Use of the Self-Administered Michigan Alcoholism Screening Test in a Family Practice Center

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This study was conducted to examine the feasibility of utilizing the self-administered Michigan Alcoholism Screening Test (MAST) in a family practice center. The main objectives of the study were to extend the scope of investigations using the self-administered MAST in outpatient settings and to consider the amount, nature, and implications of missing data. Of 207 participants, the questionnaire was fully completed by 160 (77 percent). Thirty respondents (18 percent) received positive scores (ie, 6 or higher). Results are compared with similar studies, and suggestions are offered for improving the use of the self-administered MAST in family practice settings.

Across a wide range of criteria, alcoholism is one of the nation's most serious problems. It has been estimated that 10 million people in the United States suffer from a serious drinking disorder and that the mortality rate is as high as 200,000 per year.[1] Alcoholism exerts a tremendous impact both on the health care system and on society as a whole. Given the progressive nature of this disorder and the devastating effects associated with end-stage alcoholism, recognition during the early stages is important. Unfortunately, research findings indicate that alcoholism remains greatly underdiagnosed by physicians.[2]

With this in mind, much work has been done toward developing simple, yet effective, screening tests for alcoholism. The Michigan Alcoholism Screening Test (MAST) is one of the most often used and studied screening devices. The MAST, as developed by Selzer,[3] originally consisted of 25 items related to the frequency, pattern, and consequences of drinking, and was presented orally to the patient. During the last 15 years, the MAST has been revised and validated, and it appears to be able to discriminate problem drinkers from social drinkers and nondrinkers.[4-6] A variety of quantitative scoring criteria have been derived from these studies. Statistically, at least in the interview format, the MAST has been shown to satisfy basic psychometric requirements, eg, validity, reliability, and internal consistency. Given these positive findings, the MAST has been used increasingly in recent years as a screening device in many settings.

In most studies, the patients were asked the

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MAST questions by physicians or other health professionals. In a busy general medical clinic, the MAST would be more useful, both clinically as a screening device and as a research tool, in the form of a fully self-administered questionnaire. To date, however, there has been relatively little research conducted to determine the feasibility and to examine the properties of a self-administered MAST with such a population. In addition, research establishing the reliability and validity of the MAST has been conducted with nonmedical populations.[7]

Three studies that have used a self-administered MAST for screening in a general medical outpatient population are those reported by Breitenbucher,[8] Mooney,[9] and Vande Creek et al.[10] Breitenbucher routinely administered the MAST to 252 patients who were undergoing a complete examination in a general medicine ambulatory care clinic. In that study, however, a card-sort method was used whereby each question was printed on a separate card and the patient was instructed to place the cards in either the "yes" or the "no" box. This procedure required five minutes of instruction and would be unwieldy for routine use in an ambulatory clinic. Furthermore, Breitenbucher found 42 percent of the patients to be alcoholic as measured by the MAST, a much higher figure than usually quoted for such a population. An alcohol screening study was conducted by Mooney[9] in a family practice center using the self-administered MAST. Studying responses to 174 completed questionnaires, he found that 20 percent of the scores were in either the positive or the borderline alcoholic range and 8.6 percent of the scores were positive and considered to reflect alcoholism. Most recently, Vande Creek and his colleagues[10] reported the results of a study in which the MAST and its short form were administered to 182 patients at the family practice center at Ohio State University. Thirty-seven percent of the patients in that study were identified as possible or probable alcoholics.

It should be noted that the studies mentioned above did not consider in detail the item characteristics of the self-administered MAST, nor did they discuss in any detail the feasibility of its use as a routine screening test or as a research tool in an ambulatory setting. This kind of information is important to researchers who wish to use the self-administered MAST in family practice sites. Consideration of the usefulness of the MAST in a family practice setting will facilitate the development of standardized methods of data collection and analysis and will allow comparison across a wide variety of ambulatory settings.

The present study was conducted in a suburban Chicago family practice center to test the feasibility of using a self-administered questionnaire version of the MAST as a screening tool in a family practice center. To allow rough comparisons with the previously mentioned study by Mooney, the form of the self-administered MAST used here was the same as that used by Mooney in a North Carolina family practice center. It was intended that this study serve two purposes: (1) extend the scope of preliminary investigations that have used the MAST, and (2) consider the amount, nature, and implications of missing data associated with using a self-administered questionnaire form of the MAST. In addition, item and scale characteristics of the self-administered MAST were of interest for determining the degree to which the measure can provide a reliable assessment of alcoholism. The internal consistency of the measure was assessed by computing coefficient alpha for the data provided by the respondents. Demographic information was obtained to assess the degree to which the respondents in the study reflected characteristics of the universe of patients in the family practice center.

Methods

All center patients seen during an eight-week period who were aged 16 years or older, able to read English, and physically able to complete the survey were eligible to volunteer to participate in the study. Patients were given a copy of the questionnaire with a cover letter and consent form attached. The letter was signed by the investigators and explained that the study was being conducted to study the drinking practices of the people who use the center.

The resulting sample of 207 volunteers is thus a sample of convenience and is not necessarily representative of the center's population. Eighty-three of the 207 participants (40 percent) were male; 121 (58 percent) were female. Data for sex for three of the participants were not available. Of the 207

respondents, 160 (77 percent) answered all of the MAST items, thereby composing the group for whom alcoholism scores could be calculated. This is consistent with the rate of 69 percent reported by Mooney.[9]

As noted previously, a slightly revised version of the questionnaire developed by Mooney[9] was used in the present study. The questionnaire consisted of 37 items and required approximately 10 minutes to complete. The first nine items of the questionnaire requested demographic data and general information including sex, race, present employment status, education level, marital status, living situation, and family alcoholism history. The second section consisted of the 24 MAST items that are answered in a yes-no format.

The present study was conducted in the family practice center of an 855-bed hospital located in a Chicago suburb. The center, part of a family practice residency training program, registers approximately 10,000 patient visits per year. The center population consists primarily of suburban working class families. Approximately 60 percent of the patients are female; approximately 93 percent are white.

On registering for an appointment, eligible family practice center outpatients were told of the study by the receptionist and received a letter explaining the study, a consent form, and the questionnaire. Center patients choosing to participate in the survey completed the consent form* and the questionnaire in the waiting room prior to being seen by their physician. When finished, participants returned the consent form to the receptionist and placed the questionnaire in a sealed box in the reception area.

Results

Demographics

The male-female ratio in the group of respondents is identical to the male-female ratio of patients in the center practice population: approximately 60 percent were female. With regard to racial background, this sample also reflected the composition of the patient population using the family practice center in that virtually all respondents were white. Analysis of age group data available for 165 of the 207 respondents indicated a statistically significant difference from the center population, with younger individuals somewhat underrepresented ($\chi^2 = 8.7$, $P < .05$). However, this statistically significant difference between the age distributions did not represent a marked departure from the center population. Fifty-five percent of the respondents were employed. The 44 percent who were not currently employed included housewives, retired people, and unemployed individuals. Comparable employment data for all family practice center patients were not available. The subgroup of respondents who completed all items, representing 77 percent of the original group, was similar to the entire group of 207 respondents with regard to the demographic characteristics that were assessed.

MAST Scores

MAST scores are computed by applying a weighted scoring formula that assigns scores of 0, 1, 2, or 5 points to each item. Scores are calculated by summing responses to the items. Interpretation of the scores, however, may vary. Originally, a score of 5 points or higher was considered indicative of alcoholism.[3] Recently, the following alternative method of interpretation has been recommended for applications in which it is desired to reduce the number of false identifications[7]: 0 to 4 points for nonalcoholic, 5 to 6 points suggestive of alcoholism, and 7 or more points indicative of alcoholism. More recently, Brown[4] used the following categorization method: 0 to 3 points for nonalcoholic, 4 to 10 indicative of problem drinking but not necessarily alcoholic, 11 or higher indicative of alcoholism.

Scores for the 160 respondents who answered all of the MAST items ranged from 0 to 45 points. Of these individuals, 117 respondents (73 percent) received scores of 3 or lower. Thirty respondents (18 percent) received scores of 6 or higher. Forty-three (25 percent) received scores above 4.

Scores for women tended to be lower than scores for men. The scores for women ranged from a low of 0 to a high of 12. For men, scores

*Parental consent as well as personal consent was obtained for participants younger than 18 years of age.

ranged from 0 to 45. Of the 30 respondents in the present study who received scores of 6 and over, 20 (67 percent) were men, and 10 (33 percent) were women. All but one of the scores of 11 and higher were received by men.

Missing Data

The rate of completeness was 77 percent, that is, 160 of the 207 respondents answered the entire survey. There was, however, a wide range in the number of items omitted by respondents who did not complete the entire survey. Twenty respondents omitted 1 item, 8 respondents omitted 2 items, and 8 respondents omitted all 24 MAST items. An examination of the questionnaires revealed that among the 11 respondents who deleted 22 or more of the 24 MAST items, three noted on the survey that they abstained from drinking any kind of alcoholic beverage and, therefore, did not find the questions relevant.

The surveys of the 28 respondents who omitted one or two of the MAST items were examined. Based on the answers they provided to the items they did not omit, 8 of these 28 individuals could be identified as being likely to be (or have been) problem drinkers.

In addition to considering the amount of missing data, it was of interest to consider the quality of responses to items that were completed. Examination of several questionnaires revealed a tendency for some respondents to answer the questionnaire as if all the items indicative of nonalcoholic status were scored in the same direction. Thus, two respondents who wrote on their questionnaires that they abstained from all alcohol consumption received scores of 8 because they marked "no" for all items on the survey. For completeness, a reanalysis without the data from the four respondents whose responses were indicative of a "nay-saying bias" was performed. Exclusion of these did not, however, alter the percentages reported.

Reliability

The reliability analysis of the items indicated that the 24 MAST items appear to form an internally consistent set of items; that is, the reliability analysis of the data provided by the 156 respondents in the present survey who answered all MAST items without apparent response bias supported the findings of previous investigators that showed the measure to be characterized by a high degree of internal consistency. Coefficient (Cronbach's) alpha, which provides an estimate of internal consistency and is derived from the average interitem correlation, was determined to be .83. Two items, No. 14 ("Have you ever lost a job because of drinking?") and No. 21 ("Have you ever been a patient in a psychiatric hospital or on a psychiatric ward of a general hospital where drinking was part of the problem that resulted in the hospitalization?") were characterized by no variance and were, therefore, omitted from the scale.

Discussion

As noted earlier, the scores of the participants in the present study cannot be used as the basis for inferring the prevalence of alcoholism in the family practice center. These data can, however, be compared with data obtained in other studies that have used the MAST. Respondents' scores in the present study were clustered in several groups. The distribution of MAST scores in the present study suggests five groups: scores ranging from 0 to 1, from 2 to 3, from 4 to 5, from 6 to 10, and over 10. This pattern conforms closely to the distribution of scores reported by Brown[4] and is consistent with his recommendation that MAST scores ranging from 0 to 3 be considered negative for alcoholism, scores over 4 be considered positive, and scores exceeding 10 be regarded as definite indicators of alcoholism.

Breitenbucher,[8] in his study conducted at a Minneapolis outpatient clinic, reported that 42 percent of the respondents had scores of 5 or more. This is a relatively high estimate of the extent of alcoholism and exceeds the rate of 18 percent receiving scores over 5 in the present study. The rate obtained by Breitenbucher may, at least in part, be attributable to his using a card-sort technique. That method, while minimizing the amount of missing data, may have been associated with an increased rate of false positives; that is, respondents were forced via the card-sort method

to answer the somewhat ambiguous items that respondents in this survey omitted on their questionnaires. Indeed, as indicated earlier, four patients in the present study who received scores of 8 on the MAST appeared to receive these scores as the result of a nay-saying response bias.

A positive score (ie, a negative response) on item No. 1, which was frequently omitted by respondents in this study and which may be presumed to be confusing, may also inflate the number of positive scores. In this study, for four cases a positive score on item No. 1 ("Do you feel you are a normal drinker? By normal we mean do you drink less than or as much as other people?") was responsible for raising respondents' total scores from 4 to 6. Thus, this source of measurement error may further increase estimates of the rate of alcoholism based on MAST scores. Consequently, although the issue of false negatives on the MAST is important and was addressed by Breitenbucher, the self-administered MAST appears to have some tendency to produce false positives as well.

Results from the present study, in which approximately 25 percent of the respondents who provided complete and apparently unbiased questionnaires obtained scores of 4 or more, more closely resemble the previously cited findings reported by Mooney[9] and Vande Creek et al[10] than they do the results presented by Breitenbucher.[8] In Mooney's survey, 20 percent of the respondents received scores of 4 or more on the MAST; results obtained by Vande Creek et al indicated 37 percent of the patients in the study as possible or probable alcoholics.

The estimate of the reliability of the MAST in the present study was determined to be appropriately high. It should be recognized, however, that while necessary, this indicator of reliability is not sufficient as a guarantee that the MAST has identified or will consistently identify alcoholics in a family practice. To address that concern, assessments of the validity of the measure not within the scope of the present study are required. Nonetheless, the present study is helpful in pointing to several possible sources of measurement error that may reduce the MAST's ability to identify patients with alcohol problems.

It appears clear that some items, namely No. 1, No. 5, and No. 6, are ambiguous and were omitted on that basis. The concept of normal or less in items No. 1 and No. 6 may have caused some respondents difficulty. Rewording item No. 1 to read "Do you drink less than, or as much as, most other people?" might prove worthwhile. Similarly, rewording No. 6 to read "Do friends or relatives think you drink less than, or as much as, most other people?" may improve that item. In item No. 5, the phrase "guilty about drinking" may have appeared ambiguous to some respondents in that no aspect of drinking was specified. Respondents may have wondered whether the question concerned guilt about the amount drunk, expense, drunken behavior, calories consumed, or all of the above.

Of 28 respondents who did not complete all of the MAST items, 8 could be identified as probable problem drinkers based on their responses to items they chose to answer. Thus, the 30 problem drinkers identified here would have been increased to 38 had some respondents not chosen to omit some of the items.

Before conducting the present study, there were concerns that patients with alcohol problems would refuse to complete the survey. Indeed, this may have occurred, resulting in an underestimate of the extent of alcohol problems in the center. However, based on comments written on the questionnaires by respondents, it was learned that of the eight individuals who submitted forms on which only demographic data were completed were four individuals who abstained from drinking alcohol. Thus, it may be suggested that future use of a self-administered MAST should include an explanation that the survey should be completed by individuals who abstain from drinking alcohol as well as those who do not. This should help reduce the apparent tendency for some nondrinkers to return blank questionnaires and thereby help avoid undercounting nondrinking patients in a group survey.

It is also of value to note the outcome of an informal chart audit of the records of the eight respondents who received MAST scores of 10 or higher. These results, which should be interpreted with care because of the small scale of the audit, are nonetheless relevant for future family practice research. Of the eight patients, five were found to have had alcoholism recorded as a diagnosis by the resident physicians. Problems frequently found in association with alcoholism that were revealed in the chart audit were multiple trauma, near syncope, chest pain, alcoholic liver disease,

diarrhea, alcoholic gastritis, bleeding varices, hypertension, gout, impotence, positive skin test for tuberculosis, digestive discomfort, manic-depressive illness, memory loss, cheilosis, and questionable peripheral neuropathy. Further research with a larger sample would allow examination of the rate of physician diagnosis in a family practice setting, associated diagnoses, and patterns of health care utilization among alcoholic patients and their families.

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References

1. Special report: Research opportunities in alcoholism. N Engl J Med 305:595, 1980
2. Straus R: Alcohol abuse and physicians' responsibility. Arch Intern Med 137:1513, 1977
3. Selzer ML: The Michigan Alcoholism Screening Test (MAST): The quest for new diagnostic screening instrument. Am J Psychiatry 127:1653, 1971
4. Brown R: Use of the Michigan Alcoholism Screening Test with hospitalized alcoholics, psychiatric patients, drinking drivers and social drinkers in New Zealand. Am J Drug Alcohol Abuse 6:375, 1979
5. Moore R: The diagnosis of alcoholism in a psychiatric hospital: A trial of the MAST. Am J Psychiatry 129:41, 1972
6. Fawazza A, Cannell B: Screening for alcoholism among college students. Am J Psychiatry 134:1414, 1977
7. Selzer M, Vinokur A, Van Rooijen L: A self-administered Short Michigan Alcoholism Screening Test (SMAST). J Stud Alcohol 36:117, 1975
8. Breitenbucher R: The routine administration of the Michigan Alcoholism Screening Test to ambulatory patients. Minn Med 6:425, 1976
9. Mooney A: Screening for alcoholism in family practice. Presented before the Annual Scientific Assembly of the American Academy of Family Physicians, New Orleans, Oct. 5-9, 1980
10. Vande Creek L, Zachrich R, Scherger W: The use of standardized alcoholism screening tests in family practice. Fam Pract Res J 2:11, 1982