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Clinical Characteristics Of Individuals Using An On-Line Alcohol Evaluation Program

Abstract

Access to treatment for substance abuse disorders is limited, and practical strategies are needed to expand opportunities for individuals to receive effective interventions. Automated or semi-automated treatments have shown promise in other disorders. Identifying the characteristics of patients who will be able to benefit from this unconventional approach will increase the likelihood of success. The current study examined 1,297 individuals using an on-line alcohol evaluation program. Subjects had high scores on the Alcohol Use Disorders Identification Test (AUDIT), and a substantial amount of ambivalence about the possible harm that their drinking caused, but very low levels of identifying themselves as actual problem drinkers.

Key words: Internet, alcohol, motivation, access

Introduction

According to the Surgeon General's report on mental health, only a small minority of Americans with substance use disorders receive treatment [1]. Improving access to care is a priority but remains challenging due to the limited availability of funding for treatment, the stigma associated with substance abuse that may discourage individuals from seeking help, and other obstacles as well. For example, many substance abuse programs are highly structured, and require patients to accept a specific treatment that may not coincide with their preferences or needs [2]. Group treatment is common, and sometimes the only modality available. While group treatment has been shown to be highly effective for some patients, others have more difficulty in this type of setting. Patients with co-occurring social anxiety disorder, for example, may find it particularly challenging to work effectively in a group.

Other factors not directly related to the type of treatment provided can also serve as obstacles. Programs that schedule treatment sessions during the work day may make it difficult for employed patients to attend. Some patients may experience difficulty with transportation to a program, or accessing child care while they receive treatment. The latter issue is particularly relevant to women, who may find that treatment programs are not designed to meet their specific needs. Most substance abusers are male, and so limited resources tend to be devoted to developing programs tailored to this population. Women are often expected to receive treatment in these programs along with their male counterparts, but they tend to be more successful in gender specific programs [3].

The application of information technology to psychiatric treatment has been proposed as one way to address the problem of limited access [4]. Software produced by clinicians and researchers can provide unsupervised treatment, or assist clinicians who provide care for individuals with

psychiatric problems. Patients can interact remotely with automated treatment programs at a time and place that is most convenient for them. They are not limited by the schedules of a clinic or a specific provider, and do not have to overcome problems associated with transportation. The cost of automated treatment is dramatically less compared to more traditional forms of treatment [5], and there is some evidence that people will reveal more information to a computer than to a human interviewer regarding topics that evoke feelings of shame, such as substance abuse, sexual problems, and suicidal ideas [6]. Programs that integrate automated treatment with face-to-face sessions can help clinicians who lack training in the treatment of certain disorders, or who are not familiar with specialized interventions. Software can guide the patient and the clinician through the technical aspects of an evidence-based intervention, while the clinician provides the therapeutic alliance, and the other non-specific elements of therapy. Automated treatments have been developed for obsessive compulsive disorder [7], anxiety disorders [8, 9], and depression [10, 11].

Computer-assisted treatment will not benefit all patients with substance abuse problems. In order to access a computer-based treatment, a user must know how to use the technology, and feel comfortable enough with it that they will be able to interact with the technology in a therapeutic manner. Other, currently unknown characteristics, will also determine which patients can benefit from computer-assisted treatment. Identifying the characteristics of individuals who choose to interact with an automated program is an important step in determining the best way to bring treatment to a subset of those with alcohol problems, who might not otherwise have access to an effective program.

An important characteristic of individuals with substance use problems that helps to guide the selection of appropriate therapeutic interventions is the level of motivation for change that they express [12]. The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) [13] is one way to measure patients' motivation. This scale was used in a national, multisite clinical trial of alcoholism treatment initiated by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) [14]. Subjects in this study were recruited from outpatient clinics and aftercare programs, and represent a population that is part of the minority of substance abusers able to access currently available treatment. If users of an automated, Internet program differed substantially from the clinical population in the NIAAA study, it would suggest that providing them with an effective program would potentially be a useful way to expand access to treatment. The current study evaluated 1,297 users of an Internet Web site that offered a guided assessment of alcohol use and its consequences, and reports on the data collected from these individuals.

Methods

Subjects were individuals who registered for an on-line evaluation of alcohol use located at www.alcoholcheckup.com. In order to access the program, subjects were required to be able to use a computer and a Web browser, have access to the Internet, and be able to find the site using an Internet search engine. The material was in text form, so users also had to be literate. The exclusion criteria were unwillingness to indicate that they understood, and agreed to the informed consent. No marketing of the Web site or any other form of recruitment was used. Participants were not offered any kind of incentive for filling out the questionnaires, except the opportunity to receive scores, and individualized feedback based on the results.

Subjects found the alcoholcheckup.com Web site spontaneously, primarily by using an Internet search engine. Because no resources were spent to advertise the site or the study, it was not possible for a potential subject to navigate directly to the site. The only external Web sites that linked to the study site were Web directories that automatically index large portions of the World Wide Web. The Web site listed key words such as "alcohol," "alcohol abuse," "drinking problem," "psychiatry," "addiction," and "substance abuse," so that Internet users who entered these terms into a search engine would be likely to have the study site included somewhere within their results. Search engines provide brief descriptions of a Web site to help people decide whether they want to navigate to one of the sites listed in the results. The description of the alcoholcheckup.com Web site read, "Alcohol checkup is designed for people who are concerned about their drinking. It helps people evaluate their drinking with standardized tools and measures." Consequently, the subjects were individuals who either found the site in an indexed Web directory, or through a search, then decided to visit the site based on the brief description given above.

The program interface was created using an application that generated standard hypertext markup language (HTML), which allowed the site to be accessed by the broadest range of Web browsers. The program that processed the data, and managed the storage and retrieval of the data from the on-line database, used server side scripting, such that the program was run on the server computer. Consequently, the computer code which embodied the logic of the program did not effect the standardized HTML, or place any additional requirements on the capability of the browser on the user's computer. In order to access the site, visitors were requested to fill out a brief form in which they chose a pseudonymous user name and a password. Subjects were not asked to give their name, email address, or other identifying information.

Following registration, subjects were presented with an informed consent document. They were asked to indicate if they understood the consent, and if they agreed to it. Subjects who either did not understand, or did not agree to the consent, were provided with links to alternative sources of information on alcohol abuse. The informed consent process took place without the participation of the investigator. The fully automated informed consent, as well as other details of the study, were approved by the George Washington University institutional review board. The study was completed prior to the implementation of the Health Insurance Portability and Accountability Act.

SOCRATES

The evaluation included questionnaires that addressed subjects' use of alcohol, the effects of the alcohol use on their lives, and their attitudes towards their alcohol use. The first questionnaire was the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) [13]. The version used in this study was the 19-item instrument developed in 1991, that was used as a self-administered paper-and-pencil questionnaire in the Matching Alcoholism Treatments to Client Heterogeneity study (Project MATCH) [13, 14]. The items in this short version measure three factors that have little overlap with each other: the degree to which subjects have begun to take steps to change their drinking, their recognition of having a problem with alcohol, and ambivalence regarding whether or not their drinking is maladaptive [15]. Patients with high scores on the recognition scale directly acknowledge that they are having problems with their drinking,

and perceive the need to change their behavior. High scorers on the ambivalence scale tend to wonder if they are having problems, and are open to reflection on this topic. Patients who have a high score on the taking steps scale are already making changes in their drinking behavior, and tend to have good prognoses. The SOCRATES has been found to be a predictor of long term alcohol treatment outcome [16].

The raw scores of the SOCRATES are translated into categorical ratings ranging from "very low" to "very high." The distribution of the raw scores into the rating categories is based on the Project MATCH data. One thousand seven hundred twenty six adult men and women were recruited from outpatient treatment centers and aftercare programs. There were nine sites, which were chosen to be representative of the geographical diversity of the United States. These sites included community mental health centers, academic centers, and private clinics. Subjects were required to meet the DSM-III-R criteria for alcohol abuse or dependence. Their mean age was 38.9 +/- 10.7, and the average number of years of formal education was 13.4 +/- 2.2. The translation of the raw scores into categorical ratings was designed so that each category contained an equal number of these subjects. For example, a rating of very low on the recognition subscale would be interpreted as very low relative to the treatment seeking group in the Project MATCH study, rather than to a population representative of all people with an alcohol problem.

The Alcohol Use Disorders Identification Test (AUDIT)

The Alcohol Use Disorders Identification Test (AUDIT) was included as part of the evaluation. It is a is a ten-item questionnaire designed to distinguished light drinkers from those with harmful drinking. Although the instrument was intended for the early identification of harmful drinking, the screening instrument can also detect alcoholism with a high degree of accuracy [17]. The instrument contains three questions on the amount and frequency of drinking, three questions on alcohol dependence, and four on problems caused by alcohol, including adverse psychological reactions. All these domains have shown high intra-scale reliability, and correlate highly with alcohol consumption. The questions themselves were selected on the basis of their representativeness, correlation with alcohol consumption, high face validity, and ability to distinguish light drinkers from those with harmful drinking. Based on a sample of 913 drinking patients, the sensitivity for hazardous or harmful drinking was 92 percent when using a cutoff score of eight. The specificity was 94 percent [18].

Family Tree Questionnaire

The Family Tree Questionnaire [19] is a brief questionnaire which is used to assess family history of alcohol problems. Subjects were asked to complete this questionnaire as part of the effort to identify the characteristics relevant to their alcohol problems. The questionnaire is self report, and provides subjects with a consistent set of cues for identifying blood relatives with alcohol problems by using a family tree diagram. Subjects are asked to classify relatives into one of the following categories: (1) Never Drank, a person who is a lifetime abstainer, (2) Social Drinker, a person who drinks moderately, and has never been known to have an alcohol problem, (3) Possible Problem Drinker, a person believed to have (or have had) an alcohol problem, (4) Definite Problem Drinker, a person known to have received treatment for an alcohol problem, (5)

No Relative, applicable only for the category containing brothers and sisters, (6) Don't Know/Don't Remember. The reliability of this questionnaire was examined, and the results indicated that both alcoholic and non-alcoholic subjects can reliably classify their first degree and second degree relatives as alcoholics or problem drinkers over a two week test-retest interval [20]. Although each of the questionnaires has been assessed for reliability and validity, the psychometric properties of the computer-administered versions used in this study were not specifically evaluated.

Subjects were also asked to provide a focused history relevant to their drinking. They were asked how many standard drinks they consumed on average each day of the week, and the maximum number of standard drinks they consumed in a single drinking episode during the past month. Subjects were provided with information to help them understand the nature of a standard drink. In order to encourage users to complete all of the questionnaires, they were required to finish the entire evaluation before they received the results. The results were provided in narrative form in which the nature of the tests, and the personal relevance of their responses were explained to the subjects. The narrative explanations highlighted any negative effects of alcohol use that were revealed by the questionnaires, and invited participants to consider the advantages and disadvantages of changing their alcohol use behaviors.

Scores on the three subscales of the SOCRATES were translated into categorical ratings based on the distribution of patients seeking conventional clinical care for alcohol problems as described above. Additionally, the Pearson correlation was used to compare the number of drinks that subjects reported consuming in a typical week to their report of drinking-related problems represented by their AUDIT score in order to evaluate the consistency of the subjects' responses, since the AUDIT has been shown to correlate well with alcohol consumption.

Results

Between March, 2001 and February, 2003 1,432 individuals registered to obtain access to the Web site and agreed to the informed consent. One thousand two hundred ninety-seven (90.6 percent) completed all the questionnaires in the evaluation. The subjects were 53 percent male and 47 percent female (table 1). The average age was 35 years old (+/- 11.4). Seventy-five percent of the subjects were employed, 10 percent were students, and 6 percent identified themselves as homemakers. The average number of years of school completed was 14 (+/- 2.6). According to the results of the Family Tree Questionnaire, 38.7 percent of the subjects had at least one first degree relative with a definite alcohol problem, while 28.9 percent had a parent with a definite alcohol problem.

Subjects reported consuming an average of 29.5 (+/- 22.4) drinks per week, and averaged 10.1 (+/- 5.6) drinks on the heaviest drinking day in the past 30 days. The average score on the AUDIT was 17.3 (+/- 8.9), in which 8 and above indicates a problem with alcohol (figure 1). The AUDIT score was significantly correlated to the number of drinks consumed per week (Pearson correlation = 0.640, $p < 0.001$).

Two of the three motivational variables, as measured by the SOCRATES, were highly skewed compared to people presenting for conventional alcohol treatment. Relative to this help-seeking

population, 76 percent of the online users scored "very low" on the measure of recognition of having a problem with alcohol (figure 2). Sixty eight percent scored "very low" on the measure of taking steps toward changing their drinking patterns (figure 3). The distribution of ambivalence scores was more similar to the distribution of the conventional help seeking population; 53 percent scored below "medium," and 47 percent scored "medium" or higher (figure 4).

Discussion

The individuals who participated in this study were recruited through a Web site that was made available to the general public via the Internet. The sample obtained, therefore, was a sample of convenience, and may not be representative of the population of individuals potentially able to benefit from an on-line alcohol use intervention. The ease with which individuals were able to participate in the study, however, allowed a large sample to be obtained with no expenditure of resources for recruitment. Subjects agreed to have the results of their interactions with the Web site automatically stored in a database, which allowed the data generated by the subjects to be collected without placing any additional burden on participants in terms of returning completed questionnaires to the investigator. Subjects were motivated to provide the requested information by the prospect of receiving immediate feedback on the results of the evaluation rather than by altruism or the promise of monetary compensation.

The average age of the subjects was 35, and they completed, on average, two years of college. These numbers are very similar to the average age and educational achievement of the subjects in the Project MATCH study. Seventy-five percent of the subjects in the current study were employed compared to 50 percent in the Project MATCH study. This relatively high level of employment suggests that the Web site reached a population that remained at least somewhat functional, and may have been experiencing an early stage of illness. An appropriate intervention at this stage could have the potential to prevent more serious problems. Interestingly, 47 percent, or almost half of the subjects, were women compared to 24 percent in the Project MATCH study. A survey performed in 2000 found that female Internet users outnumbered male users in the United States [21], which might explain why the population participating in the study was more evenly balanced with respect to gender than the population typically seen in treatment programs. There may also be factors associated with outpatient clinic care and aftercare programs that discourages women from participating, which were not present in the on-line alcohol evaluation. Because women have specific needs that are often unmet by conventional treatment programs, a modality that is useful and acceptable to women is potentially important.

During a 24 month period, 1,297 individuals completed the on-line alcohol abuse evaluation, which provided them with individualized feedback on their drinking habits, and some of the consequences of their drinking. The average score of the AUDIT was well above the threshold for a putative alcohol use disorder, however subjects were much less likely to identify themselves as problem drinkers, or see a clear need to change compared to help-seeking populations. Despite the low level of recognition reported by the on-line subjects, these individuals demonstrated an ambivalence profile that was similar to the population that has taken the important step of presenting for treatment, suggesting that they may be open to the idea of making a change in their drinking behavior. An intervention that effectively capitalized on this

ambivalence would have the potential to offer help to these problem drinkers. Based on the transtheoretical model of health behavior change [22], the subjects in this study were primarily in the contemplation stage. Very low scores on the recognition and taking steps scales of the SOCRATES indicate that these individuals were not yet at the point at which they accepted that their drinking was a problem that required a change in behavior. On the other hand, their relatively high ambivalence scores indicated that they had serious questions about whether their drinking was causing harm.

Because engaging a patient earlier in the course of the illness can prevent some of the morbidity associated with the disease, it is useful to identify problem drinkers in the contemplation stage. During this period they are amenable to receiving information on the negative effects of their alcohol use, potentially moving them along to a more advanced stage of change in which they are ready to take action. Screening for alcohol problems in primary care is one way to accomplish this goal, however in practice most primary care physicians generally fail to address alcohol abuse with their patients [23-25]. The ease with which an on-line program can be accessed by a problem drinker, as a opposed to seeking help at a clinic, and the potentially high level of privacy that it can offer, may allow patients to access help at an earlier stage in the development of their alcohol abuse.

The anonymity afforded by the Web site made it difficult to evaluate the truthfulness and the accuracy of the responses given by the subjects. Subjects may have given false information for a variety of reasons. They may have distrusted the strategy used to protect their identity, and withheld information they did not want attributed to them. They may not have taken the questionnaires seriously, and provided incorrect information for entertainment, or answered the questions without giving them the amount of consideration they required. Finally, they might have experimented with "what if" scenarios to evaluate how the feedback would change based on ways in which they varied their responses to the questionnaires. The correlation between the level of alcohol use reported and the AUDIT score, however, lends some degree of credibility to the subjects in terms of the accuracy of their responses, and suggests that subjects did approach the Web site in a serious and thoughtful way.

The Web site did not ask users if they were currently receiving any type of substance abuse treatment, and so it is not clear that the subjects with alcohol problems were part of the large untreated majority discussed above. Nevertheless, most of the subjects in this study were at the lowest level of the recognition and taking steps subscales of the SOCRATES. This finding suggests that these subjects were not yet ready to identify the problem accurately, and take the step of seeking formal treatment.

The current study was not designed as a treatment, but was designed to better characterize individuals who would be willing to interact with an alcohol abuse Web site. An alcohol checkup, in which problem drinkers are given objective feedback on the consequences of their drinking, has been shown to lead to clinical improvement [26], but no follow up was conducted in this study that would allow an evaluation of the effects of the Web site. Given the level of user interest that was spontaneously generated by this Web site, an evaluation of the efficacy of an actual treatment program would be desirable.

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Table 1

n	1,297
Percent male	53%
Average age (std. dev.)	35 (11.4)
Employed full time	65%
Employed part time	10%
Student	10%
Homemaker	6%
Other	9%
Average age of first drink (std. dev.)	16 (4.2)
Average age of first problem (std. dev.)	24 (9.0)
First degree relative with a definite alcohol problem	38.7%
Parent with a definite alcohol problem	28.9%
Average drinks per week	29.5
Average drinks on heaviest drinking day	10.1
Average AUDIT score	17.3

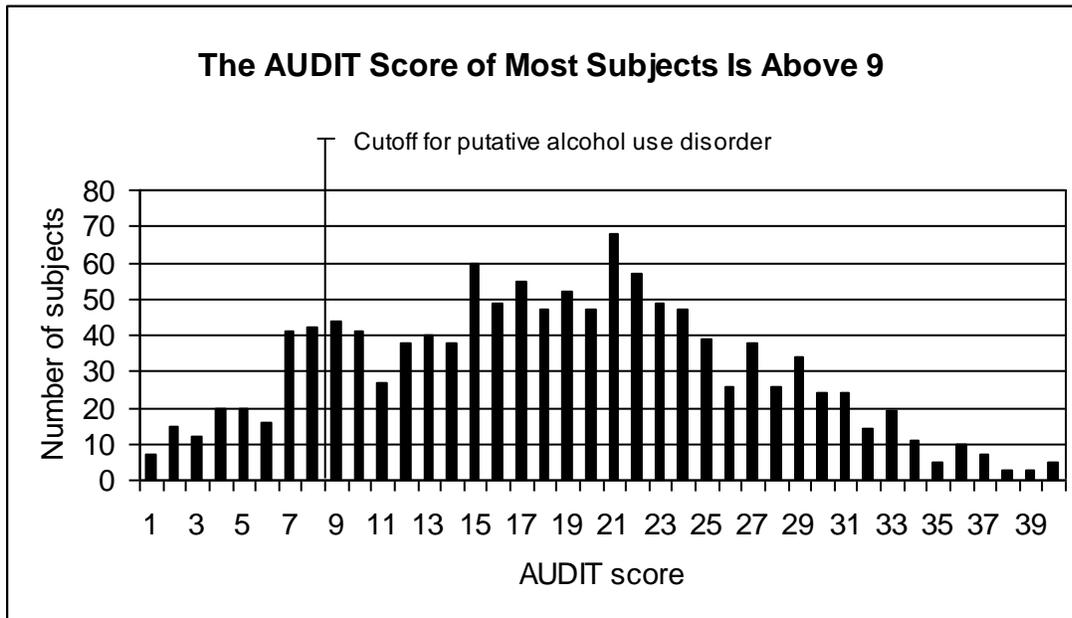Figure 1. Distribution of AUDIT scores

The AUDIT Score of Most Subjects Is Above 9

Figure 2. Distribution of recognition scores from the SOCRATES

**Subjects Had Very Low Recognition Scores
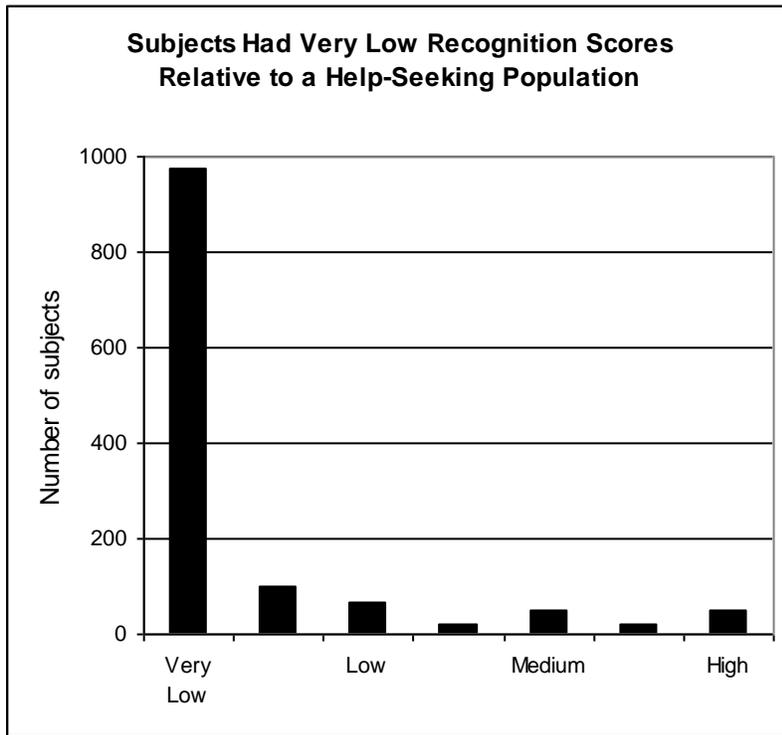Relative to a Help-Seeking Population**
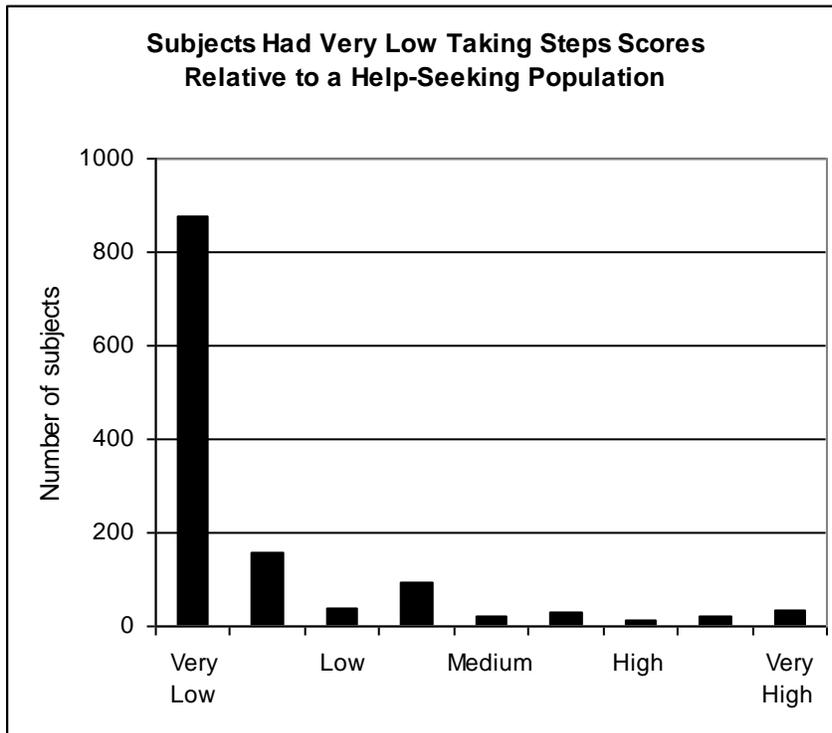
Figure 3. Distribution of taking steps scores from the SOCRATES

Figure 4. Distribution of ambivalence scores from the SOCRATES