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A Technological Approach to Reaching a Hidden Population of Problem Drinkers

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Abstract

Objective: The most common obstacle to the treatment of alcohol use disorders is that few untreated individuals seek treatment. This study compared users of a Web site that offered an evaluation of alcohol use with a group of help-seeking subjects to determine if an Internet application could reach a population of substance abusers who were distinct from those served by currently available forms of care.

Methods: An open source application was developed that incorporated elements of the Drinkers' Check-up, which has been shown to increase motivation for behavior change while presenting itself as a non-threatening evaluation. To recruit non-treatment-seekers, the program was offered as a way to increase understanding of the effects of alcohol rather than as a way to initiate change.

Results: Most of the 1,060 Internet subjects had serious alcohol-related pathology, though less than the treatment-seeking comparison group. Members of the online group were younger, and a larger proportion was female and employed. Results of a scale that measured problem recognition placed the online users in the lowest decile in relation to the comparison group. The same result was seen for a measure of taking steps to change behavior. The level of concern about the

possibility of harm from alcohol use was comparable to the treatment-seeking group.

Conclusions: Problem drinkers who do not use available forms of treatment will engage with an interactive Web site. Despite low levels of illness recognition, significant concern about their alcohol use indicates a potential role for a motivational intervention.

Introduction

Next to the development of new drugs and therapies, the greatest challenge to effective mental health treatment is successful engagement of patients. In the United States less than half of those in need receive care (1), and there is often a delay of a decade or more prior to treatment initiation (2). This problem is particularly apparent among problem drinkers. In 2001 only 16% of those with an alcohol use disorder received professional treatment (3).

Among the many factors that contribute to undertreatment of alcohol use disorders, the most important and most difficult problem is lack of desire for treatment. An analysis of the National Survey on Drug Use and Health data found that among a group of untreated alcohol abusers, only 2% perceived a need for treatment (4). Even when appropriate services are available, it is difficult to convert problem drinkers into help-seekers.

Innovative technological approaches have been used to increase access to treatment. Online therapy reduces obstacles related to geographical access and stigma. Patients can interact with a therapist regardless of their physical location, and they retain a higher degree of privacy. Online therapy was compared to traditional treatment in a group of alcoholics in the Netherlands. Using online

therapy, a population of alcoholics was reached that was significantly different from patients engaging in face-to-face therapy (5).

The development of automated interventions may also help to expand access to treatment. Because they do not require trained therapists, automated computer programs can be scaled to serve large numbers of people. A software program based on the Drinkers' Check-up (6) that was designed to run on a stand-alone computer helped subjects to decrease both the quantity and frequency of drinking by 50%, with gains maintained at 12-month follow-up (7).

Both of these studies recruited subjects who were motivated to initiate some form of active intervention. The problem of reaching the great majority of alcoholics who do not perceive a need for treatment remains largely unaddressed. The current study reports on a program that was designed to run in a Web browser, and was made available to the public over the Internet. Rather than recruit subjects with an interest in behavior change, this study enrolled Internet users who were seeking information on alcohol use, and found the program without having an expectation of modifying their drinking behavior.

Modeled on the aforementioned Drinker's Check-up, this program offered a structured assessment that fulfilled users' desire for a better understanding of their

alcohol use, while exposing them to a type of intervention that has been found to increase motivation for change when used in traditional settings. The purpose of this study was to determine if this strategy could deliver a motivational intervention to a group of problem drinkers who are significantly different from those who are served by existing forms of care.

Methods

Individuals with alcohol problems who accessed an Internet application designed to increase their motivation for change were compared to help-seeking subjects who received treatment in traditional outpatient settings. The comparison group was derived from the public data set of the Matching Alcoholism Treatments to Client Heterogeneity study (Project MATCH). The Project MATCH study population was used as a control group because the subjects in this study were specifically selected to be representative of help-seeking alcohol abusers in the United States. A total of 952 outpatient subjects were recruited from 9 treatment centers, representing a geographically diverse population of individuals seeking alcohol treatment in academic centers, community clinics, and private clinics (8).

The Internet application was based on the Drinkers' Check-up, which is a component of motivational interviewing, a form of psychotherapy that facilitates

behavior change (9). The Drinkers' Check-up is a set of measures that helps a patient to see how alcohol consumption is negatively affecting his or her life, thereby increasing awareness of, and concern about these consequences (6). Intentionally imitating a physical check-up, it is non-judgmental, non-threatening, and objective. This type of approach allowed non-help-seeking subjects to be recruited for the study.

An open source application was developed to present the questionnaires and determine feedback. It guided subjects through a series of questionnaires including the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) (10), the Alcohol Use Disorders Identification Test (AUDIT) (11), the Family Tree Questionnaire (12), and the Decisional Balance Questionnaire (13).

The SOCRATES evaluates a patient's readiness to change in the context of the transtheoretical model of health behavior change (14). Patients are scored based on their recognition of having an alcohol problem, their level of concern about whether alcohol is having a negative effect on their lives, and the degree to which they have initiated behavior change.

The AUDIT is a ten-item questionnaire designed to distinguish light drinkers from those with harmful drinking. Originally intended for the early identification of harmful drinking, the screening instrument can also detect alcohol use disorders with a high degree of accuracy (15). Using a cutoff score of 8, the sensitivity to detect hazardous or harmful drinking is 92%, and the specificity is 94% (16).

The Family Tree Questionnaire 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: never drank, social drinker, possible problem drinker, definite problem drinker, no relative (applicable only for siblings), or don't know/don't remember (17).

Individuals who found the site spontaneously were eligible to participate in the study. This strategy allowed us to collect a sample of problem drinkers self-selected for some interest in learning more about their drinking. Inclusion criteria were broad. Subjects were required to have a significant alcohol problem as measured by an AUDIT score of 8 or more, enough experience with the Internet to find the site, and the ability to successfully navigate the simple user interface. Subjects registered for the study anonymously. They did not provide any identifying information or personal health information as described in the Health

Insurance Portability and Accountability Act. Subjects were required to give informed consent by reading an information screen and agreeing to participate in the study. Written informed consent was not used because it would have precluded subject anonymity. The study was approved by the George Washington University institutional review board.

In order to determine whether the Internet application was able to reach a group who were distinct from those who access currently available treatment, the two groups were compared in terms of age, level of motivation for change (SOCRATES), disease severity (AUDIT), and number of drinks consumed on an average day. The percentages of female subjects and employed subjects in the two populations were also compared.

Because all data from the Internet application was provided anonymously, the degree of correlation between certain variables was analyzed and compared to correlations found in previous studies of non-anonymous subjects. Identifying similar correlations in the data collected via the Internet application would support the likelihood that the participants entered information with some degree of accuracy rather than capriciously. Relationships between the following variables were measured: Age of initiation of alcohol use, age of initiation of

problem drinking, number of drinks per drinking day, current severity of alcohol problems, and degree of recognition of alcohol-related problems.

Summary statistics are presented as means and standard deviations for continuous variables and percentages for discrete variables. T-tests were used to compare the characteristics of the online group and the traditional help-seeking group.

Pearson's correlation was used to evaluate characteristics within the online group that have been previously found to be associated with one another.

Results

Over a period of 25 months, 1,455 individuals registered to use the online program, and 1,297 (83%) met the inclusion criteria of an AUDIT score of 8 or more. Of these, 1,060 (82%) completed the program, and were included in the analysis.

Table 1 compares users of the program with subjects enrolled in the outpatient arm of the Project MATCH study. Users of the online program were significantly younger, less motivated to change their drinking behavior, had lower AUDIT scores, and drank fewer drinks per drinking day. In addition to using the global SOCRATES score to compare the level of motivation of the two groups, three

subscales were evaluated individually: recognition of having a problem related to drinking, ambivalence about whether their drinking is causing harm to themselves or others, and taking steps to make changes in their alcohol use. Normative data in the form of decile rankings for these subscales are based on the Project MATCH treatment-seeking population (18).

The mean recognition score of the online users was in the lowest decile. Individually, 70.6% of the online users scored in the lowest decile, and only 5.3% were in the fifth decile or higher. Examples of recognition statements from the SOCRATES include, “I am a problem drinker,” and “I really want to make changes in my drinking.” The mean taking steps score was also within the lowest decile. Individually, 84.8% of the online users were in the lowest decile, and only 2.2% were in the fifth decile or higher. An example of a taking steps statement is, “I’m not just thinking about changing my drinking, I’m already doing something about it.”

Ambivalence scores were somewhat better. The mean ambivalence score was within the third decile. Only 10.9% of the online group were in the lowest decile, and 32.2% were in the fifth decile or higher. While levels of ambivalence related to drinking were lower in the online group compared to the help-seeking group, the scores were more comparable than the recognition or taking steps scores. An

example of an ambivalence statement from the SOCRATES is, “Sometimes I wonder if my drinking is hurting other people.”

Table 2 shows the individual items of the AUDIT for the online group and the project MATCH group. The data is presented as the percentage of the group that selected each of the possible responses. The responses show that although the online group had lower scores than the help-seeking group, they still experienced a high degree of alcohol-related morbidity.

Table 3 presents the percentage of users who were female and who were employed. The online group had a proportionately greater number of female users, and were significantly more likely to be employed. Descriptive data of users’ family history of alcohol problems is shown in Table 4. Subjects reported high rates of definite or suspected alcohol problems among male first degree relatives, and lower rates among female relatives.

Findings that have been observed in other populations were tested in this population in order to help evaluate the validity of the data collected from anonymous subjects. Subjects in the Internet group reported that they began drinking alcohol at an average age of 16.6 years ($SD=14.5$), and first began having a problem with alcohol at an average age of 25.8 ($SD=25.1$). There was a

large correlation between these two variables ($r=.503$, $p<.001$). The average score on the AUDIT (20.0, $SD=7.3$) was significantly associated with both the average number of drinks per drinking day (38.7, $SD = 58.2$, $r=.294$, $p<.001$), and the recognition subscale of the SOCRATES (22.0, $r=.568$, $p<.001$). The number of drinks per drinking day was also associated with higher scores on the recognition subscale ($r=.121$, $p<.001$). Contrary to other studies, the number of drinks per drinking day reported by men and women was not significantly different in the online group (7.3, $SD=2.2$ versus 6.8, $SD=10.3$), although it was in the comparison population (14.4, $SD=8.2$ versus 11.0, $SD=6.7$, $p<.001$). The total number of drinks per week reported by men using the online program was significantly greater than the number reported by women (40.2, $SD=33.3$ versus 34.2, $SD=56.0$, $p<.05$)

Discussion

In order to connect with substance abusers who do not access treatment, it is important to offer an intervention that has a low threshold of initiation, is easily accessible, non-threatening, and has no stigma attached to it (19). Accessing a low intensity intervention via the Internet meets these criteria well. The check-up program successfully attracted Internet users, and a large percentage who registered for the program completed it. Completion rates are important for a

program that is designed to attract users as a source of information, while at the same time acting to increase internal motivation. Of the 1,297 users who registered for the program, and had an AUDIT score greater than 8, 82% completed the program.

After users completed the assessment instruments, the negative consequences of their alcohol use were highlighted in the feedback they received. Unlike criticism initiated by others, which usually elicits resistance and defensiveness, the program provided feedback that was based on the patient's own report. Alcohol problems identified by a therapist or significant other may or may not be relevant to the patient. By relying on the patient's own report, the issues identified are more likely to have personal meaning.

Supporting the hypothesis that an online program of this type was able to reach a hidden population of non-help-seeking problem drinkers, subjects had very low levels of recognition of their drinking problems, and had not yet begun to take steps to change their behavior. This non-help-seeking population was younger and contained a larger proportion of females and employed individuals compared to patients who received traditional treatment.

The finding of higher levels of employment in the online group may have been due to the flexibility of the program, which allowed it to be accessed without interfering with a work schedule. It may also reflect the ability of this program to reach alcohol abusers whose disease has not yet progressed to the point of job loss. Compared to the traditional help-seekers, who had a mean AUDIT score of 26, they appeared to be at an earlier stage of their illnesses. However, the mean AUDIT score of 20 indicated that there was nevertheless substantial morbidity associated with their drinking. For example, 80% of the online group experienced a blackout during the past year, and 33% reported an injury associated with their drinking. Similarly, although they averaged approximately 7 drinks per drinking day, they drank less than the outpatient group, who reported drinking approximately twice as many drinks per drinking day prior to treatment entry.

Importantly, a larger proportion of women accessed the program compared to the number who sought treatment at traditional facilities: 46.1% versus 28%. Despite the stereotype of the male computer enthusiast, a 2004 analysis by Nielsen//NetRatings found that women represented a higher proportion of Web users (20). Depending on age, the percentage ranged from 63.4% to 77.6%. Since the prevalence of alcohol use disorders is approximately twice as great among men compared to women (21), women were under-represented in the Project MATCH group, and over-represented in the online group.

Traditional substance abuse treatment programs do not adequately meet the needs of women owing to gender-specific barriers which include lack of childcare, lack of family treatment (women substance abusers are usually in relationships with other substance abusers), the threat of losing their children due to their substance abuse, and discomfort participating in male-dominated groups (22). There is a need for treatment opportunities that better serve women with substance use disorders.

Limitations of the data include uncertainty of the validity of information collected from anonymous subjects. Lending credibility to the data, a number of factors previously noted in other studies were confirmed in our analysis. For example, Hingson and colleagues found that persons who start to drink at an early age are more likely to develop alcohol dependence at younger ages (23), a relationship also observed in the data from the online group. The number of drinks consumed per day was significantly correlated with severity of alcohol related problems, and recognition of having an alcohol problem (24-26). Men reported significantly more drinks per week than women, but the difference in the number of drinks per drinking day did not reach statistical significance.

Although outcomes were not measured in this study, one would expect the effects of this type of intervention to be modest. Its benefits are derived from its breadth, rather than the magnitude of change effected. In contrast, the currently available healthcare system is designed to serve highly dependent drinkers, while presenting formidable barriers to treatment initiation. These barriers have contributed to the belief that drinkers need to “hit bottom” before they will be willing to consider treatment. Although severely dependent drinkers have the greatest need for treatment, those with less serious illnesses make up the majority of problem drinkers, and experience most of the alcohol-related harm (27).

Rather than just focusing on the most severely ill patients, a stepped-care model provides a series of interventions that vary in intensity and difficulty of initiation (28). An online program works well as an initial step because it is available on-demand without regard to time or location. It can take advantage of an emerging interest in behavior change, even if that interest is fleeting. Although there may be substantial costs associated with the development of this kind of program, the marginal cost for each additional user is close to zero. Therefore it can realistically be offered for free.

Based on the data from the SOCRATES scale, few users who were attracted to this program by the easy accessibility and freedom from commitment had a clear

intention of changing their drinking patterns. Nevertheless, simple exposure to the program may have been beneficial. Participation alone can be enough to provide an effective intervention even among poorly motivated subjects (29).

Conclusions

The online program was able to reach a distinct population of non-help-seeking problem drinkers. Whether the low intensity intervention was able to increase motivation, change behavior, or facilitate treatment-seeking will require further study. Despite the fact that levels of problem recognition and actual change behavior ranked at the very bottom of the decile scale, concerns about the harm of alcohol use was comparable to traditional help-seekers. The presence of significant ambivalence suggests that a window of opportunity exists, and that these individuals may be well-positioned for an intervention that can tip the decisional balance in favor of change.

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Table 1. Comparison of internet users versus traditional help-seekers.

	Internet (n=1,060) (alcoholcheckup)		Traditional (n=952) (Project MATCH)		p
	Mean	SD	Mean	SD	
Age (years)	34.4	12.4	38.9	10.7	< 0.001
Motivation (SOCRATES)	8.6	9.0	10.8	4.4	< 0.001
Disease severity (AUDIT)	20.0	7.3	26.1	6.7	< 0.001
Drinks/ drinking day	7.2	9.5	13.5	8.0	< 0.001

SD = Standard deviation. N = number of individuals.

Table 2. Alcohol Use Disorders Identification Test (AUDIT) results for users of the online program and the Project MATCH subjects (%)

Questionnaire Item	Never		Less than monthly		Monthly		Weekly		Daily or almost daily	
	On	PM	On	PM	On	PM	On	PM	On	PM
How often do you have a drink containing alcohol?	0	0	1	2	6	5	23	18	70	75
How often do you have six or more drinks on one occasion?	3	1	9	2	16	7	48	29	24	60
How often during the last year have you found that you were not able to stop drinking once you had started?	17	13	17	6	20	11	29	26	16	44
How often in the last year have you failed to do what was normally expected of you because you were drinking?	25	27	29	13	21	17	19	25	6	17
How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	72	48	11	7	7	8	5	16	5	20
How often during the last year have you had a feeling of guilt or remorse about drinking?	10	10	22	7	22	13	28	29	18	41
How often during the last year have you been unable to remember what happened the night before because you had been drinking?	20	23	31	15	23	22	21	28	5	12
	1 or 2		3 or 4		5 or 6		7 to 9		10 or more	
	On	PM	On	PM	On	PM	On	PM	On	PM
How many drinks containing alcohol do you have on a typical day when you are drinking?	7	1	26	7	29	16	21	15	18	61
	No		Yes, but not in the last year				Yes, during the last year			
	On	PM	On	PM	On	PM	On	PM	On	PM
Have you or someone else been injured as a result of your drinking?	68	58			14	24			19	18
Has a relative, friend, doctor, or other health worker been concerned about your drinking, or suggested that you cut down?	25	7			8	9			68	84

On=Online group, PM=Project MATCH

Table 3. Comparison of gender distribution and employment status (%)

	Internet (alcoholcheckup)	Traditional (Project MATCH)	
Female	47.2	27.7	p = < 0.001
Employed	89	51	p = < 0.001

Table 4. Relatives with a definite or possible alcohol problem (%).

Relative	Definite Problem	Possible Problem	Definite or Possible
Father	24.8	21.1	45.9
Mother	9.4	12.4	21.8
Any brother (average brothers = 1.6)	18.3	26.4	44.7
Any sister (average sisters = 1.6)	9.9	15.6	25.5
Any first degree relative	40.8	69.4	69.4
Paternal grandfather	12.7	15.0	27.7
Paternal grandmother	4.7	5.4	10.1
Maternal grandfather	14.0	15.2	29.2
Maternal grandmother	4.2	6.1	10.3
Any second degree relative	27.5	32.7	52.1
Any relative	53.3	75.9	79.7