

VARIATION IN AUDIT (ALCOHOL USED DISORDER IDENTIFICATION TEST) SCORES WITHIN THE FIRST WEEKS OF IMPRISONMENT

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Abstract — **Aims:** Although the prevalence of alcohol problems amongst detainees is suspected to be high, often only more flagrant problems are detected, restricting the possibilities for intervention in alcohol misuse and reducing opportunities for preventive efforts. This study examined the re-test reliability of AUDIT (the Alcohol Use Disorder Identification Test) in screening prisoners. **Methods:** AUDIT was administered for the first time on the day of entry to prison and again about 15 days later. The results were analysed according to two AUDIT thresholds: a score of 8 or higher and 12 or higher. **Results:** Of 75 consecutive entrants tested, 47 male prisoners completed the study. At the first administration, 19.1% of these 47 men met criteria for a probable alcohol problem but this percentage rose to 59.6% on the second occasion ($P = 0.0001$). The proportion of subjects with a score 12 or higher (probably dependent) was 10.6% the first time versus 42.6% the second time ($P = 0.0001$). In the 19 who scored positive at the second administration only, changes in answers to the 10 items were coherent with a total score growing from 3.0 to 18.1 ($P = 0.0001$). No prisoner had a lower AUDIT score on the second administration. As alcohol problems are not routinely considered during the medical and biological examination at entry, no confirmation of the AUDIT results could be obtained, although those obtained at the second administration fitted well with the prevalence rates in previous reports. **Conclusions:** AUDIT, for the purpose of giving a prevalence estimate or to enter appropriate prisoners into more detailed assessment or interventions, should not be conducted immediately at entry, but some weeks later.

INTRODUCTION

An alcohol problem in a prisoner is evident when the crime is drink-driving or when there are symptoms of alcohol dependence or misuse but less severe alcohol problems tend to be ignored. In France, the prevalence of alcohol problems in prisoners has been little considered. In a prison study in 1992 in Dijon (France), Michaud *et al.* (2000), found 29% were CAGE-positive (Mayfield *et al.*, 1974) and De Beaurepaire and Hiriart (1997) found a rate of 56% CAGE positive in Fresnes (France). Others screening instruments were recently tested in prisoners (Peters *et al.*, 2000) and it was concluded that the Alcohol Dependence Scale (ADS) and the Addiction Severity Index (ASI) 'Drug Use' section were the most efficient. However, no French version of ADS is available and ASI is not used in a current practice.

We screened for alcohol problems within a prison population using the AUDIT questionnaire (Alcohol Used Disorder Identification Test), an instrument that tends to detect earlier cases than CAGE. This questionnaire, which was developed by the World Health Organization (Babor *et al.*, 1992) comprises 10 items, covering three distinct areas: alcohol consumption (items 1–3), dependence and its consequences (items 4–10). It enables the detection of alcohol consumption levels which cause a problem, and targets numerous populations (Reinert and Allen, 2002). To our knowledge, AUDIT has never been applied to a prison population. Perhaps because of the psychological reactions linked to incarceration, responses

over time may not be stable. We therefore compared the scores at two points in time.

SUBJECTS AND METHODS

During 6 months, AUDIT was administered consecutively to all new prisoners entering Nîmes prison. The only criteria for exclusion were an insufficient understanding of the French language or refusal to participate. The prisoners had all been given short sentences of no more than 1 year, or were awaiting transfer to another institution if their sentence was longer. The basic data collected were sex, date of birth and principal offence committed.

AUDIT was administered by the physician during the obligatory medical examination at entry after sentencing. All prisoners were alcohol-free at that time. Prisoners were asked to repeat the test, on a voluntary basis, about 15 days later and this test was performed by a clinical psychologist who was not aware of the previous AUDIT results.

Both interviewers were asked to read the 10 AUDIT questions slowly and clearly in a neutral voice and to enter the response given by the prisoner. The results were analysed according to two thresholds of positivity: a score of 8 or higher (the threshold recommended by WHO as indicating a probable alcohol problem), and a score of 12 or higher as indicating probable alcohol dependence (Conigrave *et al.*, 1995; Saunders and Lee, 2000)

Analysis

The percentages of positive scores over the two administrations were analysed using tests for distribution (chi-squared, Fisher) and concordance (MacNemar). The means were compared using non-parametric tests for paired series.

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The threshold of statistical significance was fixed at 0.05. The data were analysed using the SPSS 10.0 software (SPSS, Chicago, IL).

RESULTS

At entry, 75 consecutive prisoners completed the questionnaire without any initial refusal. Of these, 49 answered the questionnaire a second time and constituted the study sample. The reasons for which 26 subjects could not answer the questionnaire a second time were as follows: release ($n = 9$), transfer ($n = 11$), working on an outside site ($n = 2$), refusal ($n = 4$, 8.1%).

Forty-seven of the 49 study subjects were men, with a mean age of 27.3 (± 8) years and the analysis omits the only two women, to increase the homogeneity of the sample.

The reasons for imprisonment were: 21 (44.6%) for theft or fraud, 10 (21.3%) for wilful grievous bodily harm, five (10.6%) for sexual crimes or misdemeanours, four (8.5%) for offences against the law on illegal drugs, two (4.3%) for assault, two (4.3%) for crimes or misdemeanours involving children, two (4.3%) for manslaughter or involuntary bodily harm and one (2.1%) for offences against immigration laws.

At first administration of the questionnaire, nine (19.1%) of the 47 prisoners had a score equal to or above 8, including five with a score of 12 or higher. On the second administration, these nine subjects had not modified their responses, and none of their scores fell below 8; their mean scores during the first and second administrations of the questionnaire were not statistically different (14.8 ± 7.9 vs. 18.1 ± 7.4 , NS) and there was no striking variation when each item was specifically considered (Table 1).

Of the 38 individuals (80.9%) with a score lower than 8 at the first administration, 19 (50% of the 38) did not modify their responses the second time, with mean scores of 2.3 ± 2.1 versus 3.7 ± 2.8 , respectively, a non-significant difference (Table 1). Conversely, the remaining 19 individuals (50%) increased their scores to over 8, and 13 of them had a score of 12 or higher; their mean scores rose significantly between the first and the second administration (3 ± 2.4 vs. 18.1 ± 8.7 ,

$P = 0.0001$). Item-by-item analysis for this sub-group showed that the increase in the total score was not only due to an increase in items dealing with quantity and frequency of alcohol consumption but also in those relating to dependence and consequences of heavy drinking; indeed, while mean scores to items 4 to 10 were very close to or equal to zero at first administration, they all increased at the second administration (Table 1). Finally, the values recorded for the 10 items at the second administration in these 19 prisoners were similar to those recorded from the nine prisoners being AUDIT-positive at both administrations.

Overall, at the first administration, 19.1% of the sample had an alcohol problem detected according to the AUDIT criteria, and this percentage rose to 59.6% on the second occasion, the difference being highly significant ($P = 0.0001$) (Fig. 1); in addition, the proportion of subjects with a score equal or higher than 12 strikingly increased from 10.6% at the first time to 42.6% at the second ($P = 0.0001$). Altogether, in relative terms, 28 (19 always negative and nine always positive) among the 47 subjects studied (59.6%) were identified the same way both times; although the Spearman's correlation coefficient was statistically significant ($P = 0.03$), its value was low ($r = 0.31$), as it was for the agreement between both administrations ($\kappa = 0.27$). Changes to responses between the first and second administrations were not correlated to the reasons for imprisonment. When results of the second AUDIT administration were considered, 65% of those incarcerated for violence or drug use/dealing ($n = 37$) scored positive while the three convicted for involuntary bodily harm or for offences against immigration laws scored negative.

DISCUSSION

Our results, obtained in a non-selected sample of prisoners, demonstrate that the answers to a screening instrument for detection of alcohol misuse (AUDIT) varied according to time when administered, therefore raising doubt about its reliability in such a population.

The AUDIT questionnaire is widely used throughout the world. Initially used in hospital emergency rooms, AUDIT

Table 1. Answers (mean \pm SD) to each audit item at first and second administration

Item	AUDIT SCORE					
	Negative ^a then positive ^b ($n = 19$)		Always positive ($n = 9$)		Always negative ($n = 19$)	
	First	Second	First	Second	First	Second
1	1.4 \pm 1.1	2.8 \pm 0.8	2.9 \pm 1.0	3.2 \pm 0.8	1.4 \pm 1.2	1.4 \pm 1.1
2	0.9 \pm 1.1	2.5 \pm 1.3	3.3 \pm 0.7	2.7 \pm 1.1	0.7 \pm 1.1	1.0 \pm 1.3
3	0.5 \pm 0.7	2.4 \pm 1.1	2.4 \pm 1.0	3.3 \pm 0.5	0.2 \pm 0.4	0.9 \pm 1.0
4	0.05 \pm 0.2	2.2 \pm 1.3	1.5 \pm 1.3	2.3 \pm 1.6	0.0	0.1 \pm 0.4
5	0.05 \pm 0.2	1.0 \pm 1.5	0.8 \pm 0.4	0.4 \pm 0.5	0.0	0.0
6	0.0	0.7 \pm 1.4	0.4 \pm 1.3	0.2 \pm 0.6	0.0	0.0
7	0.0	1.5 \pm 1.3	0.4 \pm 1.3	1.2 \pm 1.3	0.0	0.0
8	0.0	1.3 \pm 1.3	0.5 \pm 1.1	0.7 \pm 1.0	0.0	0.05 \pm 0.2
9	0.0	1.3 \pm 1.9	1.6 \pm 1.6	1.9 \pm 2.0	0.05 \pm 0.2	0.2 \pm 0.5
10	0.0	2.4 \pm 2.0	0.8 \pm 1.4	2.1 \pm 1.9	0.0	0.0
Total	3.0 \pm 2.4	18.1 ^c \pm 8.7	14.8 \pm 7.9	18.1 ^d \pm 7.4	2.3 \pm 2.1	3.7 ^d \pm 2.8

^aTotal score < 8; ^btotal score \geq 8; ^c $P = 0.0001$ versus first administration; ^dNS versus first administration.

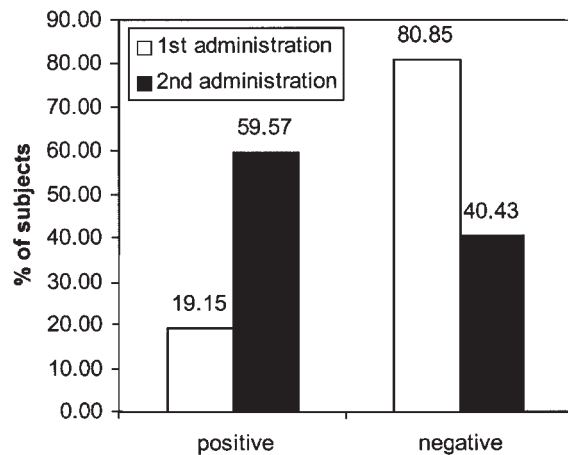


Fig. 1. Distribution of audit scores at first and second administrations. Positive if audit score ≥ 8 ; negative if score < 8 .

has since been tested in numerous populations of sick and apparently healthy individuals. The results have made it possible to conclude that even if minor variations could be seen for certain items from one sub-group to another, the instrument is multicultural and thus can be used in all populations; the only precaution necessary is to differentiate the thresholds of positivity as a function of sex (6 for women and 8 for men) (Reinert and Allen, 2002).

In the literature, the stability of responses to AUDIT over time is deemed satisfactory. Indeed, in two separate studies conducted in different sub-groups of population, and by measuring variations in the responses at an interval of 15 days, the correlation between scores ranged from 0.92 (Lennings, 1999) to 0.64 (Maisto *et al.*, 2000); similar results were observed when the interval between two administrations was longer (Bradley *et al.*, 1998; Daepfen *et al.*, 2000). Finally, a recent study showed that in the general population agreement between answers is better in low than in high alcohol consumers but that the overall test–retest reliability of the AUDIT to detect high-risk drinkers is satisfactory (Selin, 2003).

On the contrary, our results showed that AUDIT lacked stability when it was applied to an incarcerated population. Indeed, 40% of subjects changed category at the second AUDIT administration. This change was always in the same direction (i.e. towards a worse score) and the proportion of subjects identified by AUDIT as having an alcohol problem rose from 20 to nearly 60%. Such a critical variation was not observed in a previous study aiming to compare the effectiveness of eight different screening instruments (not including AUDIT) for detecting alcohol/drug misuse in prisoners (Peters *et al.*, 2000); indeed the test–retest reliability performed in 60 prisoners was always high (more than 0.8). However, this study and ours are hardly comparable in this regard since the interval time between the two administrations was 3 days and 2 weeks, respectively and, more importantly, while Peters performed the first administration a couple of days after admission to the prison we did it on the day of entry and it could not be excluded that the shock of imprisonment might have biased the initial answers. It should also be noted that, in our study, the items that varied the most, in absolute values, from the first to the second administration were those relative to the frequency of consumption and the quantity consumed; this observation has already been pointed

out using AUDIT (Medina-Mora *et al.*, 1998; O'Hare and Sherrer, 1999; Karno *et al.*, 2000) and might be related to the generalized denial which prevails in this respect (Batel *et al.*, 1999; Gaussoit, 2000). Given that two different examiners, a physician and a psychologist, participated in the study, an inter-rater reliability test should have improved the interpretation of the results but we were not able to perform it for technical and administrative reasons. We cannot exclude the possibility that variations in answers might be due to a different presentation of the questionnaire, but this should be slight as each investigator was asked only to read the questions, and because the AUDIT scoring system depends firstly on the sincerity of the answers.

Biases that could affect the self-reporting of symptoms in a prison population might operate in either direction. A bias towards reporting more severe dependence at entry to the prison might occur because some prisoners try to obtain tranquillizer medicines by exaggerating symptoms. There was no evidence that this was occurring in the present study—there was, if anything, minimization of symptoms at entry. There was no obvious incentive to exaggerate symptoms at the second testing, such as 'rewards' for getting on to a 'treatment programme'. Finally, as the total score at first administration was never given to participants and as no recall of the previous answers was done before the second administration, this also contributed to minimized memory bias. Therefore it appears that changes in AUDIT scores mainly reflect the difference in time of administration.

Faced with such a lack of reliability in AUDIT scores, legitimate questions can be raised about the true prevalence of alcohol problems in our prison population. The AUDIT results could not be confirmed by laboratory data, because the medical examination carried out at entry into the prison did not include the biological parameters (serum gamma glutamyl transferase etc.). However, because of a lack of sensitivity, these parameters, even if they had been available, would still not have made it possible to reach a firm diagnosis. Moreover, as in another report (Peters *et al.*, 2000), no objective measures of alcohol abuse or dependency history were available from institutional records to independently corroborate the self-report information.

Factors that aid our confidence in our data is that the frequency of alcohol problems observed according to the AUDIT scores at the second was similar to that reported in prison populations by other authors in France (De Beaurepaire and Hiriart, 1997) as well as in other countries (Mason *et al.*, 1997); the changes in answers were coherent, more severe items tending to be acknowledged on the second occasion; and the refusal rate for the second occasion was low, less than 10%, even though the test was administered on a voluntary basis.

The alcohol problems emerging in our sample tended to be serious: at the second AUDIT administration, two-thirds of the subjects scored higher than 12, a threshold above which alcohol dependence is likely; this also confirms the potential link between alcoholism and antisocial behaviours.

Although our findings cannot be considered as definitive, owing to lack of external confirmation of AUDIT scores, they suggest that screening by AUDIT questionnaire for the purpose of giving a prevalence estimate, or to enter appropriate prisoners into more detailed assessment leading to intervention programmes (Brooke *et al.*, 1998; Michaud *et al.*,

2002) should not be conducted immediately at entry, but some weeks later.

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