

Efficacy of an Alcoholism Self-Report Questionnaire in a Residency Clinic

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The efficacy of the CAGE alcoholism screening test, when used as a part of a much larger health and social history questionnaire, was assessed in a family medicine residency clinic by retrospectively studying 155 charts of randomly selected adult patients. The rate of problem drinking, as determined by the CAGE, was then compared with the rate found in other studies using the CAGE questionnaire. The CAGE responses were also compared with other information in the patients' charts to assess how frequently this screening test might support a diagnosis of problem drinking.

The incidence of problem drinking identified by the CAGE was 3.2 percent, compared with the expected 9.8 percent level ($P = .0039$). The CAGE questionnaire proved to be no better than a simple self-report of alcohol consumption (which demonstrated an incidence of 4 percent), and failed to identify two patients with histories of alcohol abuse as noted in their charts. CAGE, when used as a part of a larger health questionnaire, thus failed to identify the anticipated number of patients with drinking problems.

Alcoholism has been identified as the third leading cause of death in this country, associated with a mortality rate as high as 200,000 per year, when its involvement in deaths by motor vehicle, fire, murder, and suicide are included with its medical complications.¹ One of its sequelae, cirrhosis, is the seventh leading cause of death.² Alcoholism has also been implicated as a cause of some malignancies and diseases of the endocrine, hematopoietic, cardiovascular, gastrointestinal, and nervous systems. Furthermore, fetal alcohol syndrome has now become a well-recognized outcome in many infants born to mothers who drink more than 150 g of ethanol daily.³

It has been supposed that the early identification and treatment of the alcoholic would be an effective method of reducing these disastrous sequelae of alcoholism. Many laboratory tests have been proposed as a method for screening for unsuspected alcoholism. These tests include blood alcohol, mean corpuscular volume, liver function

tests, and others.⁴ In general, these tests are of either low sensitivity, low specificity, or both. Early clinical manifestations of alcoholism, such as acute pancreatitis, hepatomegaly, palpitations, tremor, or hypertension, suffer from similar problems of interpretation.⁵

Recent work has validated the usefulness of alcoholism screening questionnaires (for example, CAGE, MAST, etc) in a variety of health care settings. Sensitivities of 90 percent and specificities of 75 percent, and higher, have been reported for these questionnaires.^{4,6} Using these screening questionnaires in various health care settings, however, the incidence of alcoholism has typically been reported to vary from 8 to 40 percent or more.⁶⁻¹⁴ For example, the incidence in one orthopedic service was found to be 18 percent, compared with 8 percent in the obstetric service in the same hospital.⁶ For the setting of an outpatient clinic, the incidence of alcoholism has typically been reported to be between 8 and 20 percent, clustering about the 15 percent rate.^{6-9,11,14}

It remains to be demonstrated which of these two tests, CAGE or MAST, is the superior instrument in the identification of otherwise unsuspected alcoholism. CAGE, an acronym derived from the first letter of the key word for each of its four questions, is very short: (1) Have you ever considered cutting down on your drinking? (2) Has anyone ever annoyed you by criticizing your drinking?

Submitted, revised, April 9, 1987.

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(3) Do you ever feel guilty about your drinking? (4) Have you ever had an eye-opener in the morning? The CAGE score is the number of positive responses (0 to 4).^{15,16} Two or more positive responses are generally considered to be indicative of problem drinking. The MAST (Michigan Alcohol Screening Test) comes in two primary versions: 24 questions and 10 questions.^{17,18} Several previous studies have demonstrated similar sensitivities and specificities for both instruments. Typically, the CAGE has been shown to be the more sensitive, while the MASTs have been relatively more specific.^{4,6}

The current study was undertaken to evaluate the CAGE in detecting otherwise unsuspected cases of alcoholism in the Family Medicine Clinic (FMC) at the University of Washington. The CAGE has been used for the past five years as an integral part of the health history questionnaire that each patient fills out before initial consultation with a physician. Because the CAGE consists of only four questions, it was originally believed that its integration into the health history questionnaire would not compromise its ability to find the problem drinker, although this had never been proven.

The FMC serves a diverse population, and one would expect at least an 8 percent incidence of alcoholism in this setting based on the results obtained at other institutions with similar patient demographics, which typically report an incidence of 8 to 20 percent, or more.^{5,6,13,14,19} The incidence of alcoholism, in the population group aged 20 years and older, of King County, Washington, wherein the great majority of FMC patients reside, has been estimated to be 9.8 percent.²⁰ A study was therefore conducted to (1) establish the frequency of alcoholism in patients of the FMC as determined by the CAGE, (2) compare this frequency to the other information in the patient's record to examine the validity of the CAGE in identifying cases of otherwise unsuspected problem drinking, and (3) determine how frequently other information, such as laboratory values, medical history, and social history, that is in the record supports a diagnosis of problem drinking.

METHODS

New patients fill out a health history questionnaire prior to being seen by one of the physicians in the Family Medicine Clinic at home before their first appointment or in the clinic waiting room. The health history questionnaire includes background data such as past medical history, review of systems, personal health habits (including questions about whether alcohol is used, and how much, and the CAGE questions), and questions designed to assess the patient's social adjustment and support. The data in

this study are derived from analysis of the CAGE questions from the health history questionnaires along with other information in the charts.

A random chart review was performed on 155 charts (out of an estimated potential of 8,000 charts) in which the patient (1) had filled out the health history questionnaire that included the CAGE questions, and (2) was at least 21 years of age. Age was a consideration, not only because the legal drinking age in the State of Washington is 21 years, but also because the CAGE's sensitivity and specificity are better known in the adult group. Data were tabulated on the first 80 patients for age, sex, presenting problem, responses to the alcohol consumption and CAGE questions, occupation, laboratory values if obtained in the course of initial treatment, patient self-report of problems with drinking, history of drug abuse, and instances where a diagnosis of alcoholism or alcohol abuse were made. Specific laboratory data noted, if present, included mean red blood cell volume, alanine aminotransferase, aspartate aminotransferase, gamma glutamyl transferase, bilirubin, cholesterol, triglycerides, alkaline phosphatase, and uric acid. The occurrence of laboratory data within any given chart was low (23.8 percent), and its collection was terminated after the first 80 charts. Subsequently, 75 more charts were reviewed simply for the demographic data, CAGE score, self-report of problems with drinking, and any notation in the record by the physician of suspected problem drinking.

Next, a random chart review of an additional 50 charts was performed on patients who had entered the FMC in the five years immediately prior to the institution of the CAGE questions to compare the performance of CAGE with the simple self-report alcohol-use questions to which the CAGE questions were later added. Only the demographic data, the patient's response to the alcohol-use questions, and whether a diagnosis of problem drinking or alcoholism had been made were recorded.

RESULTS

Demographic data are summarized in Table 1, comparing the study population with similar available demographic data for King County. Current data for the FMC as a whole, for comparison to the study population, were not available; however, the patient demographics are not believed to have changed in any substantive way from those previously reported and are not significantly different from the study population.¹⁹

Of the 155 charts initially reviewed, 137 contained properly completed CAGE sections (88.4 percent). In 18 cases (11.6 percent) the patient did not fully answer all four of the CAGE questions. There were 42 unanswered

TABLE 1. DEMOGRAPHIC DATA

Demographic Variables	Study Group (n = 155) Percent	King County ²¹ Percent
Women	61.3	50.7
Men	38.7	49.3
White	90.3	88.9
Minorities	9.7	11.1
Median age	31.0 (years)	30.8 (years)
Married	53.5	55.5
Unemployed	20.6	9.9
Living alone	16.1	14.5
Education through, or beyond, high school	85.2	82.6

CAGE questions in these 18 charts, but no question in the CAGE was left blank more than any other. During the time before the CAGE was added to the health history questionnaire, 40 out of 50 patients (80 percent) reported using alcohol. After the introduction of the CAGE, the proportion of patients acknowledging drinking alcohol dropped to 75.5 percent (117 of 155).

As shown in Table 2, of the 155 charts reviewed containing the CAGE questions, five had a CAGE score of 2 or more, indicating a problem with alcohol (for an incidence of 3.2 percent), significantly below the expected incidence of 9.8 percent ($P = .0039$). Generally, the CAGE score must be 2 or more to be meaningful. If the criterion is changed to a single positive response, there were 15 charts that were positive (for an incidence of 9.7 percent). These additional ten cases generally responded to the "considered cutting down" question (Table 3). In four charts, however, it was noted that the patient was visiting for prenatal care, and in two charts it was noted that the patient was seeking weight-loss information, suggesting that there were concerns other than the issue of alcohol consumption involved in the response to the question of cutting down. For example, the potential harmful effects

of alcohol on the unborn child are of great concern to the general public and medical community alike, and are routinely discussed at the FMC during prenatal visits. As far as dieting is concerned, alcohol supplies calories without good nutritional balance and would therefore be avoided or minimized.

Of the five patients who had a CAGE score greater than 1, four patients reported drinking heavily (at least four drinks daily). None of the other 150 patients reported drinking more than two drinks daily. In two of these 150 CAGE-negative patients, however, there were notations by the physician that the patient had a history of alcohol abuse and that the patient was currently trying to moderate its use, yet the CAGE score was 1 (yes to the cutting down question) for one patient, and 0 for the other patient.

Of the five patients with a CAGE score of 2 or more, three charts (60 percent) had notations made by the physician indicating that the pattern of excess alcohol consumption had been confirmed and discussed with the patient. Although none of the charts had a specific diagnosis of alcoholism, laboratory data that could be helpful to screen for alcoholism was available in 23.8 percent (19 of 80) of the charts. In none of the five cases where the CAGE score was at least 2 were appropriate laboratory tests available. Indeed, no laboratory test was performed in any of the other ten patients with a CAGE score of 1, or in the patient who had a history of alcohol abuse but had a CAGE score of 0. In four patients (5 percent) laboratory tests were elevated, but these were persons recovering from hepatitis who had elevated liver enzyme levels. The interpretation of these tests for the purpose of screening for alcoholism is therefore difficult.

DISCUSSION

In this study the CAGE questions suggest an incidence of 3.2 percent of problem drinkers presenting to the FMC, rather than the 9.8 percent suggested by the estimate of

TABLE 2. SUMMARY OF ALL PATIENTS WITH SUSPECTED DRINKING PROBLEMS (n = 7)

Age (years)	Sex	CAGE Score	Patient's Reported Alcohol Use	Chief Complaint	Occupation
39*	Male	2	No response	Low back pain	Steelworker
37*	Female	3	1 to 5 a day	Low back pain	Librarian
30	Male	4	6 daily	Sinusitis	Machinist
35*	Female	4	A lot	Tension	Secretary
48	Male	3	1/5 whiskey plus 1 case beer/wk	Abdominal pain	Salesman
24**	Male	0	3 to 4 daily	Blurred vision	Finance manager
23**	Female	1	2 beers/wk	Prenatal	Secretary

* Discussion of alcohol consumption/abuse noted in the record

** Reported by physician to have history of excess alcohol use

TABLE 3. AFFIRMATIVE RESPONSES TO THE INDIVIDUAL CAGE QUESTIONS

CAGE Questions	CAGE Score ≥ 2 (n = 5)	CAGE Score ≤ 1 (n = 150)	Total of Sample
Cut down?	5	10	15
Annoyed?	4	1	5
Guilty feelings?	4	2	6
Eye-opener?	2	0	2
Total	15	13	28

local incidence ($P = .0039$).²⁰ The demographic variables known to influence the incidence of alcoholism include religious, ethnic, and racial background. The ratio of men to women is also important, as the frequency of alcoholism in men is greater. The FMC patient population includes more women and has a higher rate of unemployment, but is otherwise representative of the local population.

In this study only a single case of otherwise unsuspected problem drinking was detected by the use of the CAGE questions. The CAGE was not any better than simply asking patients how much they drank. That question alone provided an incidence of 4 percent, taking four or more drinks per day as the minimum for suspicion of problem drinking. Of course, the two consecutive time periods may not be comparable, given the other changes made in the health history questionnaire and changes in physician and societal attitudes over time.

Considering the CAGE sample alone, in two cases there were indications in the record that two patients were currently having (or recently had) drinking problems that were not identified by the CAGE. Given the small number of patients identified by the CAGE, the proportion of false negatives may be considerable, although too small to demonstrate statistical significance.

The low rate of alcoholism (as determined by the CAGE) found in this study may well be due to the failure of many patients to complete the CAGE, although the relatively small sample size used in this study limits the conclusions one might draw. There were 18 charts in which the patient did not answer all four questions. Patients who are actively denying alcohol problems may not respond to the CAGE questions. Of the two patients who had a history of problems with alcohol entered in the record by the physician, one had a score of 1 (a prenatal visit indicating that the reason for cutting down alcohol consumption was the pregnancy) and the other did not respond to the question about guilt related to drinking, although denying the other three questions.

A previous study found mention of alcohol in the charts of 50 percent (12 of 24 charts) of patients who were prob-

able alcoholics as judged by MAST, similar to the 60 percent (3 of 5) found in the current study.⁶ A diagnosis of alcoholism was recorded in two of these 24 cases. Another study found that five of 56 MAST-positive charts had a recorded diagnosis of alcoholism compared with none for the current study.¹³ There are many reasons why a physician may not choose to record the diagnosis of alcoholism. Uncertainty about the diagnosis itself or about the effects of labeling the patient are frequently stated concerns. On the other hand, delaying a written diagnosis of alcoholism until the evidence is overwhelming (such as arrests for drunk driving, withdrawal signs, or other hard evidence) offers little in the way of early detection and treatment.

In conclusion, the CAGE, as applied within a larger survey form, does not appear to be helpful in detecting alcoholism. Some of this may be accounted for by the failure of some patients to complete the questionnaire, but the CAGE, when used as a self-report instrument, did not function any better than simply asking the patient, "Do you drink?" and "If so, how much?" The 3.2 percent incidence is significantly below the rate believed present in the patient group involved, and the CAGE appears to be neither sensitive nor specific for the detection of drinking problems as used in this particular clinical setting.

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