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Original Article

Psychiatry Section

Development of Screening Questionnaire for Detection of Alcohol Dependence

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ABSTRACT

Introduction: Alcohol dependence (AD) is a major reason for morbidity and visits to emergency medical settings. However, the detection of AD is often difficult or overlooked. This study aimed to develop a brief screening questionnaire in Hindi language for detection of AD in an emergency medical setting.

Materials and Methods: The authors in consultation devised a set of questions related to AD in the Hindi language requiring binary yes/no type of response. These questions were guided by clinical experience, nosological criteria and previously published screening questionnaires. After initial piloting, these questions were administered by the treating doctors to 100 consenting adult patients presenting with possible AD in the emergency medical services of a tertiary care hospital in North India. A diagnosis of AD was arrived at by administering Mini-International Neuropsychiatric Interview separately. Identification of the most discriminant combinations of items for the detection of AD were based on the chi-square test and binary logistic regression analyses. The final version of the questionnaire was then externally validated on another cohort of patients.

Results: Based on the analyses, we retained 5 items in the final version of the questionnaire. Sensitivity and specificity values for cut-off scores were calculated. Subsequent external validation revealed satisfactory psychometric properties of the questionnaire.

Conclusion: The questionnaire represents a simple and brief clinician-administered instrument for screening of AD in an emergency medical setting.

Keywords: Alcoholism, Emergency, Hindi Language, Medical

INTRODUCTION

The consumption and acceptability of alcohol in Indian society is increasing [1]. This is reflected in a growing contribution of alcohol to illness and morbidity in both routine and emergency surgical and medical settings [2-6]. Thus it is important that alcohol use disorders (AUD) be recognized in health care settings. One way of quick detection is by the use of screening questionnaires. There are numerous screening questionnaires for detection of AUD such as the well known CAGE (an acronym for Cut down, Annoyed, Guilty feelings and Eye opener) [7], Fast alcohol screening test (FAST) [8], Alcohol use disorders identification test (AUDIT) [9] and others [10]. There is also ample evidence to suggest that screening for AUD is useful and important [11]. However, it is often difficult to administer these instruments in a busy emergency setting because of paucity of time, attitude of the health-care professional, length of time required in administration of the instrument, lack of awareness or unavailability of relevant instruments [12]. Moreover, these instruments have been developed for use in western cultures and the idioms and language used are often not applicable in an Indian context. Some of the instruments used also depend on the quantification of alcohol consumed which may not be relevant to our context given the wide variety of alcohol available locally [13]. Another issue in this area is that of terminology and severity of AUD that the screening questionnaire is designed for. These terminologies range from hazardous and harmful alcohol use to alcohol dependence syndrome (AD) [14,15]. Therefore, there is a need for a simple, culturally sensitive, vernacular screening questionnaire for detection of AUD in an Indian emergency setting.

This paper describes the development of a screening questionnaire in the Hindi language for detection of AD for use by doctors in an emergency setting. We have decided to restrict ourselves to the diagnosis of AD as these patients have demonstrable behavioural, social, or health consequences of alcohol use and are in imminent danger of adverse consequences such as complicated withdrawal [16]. As mentioned above, we have designed the questionnaire to be simple, brief and based on behavioural and physiological aspects of alcohol dependence instead of the quantification of alcohol consumed. This questionnaire is designed to screen for presence of the diagnosis of AD or mental and behavioural disorders due to use of alcohol, dependence syndrome, currently using the substance (F10.24) as per the ICD-10 [15].

MATERIALS AND METHODS

This study was conducted in the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh and was approved by the institute ethics committee. All participants provided written informed consent. The study was conducted from May 2013 to July 2013.

The items of the questionnaire were derived by consultation among the authors. The items were derived by clinical experience, diagnostic criteria of nosological systems and also relevant questions framed in other screening questionnaires. However, all items were designed in Hindi language to begin with and not just translated from the above sources. All items had a possible yes/no binary response to minimize ambiguity and confusion. A scoring system by which a 'no' response is marked as 0 and a 'yes' response is marked as 1 was decided upon. An initial questionnaire of 29 items was arrived at. The authors agreed that the items in the questionnaire tapped into the formal nosological diagnostic criteria for AD and also other behavioural and cognitive markers that have earlier been described in other such instruments. This was then piloted in 10 participants to check for language, ease of administration, understanding and responding. Thereafter, a questionnaire with 29 items was arrived at, which was administered among the participants of the study. The other instruments used were the socio-demographic profile sheet for the socio-demographic profiles. The Mini-International Neuropsychiatric Interview (MINI) [17] was used to arrive at a formal diagnosis of AD as per ICD-10.

The participants of the study comprised of patients admitted to the medical emergency services of PGIMER. A purposive method of sampling was employed. The inclusion criteria were that the patients needed to have consumed alcohol in some form in the previous year. The exclusion criteria were refusal to participate in the study or inability to understand and answer the questions due

to any organic brain condition. Other than the administration of the questionnaire, no other intervention was done and treatment was carried out as usual.

The study was conducted in two phases. In the first stage, the socio-demographic data of the patients were recorded. All the participants were then administered the 29 item-questionnaire by the doctor on duty in the emergency. Thereafter, all participants were administered the MINI by a psychiatrist to arrive at or rule out a diagnosis of AD. The psychiatrist was blind to the results of the earlier assessment.

The statistical methods followed in arriving at the final set of questions are described below. For each item on the questionnaire, a Chi-square test (χ^2) was performed to compare the proportion of 'yes' responses between the AD and the non-AD groups. The items that differentiated the two groups significantly were then examined for redundancies. This was done by classifying the questions as per the domains of the diagnostic criteria as described in the ICD-10 and other behavioural and cognitive markers as described in other screening instruments. Wherever items were deemed to be similar in content, the one item most predictive of a 'yes' response with the AD status as the dependent variable was arrived at using a binary logistic regression analysis. The items arrived at were then included in a binary logistic regression analysis to decide the items most discriminative of AD and not-AD (NAD) status.

Sensitivity and specificity values and Youden Index (Sensitivity+ Specificity-100) [18] for various cut-off points for the total score of the final version of the questionnaire were then calculated. The corresponding Cronbach's alpha and Area under curve (AUC) using the Receiver Operating Characteristics test were also calculated.

In the second stage, the questionnaire developed earlier was administered to a subsequent cohort of consenting patients with inclusion and exclusion criteria similar to those described above. This was done to externally validate our findings [19]. The questionnaire was administered by the doctors on duty in the emergency. In addition these doctors were asked how easy and how clinically relevant they considered the administration to be. A formal diagnosis using MINI was later done by the psychiatrist who was blind to the findings of the initial administration.

The data were analysed using the Statistical Package for Social Sciences (SPSS) software for Windows [20].

RESULTS

A total of 100 participants were recruited into the first stage of the study. In keeping with the usual trend as regards AD in this part of the country, all the participants were males. [Table/Fig-1] presents the socio-demographic profile of the participants. There were no significant differences amongst the AD and not AD groups.

For each item, a χ^2 test was performed to compare the yes response between the AD and NAD groups. Out of 29 items, 4 items did not significantly differentiate between the AD and NAD groups. These were then excluded from the subsequent analysis. Subsequent stepwise binary logistic regression analyses revealed 5 items to be the most predictive of AD status. The sensitivity and specificity values for different cut-off scores of the 5-item scale are presented in [Table/Fig-2]. The Cronbach's alpha was found to be 0.62 reflecting a relationship but lack of redundancy between the items [21]. The AUC was 0.90 (0.84-0.96 95% Confidence Interval) which indicates a good ability to differentiate AD from NAD subjects [22].

	n	Mean age in years (SD)	Background		Education in years (SD)
			Rural	Urban	
AD	64	47.17 (12.03)	29	35	9.86 (3.70)
Not AD	36	44.44 (11.86)	15	21	8.69 (3.88)
		p=0.69*		p=0.72**	p=0.64*

[Table/Fig-1]: Socio-demographic details of the participants in the first stage of the study*=Independent samples t-test, **=Pearson's Chi-square, p significant if <0.05

Cut-off score	Sensitivity	Specificity	Youden Index
1	100	19.4	19.4
2	95.3	52.8	48.1
3	78.1	88.9	67
4	56.3	98.2	54.5
5	29.7	100	29.7

[Table/Fig-2]: Sensitivity and specificity values (in percentages) and Youden Index at different cut-off scores of the 5-item questionnaire

	n	Mean age in years (SD)	Background		Education in years (SD)	Ques-tion-naire Score <3	Ques-tion-naire Score ≥3
			Rural	Urban			
AD	64	50.23 (13.02)	27	37	10.60 (2.61)	6	58
Not AD	47	45.08 (15.55)	21	26	10.63 (3.19)	46	1
		p=0.06*	p=0.84**		p=0.31*	p<0.05**	

[Table/Fig-3]: Socio-demographic and clinical details of patients included in the second stage of the study

*=Independent samples t-test, **=Pearson's Chi-square, p significant if <0.05

The results shown in [Table/Fig-2] suggest that a score of ≥3 would indicate a positive screen for the diagnosis of AD. The positive predictive value for a diagnosis of AD with a score of ≥ 3 on the 5-item questionnaire was found to be 92.59 (81.25-97.60 95% Confidence Interval) and the negative predictive value was 69.56 (54.07-81.80 95% Confidence Interval). The probability of a false positive was found to be 7.40 (2.39-18.74 95% Confidence Interval).

The subsequent external validation was carried out on 111 consenting patients. All of them were male. The socio-demographic and clinical data of the participants is presented in [Table/Fig-3]. The sensitivity and specificity values for a diagnosis of AD (at a score of ≥3 on the questionnaire) were found to be 90.62 (80.05-96.13 95% Confidence Interval) and 97.87 (87.28-99.88 95% Confidence Interval) respectively. The positive predictive value at the same cut-off score was 98.35 (89.70-99.91 95% Confidence Interval) and the negative predictive value was 88.46 (75.87-95.22 95% Confidence Interval). The AUC with a diagnosis of AD (at a score of≥3 on the questionnaire) in this cohort was found to be 0.94 (0.89-0.99 95% Confidence Interval). The Cronbach's alpha value of the final version of the questionnaire in this stage of the study was found to be 0.80.

None of the patients found any difficulty in answering the questionnaire. The doctors considered the administration of the questionnaire easy and relevant to clinical history taking and decision making for the management of AD.

DISCUSSION

AUD and AD are important contributors to morbidity and mortality all over the world and India is no exception. This contribution to morbidity and mortality is not only due to the direct toxic effects of alcohol use but also indirectly from the contribution of alcohol use in complicating and aggravating other physical and mental diseases. The contribution of alcohol use to economic and social upheaval and avoidable trauma is also well-known [23]. In such a scenario, the detection of AUD and AD become important [11]. Screening instruments either involve biochemical tests or questionnaires [10]. Questionnaires have been popular for their obvious ease of administration, non-invasive nature and brevity as compared to biochemical markers. They have also been found to be useful when compared to clinical impressions, or quantity-frequency measures [10]. However, the use of questionnaires is not without caveats. Firstly and most importantly, there is an issue of terminology in 'what' actually is being detected. Different instruments have been designed to detect different conditions such as moderate drinking,

hazardous drinking, at-risk drinking, harmful drinking, AD, alcohol abuse [10]. All these are specific entities and are not synonymous. For instance, harmful drinking represents a totally different set of issues and challenges as compared to established AD. Therefore, questionnaires are not necessarily interchangeable as per requirement. Clinical variables such as demographic parameters and current versus life-time diagnosis significantly influence the accuracy of screening questionnaires [10]. To further complicate matters, many of these questionnaires are dependent on measures or quantities of alcohol imbibed. While this may be applicable in settings where alcohol content is standardized, in a country such as India where alcohol content may depend largely on the source such as Indian made foreign liquor versus country liquor versus home-brewed and sometimes illicit liquor, the problem is obvious [13]. Finally, all these questionnaires have been designed and developed in the western world with that population in mind. Our cultural patterns and attitudes with respect to alcohol consumption differ significantly from the former. Therefore many items in these questionnaires may not be culturally sensitive to the Indian population. Indian research in this area has been scarce. Screening questionnaires have been used primarily in the community settings for epidemiological purposes [24]. In hospital settings, some studies regarding the utility of pre-existing questionnaires have been done with mixed results [25]. Screening questionnaires have also been used in some other studies where diagnosis or epidemiology was not the primary focus [26]. AUDIT is available in a Hindi translation but has 10 items and may not be suitable for a busy emergency setting [14]. It is clear that more research is needed in this field.

To the best of our knowledge, the development of this questionnaire is the first attempt to develop a vernacular instrument for the screening of AD in an emergency medical setting in India.

The health care setting in general and the emergency in particular represents peculiar challenges and opportunities in the management of patients with AD or conditions that are brought about or aggravated by AD [11]. The barriers to effective screening include not just paucity of time and attitudinal issues but also the availability of culturally relevant, brief instruments that can be rapidly and easily administered. Another confounding factor is also the various terminologies regarding the AUD that are used in these questionnaires. Therefore, in the development of this questionnaire we tried to include items that were deemed to be brief, easily understandable, and relevant to the socio-cultural context. We used a purposive sampling method as we wanted to develop a questionnaire that can be used in patients where initial history taking suggests that AD may be present and missing the diagnosis may be detrimental to the patient. We also decided to screen for AD as defined in ICD-10 rather than abuse or hazardous drinking because of the different terminologies involved. The detection of AD in an emergency setting is important. This is because patients with AD often have various co-morbid conditions that can cause them to visit the emergency medical services. Often, AD can be missed in such patients. Advice or interventions that could be instituted to manage AD are thus not initiated leading to an aggravation in the comorbid conditions. Another important aspect of the detection of AD is the prevention of Delirium Tremens and other complicated alcohol withdrawal syndromes (DT) [27]. Though we did not study the ability of this questionnaire for prediction of DT, we believe that this questionnaire can be useful when taken in association with other known risk factors for DT [27]. In any case, a positive screen for AD should enable a clinician to pre-empt and anticipate DT.

Our study population was comprised entirely of males who generally present with alcohol related problems in the North of India. This may be different from other parts of the country or in other parts of the world where the problem of AD is a lot more widespread among both sexes. However, we believe that our study group is fairly representative of the local situation. Most of the patients were in the 5th and 6th decades of life and presented with medical emergencies of various descriptions. Though we did not gather data regarding the progression of alcohol use in these subjects, the mean ages indicate that those who had AD were in the 5th and 6th decades of life and were in all likelihood abusing alcohol for long durations. The years of education indicate that the subjects would have been intellectually sophisticated enough to understand and respond to the questionnaire appropriately. Our experience in administering the questionnaire indicated an ease in administration and understanding of the items. Our findings suggest that AD as defined in ICD-10 is a heterogeneous condition. Therefore, any screening questionnaire is likely to require items that tap into physiological, cognitive and behavioural aspects of AD.

In our study population, the parameters of tolerance to the effects of alcohol, the inability to control the intake of alcohol, the phenomenon of withdrawal to the effects of alcohol, morning drinking and the report of friends and family members disapproval of the level of alcohol use and advise of reduction or cessation of drinking were the most significant predictors of an AD status. Our findings suggest that in our study group, the physiological effects of AD were more important than cognitions such as anger at being told to cut down or guilt as enumerated in the CAGE questionnaire. This may reflect the fact that physiological effects being easily and reliably demonstrable may be more commonly accepted than the cognitive aspects which are more likely to be disregarded or may be prone to falsification for social reasons. The inability to cut down or control drinking is a behavioural correlate of AD. As such, it is easily observable and is thus not prone to falsification. This may come about due to uncontrollable craving and a genuine lack of control over drinking behaviour. Morning drinking is reflective of impaired control over craving or the drinking for relief of withdrawal symptoms. It is also easily observable and difficult to conceal. The disapproval of family members and friends to current levels of drinking also indicate the degree of social, occupational dysfunction or use despite obvious adverse consequences. Thus we believe that the items in the questionnaire tap into easily verifiable and observable physiological, behavioural and consequential aspects of AD. Our experience in the administration of this questionnaire also suggests that the items are less prone to be responded to untruthfully. This is because many respondents would be uncomfortable in accepting that they have been neglectful of family and occupational responsibilities, or accepting up to their own cognitions of guilt or anger. Also, many respondents would be more comfortable accepting physiological aspects of tolerance and withdrawal to alcohol in AD. This also holds true for the inability to control the use of alcohol and the disapproval of friends and family members. Secondly, as these attributes are observable by others as well, they are less likely to be reported falsely.

The stage of external validation of the questionnaire reveals that the instrument performed better than the results extrapolated from the initial item selection stage would indicate. This is probably because the fewer number of items meant that the questionnaire could be answered with more accuracy and redundancies were removed. Owing to the fluid nature of emergency services, test-retest and inter-rater reliabilities could not be attempted and calculated. This will remain as a limitation of the study. We also could not formally test the instrument for divergent validity. However, clinical experience suggests that the scores derived are unlikely to correlate with any other clinical measure.

CONCLUSION

To conclude, our instrument has the following advantages over pre-existing questionnaires. It is designed to provide a current rather than a life-time diagnosis of AD using easily remembered and administered items that have a yes/no answer format that reduces ambiguity and enhances ease of scoring. Therefore,

the questionnaire is meant to be used in a particular setting for screening of a particular diagnosis and we believe this will enhance the accuracy of diagnosis. The questionnaire has been designed from inception to be useful in an Indian emergency medical setting where the need for such an instrument is most felt rather than being a translation of another questionnaire designed with another type of population in mind. Finally the items in the questionnaire are in Hindi language and can be used as such rather than sometimes inaccurately mentally translating items in other questionnaires.

However, we would like to stress that the study group comprised of subjects who had presented to the emergency medical services and thus any direct extrapolation to populations attending deaddiction services is premature. It is also pertinent to note that this questionnaire screens only for a possible diagnosis of AD and not abuse or harmful use or hazardous drinking. Hence, it reflects the findings in a group of subjects with possibly more severe alcohol problems.

The final questionnaire that was derived is presented in [Appendix-1].

क्या आपने पिछले एक वर्ष में किसी भी रूप में शराब, जैसे कि बीयर, देशी या अँग्रेजी शराब का सेवन किया है?

यदि हाँ, तो निम्नलिखित प्रश्नों का उत्तर हाँ या नहीं में दें।

पिछले एक वर्ष में कभी भी ऐसा हुआ है कि:

Item number	Question	Response	
		हाँ (score 1)	नहीं (score 0)
1	पहले जैसा नशा पाने के लिए अब ज्यादा पीनी पड़ती है?		
2	शराब नहीं मिलने पर तकलीफ/कंपकपी हुई हो या नींद नहीं आई हो?		
3	शराब पीना कम करना / छोड़ना चाहा हो, पर ना कर पाये हों?		
4	कभी किसी ने शराब कम करने या इलाज करवाने की सलाह दी हो?		
5	कभी आपने सुबह शराब पी हो?		
Total			

[Appendix-1]

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