Validation of the Alcohol Use Disorders Identification Test and the Drug Abuse Screening Test in First Episode Psychosis

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Objective: To determine the validity and reliability of the Alcohol Use Disorders Identification Test (AUDIT) and Drug Abuse Screening Test (DAST) for detecting alcohol and drug use disorders, respectively, in a population with first-episode psychosis (FEP).

Method: Subjects with FEP completed the AUDIT and DAST and were divided into groups according to the presence or absence of a Structured Clinical Interview for DSM-IV (SCID) diagnosis of either current alcohol or drug misuse. The data were analyzed to see whether AUDIT and DAST scores were predictive of SCID diagnosis.

Results: Patients with alcohol-related SCID diagnoses and those with drug-related SCID diagnoses scored significantly higher on the AUDIT and DAST, respectively, than the group without the respective SCID diagnosis ($P < 0.001$ in both cases). The AUDIT functioned best with a problem drinking cut-off score of 10 (sensitivity, 85%; specificity, 91%). The DAST functioned best with a problem drug use cut-off score of 3 (sensitivity, 85%; specificity, 73%). The area under the receiver operating characteristic curve was 0.86 for the AUDIT and 0.83 for the DAST.

Conclusion: The DAST and AUDIT may reliably identify FEP patients with substance abuse.

Information on funding and support and author affiliations appears at the end of the article.

Clinical Implications

- Given the efficacy of the AUDIT and DAST in patients with FEP, clinicians should be able to screen for substance use disorders quickly and regularly, with minimal burden on resources.
- This might promote better monitoring of substance use disorders in this population, which is prone to adverse consequences from such use.
- These instruments function better in a population with FEP when cut-off scores are altered to better suit this population.

Limitations

- AUDIT cut-off points are less precise because there were few subjects with problem drinking. A slightly larger sample might have helped in this regard.
- One-third of the total catchment area sample either refused treatment and (or) refused consent to participate in this study, limiting somewhat the generalizability of these findings. Data analyzed derived solely from scores on the AUDIT and DAST administered to patients at baseline. Other time points in treatment were not examined.

Key Words: *early psychosis, substance abuse, screening instruments*

The rates of substance use in FEP populations vary widely but are generally very high, ranging from 35% to 73%.[1–5] The most commonly misused substances in FEP are cannabis and alcohol, with rates of cannabis misuse ranging from 25% to 63% and rates of alcohol misuse ranging from 24% to 28%.[1,2,5] It is critical that substance use be addressed in FEP because it has been associated with medication nonadherence, symptom exacerbation, and higher rates of relapse in this population.[6–9] There is also evidence that interventions to reduce substance use are more effective in a population with early psychosis, compared with populations having a longer history of psychotic illness, perhaps because substance use is less consolidated at this early stage.[10,11]

In most clinical settings, it is not feasible to conduct detailed structured diagnostic assessments to determine the presence of comorbidity with alcohol and other substance abuse in a young patient population seeking treatment for the first time. Brief screening tools may be of particular value in this regard. The AUDIT and DAST are brief self-report instruments designed, respectively, to screen for alcohol and other substance use disorders in the general population.[12,13] They have previously been effectively applied in various psychiatric populations.[14–19] Although some of these studies involved heterogeneous populations of psychiatric patients, including those diagnosed with schizophrenia, only the AUDIT has been previously applied specifically to a population with schizophrenia.[15,20] One study employed the AUDIT in patients at the first to the third psychotic episode and found it to have a high sensitivity and specificity when the standard cut-off of 8 was used.[21] However, these 2 instruments have yet to be validated in a population of previously untreated FEP patients, who tend to be at particularly high risk of substance abuse and in whom intervention at such an early stage might be most beneficial.

The objective of the present study was, therefore, to assess the validity of the AUDIT and DAST as screening instruments to assess alcohol and drug misuse disorders in a population of FEP patients.

Method

Participants
The present study was carried out at PEPP-Montreal in Montreal, Quebec, a specialized service that assesses and treats all cases of FEP in one sector of a large urban setting.

Admission Criteria
Admission criteria included an age of 14 to 30 years; the presence of symptoms that meet syndromal criteria for a DSM-IV psychotic disorder and have been present consistently for at least 1 week; never having received antipsychotic therapy for a period greater than 1 month; and ability to speak English or French. Patients with an IQ of 70 or less or with a diagnosis of organic brain syndrome, toxic psychosis, or epilepsy were excluded. Concurrent substance use or abuse was not an exclusion criterion.

Treatment Program
PEPP-Montreal was established to assess and treat individuals with a diagnosis of FEP, preferably in an outpatient setting, although treatment is available initially in both inpatient and outpatient settings. The PEPP treatment program incorporates continuity of care through direct access to designated inpatient beds and an assertive case management model modified to address the special needs of a younger, treatment-naive patient population. The details of the treatment model have been provided elsewhere.[22] As part of the PEPP protocol, which has been approved by the Research Ethics Board of McGill University, patients provide informed consent to participate in regular research follow-up assessments and allow the findings of these assessments to be used for research.

Instruments and Assessment
All measures were taken within a month of the client's entry to the PEPP program. Thus, although they may not reflect a true baseline, they reflect the state of patients when they are likely to be conveniently first approached for assessment in a mixed inpatient–outpatient setting and when accurate information can be obtained. We have no reason to suspect that this short delay has a great impact on these assessments; it may in fact incorporate more accurate and detailed information. Primary and secondary diagnoses were established on the basis of the SCID conducted by trained research staff and followed by a consensus between 2 senior psychiatrists.[23] Measures of DUP and DUI were determined by administration of the

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Abbreviations used in this article

AUDIT	Alcohol Use Disorders Identification Test
AUROC	area under the receiver operating characteristic
CI	confidence interval
DAST	Drug Abuse Screening Test
DUI	duration of untreated illness
DUP	duration of untreated psychosis
FEP	first-episode psychosis
NPV	negative predictive value
PEPP-Montreal	Prevention and Early Intervention Program for Psychoses–Montreal
PPV	positive predictive value
ROC	receiver operating characteristic
SCID	Structured Clinical Interview for DSM-IV

Circumstances of Onset and Relapse Schedule, a semi-structured interview conducted by research staff and, again, followed by consensus between 2 senior psychiatrists.[24] DUP was calculated as the period beginning with the time of onset of psychotic symptoms for the presenting episode to the time of adequate treatment with antipsychotics plus the duration of any previous psychotic episodes. DUI was defined as the period beginning with the first onset of any psychiatric symptoms to the time of adequate antipsychotic medications.

The AUDIT is a 10-item, self-report instrument designed to identify individuals whose use of alcohol places them at risk for alcohol problems or who are experiencing such problems.[12] The time reference of the AUDIT items is the past year, although 2 items have no specific time reference. AUDIT scores are moderately to highly correlated with other self-report alcohol use screening tests, such as the Michigan Alcohol Screening Test and the CAGE Alcohol Screen.[12,25] AUDIT scores are calculated by summing the responses to all the questions, each of which is assigned a value of 0 to 4. AUDIT total scores can range from 0 to 40, and scores of 8 or higher have been used to identify individuals who may be at risk for, or who are experiencing, alcohol-related problems.[26]

The DAST-20 is a 20-item shortened version of the 28-item DAST designed to identify drug-use related problems.[13] This shortened version has demonstrated high internal consistency.[13] In the current study, the DAST was used to screen for a period covering the preceding 3 months. DAST scores are calculated by summing the responses to all the questions, with yes = 1 and no = 0, except for 2 items that are reverse scored. Scores range from 0 to 20, and the general clinical cut-off is a score of 6 or higher.

Data Analysis

Analyses were performed to test whether AUDIT and DAST scores were predictive of SCID diagnoses of alcohol and other drug misuse, respectively. Patients were categorized as alcohol or other drug abusers if they had a SCID diagnosis of past or current misuse of alcohol or other drugs and if, on the basis of clinical notes, a pattern of misuse was present prior to the date of the DAST-20 or AUDIT screening, during the time screened for by each test (1 year for the AUDIT, 3 months for the DAST). Descriptive statistics and t tests were performed on AUDIT and DAST scores split into groups with and without alcohol and drug misuse, respectively. Sensitivity, specificity, PPV, and NPV were calculated, with different cut-offs used for clinically relevant alcohol or other drug misuse. Sensitivity refers to the true positive rate (that is, the number of subjects who meet diagnostic criteria and screen positive out of the total number who meet diagnostic criteria); specificity refers to the true negative rate (that is, the number of subjects who do not meet diagnostic criteria and screen negative out of

Table 1 Patient characteristics

	Total sample n = 128	Subsample used for the analyses n = 88
Male sex, n (%)	86 (67)	61 (69)
Single status, n (%)	109 (85)	75 (85)
Some post-secondary education, n (%)	59 (46)	43 (49)
Schizophrenia spectrum, n (%)	106 (83)	71 (81)
Affective psychosis, n (%)	22 (17)	17 (19)
Mean age, years	22.7	22.7
Median DUP, weeks	15	15
Median DUI, weeks	134	182

the total number who do not meet diagnostic criteria). For example, sensitivity for the AUDIT would be measured as those subjects with a SCID diagnosis of current alcohol misuse who screen positive on the AUDIT out of the total number with a SCID diagnosis of current alcohol misuse. PPV is defined as the proportion of true cases who are correctly diagnosed (the number who meet diagnostic criteria and screen positive out of the total number who screen positive). For example, PPV for the AUDIT would be calculated as the number of subjects with a SCID diagnosis of current alcohol misuse who screen positive on the AUDIT out of the total number who screen positive on the AUDIT. NPV is defined as the proportion of nonaffected subjects who are correctly diagnosed, that is, the number who do not meet diagnostic criteria and screen negative out of the total number who screen negative. The ROC curves plot sensitivity as opposed to specificity at each cut-off, and the AUROC curve reflects the overall performance of a screening test, with 1.0 being a perfect test and 0.5 representing a test that provides no information. The internal consistency of the AUDIT and DAST were determined by calculating Cronbach's alpha, an estimate of the interitem reliabilities of the scales. All statistical analyses were performed with SPSS, Version 11.5 for Windows (SPSS Inc, Chicago, IL, September, 2002) except for calculations of sensitivity, specificity, NPV, and PPV, which were done manually.

Results

Sample Characteristics

A total of 128 consecutive patients who met admission criteria for the program were potentially available for collection and analysis of the data relevant to the present report. Baseline data were available on 112 subjects for SCID diagnosis, on 87 for the AUDIT, and on 91 for the DAST. Data for 79 subjects were available for both diagnosis and the AUDIT, and 84 had

Table 2 Functioning of AUDIT and DAST at different cut points

Cut point	AUDIT					DAST				
	Sensitivity %	Specificity %	PPV %	NPV %	Correctly classified %	Sensitivity %	Specificity %	PPV %	NPV %	Correctly classified %
1	85	32	20	91	41	98	41	60	95	68
2	85	47	24	94	53	90	59	67	87	74
3	85	55	27	95	59	85	73	74	84	79
4	85	67	33	96	70	73	80	76	76	76
5	85	74	39	96	76	63	84	78	71	74
6	85	77	42	96	78	55	86	79	68	71
7	85	83	50	96	84	50	89	80	66	70
8	85	86	55	97	86	43	89	77	63	67
9	85	89	61	97	89	25	93	77	58	61
10	85	91	65	97	90	13	98	83	55	57
11	77	94	71	95	91	5	98	67	53	54
12	69	95	75	94	91	5	98	67	53	54
13	62	98	89	93	92	—	—	—	—	—
14	53	100	100	92	92	—	—	—	—	—
15	46	100	100	90	91	—	—	—	—	—

data for both diagnosis and the DAST. These are the subsamples used for analyses to see whether AUDIT and DAST scores were predictive of SCID diagnosis. Data were missing when subjects refused to participate in the treatment program following the initial assessment, discharged themselves without completing assessments, or refused to sign informed consent. Demographic and clinical characteristics were determined for the total sample ($n = 128$) and for the subsamples of patients who had data for the SCID and the AUDIT or DAST ($n = 88$) (see Table 1). The 2 samples did not markedly differ on any of these characteristics.

Alcohol Use Disorders Identification Test
The AUDIT proved to be internally consistent in our sample (coefficient $\alpha = 0.984$). In the total sample of 112 for whom SCID-based diagnoses were available, 18 (16%) had a diagnosis of alcohol abuse or dependence and a history of alcohol misuse within the past year (the period of time covered by the AUDIT). Subjects with a SCID diagnosis of alcohol abuse or dependence and a history of alcohol misuse within the past year ($n = 13$) had a median AUDIT score of 14, whereas subjects without such a diagnosis ($n = 66$) had a median AUDIT score of 2. This was significantly lower (Mann–Whitney U test $z = -4.11$, $P < 0.001$). A commonly used cut-off for alcohol misuse on the AUDIT is a score of 8. When we used this cut-off in our sample ($n = 79$), the AUDIT had a sensitivity of

85%, a specificity of 86%, a PPV of 55%, and an NPV of 97%, and 86% of subjects were correctly classified. The best results are obtained for our sample with a cut-off of 10, which gives a sensitivity of 85%, a specificity of 91%, a PPV of 65%, and an NPV of 97%, and correctly classifies 90% of subjects (see Figure 1 for the distribution of AUDIT scores and Table 2 for the functioning of the AUDIT at different cut points). The AUROC curve for the AUDIT is 0.86 in our sample (95%CI, 0.693 to 1.02) (see Figure 3).

Drug Abuse Screening Test
The DAST also proved to be internally consistent in our sample (coefficient $\alpha = 0.998$). In the total sample of 112 for whom SCID-based diagnoses were available, 52 (46%) had a SCID diagnosis of drug abuse or dependence and a history of drug misuse within the past 3 months (the period of time covered by the DAST). Subjects with a SCID diagnosis of drug abuse or dependence and a history of drug misuse within the past year ($n = 39$) had a median DAST score of 6, whereas subjects without such a diagnosis ($n = 45$) had a median DAST score of 1. This was significantly lower (Mann–Whitney U test $z = -5.37$, $P < 0.001$). The DAST cut-off for drug misuse is generally a score of 6. Using this as the cut-off for our sample ($n = 84$) yielded a sensitivity of 55%, a specificity of 86%, a PPV of 79%, and an NPV of 68%, and 71% of subjects were correctly classified. The best results are obtained using a

Figure 1 Distribution of AUDIT Scores. Histograms show the distribution of AUDIT scores among patients without a SCID diagnosis of alcohol misuse (a) and among patients with a SCID diagnosis of alcohol misuse and a recent history of misuse (b). The lines on each figure represent cut points for clinically relevant alcohol use: a score of 8 (thin line, a commonly used cut point in the general population) and a score of 10 (thick line, the cut point that functioned best in our sample of patients with FEP).
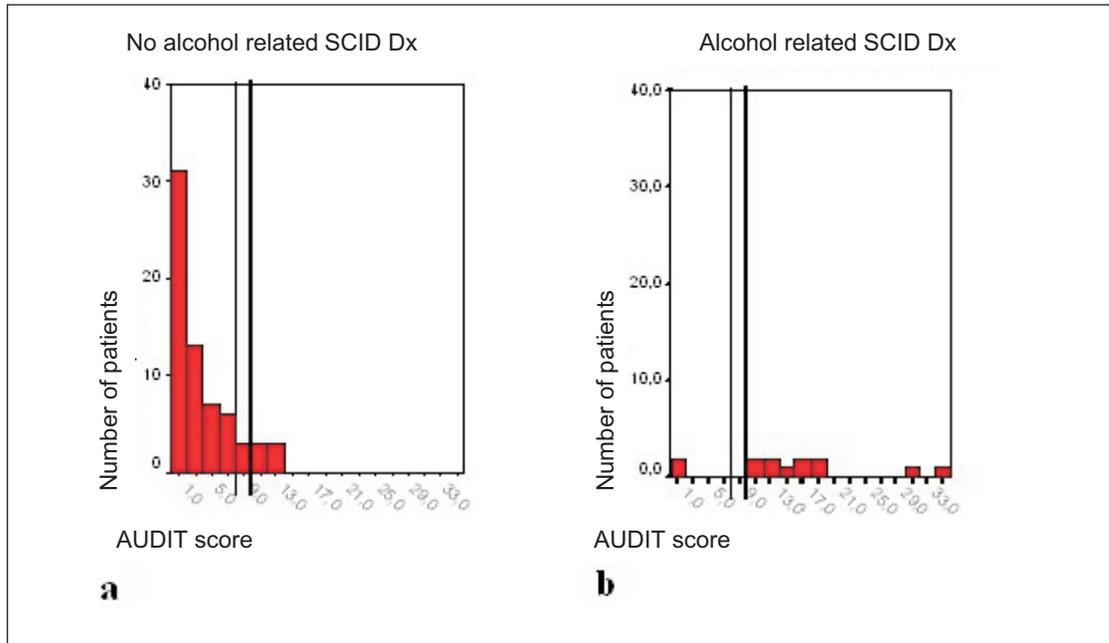
Figure 2 Distribution of DAST Scores. Histograms show the distribution of DAST scores among patients without a SCID diagnosis of drug misuse (a) and among patients with a SCID diagnosis of drug misuse and a recent history of misuse (b). The lines on each figure represent cut points for clinically relevant drug use: a score of 6 (thin line, a commonly used cut point in the general population) and a score of 3 (thick line, the cut point that functioned best in our sample of patients with FEP).
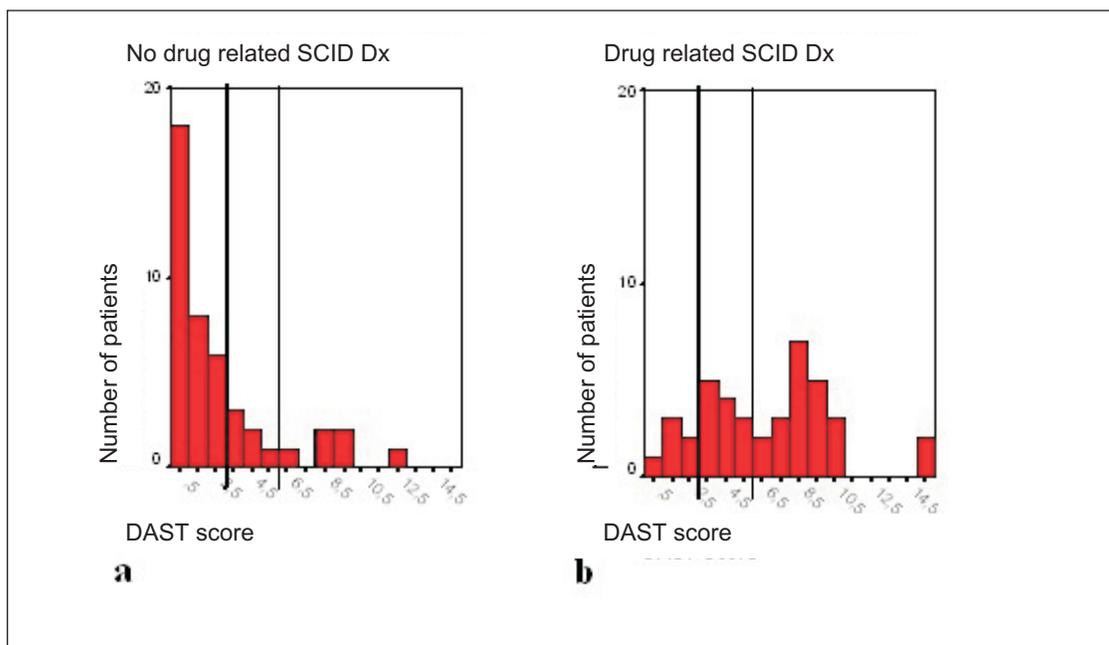
Figure 3 ROC curves for AUDIT (a) and DAST (b). Sensitivity is plotted against 1 – specificity for each cut point. Area under the curve is calculated as a measure of overall test performance, with a score of 1.0 representing a perfect test and a score of 0.5 a test that provides no information. The AUROC curve was 0.86 for the AUDIT and 0.83 for the DAST.
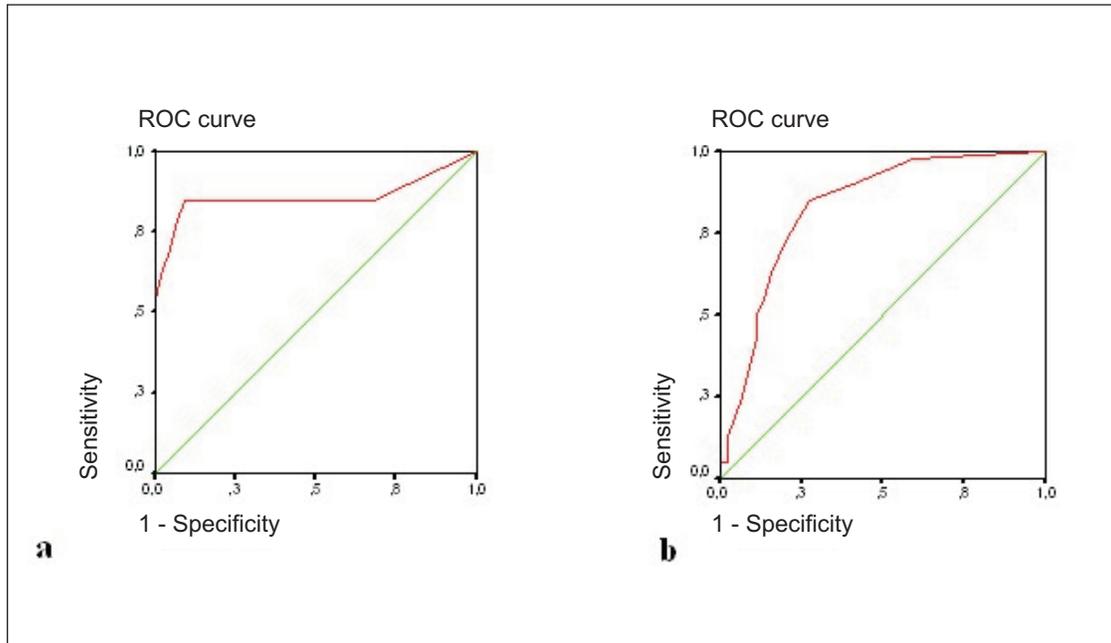
cut-off of 3, which yields a sensitivity of 85%, a specificity of 73%, a PPV of 74%, and an NPV of 84%, and correctly classifies 79% of subjects (see Figure 2 for the distribution of DAST scores and Table 2 for the functioning of the DAST at different cut points). The AUROC curve for the DAST is 0.83 (95%CI, 0.739 to 0.918) (see Figure 3).

Discussion

This study confirms a relatively high prevalence of SCID-diagnosed alcohol and other drug use disorders among patients with FEP, as reported in previous studies.[1–5] More specifically, our results indicate that the AUDIT and DAST are effective screening instruments to determine which patients are likely to have such disorders, because AUDIT and DAST scores were highly predictive of SCID diagnoses of substance use disorders. This, to our knowledge, is the first report to validate the AUDIT and DAST, screening instruments commonly used in community general population and general psychiatric samples, in a population presenting with FEP.

The optimal AUDIT cut-off score was achieved in this population by increasing the standard cut-off score from 8 to 10,

and the optimal cut-off score for the DAST was achieved by decreasing the standard cut-off score from 6 to 3. Studies employing the AUDIT in patients with schizophrenia or other psychoses have recommended conserving the cut-off score of 8, whereas some studies employing the DAST in patients with mental illness have recommended reducing the DAST cut-off score.[14,16,19,20,22]

In our sample, using the cut-off of 10, the AUDIT had a very high sensitivity, specificity, and NPV but a more modest PPV of 65%, implying that about two-thirds of those with a score of 10 or higher on the AUDIT will have a SCID diagnosis of alcohol misuse and a recent history of misuse. This is not surprising, given that the AUDIT was designed to screen those who have current alcohol-related problems as well as those who are at risk of developing such problems, with the latter group not likely to yet have an alcohol-related SCID diagnosis.[12] Because both the usual AUDIT cut-off score of 8 and an altered cut-off score of 10 work quite well, and because the number of patients with an alcohol-related SCID diagnosis is low in our sample ($n = 13$), it is hard to say with any certainty which is the ideal cut-off to employ in this population.

We observed that the DAST had a very high sensitivity and NPV but more modest specificity (73%) and PPV (74%) with a cut-off score of 3. With the more common cut-off score of 6, the specificity and PPV increase but the sensitivity and NPV drop sharply. This is consistent with the fact that there is an entanglement of cases with and without a drug use diagnosis among those patients whose scores fall between 3 and 6 on the DAST (see Figure 2). This suggests that the DAST may have some limitations in predicting diagnosis for patients whose scores fall in this range.

These results support the utility of the AUDIT and DAST as instruments for quick screening for substance use disorders among patients with FEP. A brief, reliable, screening instrument would be invaluable to clinicians, given the potential for substance use to have an adverse effect on medication adherence, symptom levels, and relapse in this young population and given the potential benefits of addressing it early.[6–11] One advantage of quick screening instruments is their ability to be used repeatedly with minimal burden to patients or clinicians, which permits changes in substance use patterns to be monitored more easily. A logical extension of the current study would be to see whether the validity of the AUDIT and DAST is maintained when the tests are administered repeatedly at regular intervals.

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Résumé : Validation du test d'identification des troubles liés à l'utilisation d'alcool et du test de dépistage de l'abus de drogues dans le premier épisode psychotique

Objectif : Déterminer la validité et la fiabilité du test d'identification des troubles liés à l'utilisation d'alcool (AUDIT) et du test de dépistage de l'abus de drogues (DAST) pour détecter les troubles liés à l'alcool et aux drogues, respectivement, dans une population souffrant d'un premier épisode psychotique (PEP).

Méthode : Les sujets ayant un PEP ont répondu à l'AUDIT et au DAST, et ont été divisés en groupes d'après la présence ou l'absence d'un diagnostic d'entrevue clinique structurée du DSM-IV (SCID) confirmant l'abus actuel soit d'alcool, soit de drogues. Les données ont été analysées pour déterminer si les scores à l'AUDIT et au DAST étaient prédicteurs d'un diagnostic SCID.

Résultats : Les patients ayant des diagnostics SCID liés à l'alcool et ceux ayant des diagnostics SCID liés aux drogues avaient des scores significativement plus élevés à l'AUDIT et au DAST, respectivement, que le groupe sans diagnostics SCID respectifs ($P < 0,001$ dans les 2 cas). L'AUDIT fonctionnait au mieux avec un seuil d'inclusion d'un problème d'alcool de 10 (sensibilité, 85 %; spécificité, 91 %). Le DAST fonctionnait au mieux avec un seuil d'inclusion d'un problème de drogue de 3 (sensibilité, 85 %; spécificité, 73 %). La zone sous la courbe caractéristique d'efficacité pour le récepteur était de 0,86 pour l'AUDIT et de 0,83 pour le DAST.

Conclusion : Le DAST et l'AUDIT peuvent identifier de façon fiable les patients d'un PEP ayant un trouble d'abus de substance.