Diagnosis of Alcoholism in a Simulated Patient Encounter by Primary Care Physicians

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Although early detection and treatment of alcoholism have been shown to be efficacious, it is widely accepted that primary care physicians often fail to diagnose alcoholism. In this study, a computerized, simulated encounter with an alcoholic patient was used to assess the performance of a randomly selected sample of primary care physicians in diagnosing alcoholism.

Of 95 physicians in this study, only 32 percent diagnosed alcoholism with maximal certainty. There was great variability among physicians in the threshold of information needed to diagnose alcoholism. One third of subjects misinterpreted symptoms of alcoholism and erroneously made other psychiatric diagnoses, chiefly anxiety or depression.

Results of this pilot study were not associated with the physicians' age, sex, specialty, duration of training, or reported personal impact of alcoholism. This study provides further evidence of the need for additional education of primary care physicians if such physicians are to succeed in reducing the dramatic impact of alcoholism and alcohol abuse on public health.

Alcoholism and alcohol abuse are among the most prevalent and serious public health problems in the nation, with 14 percent of the adult population estimated to be "symptomatic drinkers."[1] In 1980 the total mortality attributed to alcoholism in the United States was over 69,000.[1] Additionally, alcohol abuse contributes substantially to many morbid conditions,[2] is linked to family disruption, child abuse, and violence,[2,3] and is estimated to cost the nation as much as $116.7 billion yearly.[1]

Alcoholism can be diagnosed before irreversible biomedical consequences have occurred,[4–6] and, once diagnosed, it can be successfully treated.[7–10] Nevertheless, physicians often fail to diagnose alcohol problems,[11–14] and when such problems are diagnosed, physicians often fail to attempt to treat them.[14–18] Although from 10 to 40 percent of patients seen by physicians have alcohol problems,[19] only 15 percent of all alcoholics are believed ever to receive treatment.[20] Primary care physicians therefore have a sizable opportunity to improve the health outcomes of a large segment of their patient populations.

This study was an initial attempt to assess the performance of practicing primary care physicians in diagnosing early alcoholism by using a computerized, simulated patient encounter. It was intended that the results would provide an estimate of the frequency with which primary care physicians might diagnose alcoholism in patients similar to the simulated patient and, more important, that they would provide insight into aspects of physicians' thought processes, which, if altered, might facilitate physicians' diagnosing of alcoholism.

METHODS

Subjects and Recruitment

Recruiting letters were mailed to a random sample of the approximately 400 board-certified family physicians and general internists (without subspecialty board certification) who were included on the mailing lists of the King County (Washington) Medical Society. The letters offered two category I continuing medical education (CME) credits, $25, and educational feedback in return for completing a computerized, simulated patient encounter and a follow-up questionnaire. Physicians were informed that the

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TABLE 1. CLUES TO THE DIAGNOSIS OF ALCOHOLISM IN THE SIMULATED PATIENT

1. Drinking in response to stress
2. Marital discord
3. Difficulties at work
4. Recent change of job
5. History of a one-car motor vehicle accident
6. Paternal history of alcoholism
7. Failure to reduce coffee intake
8. Failure to reduce cigarette use
9. Feelings of discouragement about his situation
10. Sleep disturbance
11. No appetite disturbance
12. Slight weight gain
13. Slightly disturbed attention and concentration
14. Normal libido
15. Slightly fatigued
16. No suicidal thoughts
17. No previous psychiatric history
18. Anxious feelings about work
19. Intermittently elevated blood pressure
20. Blood alcohol level of 9 mmol/L (40 mg/dL)
21. Serum glutamic-oxaloacetic transaminase (SGOT) of 0.09 μkat/L (54 U/L)
22. Gamma glutamyltransferase of 5.07 μkat/L (304 U/L)
23. High-normal mean corpuscular volume
24. Gastritis visible on gastroscopy

TABLE 2. CLUES TO THE DIAGNOSIS OF ALCOHOLISM ON THE ALCOHOL USE MENU

1. Admits greater alcohol consumption than previously
2. History of alcoholic blackouts
3. Previous attempts to decrease drinking
4. Wife's concern about patient's drinking
5. Patient's guilt over his drinking
6. Morning consumption of alcohol

study's purpose would be to investigate how physicians would manage a particular patient in their practices. Full-time physicians at the authors' institution and close acquaintances of the authors were excluded. Ninety-five physicians (39 percent of those contacted) were enrolled in the study. More family physicians were recruited and enrolled because the supply of general internists was exhausted. Differences between the participation rates of family physicians and general internists were not statistically significant.

The Computerized, Simulated Patient Encounter

Initially, the computerized, simulated case was pretested on six faculty members, including two with special expertise in alcoholism. The case fulfilled the *Diagnostic and Statistical Manual of Mental Disorders,* Third Edition (DSM III) criteria for a diagnosis of alcohol abuse but not for any other psychiatric diagnosis based on DSM III criteria.[21] Other correct diagnoses were gastritis and peptic ulcer. All six faculty members found the case to be realistic and the correct diagnoses to be accurate.

A trained research assistant administered the simulation to each physician on a portable microcomputer, usually in the physician's office. Each physician was instructed to obtain sufficient information to make a diagnosis with appropriate certainty and to formulate a complete management plan. Each physician then performed a diagnostic evaluation of the same simulated patient by means of a menu-driven computer program that was created for this study. The menus presented physicians with over 600 descriptions of pieces of clinical data that physicians could request on the patient. In so doing, physicians performed a history and physical examination, ordered and received laboratory tests, and reviewed past medical records. The computer program recorded the order in which each subject obtained various pieces of clinical data. Almost all physicians completed the exercise within 45 minutes.

The case was one of a 38-year-old male, married, inventory control manager with recurrent abdominal pain. If appropriate items were selected, the history revealed symptoms of active peptic ulcer and gastritis and many clues to alcoholism,[22,23] as shown in Table 1. Eighteen of these clues were strictly historical, including the patient's admission of drinking in response to stress. Several of these historical clues, such as anxiety related specifically to the patient's job and a normal libido, were designed to help rule out a diagnosis of anxiety disorder or depression. Five clues were laboratory results, and one, high blood pressure, was obtainable by history, physical examination, and past medical records.

Throughout the exercise, the assistant encouraged the physicians to request additional information not found on the computer menus. Three additional menus dealing with marital and family problems, stress, and alcohol use were made available by the assistant if physicians expressed an interest in these specific areas. Responses to items on the alcohol-use menu provided further information on the extent of the patient's drinking problem (Table 2).

Immediately after completing the exercise, subjects were given a questionnaire on which they indicated the likelihood that the patient had any of 11 diagnoses—gallbladder disease, gastritis, gastrointestinal tumor, pancreatitis, peptic ulcer, alcohol problem, anxiety disorder, depression, malingering, personality disorder, and somatization disorder—on a five-point Likert-type scale: very likely, somewhat likely, intermediate, somewhat unlikely, and very unlikely.

TABLE 3. PERCENTAGE OF SUBJECTS WHO SELECTED PSYCHOSOCIAL DIAGNOSES ON THE SIMULATED PATIENT

Diagnosis	Very Likely	Somewhat Likely	Intermediate	Somewhat Unlikely	Very Unlikely	Missing
Alcohol problem	32	33	17	15	4	0
Anxiety disorder	28	35	24	11	0	2
Depression	23	44	19	11	3	0
Malingering	0	0	1	17	79	3
Personality disorder	3	7	16	24	46	3
Somatization disorder	4	8	5	26	53	2

Follow-up Questionnaire

Several weeks after completing the computerized case, 93 percent of the subjects completed a questionnaire describing their medical training, their office practices, and the impact of alcoholism on their personal lives.

RESULTS

Subjects

Of all 95 subjects, 54 percent were family physicians, 44 percent were general internists, and 2 percent were board certified in both specialties. Their mean age was 42.3 years (standard deviation 10.3 years). Ten (11 percent) were female. Of the 88 who returned the follow-up questionnaire, 56 percent had completed exactly three years of postgraduate training, 30 percent four years or more, and 15 percent less than three years. One half of these subjects indicated that drinking problems have had at least "some impact on their personal lives, either through family, friends, or themselves." Subjects reported seeing from 12 to 200 (mean 83.6) ambulatory patients in 6 to 80 (mean 40.7) hours each week.

Diagnoses

A total of 30 subjects (32 percent) diagnosed alcoholism as very likely. Of these, 11 also diagnosed at least one other psychosocial condition, chiefly anxiety or depression, which by DSM III criteria would be inappropriate diagnoses (Table 3).[21] Twenty-six (27 percent) of the subjects erroneously diagnosed one or more psychiatric problems (usually anxiety or depression [Table 4], but also somatization and personality disorders) and did not diagnose an alcohol problem. Thirty-nine (41 percent) identified no psychosocial diagnosis to be very likely. In contrast, at least one of the two correct biomedical diagnoses, peptic ulcer and gastritis, was rated as very likely by 91 (96 percent) subjects, and only one rated another biomedical diagnosis (gastrointestinal tumor) as very likely. Subjects' performance in assessing the biomedical diagnoses, plus the observation that all subjects made a "very likely" response for at least one diagnosis, indicated that each subject used a "very likely" response to indicate a certain, principal diagnosis.

TABLE 4. DIAGNOSES OF ALCOHOL PROBLEM, ANXIETY DISORDER, AND DEPRESSION MADE ON THE SIMULATED PATIENT

	Anxiety or Depression* Diagnosed	Anxiety or Depression* Not Diagnosed	Totals
Alcohol problem** diagnosed	11	19	30
Alcohol problem** not diagnosed	25	40	65
Totals	36	59	95

* *Incorrect diagnosis*
** *Correct diagnosis*

Clues

Subjects uncovered an average of 11.2 (standard deviation 4.7) of the 19 nonlaboratory clues to alcoholism. Although the total number of nonlaboratory clues uncovered was not associated with the certainty of diagnosis of alcoholism, the uncovering of two of these clues was associated with rating an alcohol problem as very likely according to chi-square tests. These clues were (1) a previous history of a one-car motor vehicle accident ($P < .01$) and (2) a paternal history of alcoholism ($P = .05$). Discoveries of a mean corpuscular volume (MCV) at the upper end of the normal range and of gastritis on gastroscopy were not related to diagnosing the alcohol problem. Laboratory findings of three tests were clues associated with the diagnosis of an alcohol problem: a blood alcohol level of 9 mmol/L (40 mg/dL), elevated serum glutamic-oxaloacetic transaminase, and elevated gamma-glutamyltransferase.

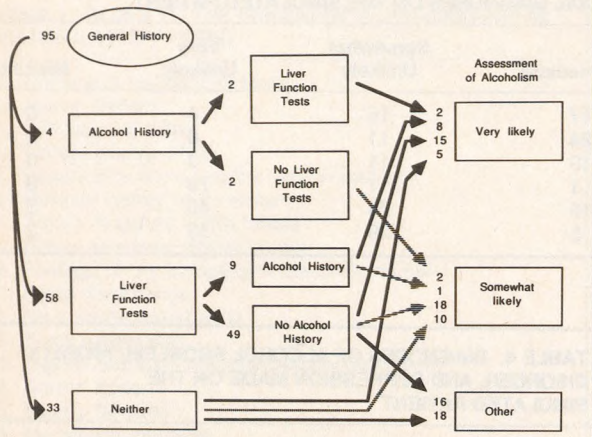

Figure 1. Paths taken by physicians in the simulation exercise leading to their assessments of the likelihood of an alcohol problem. Numbers show how many subjects, of a total of 95, took the respective paths

Paths

Paths that subjects took relative to their assessments of alcoholism are diagrammed in Figure 1. Based on information gathered by general history and physical examination, four subjects requested alcohol history beyond that which was immediately available on the menus. Two of these then uncovered the elevated liver function tests and diagnosed alcoholism. The other two did not obtain these laboratory tests and rated alcoholism as only somewhat likely. Fifty-eight subjects found elevated liver function tests without previously having requested additional alcohol-related history. Only nine of these then went on to request additional alcohol-related history, and eight of these nine diagnosed alcoholism. Forty-nine of the 58 subjects (84 percent) who obtained liver function tests never sought additional alcohol-related history. Of these 49 subjects, 15 subsequently diagnosed alcoholism, and 16 rated it less than somewhat likely. The remaining 33 subjects neither found abnormal liver function tests nor requested additional alcohol-related history. Five of these nevertheless diagnosed alcoholism as very likely.

In summary, 15 percent of those who obtained neither liver function tests nor additional alcohol history had sufficient information to diagnose alcoholism with maximal certainty. However, 62 percent of the 60 who had uncovered elevated liver function tests and 23 percent of the 13 who had obtained a detailed positive alcohol history did not rate alcoholism as a very likely diagnosis.

None of the results, whether relating to diagnoses, clues, or paths to diagnosis, were associated with age, gender, specialty, duration of training, or reported personal impact of alcoholism.

DISCUSSION

It seems clear that subjects diagnosed the psychosocial problem, namely alcoholism, with much less accuracy and certainty than the biomedical problems, peptic ulcer and gastritis. More than 40 percent did not make any psychosocial diagnosis at all. Most interesting, however, were the vastly different informational thresholds among physicians in diagnosing alcoholism. Some physicians diagnosed alcoholism on the basis of only general historical clues, while others who possessed information on elevated liver function tests or the results of a detailed alcohol history did not make the diagnosis.

Several methodological issues deserve comment. It is questionable how the diagnoses that physicians indicated on the likelihood scale would relate to those that the physicians would make in a more open-ended fashion. For example, does a "very likely" response truly indicate a certain diagnosis, and does a "somewhat likely" response truly indicate a less than certain diagnosis? This study used the responses to questions on biomedical diagnoses as a guide to interpreting physicians' responses to similar questions on psychosocial diagnoses. Unfortunately, it is not known whether physicians judge the certainty of psychosocial diagnoses in the same way they judge that of biomedical diagnoses. It seems reasonable, however, that a physician's failure to indicate a maximal degree of certainty about a diagnosis of alcoholism would predict a failure to provide effective treatment for it, but there are no data to support this.

The use of a computerized, simulated patient encounter in the study raises questions of validity. To what degree do the subject's performances on this computerized, simulated patient encounter correspond to the frequency with which and the manner in which the subjects would diagnose early alcoholism in clinical practice? The lack of nonverbal cues from the simulated patient may have hindered physicians in performing psychosocial evaluations. On the other hand, physicians may have been less inhibited about asking personal questions of the simulated patient than of humans, who can exhibit or elicit even greater anger and discomfort than computers. Cueing effects, produced by listing of possible pieces of clinical data that could be obtained on the simulated patient, may have provoked physicians to choose options that they would not actually perform in clinical practice.[24–27] Relevant cueing was minimized in this study by including over 600 items and by revealing more detailed menus on alcohol use, stress, and family or marital problems only in response to specific requests. In any case, cueing problems

are thought to bias results in such a manner that clinicians perform better on patient management problems than they actually do in clinical practice.[27]

Other studies have explored aspects of the validity of other simulated patient encounters. Investigators have found significant relationships between performance on patient management problems and scores on more traditional multiple-choice examinations.[28–31] In addition, experienced clinicians outperform residents, who, in turn, surpass medical students in performance on patient management problems.[24,30,31] Nevertheless, minor variations in the content of the case might have produced different results.[32] Further assessment of the validity of this study would require additional investigation.

Generalizability of the study's results to all primary care physicians of King County would require further characterization of nonparticipants. Some comfort with generalizability may be derived from the fact that physicians were not aware of the focus of the study when they decided whether to participate. Also, data on the subjects' practices demonstrate that many busy physicians participated in this study.

This study suggests that many primary care physicians may fail to diagnose early alcoholism, despite the availability of many symptoms and supporting laboratory evidence, and that there may be marked differences among physicians in informational thresholds for diagnosing alcoholism. Some physicians who miss the diagnosis, such as those who uncovered many historical clues and abnormal laboratory tests, may fail to generate a hypothesis of alcoholism. Others who miss the diagnosis, such as those who had received additional, pathognomonic, historical information on alcohol use, may be reluctant to make what they consider to be a judgmental diagnosis, the treatment of which may demand an unpleasant confrontation with the patient. Some physicians may be unaware of the extent to which alcoholism and its psychosocial consequences to its victims can mimic or elicit symptoms of anxiety or depression. Others, such as some of those who made no principal psychosocial diagnosis, may feel that doing so would be beyond the scope of their duties in providing primary care.

The results of this study are consistent with those of many others that show that physicians often miss the diagnosis of alcoholism.[11–14] In addition, this study supports the results of one particular study that suggest that primary care physicians may have difficulty in diagnosing alcoholism with coexistent symptoms of depression and without a coexistent antisocial personality disorder.[13]

There is one report of improvement in diagnosis of alcoholism following an educational intervention.[11] Such improvement, however, occurred to a point at which physicians had identified 2.5 percent of their patients as alcoholics, at least fourfold less than would be expected. Unfortunately, even optimization of primary care physicians' diagnosis of alcoholism would be insufficient, as one recent study showed that for many patients who were diagnosed as alcoholic, no attempts at treatment were made.[14] Clearly, further education of primary care physicians is necessary if such physicians are to have more of an impact on reducing the public health impact of alcoholism and alcohol abuse.

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References

1. Harwood HJ, Napolitano DM, Kristiansen PL, et al: Economic Costs to Society of Alcohol and Drug Abuse and Mental Illness: 1980. Publication RTI/2734/00-01FR. Research Triangle Park, NC, Research Triangle Institute, 1984
2. West LJ, Maxwell DS, Noble EP, et al: Alcoholism. Ann Intern Med 1984; 100:405–416
3. Institute of Medicine, Division of Health Promotion and Disease Prevention: Alcoholism, Alcohol Abuse, and Related Problems: Opportunities for Research. Washington, DC, National Academy of Sciences, 1980
4. Bernadt MW, Mumford J, Taylor C, et al: Comparison of questionnaire and laboratory tests in the detection of excessive drinking and alcoholism. Lancet 1982; 1:325–328
5. Peterson B, Treel E, Kristianson H: Comparison of gamma-glutamyl transferase and questionnaire tests as alcohol abuse indicators in different risk groups. Drug Alcohol Depend 1983; 11: 279–286
6. Bernadt MW, Mumford J, Murray RM: A discriminant function analysis of screening tests for excessive drinking and alcoholism. J Stud Alcohol 1984; 45:81–86
7. Emrick CD: A review of psychologically oriented treatment of alcoholism: I. The use of interrelationships of outcome criteria and drinking behavior following treatment. Q J Stud Alcohol 1974; 35:523–549
8. Emrick CD: A review of psychologically oriented treatment of alcoholism: II. The relative effectiveness of treatment versus no treatment. J Stud Alcohol 1975; 36:88–108
9. Baekeland F, Lundwall L, Kissin B: Methods for treatment of chronic alcoholism: A critical appraisal. In Gibbins R, Israel Y, Kalant H, et al (eds): Research Advances in Alcohol and Drug Problems. New York, John Wiley & Sons, 1975, pp 247–327
10. Brandsma JM, Maultsby MC Jr, Welsh RJ: Outpatient Treatment of Alcoholism: A Review and Comparative Study. Baltimore, University Park Press, 1980
11. Fisher JV, Fisher JC, Mason RL: Physicians and alcoholics: Modifying behavior and attitudes of family practice residents. J Stud Alcohol 1976; 37:1686–1693
12. Moore RD, Malitz FE: Underdiagnosis of alcoholism by residents in ambulatory medical practice. J Med Educ 1986; 61:46–52
13. Coulehan JL, Zettler-Segal M, Block M, et al: Recognition of alcoholism and substance abuse in primary care patients. Arch Intern Med 1987; 147:349–352
14. Bush B, Shaw S, Cleary P, et al: Screening for alcohol abuse using the CAGE questionnaire. Am J Med 1987; 82:231–235
15. Hayman N: Current attitudes to alcoholism of psychiatrists in Southern California. Am J Psychiatry 1956; 112:484–493
16. Jones RW, Helrich AR: Treatment of alcoholism by physicians in

private practice: A national survey. J Stud Alcohol 1972; 33:117–131
17. Caswell S, MacPherson M: Doctors and alcohol: The responses of a self-selected group of general practitioners to patients with alcohol-related problems. NZ Med J 1982; 95:462–466.
18. Anderson P: Managing alcohol problems in general practice. Br Med J 1985; 290:1873–1876
19. Lewis DJ, Gordon AJ: Alcoholism and the general hospital: The Roger Williams Intervention Program. Bull NY Acad Med 1983; 59:181–197
20. Saxe E, Dougherty D, Esty K: The effectiveness and cost of alcoholism treatment: A public policy perspective. In Mendelson JA and Mello NK (eds): The Diagnosis and Treatment of Alcoholism, ed 2. New York, McGraw-Hill, 1985, pp 485–539
21. Diagnostic and Statistical Manual of Mental Disorders, ed 3 (DSM III). Washington, DC, American Psychiatric Association, 1980
22. Skinner HA, Holt S: Early intervention for alcohol problems. J R Coll Gen Pract 1983; 33:787–791
23. Manual on Alcoholism, ed 3. Monroe, Wisc, American Medical Association, 1977
24. Page GC, Fielding DW: Performance on PMPs and performance in practice: Are they related? J Med Educ 1980; 55:529–537
25. Newble DI, Hoare J, Baxter A: Patient management problems: Issues of validity. Med Educ 1982; 16:137–142
26. Norman GR, Feightner JW: A comparison of behavior on simulated patients and patient management problems. Med Educ 1981; 15: 26
27. Goran MJ, Williamson JW, Gonella JS: The validity of PMPs. J Med Educ 1973; 43:171–177
28. Norcini J, Swanson D, Webster G: Reliability, validity, and efficiency of various item formats in assessment of physician competence. Conf Res Med Educ Proc 1983; 22:53–58
29. Hubbard JP: Objective evaluation of clinical competence, In Hubbard JP (ed): Measuring Medical Education. Philadelphia, Lea & Febiger, 1971
30. Newble DI, Hoare J, Elmslie RG: The validity and reliability of a new examination of clinical competence of medical students. Med Educ 1981, 15:46–52
31. Mazzuca SA, Cohen SJ, Clark CM: Evaluating clinical knowledge across years of training. J Med Educ 1981; 56:83–90
32. Norman GR, Feightner JW, Tugwell P, et al: The generalizability of measures of clinical problem-solving. Conf Res Med Educ Proc 1983; 22:110–114