


Review: sensitivity of the CAGE questionnaire for the DSM diagnosis of alcohol abuse and dependence in general clinical populations was 71% at cut points ≥ 2

Aertgeerts B, Buntinx F, Kester, A. The value of the CAGE in screening for alcohol abuse and alcohol dependence in general clinical populations: a diagnostic meta-analysis. *J Clin Epidemiol* 2004;**57**:30-9.


Clinical impact ratings GP/FP/Primary care ★★★★★☆☆ IM/Ambulatory care★★★★★☆☆ Internal medicine ★★★★★★☆☆

Q What are the characteristics of the CAGE questionnaire in screening for a diagnosis of alcohol abuse and dependence in general clinical populations?


METHODS



Data sources: Medline (1974–2001), MEDION database, hand searches of Dutch language general practice journals not indexed in Medline, reference lists of retrieved papers, and experts.



Study selection and assessment: studies published in any language (except Japanese) that used the CAGE as an independent questionnaire in consecutive patients or a random sample of patients from well described general clinical populations; used DSM criteria as the diagnostic standard; and reported (or provided data for calculation of) test characteristics at all cut points of the CAGE. Exclusion criteria: studies of non-clinical or special clinical populations; comparisons of patients in alcohol or drug treatment with other drinkers or psychiatric populations; application of the diagnostic standard only to patients with positive CAGE results; or CAGE not completed in >50% of the initially identified population.



Outcomes: sensitivity, specificity, and likelihood ratios (LRs).

MAIN RESULTS

10 studies (n = 4562) met the selection criteria. Lifetime prevalence of alcohol abuse and dependence was 20% for primary care patients, 36% for ambulatory medical patients, and 25% for inpatients. Pooled test characteristics of the CAGE for scores of 1 and 2 (out of 4) are summarised in the table. At cut points ≥ 1 , sensitivity was highest in inpatients, but specificity was highest in primary care patients. Pooled area under the receiver operating curve was 0.87 (95% CI 0.85 to 0.89). Heterogeneity was present across studies for all scores and all test characteristics. However, at low specificities, sensitivity was homogeneous across studies, whereas at low sensitivities, specificity was heterogeneous.

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CONCLUSION

In general clinical populations, sensitivity of the CAGE questionnaire for screening for a diagnosis of alcohol abuse and dependence was 71% at cut points ≥ 2 , and specificity was 90%, and varied in different subpopulations.

Commentary

Screening for alcohol problems in clinical practice remains challenging, at least in part because of the difficulty of easily obtaining an accurate alcohol history. The purpose of the meta-analysis by Aertgeerts *et al* was to assess the accuracy of the CAGE questions in screening for alcohol abuse and dependence in several different populations. These populations were limited to inpatients, ambulatory medical patients, and primary care patients to minimise heterogeneity. The authors included only studies involving a lifetime diagnosis of alcohol abuse or dependence using DSM criteria. Despite limiting the clinical populations, heterogeneity still existed among studies. This is not surprising because the studies still differed in clinically important ways, including patient age and ethnic background.

The authors concluded that the CAGE is of limited value at the recommended cut point of 2 positive responses. Overall, this is a reasonable conclusion, but closer examination of their results indicates that the CAGE still has considerable utility. Firstly, the LRs in ambulatory medical and primary care patients appear quite similar. In each group, the positive LR is about 8 at a cut point of 2, which is high enough to increase the probability of detection of an alcohol problem to a clinically important degree at the prevalences of alcohol abuse and dependence studied. The positive LR is lower among inpatients. Secondly, the LRs in ambulatory patients increase as the number of positive answers increases, providing additional information. As the authors note, their analysis did not support a single optimal cut point for all of the populations.

In summary, this well done meta-analysis suggests that the CAGE is more useful in identifying alcohol problems in ambulatory than hospital patients and confirms that additional information can be gained by considering the score as a graded measure rather than simply positive or negative.

John B Schorling, MD
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Test characteristics of the CAGE in screening for a diagnosis of alcohol abuse or dependence in general clinical populations*

Patient population	CAGE score†	Sensitivity (95% CI)	Specificity (CI)	+LR	-LR
All	≥ 1	87% (79 to 93)	68% (47 to 85)	3.44	0.18
All	≥ 2	71% (61 to 80)	90% (82 to 96)	6.86	0.33
Primary care	≥ 1	85% (71 to 94)	78% (70 to 85)	3.95	0.19
Primary care	≥ 2	71% (54 to 84)	91% (87 to 95)	7.73	0.32
Ambulatory medical	≥ 1	83% (68 to 93)	50% (17 to 84)	3.78	0.22
Ambulatory medical	≥ 2	60% (42 to 76)	92% (85 to 97)	8.16	0.43
Inpatient	≥ 1	98% (95 to 100)	56% (21 to 87)	4.13	0.02
Inpatient	≥ 2	87% (75 to 95)	77% (45 to 96)	4.19	0.17

*Diagnostic terms defined in glossary.

†The CAGE comprises 4 questions requiring yes/no responses: have you ever felt you should cut down on your drinking? Have people annoyed you by criticising your drinking? Have you ever felt bad or guilty about your drinking? Have you ever had a drink in the morning to get rid of a hangover (eye-opener)? Scores are calculated as the sum of yes responses.