 43 ($M = 42.7$, $SD = 10.2$). With respect to race, 130 (87.2%) were White, 11 (7.4%) Black, and 8 (5.4%) Hispanic. Mean age of onset of the clients' symptoms was 19.4 ($SD = 8.0$). Fifty-four (36.2%) were hospitalized for psychiatric reasons within the past year, and 143 (96.0%) were hospitalized at least once in their lifetimes. Ninety-one (61.1%) clients completed high school. Ninety-two (61.7%) were never married, 11 (7.4%) were married, and the remainder were either separated or divorced. One hundred and

one (67.8%) were primarily dependent on supplementary security income, and only 25 (16.8%) were engaged in some paid employment. Fourteen (9.4%) were noncombat veterans. Seventy-six (51.0%) lived in private residences, and 64 (42.9%) lived in supported housing or group homes. About half (79, 53%) of the clients were diagnosed by staff psychiatrists with schizophrenia, 45 (30.2%) had major mood disorders, and 25 (16.8%) were assigned other axis I diagnoses. Agency #1 had proportionately more persons with schizophrenia (67.0% vs. 24.5%), and a greater proportion of them lived in group homes.

Instruments

AUDIT. The AUDIT is composed of 10 self-report items (scored continuously from 0-4; one item is scored 0-5; maximum score is 41). There are three items that measure alcohol use (quantity, frequency, and peak drinking: "six or more"), four items that measure dependence (unable to stop, failed responsibilities, eye opener, guilt), and three items that measure consequences (memory loss, injury to others, advised to cut down). The AUDIT is distinguished from other well-known screens in that the items are scored on a frequency continuum (rather than dichotomously), it requests measures over a limited time period (e.g., 6 months vs. lifetime), and it appears to have broader applicability by discriminating hazardous and harmful drinkers (i.e., at-risk problem drinkers) rather than those who are alcohol dependent (Saunders et al., 1993; Bohn et al., 1995).

AUS and DUS. The AUS and the DUS are single-item clinician-rated indexes of alcohol and drug abuse (Carey et al., 1996; Drake et al., 1998) measured on a 5-point scale (from *no problems* to *extremely severe*). Recent evidence suggests that the use of simple substance abuse indexes by case managers correlates well with more extensive batteries (Barry et al., 1995; Carey et al., 1996; Drake et al., 1998) and that these should be included as part of a brief, multidimensional assessment.

The Psycho-Social Wellbeing Scale. The Psycho-Social Wellbeing Scale (PSWS) is a multidimensional debriefing instrument used to summarize qualitative and quantitative clinical data collected from multiple sources. The 12 items that comprise the PSWS are rated by the practitioner on a 5-point scale (*excellent* = 4, *good* = 3, *marginal* = 2, *impaired* = 1, *poor* = 0) and cover the following problem domains: mental status-cognitive functioning, mental status-emotional functioning, impulse

control, substance abuse, coping skills, health, recreational activities, living environment, immediate social network, extended social network, independent living, and work satisfaction. These items were constructed by reviewing the empirical assessment literature and related measurement research regarding psychiatric and psychosocial problems experienced by persons with severe and persistent mental illness. The initial investigation with the PSWS (O'Hare et al., 2003) was conducted with 297 community clients (55.9% female, median age 43, mostly persons with schizophrenia and major mood disorders). Two main factors emerged when exploratory factor analysis (replicated with confirmatory factor analysis) was used: psychological and social well-being. Four other items were retained as "stand-alone" indexes: global substance abuse index (GSAI), health, activities of daily living, and work satisfaction. Internal consistency was good for both brief (4-item) subscales (psychological and social) at .84 and .79, respectively. A Pearson's correlation for the psychological and social well-being subscales ($r = .51, p < .001$) demonstrated good discriminant validity. Testimonial evidence from many line clinicians suggests good face validity and ease of use. Although scales should be used on larger and more representative populations prior to establishing norms, conditional norms are suggested: The summary scores for the two (4-item) subscales (psychological and social) are *poor* (0-2), *impaired* (3-6), *marginal* (7-9), *good* (10-13), and *excellent* (14-16). For the two (4-item) subscales, any subscale score below 10 should be a focus of concern and any score of 2 or less (i.e., marginal, impaired, poor) should warrant clinical attention.

High-risk events. The frequency of client self-reported high risk events that occurred within the past 6 months was examined. These included events in which the client was victimized (e.g., physically or sexually abused), engaged in risky activities (e.g., self-mutilation, running away, unprotected sex, or injected street drugs), and engaged in criminal activities including misdemeanors (e.g., shop-lifting) and felonies (e.g., robbery or assault). Items chosen were drawn from the literature concerning stressful events that negatively affect client well-being. For example, research on the association between traumatic events (Mueser, Trumbetta, et al., 1998) and criminal behavior by mentally ill persons (Nieves, Draine, & Solomon, 2000) is increasing. Practitioners should be aware of these relatively infrequent but critical events because they are likely to have important implications for treatment.

RESULTS

Frequency Distributions of Major Factors

Means and standard deviations for the main study factors are as follows: AUDIT, $M = 4.3, SD = 8.5$; psychological subscale of the PSWS, $M = 9.4, SD = 3.1$; social subscale of the PSWS, $M = 9.4, SD = 3.4$. Means and standard deviations for the four 1-item indexes of the PSWS are as follows: Global Substance Abuse Index (GSAI), $M = 2.9, SD = 1.4$; health, $M = 2.5, SD = .9$; activities of daily living, $M = 2.6, SD = 1.0$; work satisfaction, $M = 1.9, SD = 1.3$. Univariate data from the Global Assessment of Functioning is $M = 50.0, SD = 10.7$.

Frequency and percentages for responses to the 1-item AUS are as follows: "abstinent" = 97, 65.1%; "use without impairment" = 15, 10.1%, "abuse" = 15, 10.1%; "dependence" = 17, 11.4%; "dependence with institutionalization" = 1, .7%. The AUS was also divided into a dichotomous variable to be used as a diagnostic criterion for testing the receiver operating characteristics of the AUDIT. Frequencies and percentages for the two categories are as follows: "abstinent and use without impairment" = 112, 75.2% and "abuse, dependence and dependence with institutionalization" = 33, 22.2%, corresponding to DSM criteria for an alcohol-use disorder (four cases showed missing data).

High-Risk Events

Respondents were queried about a number of high risk events occurring over the past 6 months. Frequencies and percents of each of these occurrences are as follows: was physically abused = 9, 6.0%; was sexually abused = 6, 4.0%; attempted suicide = 12, 8.1%; engaged in self-mutilation = 13, 8.7%; ran away or was unaccounted for = 10, 6.7%; engaged in misdemeanors = 9, 6.0%; committed a felony = 5, 3.4%; threatened another person verbally or physically = 26, 17.4%; was violent toward another person = 8, 5.4%; sexually assaulted another person = 2, 1.3%; abused substances = 49, 32.9; overdosed on prescribed medication = 9, 6.0%; injected drugs with a shared needle = 2, 1.3%; engaged in sex without protection = 28, 18.8%.

Reliability Ratings for Major Factors

Chronbach's alpha was calculated for the AUDIT (.95) and the PSWS 4-item psychological (.77) and social (.79) subscales.

TABLE 1: Receiver Operating Characteristics of the AUDIT at Several Cutoff Scores With the Alcohol Use Scale as Criteria (N = 149)

Cutoff Score	Sensitivity/ Specificity (%)	PPV (%)	Area Under Curve
≥1	100.00/77.5	55.4	.887
≥2	100.00/78.4	56.4	.892
≥3	100.00/86.5	67.4	.932
≥4	93.55/88.3	69.1	.909
≥5	87.10/92.8	77.1	.899
≥6	80.65/92.8	75.8	.867
≥7	74.19/94.6	79.3	.844
≥8	70.97/94.6	78.6	.828
≥9	50.06/94.6	75.0	.763
≥10	51.61/95.5	76.2	.736

NOTE: Sensitivity = probability that the test result will be positive when the condition (diagnosis) is present; specificity = probability that the test result will be negative when the condition is not present; PPV = positive predictive value, probability that the condition is present when the test is positive.

Correlational Analysis of Major Variables

The AUDIT raw score correlated in the expected direction with the PSWS psychological subscale ($r = -.45, p < .001$) and the PSWS social subscale ($r = -.56, p < .001$), showing significant moderate correlations. Those clients with more serious drinking problems experience worse psychological and social well-being. The AUDIT also significantly correlated as expected with GSAI ($r = -.64, p < .001$), health ($r = -.21, p < .05$), activities of daily life ($r = -.25, p < .01$) and work satisfaction ($r = -.33, p < .001$). The AUDIT also correlated significantly with the AUS ($r = .67, p < .001$). The following high-risk items showed low but significant correlations with the AUDIT raw score (Spearman correlation is used due to dichotomous, nonnormal distributions on the individual high-risk items): physically abused ($\rho = .18, p < .05$), engaged in self-mutilation ($\rho = .22, p < .01$), ran away or was unaccounted for ($\rho = .23, p < .01$), engaged in misdemeanors ($\rho = .25, p < .01$), threatened another person verbally or physically ($\rho = .17, p < .05$), was violent toward another person ($\rho = .20, p < .05$), abused substances ($\rho = .68, p < .001$), engaged in sex without protection ($\rho = .32, p < .001$).

ROC Analysis With Audit and the AUS as Diagnostic Criterion Variable

Analysis with a range of cut scores can be reviewed in Table 1. In general, it appears that a cutoff score of ≥ 3 predicts the AUS (i.e., abuse/dependence) most accurately.

DISCUSSION AND APPLICATIONS TO SOCIAL WORK PRACTICE

These results suggest that the AUDIT is a reliable and valid indicator of problem drinking in persons with serious mental illness. Correlations between the AUDIT and other psychosocial indicators also suggest not only that the AUDIT detects problem drinking but that clients who abuse alcohol are experiencing more psychological and social distress including poorer health, impaired living skills, and less satisfaction with work. In addition, receiver operating characteristics in this study support a lower cut score (≥ 3) for the AUDIT than previously suggested. A recent investigation (Hulse, Saunders, Roydhouse, Stockwell, & Basso, 2000) used the AUDIT with the standard cut (≥ 8) with 665 hospitalized psychiatric patients, and it found fewer patients consuming alcohol at hazardous, harmful, or dependent levels than is generally reported in the literature. It is possible that when the AUDIT is employed with standard cut scores it fails to detect the negative consequences of lower amounts of alcohol in persons with serious mental illness. Dawe et al. (2000) reported 87% sensitivity and 90% specificity for AUDIT at a cutoff of ≥ 8 using DSM-IV and International Classification of Disease–10 criteria derived from the Composite International Diagnostic Interview with a small sample of hospitalized psychiatric clients. The current study achieved similar sensitivity (87.1%) and specificity (92.8%) at a cutoff of ≥ 5 . Maisto, Carey, et al. (2000) employed the AUDIT with 162 clients with serious mental illness with the structured interview schedule to obtain a DSM-IV diagnosis and found that a cutoff score of ≥ 8 achieved 95% sensitivity but only 65% specificity. The positive predictive value was very low (31%) with an overall correct identification of a modest 69%. However, when a less stringent criteria of alcohol-use symptoms was used, a cutoff of ≥ 5 achieved a 90% sensitivity, 72% specificity, and a positive predictive value of 72%. Cutoffs lower than 5 were not reported in the table. The authors suggested that clinical utility should be an important consideration given that “even small amounts of substance use could have negative consequences” (Maisto, Carey, et al., 2000, p. 191). As previously noted, Volk et al. (1997) used the AUDIT to detect combined “at-risk and dependent drinkers” (similar to combined abuse and dependence in the current study), and found a cut score of ≥ 4 to achieve the best balance of sensitivity (85%) and specificity (84%). However, the data implied a low positive predictive value (not reported) using the AUDADIS as the criterion variable.

Although it is difficult to compare test performances across different studies given variations in samples, training, implementation of paper-and-pencil versus structured interview methods, differences in diagnostic criteria, and, perhaps, time frames referenced for reporting, it appears that a lower cut score for the AUDIT may be in order when used with populations, such as the mentally ill, who are more at risk to suffer negative psychological and social consequences from excessive drinking. Using lower cut points for this population may make sense given the greater vulnerability of mentally ill persons to the cognitive, emotional, physiological, and behavioral effects of drugs (including alcohol). Drinking even relatively small amounts of alcohol can increase anxiety and depression and can interfere with the effectiveness of psychotropic medications.

Integrated mental health–substance abuse programs have demonstrated promising results for improved treatment engagement, better housing, and overall adjustment when compared with standard case management (Drake, Yovetich, Bebout, Harris, & McHugo, 1997; Drake et al., 1998; Bellack & DiClemente, 1999). Because common multidimensional goals are targeted by both mental health and substance abuse treatment efforts, the AUDIT could be a valid, reliable, useful, and inexpensive way for social workers who work with mentally ill persons to monitor client progress in reducing alcohol use. Evaluation methods employed in typical agency environments are best served when several ingredients are included in the design: routine integration of qualitative and quantitative judgements or measures, employing data from multiple points of view, timeliness and utility of measures, and using data at both the ideographic (individual client) and aggregated (program or agency) levels. These data can be useful in responding to private-public managed care payers, licensing reviewers, and accrediting bodies and for documenting the implementation of evidence-based practices (Bickman & Salzer, 1997; Howard & Jenson, 1999; O'Hare, 2002). The AUDIT would serve as a valuable component in such an evaluation strategy.

Limitations of this study include the lack of a more extensive diagnostic evaluation of the clients' substance abuse problems such as those that can be provided by structured interview diagnostic instruments. In addition, this study only examined a relatively small sample of clients from two agencies. More research is needed to examine the validity and generalizability of the AUDIT with persons who suffer from severe and persistent mental illnesses.

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