

# Frequency of alcohol use disorders in patients admitted in a psychiatric hospital according to admission diagnosis

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## Summary

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**Background:** Comorbidities such as mental illness and alcohol use disorders (AUD) worsen the prognosis of both conditions. There is a need to identify early alcohol use disorders in psychiatric patients to prevent the development of dual diagnosis diseases, which are more difficult to treat. The Alcohol Use Disorders Identification Test (AUDIT) was developed by the World Health Organisation to promote early identification of alcohol use disorders and has been validated mainly in primary care settings. No study has validated the AUDIT in a French-speaking psychiatric setting. There is also a need to identify the risk factors of heavy drinking with psychiatric disorders.

**Purpose:** This study aims at (1) validating the French version of the Alcohol Use Disorders Identification Test (AUDIT) for psychiatric inpatients and (2) determining the frequency of alcohol use disorders in four major psychiatric ICD-10 diagnostic categories: neurotic and depressive disorders (F3 and F4), personality disorders (F6), psychotic disorders (F2) and other disorders (n = 10).

**Subjects and methods:** Of 383 consecutive psychiatric admissions, 219 completed the AUDIT. A subset was also interviewed with the CIDI (gold standard) and was retested with the AUDIT. Psychiatric diagnoses were recorded from hospital medical records.

**Results:** Validation of the AUDIT showed a very good sensitivity (94.1%) and specificity (91.7%) in this psychiatric inpatient population. Frequency of alcohol use disorders was 35.1%. Personality disorders had the highest rate of AUDIT scores  $\geq 8$  (50.7%). Gender was the only statistically significant outcome in a multivariate model.

**Discussion:** Male sex as an outcome associated with the presence of alcohol use disorders, is consistent with the other AUDIT studies in psychiatry. The uniqueness of the present study is the evaluation of personality disorders among the psychiatric diagnostic categories.

**Conclusion:** This study strengthens the evidence that the AUDIT is reliable and valid with psychiatric patients and confirms the high frequency of alcohol use disorders in this population. Drinking habits of patients with emotionally labile personality disorders should be screened.

**Keywords:** AUDIT questionnaire; alcohol abuse/dependence; psychiatric disorders

## Introduction

The prevalence of alcohol use disorders (AUD) is 2 to 3 times higher in psychiatric clinics than in the general population [1]. Alcohol use disorder worsens the prognosis of mental illness [2–4], thus there is a need for identifying comorbid alcohol use disorders in psychiatric patients [5]. The Alcohol Use Disorders Identification Test (AUDIT) was developed by the World Health Organisation to

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promote early identification of alcohol use disorders [6]. The AUDIT has been validated in various psychiatric settings [7–10]. This study aims at (1) validating the French version of the AUDIT for patients admitted to a psychiatric ward, and (2) determining the frequency of alcohol use disorders within each of four psychiatric diagnostic categories.

## Subjects and methods

### Study sample

The sample was drawn from persons within the metropolitan area of Lausanne, Switzerland, which has 250 000 residents. The Lausanne University Psychiatric Hospital has a single admission unit, where each patient admitted stays briefly before being transferred to a specialised unit appropriate for the main diagnosis (e.g. Personality Disorders Unit, Neurotic and Depressive Disorders Unit and Schizophrenic Spectrum Disorders Unit). From July 2001 to January 2002, 383 patients were screened during the first 2 days of their admission; of these, 17 failed to meet eligibility criteria based on age (18–65 years old) or having at least one psychiatric disorder meeting ICD-10 criteria [11] other than alcohol use disorder. Also excluded were 56 others who had been hospitalised less than 24 hours or were admitted twice during the inclusion period, or had insufficient knowledge of the French language. There were 310 patients who met the inclusion criteria and were targeted for the AUDIT screening. A French translation of the AUDIT [12] was administered by the hospital ward nurse who informed all patients that the questionnaire was to be used as a screener for alcohol use disorder and if they did not object their AUDIT scores would become part of the study data. All patients received structured feedback regarding their AUDIT scores from the nurse. Of the 310 patients meeting the inclusion criteria, 91 were excluded for one of the following reasons: either the hospital stay was too short to allow filling out the questionnaire or the patient was quickly transferred to a specialised unit or to another psychiatric hospital more appropriate for their diagnosis; cognitive impairments, such as acute psychotic or organic brain disorder, mental retardation or psychotropic medication precluded completion; the patient refused to participate.

### Validation of the AUDIT

For the validation of the French translation of the AUDIT with psychiatric inpatients, we selected a subsample of 81 patients that were included consecutively from December 2001 to January 2002, with an interruption of inclusion from 22nd December 2001 to 6th January 2002 to avoid any seasonal bias toward excessive alcohol consumption. Patients were excluded for the same reasons as above and there were also some patients who refused to participate or were not able to fill out the AUDIT; this left 56 patients for the validation period. Written informed consent was obtained and the twelve-month version of the Composite International Diagnosis Interview [13], Section J: “Disorders resulting from the use of alcohol”, was administered by a research assistant (CN) in order to detect any alcohol use disorder. Participants who met criteria for any CIDI alcohol use disorder during the last year were categorised as CIDI alcohol+, those negative on the CIDI were classified as CIDI alcohol-. Three patients did not complete the CIDI. These data provided the basis for evaluating the external validity of the AUDIT. Attempts were made to retest these remaining 53 subjects on the AUDIT between 2 and 4 days after the initial assessment, but some patients had already been discharged and only some of them could be reached by phone and interviewed; the final AUDIT test-retest sample consisted of 38 (71.7%) patients.

### Determination of the main psychiatric diagnosis

Psychiatric diagnoses were recorded from hospital medical records according to ICD-10 codes [11]. Of 219 patients who completed the AUDIT, 93 (42.5%) had only one psychiatric diagnosis while 126 (57.5%) had several diagnoses. Two senior psychiatrists (NK and RG) analysed the 126 medical reports independently and determined for each subject the main psychiatric diagnosis, defined as the psychiatric problem that prompted the hospital admission. There was agreement 96% of the time and consensus was reached for the rest. We classified these main psychiatric diagnoses into four ICD-10 major diagnostic categories corresponding to the subdivisions of the specialised units of the hospital:

- 1) neurotic and depressive disorders, corresponding to diagnoses in ICD-10 categories F3 (affective disorders) and F4 (neurotic, stress-related and somatoform disorders);

**Table 1** AUDIT sensitivity (%), specificity (%), positive predictive value (PPV) and negative predictive value (NPV) by different cut offs (n = 53).

cut off (N)	sensitivity	specificity	PPV (%)	NPV (%)
≥4 (23)	94.1	80.6	69.6	96.6
≥5 (21)	94.1	86.1	76.2	96.9
≥6 (20)	94.1	88.9	80.0	97.0
≥8 (19)	94.1	91.7	84.2	97.1
≥9 (16)	88.2	97.2	93.7	94.6
≥11 (15)	82.4	97.2	93.3	92.1
≥12 (13)	70.6	97.2	92.3	87.5

N: number of subjects with an AUDIT score equal or greater than cut off.

- 2) personality disorders, corresponding to category F6 (disorder of adult personality and behaviour);
- 3) psychotic disorders, corresponding to category F2 (schizophrenia, schizotypal and delusional disorders);
- 4) others, corresponding to categories F0 (organic mental disorders), F1 (mental and behaviour disorders related to substance use), F7 (mental retardation), F8 (disorders of psychological development) and F9 (behavioural and affective disorders arising during childhood or adolescence).

There were no diagnoses of the category F5 (behavioural syndromes associated with physiological disturbance and physical factors).

#### Statistical analyses

Three analyses were conducted for the validation part of the study: Cronbach's  $\alpha$  coefficient was computed to assess the AUDIT internal consistency, intraclass correlation coefficients were used to establish test-retest reliability, and the Area Under Receiver Operating Characteristic (AUROC) sensitivity and specificity were determined to evaluate the performance of the AUDIT in identifying CIDI alcohol+ and CIDI alcohol- groups. Multivariate logistic regressions procedures were applied to factors associated with the two groups defined by AUDIT scores of 0-7 or  $\geq 8$ , and groups defined by an AUDIT fulfilled or partially fulfilled. Because this study is an observational one univariate tests are of limited value, thus multivariate methods are more appropriate, and the adjusted odds ratios of predictor variables are shown.

## Results

### Demographic and psychiatric data

Of the 219 subjects with complete AUDIT scores, 129 (58.9%) were females and 90 (41.1%) were males. Ages ranged from 18 to 64 years, with a mean of 37.8 years (SD 12.4 years). About 59% of all subjects were living in a private household with their partner or their family and 41.7% were employed. Neurotic and depressive disorders (51.1%) were the most frequent psychiatric diagnostic category, followed by personality disorders (32.4%), psychotic disorders (11.9%) and others (4.6%).

### Validation of the AUDIT

The internal consistency within the validation sample of 53 patients measured with Cronbach's alpha was 0.943, showing excellent reliability [14]. The external validity and the performance of the AUDIT were evaluated using the CIDI categories of alcohol+/alcohol-. The sensitivity, specificity, positive predictive and negative predictive values were computed and are summarised in table 1 according to cut offs ranging from 4 to 12. The area under the receiver operating curve (AUROC) was 0.958 (95% CI 0.890-1.025). A cut off of 8 produced the optimal sensitivity (94.1%) and specificity (91.7%) in identifying alcohol use disorder during the last year (CIDI alcohol+). The reliability of the instrument was estimated by the degree of agreement between each subject's initial and their second AUDIT completed 2 to 4 days later. Thirty-eight (71.7%) individuals completed this test-retest phase. The intraclass coefficient correlation of total scores between the first and the second AUDIT for this subset was 0.958. In order

**Table 2** Socio-demographic characteristics, principal psychiatric diagnosis by AUDIT score (n = 219) and odds ratios for dependent factors (AUDIT  $\geq$ 8 versus AUDIT 0–7).

	AUDIT 0–7 (n = 142)	AUDIT $\geq$ 8 (n = 77)	odds ratio [95% CI] multivariate model
age, mean (SD)	38.8 (12.7)	35.9 (11.8)	0.99 [0.96–1.01]
male % (n)	32.4 (46)	57.1 (44)	<b>3.3 [1.7–6.3]</b>
Swiss % (n)	64.8 (92)	71.4 (55)	1.6 [0.8–3.1]
cohabiting % (n)	61.7 (87)	53.2 (41)	0.74 [0.38–1.4]
employed % (n)	37.6 (53)	49.3 (37)	1.8 [0.94–3.4]
main psychiatric diagnosis % (n)			
neurotic and depressive disorders	56.3 (80)	41.6 (32)	0.8 [0.17–3.8]
personality disorders	24.6 (35)	46.7 (36)	3.1 [0.6–15]
psychotic disorders	14.1 (20)	7.8 (6)	0.6 [0.1–3.5]
others	4.9 (7)	3.9 (3)	–

to see if these results could generalise to the larger sample, we tested for differences in demographic variables for the 53 patients who belonged to the validation period versus the 163 who did not. There were no significant differences on demographics nor were there any significant differences between these two groups across the four major psychiatric diagnostic categories nor on mean AUDIT scores, which were 7.8 (SD 10.3) and 7.8 (SD 10.0), respectively.

#### Prevalence of AUDIT-positive and associated factors

Using a cut off of 8, the frequency of alcohol use disorder in the 219 patients was 35.1%. Among the 90 men, 44 (48.9%) had AUDIT scores  $\geq$ 8 compared to the 129 women, of whom 33 (25.6%) had positive AUDIT scores. Using multivariate analyses controlling for socio-demographic characteristics and main psychiatric diagnoses (table 2), gender was the only significant association with positive AUDIT scores, with a higher proportion of men that were positive to the AUDIT than were negative (odds ratio = 3.3, 95% CI 1.7–6.3). Positive AUDIT scores within the main psychiatric diagnostic categories were found in the following proportions: personality disorders, 50.7%; neurotic and depressive disorders, 28.6%; psychotic disorders, 23.1%; and others 30.0% (see table 2). Among personality disorders we found the following percentages of types: 47.9% emotionally labile; 39.4% other, non specified or mixed; 5.6% dependent personality; 4.2% schizoid or antisocial; and 2.8% long-lasting personality modification. The highest frequency (58.8%) of positive AUDIT

scores  $\geq$ 8 were seen within the emotionally labile personality disorder category.

Differences between patients who completed the AUDIT questionnaire and those who did so incompletely or not at all

To assess the possibility of generalising these findings to the global sample of 310 patients, we compared the group who completed the AUDIT to the group who did so incompletely or not at all. Multivariate analyses, controlling for socio-demographic characteristics and main psychiatric diagnoses, showed that only employment was significant; there was a higher proportion of employed subjects who fully completed the AUDIT (41.7%) versus those who did not (16.0%; odds ratio = 2.9, 95% CI 1.4–5.9).

#### Discussion

Our study is the first to confirm the reliability, validity and stability of the AUDIT in an adult population within a French psychiatric setting. The high rate of alcohol abuse and dependence in psychiatric populations and the associated adverse consequences have consistently been documented in a range of studies from around the world. The need for standardised instruments to help clinicians in the early identification of alcohol use disorder in psychiatry led to several studies using the AUDIT where it proved to be reliable and valid for persons diagnosed with schizophrenia [9]. It also demonstrated good performance and psychometric properties when used with adults having

severe and persistent mental illness in identifying alcohol use disorder [8] and with psychiatric patients in a developing country [10].

#### Prevalence of AUDIT-positive and associated factors

The current study shows that approximately 35% of all patients admitted to the general hospital psychiatric units had alcohol use disorder; 48.9% of the men and 25.6% of the women were AUDIT positive. After multivariate analyses were completed, gender remained the only outcome variable associated with the presence of alcohol use disorder. This is consistent with the findings in much of the published research [3, 15, 16]. In comparison to other AUDIT studies in psychiatry, these rates are slightly lower than those of Hulse et al. [7], who found that (depending on the psychiatric diagnosis) 49.1 to 72.4% of men and 29.2 to 44.0% of women were AUDIT positive and differed significantly by gender, yet are quite similar to those of Maisto et al. [8], who reported that approximately 42% of males and 32% of females with a severe and persistent mental illness were AUDIT positive. In a sample of psychiatric in-patients admitted to acute general psychiatry wards, McCloud et al. [4] found the frequency of alcohol use disorder to be approximately 48%, of whom 53% of the men and 44% of the women had AUDIT scores  $\geq 8$ . This particularly high rate of alcohol use disorder among women appears to be specific to this study. Regarding the psychiatric data, the uniqueness of the present study is the evaluation of personality disorders among the psychiatric diagnostic categories, as opposed to most other studies using the AUDIT within psychiatric settings that looked at other kinds of psychiatric diagnostic classifications, namely mood or anxiety disorders, psychosis or severe mental illness [4, 7–9]. Among the diagnostic categories, personality disorder had the highest rate of positive AUDIT scores. Despite an odd ratio of 3.1, the multivariate model does not reach statistical significance for personality disorders positive on the AUDIT: the reason for this certainly lies with the small sample size of the study ( $\beta$  error). Large-scale epidemiological surveys [1, 17] typically have not included assessment of axis II disorders other than antisocial personality disorder. Studies of personality disorder in substance abusers have largely been confined to clinical samples, in which rates have been highly variable but usually at least 3 times higher than those reported within non-patient samples, especially for antisocial personality disorder and borderline personal-

ity disorder [18]. Consistent with the findings of Rounsaville et al. [19] and with a review by Trull et al. [20] cluster B personality disorder is prominent in our sample. Comorbid conditions such as personality disorder and substance abuse are interactive and maintaining each other, thus they result in poorer prognoses than occur under single conditions [21]. There is a need to identify comorbid substance use disorders in patients with personality disorders, in order to provide interactive treatment integrating substance abuse approaches and personality disorder therapies [22]. This study provides evidence that the AUDIT is reliable and valid for the early screening of alcohol use disorder among psychiatric patients with a personality disorder. Neurotic and depressive disorders were the most frequent main psychiatric diagnostic category, yet the prevalence of these disorders with AUDIT scores  $\geq 8$  was lower (28.6%) than found by Hulse et al. [7] among 498 psychiatric in-patients with a mood, anxiety or adjustment disorder (45% AUDIT positive). We found a smaller proportion (23.1%) of patients with a psychotic disorder positive on the AUDIT, compared to several other studies using the AUDIT with psychiatric in-patients, e.g. McCloud et al. [4] found that 44.4% of subjects with a psychotic disorder were positive on the AUDIT, and Hulse et al. [7] found that 45.8% of their sample with a psychotic disorder were positive on the AUDIT. The lower proportion of psychotic disorder plus AUDIT-positive subjects found in our study may be due to the short-duration screening phase (i.e. only the first two days of admission) where patients in acute psychotic states would not be included. Procedurally, we may have created a selection bias in that the most severe type of schizophrenic subjects who were most at risk for drinking were left out.

#### Validation of the AUDIT

Regarding external validity and the performance of the AUDIT in our in-patient psychiatric population, several cut-off scores produced the highest sensitivity (94.1%) on our AUROC curve for detecting alcohol use disorder according to the CIDI classification. A cut-off score  $\geq 8$  on the AUDIT produced the optimal negative predictive value of 97.1% and a specificity of 97.7%. Increasing the AUDIT cut-off to  $\geq 9$  reduced both the sensitivity (88.2%) and the negative predictive value (94.6%), and increased the specificity to 97.2%. Therefore, a cut-off score  $\geq 8$  for screening alcohol use disorders is the most useful because of its high sensitivity and negative predictive value. These results



compare favourably with those obtained in other psychiatric settings. Using a cut off of 7, Maisto et al. [8] found sensitivity (95%) and specificity (65%) for the AUDIT estimated by the SCID questionnaire [23] and sensitivity (85%) and specificity (77%) with a cut off of 9–13 for current diagnosis of alcohol use disorder. Dawe et al. [9], in their study of the utility of the AUDIT in people with schizophrenia, reported that a cut off of  $\geq 8$  produced the highest level of correct classification (89%) estimated by the CIDI for current alcohol use disorder, with sensitivity of 87% and specificity of 90%. The test-retest performance of the AUDIT obtained in our psychiatric setting seems comparable to that reported in those previous studies. The test-retest reliability of the AUDIT in the general population after approximately one month is high [24]. In our previous study in a community sample [12] a Spearman rank correlation coefficient of 0.81 ( $p < 0.001$ ) for the test-retest reliability of the AUDIT in 126 patients was determined. Results reported here also offer evidence of good internal validity of the AUDIT in a psychiatric setting, illustrated by Cronbach's  $\alpha$  of 0.94, and is identical to the 0.94  $\alpha$  found by Carey et al. [10] and higher than the 0.85  $\alpha$  observed by Dawe et al. [9].

#### Limitations of the study

In interpreting these results, it is important to recognise several limitations. First, since the employment rate was higher in the subset of patients with complete AUDIT data, we can hypothesise that the 91 non-included patients probably had more social and drinking problems. In addition, the main reason for patients not being screened was because they had a very short hospital stay (placing them at higher risk for alcohol use disorder), thus the actual frequency of alcohol use disorder in the study population is perhaps higher than what we obtained. Second, conducting the retest of the AUDIT 2–4 days after the initial test had the advantage of reflecting accurate estimations of alcohol use disorder but had a disadvantage in that the patients may have given similar responses to the same questions, more as a function of recent recall rather than of "accurate" self-reporting, possibly limiting the test-retest validity. Third, the procedure of determining psychiatric diagnoses from medical charts under the supervision of a senior psychiatrist was certainly less accurate than diagnoses obtained by a trained research assistant using standardised instruments. Patients from the personality disorder category were more affected by this, as shown by the high

number of other, non-specified or mixed personality disorders. Nonetheless, the protocol used here seems adequate for dividing the diagnoses into four major categories. Finally, the sample size was probably too small for detecting any significant difference of frequency of alcohol use disorder among the psychiatric diagnostic categories in a multivariate model.

#### Conclusion

First, this study adds weight to accumulating evidence that the AUDIT questionnaire is reliable and valid when used with psychiatric patients. Second, this study confirms the high frequency of alcohol use disorder in psychiatric patients (especially among males). Third, the high frequency of alcohol use disorder found among patients with personality disorders (particularly those of the emotionally labile type) should be a signal for clinicians to pay more attention to the drinking habits of their patients.

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