The benefits of the CAGE as a screening tool for alcoholism in a closed rural South African community

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Objective. Testing the benefits of the CAGE questionnaire (a four-item test with questions on **C**utting down, **A**nnoyance at criticism, **G**uilty feelings and use of **E**ye-openers) in screening for possible alcoholism in rural underserviced South Africa.

Design. The CAGE questionnaire and the *Diagnostic and Statistical Manual IV* diagnostic criteria for substance abuse and dependence were used to screen a representative sample ($N = 96$) of a rural community in the North West province of South Africa.

Setting. The closed community of Ammerville situated at Fraserburg, approximately 500 km from Cape Town.

Subjects. Adults above the age of 18 years.

Results. The prevalence of alcohol dependence in this community was 56%. The 'positive' CAGE (two or more affirmative replies) showed a sensitivity of 100% and a specificity of 78% for alcohol dependence. This compared favourably with similar screening results in other clinical settings.

Conclusions. The high prevalence of alcohol dependence (56%) in this community, and the possibility of comparable results in many similar rural South African communities, reflect a startling reality that should be addressed. Use of the CAGE by other than traditional sources is recommended and emphasised. Treatment modalities for alcohol dependence and abuse in rural areas should be developed.

S Afr Med J 1999; **89**: 976-979.

Many closed communities still exist in rural South Africa, divided by race and very much representative of the apartheid era. It is well known that the psychological well-being of most of these rural communities was negatively affected by the apartheid policies of the past[1] and that the availability and quality of mental health services (including alcohol and drug services) to these communities suffered the same fate. In 1993

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the World Bank reported that within the group of non-communicable diseases, alcohol dependence, depression, epilepsy and the dementias followed cardiovascular disease as the major causes of disability across developed and developing regions.

In 1985, Plant[2] stated, 'The paradox of alcohol is that as long as it continues to be our favourite valued recreational drug, the price we have to pay is a high level of alcohol-related problems. No political party seems interested . . .' The International Bureau against Alcoholism also found that South Africa has the fourth highest prevalence of alcoholism among 20 countries studied, with 1.9% of the adult population affected.[3]

Published and unpublished information indicates the presence of so many rural communities disadvantaged by policies of the past, coupled with the known relationship between social class and alcoholism[4,5] (and J L Botha *et al.*, unpublished MRC report, October 1980), and raises questions such as: is the new reformed health care system of South Africa equipped to deal with the increase in alcohol consumption,[6] the harmful effects thereof, and the frightening financial costs involved in the management and treatment of alcohol-related diseases?[7]

The lack of qualified mental health workers at primary level in South Africa raises a further question: could the screening for possible alcoholism in these communities be carried out by community workers or primary health care personnel?

Alcohol abuse/dependence has been receiving increased attention with the recognition that in clinical settings up to 20 - 30% of patients have alcohol-related problems.[8-15] Several studies indicate that physicians detect as few as 10 - 50% of these patients.[9,12-15] Despite the social problems associated with illicit drugs, alcohol still remains the most common substance of abuse[16] and alcoholism is also a risk factor for infectious diseases such as tuberculosis, the leading notifiable disease in South Africa.[17]

The 'CAGE' acronym, representing a four-item test with questions on '**C**utting down, **A**nnoyance at criticism, **G**uilty feelings and use of **E**ye-openers' (Table I) was first described by Ewing in 1970. It is one of several questionnaires designed to improve the ability of health care workers to identify patients who might be abusing or dependent on alcohol.[9,18,19] The CAGE does not require training to administer or score; it takes no more than 2 minutes to complete and can be self-rated, assisted or by interview.

Table I. The CAGE questionnaire

Felt need to **C**ut down drinking?
Ever felt **A**nnoyed by criticism of drinking?
Had **G**uilty feelings about drinking?
Ever take morning **E**ye-opener?

It also concentrates on the social and physical consequences of alcohol abuse;[20] in clinical inpatient settings it has been proved to have a sensitivity of 75 - 91% and a specificity of 77 - 96% in detecting alcohol abuse or dependence.[21-23] Recent studies in clinical settings using the CAGE indicated a sensitivity ranging from 43% to 100% and a specificity ranging between 65% and 95%. In these studies a score of two or more positive answers was considered a positive CAGE.[8,24-26] Questionnaires such as the CAGE and the 10-item Brief Michigan Alcoholism Screening Test have proved to be superior to laboratory methods[21,22,27,28] in detecting alcohol-related problems. However the Brief MAST is less sensitive in detecting problem drinkers or heavy drinkers in general population samples.[24]

A positive response to the CAGE interview is not diagnostic of alcoholism, but a positive response should alert the interviewer to a high likelihood of this condition.[29] Certain people consider that four positive responses are pathognomonic of alcoholism.[30]

In a small rural closed community the common gossip regarding who has a drinking problem is usually known. The detection of alcohol dependence rather than abuse, however, comes down to more than just gossip. It relies on the primary health worker being trained/skilled in screening methods and pursuing the drinking pattern further.

This paper reports on a study using the CAGE as a screening tool in a rural closed community in the North West province of South Africa. The community had never been tested with such an instrument before.

METHOD

In 1995 the rural community of Ammerville, Fraserburg, consisted of 1 702 people in total, with 960 individuals above the age of 18 years (D E Nortjie — unpublished report, September 1990). This study was performed in April 1995. The people of this community are primarily coloured and speak mainly Afrikaans, therefore all questions in this study were translated into Afrikaans.

The CAGE[19] and the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*, 1994)[31] diagnostic criteria have not been standardised to evaluate individuals of the coloured population. Nevertheless both of these were used as they reflect a consensus of current formulations of evolving knowledge in the field of psychiatry. It is noted that the *DSM-IV* does not encompass all the conditions for which people may be treated or all the appropriate research topics.

A sample size of 60 was recommended following the results of a power study. However, the sample size was increased to ensure adequate numbers when allowing for consent to participate. A list of the permanent occupants of each home in Ammerville at the time of the study was obtained from the

clinic nurse, and every third home on the list was visited by the examiner. The adult occupant in each home whose birthday was closest to April was interviewed. If this person was not at home or did not wish to participate, the person with the birthday following was interviewed. A total of 96 people gave consent to participate. In some cases appointments were made to see participants later at a time that suited them, either at the health clinic (situated in Ammerville) or at home. Interviews were conducted in Afrikaans by the Afrikaans-speaking author. The formal interview consisted of a general information section (age, gender, literacy level, employment status, marriage and number of people sharing a house with the respondent) and the four-question CAGE interview.

Respondents who answered positively to two or more questions of the CAGE were rated as abusing/dependent on alcohol (the 'positive' group). In addition to the CAGE, each participant was also screened for substance abuse and substance dependence using the *DSM-IV* diagnostic criteria.

From the results obtained, the sensitivity and specificity of the CAGE was established. In the case of a test that divides the population into two groups, validity is assessed by how well it picks up those with diseases/conditions/afflictions (its sensitivity), and how well it rejects those without disease (its specificity).[32]

Table II. Derivation of sensitivity and specificity in terms of alcohol abuse

	DSM-IV criteria		
CAGE	Positive	Negative	Total
Positive	63[a]	0[b]	63[a+b]
Negative	0[c]	33[d]	33[c+d]
Total	63[a+c]	33[b+d]	96

Sensitivity = $\frac{\text{true positives}}{\text{all positives}} = \frac{a}{a+c} = \frac{63}{63} = 100\%$

Specificity = $\frac{\text{true negatives}}{\text{all negatives}} = \frac{d}{b+d} = \frac{33}{33} = 100\%$

Table III. Derivation of sensitivity and specificity in terms of alcohol dependence

	DSM-IV criteria		
CAGE	Positive	Negative	Total
Positive	54[a]	9[b]	63[a+b]
Negative	0[c]	33[d]	33[c+d]
Total	54[a+c]	42[b+d]	96

Sensitivity = $\frac{\text{true positives}}{\text{all positives}} = \frac{a}{a+c} = \frac{54}{54} = 100\%$

Specificity = $\frac{\text{true negatives}}{\text{all negatives}} = \frac{d}{b+d} = \frac{33}{42} = 78\%$

RESULTS

During the selection process no one declined to be interviewed and all gave verbal consent. The 96 respondents consisted of 50 men and 46 women. The mean age was 38 years, ranging from 18 to 71 years (standard deviation = 11.95).

When two or more questions are answered positively this is categorised as a 'positive CAGE'. Sixty-three (66%) of the 96 respondents in this study had a positive screen. The majority (45, 71%) of the positive group were men. In the positive group all four questions were answered positively by 46 (73%) individuals, three questions were answered positively by 14 (22%), and 3 (5%) responded positively to two questions only.

In responding to the *DSM-IV* diagnostic criteria for substance abuse and dependence, all the individuals in the positive group (100%, 63) met the criteria for alcohol abuse, whereas 86% (54) of this group met the criteria for alcohol dependence.

This means that 56% (54) of the total sample met the *DSM-IV* diagnostic criteria for alcohol (substance) dependence. All respondents who failed to reach a positive CAGE (the 'negative group') also failed to meet *DSM-IV* criteria for substance abuse or dependence (Table II and III).

DISCUSSION

This study indicates that the prevalence of alcohol dependence in this closed rural community is 56%, which is much higher than the average 20 - 30% prevalence reported in earlier studies of alcohol dependence in other clinical settings.[8-15] This figure was supported by the local general practitioner and health care staff, who saw abuse of alcohol as the biggest threat to the health of the community. It is interesting to note that not one respondent gave a positive answer for only one question of the CAGE.

The sensitivity of the CAGE (100%) in this study population correlates reasonably well with studies by Bush *et al.*[23] in 1987 (85%) and Beresford *et al.*[27] in 1990 (76%) with regard to alcohol dependence. It correlates well (100% versus 76%) with an alcohol abuse study by Ford *et al.*[20] in 1994. The specificity of the CAGE in this study was 78% for alcohol dependence, which compares well with the 89% of Bush *et al.* in 1987 and the 94% of Beresford *et al.* in 1990. It can be speculated that the high sensitivity of the CAGE in this study could in part be due to the specific social environment. The problem of excessive use of alcohol has psychological as well as sociocultural dimensions, and poverty, unemployment, isolation and lack of health and social services all contribute to affect self-esteem and social relations in the study population. Although the results of this study could have been biased by the author administering both the CAGE and the *DSM-IV* diagnostic criteria, it is felt that the influence of this on the results was negligible. In 1995 it was declared[35] that two or more positive answers on the CAGE questionnaire suggests, with 80 - 90%

sensitivity, that a patient has a problem and needs fuller investigation. This study supports that view.

Unpublished data indicate a low level of education (an average of 5 years of schooling, and a 34% illiteracy rate), high unemployment (47%) and availability of social benefits (average R1 000 000 per annum) in this community, and the CAGE impresses as sensitive, non-judgemental, easy to use and a quick way to assess whether a patient should be investigated further for an alcohol dependency problem. Substantial evidence exists indicating that primary care providers fail to identify at least half of patients who abuse alcohol.[13,34]

The CAGE could easily be memorised and productively used by health workers and even laypersons in the primary setting of rural South Africa. A positive result on the CAGE would raise the index of suspicion that alcoholism may be a problem for the respondent. Further inquiry into the extent of alcohol use may follow and 'preclinical' alcoholism with its dire effects might then be addressed. The CAGE is an excellent screening method, but the danger exists that there might be no or minimal treatment modalities available to address the problem of alcoholism. The communities and the government should look with urgency to restoring family values, cultural ethics and the education of people. Outpatient treatments, group therapies and psychiatric social workers should form an integral part of new developments in these rural communities.

Our knowledge of patients with alcohol problems is inadequate — more attention must be directed towards effective health policies in the still divided South Africa in order to integrate knowledge into clinical practice. This will, it is hoped, result in not only the saving of lives, but also better quality of life and the conservation of much-needed public health care funds.

My thanks to Sister Denise Nortje of the Community Health Center at Fraserburg; Professor Naas Carstens, retired Head of the Department of Community Dentistry, University of Stellenbosch, and his staff; and Drs Willie Pienaar and Piet Oosthuizen from the Department of Psychiatry, University of Stellenbosch. I would also like to express my gratitude to the people of Ammerville, without whose help this study would have been impossible.

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Accepted 20 Sep 1998.