

# USEFULNESS OF THE "CAGE" IN MALAYSIA

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## ABSTRACT

*This study examines the usefulness of the "CAGE", (which is an acronym for "cut down", "annoyed", "guilty" and "eye-opener"), a 4-question screening test to identify excessive drinkers among Malaysian inpatients. The CAGE questionnaire after translation and back translation was administered to all inpatients in the General Hospital, Kuala Lumpur. The author interviewed 'blindly' all who score positive on the CAGE score and 10% of all negatives using the DSM III interview schedule for alcohol abuse dependence. The results show that the CAGE performs best at a cut-off point of 2 and above, with a sensitivity of 92%, specificity of 62%, positive predictive values of 38% and Kappa (K) of 0.37 with a DSM III R diagnosis for alcohol abuse/dependence.*

*The poor agreement with a DSM III diagnosis indicates that the CAGE is not useful in the Malaysian population. Reasons suggested for this are: cultural factors in the Malaysian population resulting in the overrating of the question on 'guilt' by Muslims and translations into the local languages which are only the closest approximations.*

**Keywords:** CAGE, Malaysian, inpatients.

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## INTRODUCTION

Efficient and valid screening techniques to detect excessive drinkers in patients in hospital and other high risk groups are increasingly important. These may be in the form of questionnaires or laboratory methods<sup>(1)</sup>.

A report which was part of a larger study done by World Health Organisation<sup>(2)</sup> shows that alcohol specific screening instruments differentiated best alcoholics from non-alcoholics, followed next by clinical and laboratory methods. This correlates well with earlier work which also supports questionnaire screening as superior to laboratory tests in detecting excessive drinkers<sup>(3)</sup>. In the Malaysian context, laboratory tests would be too expensive and time consuming to use.

In view of the acceptability of alcoholic self reports, questionnaire interviews using the Michigan Alcoholism Screening Test<sup>(4,5)</sup> and CAGE<sup>(6-9)</sup> have become well-known screening tests for early detection. The CAGE however is easier to use, less intimidating and more sensitive when the two were compared in a community survey<sup>(7)</sup>. The CAGE questionnaire includes four questions:

1. have you ever felt you ought to *Cut down* on your drinking?
2. have people *Annoyed* you by criticising your drinking?
3. have you ever felt bad or *Guilty* about your drinking?
4. have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? – *Eye-opener*.

Recent work done<sup>(9)</sup> in the United Kingdom showed that the CAGE performed well as a screening instrument to detect excessive drinkers in general practice with a sensitivity of 84%, a specificity of 95%, and a positive predictive value of 45%.

Outside the English speaking European countries, the CAGE has been validated and adapted for use in Brazil<sup>(10)</sup>.

This is a cross-sectional study of all inpatients in 3 units of a General Hospital i.e. medical, surgical and orthopaedic.

Interviewers used the CAGE to screen the population, and all those scoring one affirmative answer and above and a proportion of the negative questionnaires were screened 'blindly' by the author using DSM III R (American Psychiatric Association, 1980) criteria to establish a diagnosis of alcohol abuse or dependence. This study attempts to examine the usefulness of the CAGE in a multiracial, multi-ethnic, non-English speaking population and to answer the question "How good is the CAGE compared to a DSM III interview?"

## METHODOLOGY

Consent was obtained from all the subjects before the interview was conducted.

The inclusion criteria for the study population was all inpatients 16 years and above who had been admitted for more than 24 hours on the particular day the study was carried out. The unconscious, those with fluctuating levels of consciousness, the very ill and those with severe language difficulties although included in the study would be omitted from the main analysis. The wards were randomly selected from the various units and screened ward by ward till all the wards in the units were completely screened. The Health System Questionnaire which was designed included in the first part the CAGE questionnaire and questions on demographic data, smoking, drug use, diet, exercise, history of previous health and past admissions into hospital. These questions were included to have a health orientated approach and to avoid undue emphasis on alcoholism. The 4 questions from 'the CAGE' were imported directly into the questionnaire with as literal and as appropriate a translation as possible.

The second part includes DSM III criteria for alcohol abuse/dependence. The author used these criteria as a guideline to decide which diagnostic category the patient could be included under.

All the questions were translated first from the original versions to the 3 native languages, Malay, Tamil and Mandarin by colleagues, back-translated into English by other colleagues and the two versions compared to see whether there were differences in meaning.

Two senior medical students were given the questionnaires and the translated versions to study, and for their first practice run each student interviewed 10 diagnosed alcoholics and 10 non-alcoholics under the supervision of the author and a research assistant (RA). Inter-rater reliability was calculated on these two.

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They screened 20 patients consecutively each from a randomly selected ward, a day later switched and interviewed the other 20 patients 'blindly'. To avoid the effect of recall by the patients a day's delay was given. Throughout the course of the survey, the interviews of the students were supervised at random intervals by the RA, who also cross-checked.

Only the responses which were in agreement with the other interviewer were accepted.

All the questionnaires of patients who scored positive i.e. "yes" on at least one CAGE score plus 10% of all negative cases were selected by the RA. The author "blindly" interviewed all these cases with DSM III interview for alcohol abuse/dependence within 2 to 3 days of the first screening interview. The author then selected all positive DSM III alcohol abusers/dependents and 10% of negatives and the other psychiatrist diagnosed them again using the DSM III criteria for alcohol abuse/dependence.

To evaluate how accurate or valid the CAGE is in identifying excessive drinkers, the sensitivity and specificity indices are used. In this study all alcohol dependents/abusers by the DSM III have been administered the CAGE as the study progressed, and so have the drinkers.

The cut-off scores for the CAGE is determined by calculating the sensitivity and specificity for a possible range of affirmative answers to the CAGE ranging from 1 to 4 for both diagnosed alcohol abuse/dependence (by DSM III) versus non-alcoholic drinkers. The agreement Kappa (K) between the various scores and a psychiatric DSM III diagnosis of alcohol abuse/dependence was calculated to identify the score that agrees best with a diagnosis of alcohol abuse/dependence.

## RESULTS

Six hundred and twenty-one patients which included all inpatients in the three units were screened with the translated versions of the CAGE questionnaire. Eighty-six (14%) who were unable to complete the questionnaire were omitted from the main study.

The medical students showed complete agreement for detecting drinkers and non-drinkers, but only 15% (K = 0.15) agreement on CAGE scores of 2 and above, and below 2. Possible reasons for poor agreement on rating CAGE scores are discussed later.

The prevalence of alcohol abusers/dependents as detected by the author was 10% (52/535)<sup>(11)</sup>. Only 264 patients ever consumed alcohol, and the prevalence of abusers and dependents in this group was 25%.

**Table I – Prevalence rates of alcohol abusers and dependents**

	Numbers	Total Population	%	Confidence Interval (95%)
Alcohol Abusers/Dependents as diagnosed by author (using DSM III R criteria)	52	535	10	12.19 to 7.35
Total number of Alcohol Abusers/Dependents	66	621	11	12.97 to 8.27
Alcohol Abusers/Dependents in the Omitted group	14	86	16	24.07 to 8.47
Alcohol Abusers/Dependents in the drinking population	66	254	25	30.2 to 19.8

**Table II – Summary of various cage scores for detecting alcohol abuse/dependence**

CAGE Score	Sensitivity	Specificity	Positive Predictive Values	Kappa
≥ 1	100.0	37	28	0.18
≥ 2	92.0	62	38	0.37
≥ 3	47.0	88	50	0.36
≥ 4	10.0	99	71	0.13

There is very poor agreement between the CAGE scores as a predictor of alcohol abuse and dependence and a diagnosis using DSM III. Table II is a summary of the various CAGE scores.

**Table III – Item analysis of CAGE questions by race.**

CAGE Questions	Chinese	Indian	Malay	Others	Total
Q <sup>n</sup> 1: 'cut down'	5	4	6	0	15
Q <sup>n</sup> 2: 'annoyed'	7	7	3	0	17
Q <sup>n</sup> 3: 'guilty'	26	42	44	4	116
Q <sup>n</sup> 4: 'eye-opener'	6	15	4	1	26
Total	44	68	57	5	174

Table III shows that Question III 'Have you ever felt bad or guilty about your drinking?' elicited 116 'yes' responses compared to a total of 58 'yes' responses for all the other CAGE questions.

**Table IV – Cage responses by race**

	Q <sup>n</sup> 1, 2 & 4	Q <sup>n</sup> 3	Total
Non-Malays	45	72	117
Malays	13	44	57
Total	58	116	174

p < 0.04

Table IV shows that the Malays did not differ significantly from the non-Malays (p < 0.04) in their overall scoring.

## DISCUSSION

The inter-rater reliability for identifying drinkers versus non-drinkers was 100%, but by CAGE scores of below 2 and greater than 2 there was only agreement in 6 out of 11 cases i.e. k = 0.15 (i.e. 15%) (Indran, 1992). Clearly, there is a lot of variability in the responses to the CAGE.

The CAGE questionnaire although very promising in many other countries performed poorly in this study. CAGE scores of 2 and above 2 is often used in other studies for identifying excessive drinkers and in this study gave a prevalence of excessive drinkers of 118 i.e. 22% of the population. This is too sensitive and includes 73 cases that were not abusers and drinkers by DSM III but misses out only 4 cases of abusers and dependents. Since the actual prevalence of abusers and dependents is 10%, it is unlikely that the extra cases are excessive drinkers who are 'at risk' of becoming abusers/dependents. CAGE score of 3 and above gives a prevalence rate of 9% (i.e. 66 cases) which includes 23 cases that are not abusers/dependents

and misses 26 cases that are. Both their agreements with a psychiatric diagnosis of DSM III are too low to be acceptable.

The reasons for this are the poor inter-rater reliability in the scoring of the CAGE scores due to varying interpretations of the CAGE questions by the patients in spite of translations and back translations carried out.

The subjectiveness of the questions is affected by the differing meanings the words have in the various languages e.g. 'annoyed' – is literally translated into 'feeling angry' in Malay and Tamil since that was the closest possible approximation. Similarly, 'cut down' becomes 'reduce' and 'try to stop' in the other languages. 'Criticise' is another word for which only best approximate translations were used. Only question 4 which had an objective description of dependence was answered with little variability. Besides the problems resulting from translations, cultural factors also affected these response. The Chinese and Indians generally do not have as severe religious taboos against consuming alcohol as the Malays have. Thus the Malays scored highest for question 3, i.e. 'Have you felt bad or guilty about your drinking?' compared to the other races even though they drank the least<sup>(11)</sup>. All the same, this question received more 'yes' responses compared to the other questions even from the other races. This question is over-rated as shown by item analysis and results in increasing the CAGE score.

Another possible suggestion is that the CAGE in this study has been validated against DSM III diagnosis only, and those (n=14) with evidence of physical ill-health, e.g. liver damage fell into the "omitted" group, due to difficulties in interviewing. It is likely that this significant group has affected the validity of the CAGE. A future study validating the CAGE against alcoholics with physical morbidity, e.g. cirrhosis might be helpful before discarding the use of the CAGE in hospital settings in Malaysia.

## CONCLUSION

The CAGE was selected over questionnaires like the MAST<sup>(11)</sup> and CAST or the Canterbury Alcoholism Screening Test<sup>(12)</sup> but it performed poorly in this study and could not be validated as a good screening instrument in this heterogeneous population. The Alcohol Clinical Index<sup>(13)</sup>, which includes clinical signs and medical history items, comes out superior to laboratory diagnosis but could not be selected for this study primarily because of its

length and the time involved in using it. However, as has been suggested, using the Alcohol Clinical Index routinely during clinical examination followed by a brief screening questionnaire and confirmatory laboratory tests could increase the probability of identifying the undetected cases. In the Malaysian context and considering the short-falls of the CAGE, the author would like to suggest instead the use of a questionnaire that would quantify the amount of liquor consumed, i.e. by quantity-frequency or Consumption Index<sup>(14)</sup>.

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