

Strengths and Weaknesses of Health Behavior Change Programs on the Internet

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Abstract

Full reviews were conducted on 37 public websites on health behavior change for disease prevention and management. All had at least four of five of the '5 A's for effective health behavior change treatment on the Internet' (advise, assess, assist, anticipatory guidance and arrange follow-up) that are assumed to be minimum criteria for a program to have the potential for producing behavior change. The strength of these 37 programs included: rationales provided for assessments; privacy and confidentiality protections; some form of feedback provided; and some form of interactivity. The weaknesses included: few were theory driven; few had individualized tailoring; few had empirically based tailoring; and few were evidence based or reported subsequent plans for evaluation.

Keywords

disease management, evaluation studies, health behavior, health promotion, Internet

Introduction

THE INTERNET is an emerging and potentially powerful influence on health. Research has shown that use of the Internet can play a strong role in changing the more than \$1 trillion health care industry in the USA due to health being a primary topic on the Internet. Approximately 169 million Americans had Internet access from home or work in January 2001 (Nielsen/NetRatings, 2001). Based on estimates from a mid-2000 survey, 86 percent of adult Internet users utilized the Internet to do research on a specific disease or health care (Harris Interactive, 2001). Most of these individuals used the Internet for health-related purposes at least once a month and half said access to information on the Internet has improved the way they take care of themselves (Pew Internet & American Life Project, 2000). Further, many reported that the material they gathered directly affected their decisions about getting care and treatment for their illnesses (Pew Internet & American Life Project, 2000). Consumers are also using Internet-gathered material to enhance their face-to-face interactions with health care providers. The most important effect of the Internet may be its influence on how patients approach their health care since those who seek information online report that it influences how they manage their overall health and how they comply with prescribed treatments (Harris Interactive, 2001).

Concern over how health information is presented on the Internet has prompted several groups to develop criteria to guide and evaluate health-related website content (Berland, Elliott, Morales, Algazy, Kravitz, Broder et al., 2001; Foubister, 2000). Although several organizations have developed evaluation criteria for general health on the Internet, there are no existing guidelines specifically to evaluate health behavior change programs that address disease management and prevention on the Internet. It was found that previously available criteria for evaluating Internet health content were necessary but not sufficient for evaluating content intended to help people change behaviors. Existing criteria like protecting confidentiality, accountability, accessibility and security are necessary for building trust in the information on an Internet site. However, health promotion

and disease management programs must extend well beyond information if behavior change content is to be effective.

To meet the needs of behavior change, a set of screening criteria was adapted from the 5 A's in the Public Health Service's *Clinical practice guideline* for treating tobacco use and dependence (Fiore, Bailey, Cohen, Dorfman, Goldstein, Gritz, Heyman, Jaen, Kottke, Lando, Mecklenburg, Mullen, Nett, Robinson, Stitzer, Tommasello, Villejo, & Wewers, 2000). The 5 A's (ask, advise, assess, assist and arrange follow-up) were first developed for treating tobacco for both prevention and management of disease. The '5A' criteria from this guideline were expanded for Internet programs and behavior change criteria were developed for full reviews to create the criteria, '5 A's for effective health behavior change treatment on the Internet' (see Table 1). The adapted 5 A's do not assure efficacy for behavior change. However, the 5 A's are assumed to provide the minimum criteria for a program to have the potential for producing behavior change.

In addition to the 5 A's criteria, reviews addressed whether the site used any of five major theories of health behavior change: the Transtheoretical Model, Stage of Change Model, Theory of Planned Behavior, Social Learning Theory, and Health Belief Model, and the variables included in them. There are many important reasons for websites to use theories of health behavior change. Sites could draw on the science that supports the theories; a systematic theoretical approach could be commonly applied to change variables across different target behaviors; and theories could be used for continuous quality improvement by helping to identify which variables work well and which need improvement. Criteria also were developed to evaluate whether a site addressed multiple risks, and if so whether the behavior change program treated each behavior separately (modular) or treated the behaviors together in an integrated manner.

The project's funding agent, the Robert Wood Johnson Foundation, selected four health behaviors—tobacco use, physical activity, alcohol and diet—and three disease management areas—diabetes, depression and pediatric asthma—to be reviewed. These areas are viewed as the most serious health behavior risks and

Table 1. Behavioral criteria examples for the '5 A's for effective health behavior change treatment on the Internet'

Advise

1. Is advice given about the need to change?
2. Is the purpose of the program to change behavior?

Assess: a variety of possible variables that may impact on behavior change

1. What does the assessment assess?
2. Is the purpose/rationale of the assessment given?
3. Is the assessment's source and scientific basis stated explicitly?

Assist

1. What is the degree of feedback tailoring based on the assessment?
2. Are strategies provided to assist the individual in meeting the recommendations?
3. How many assist choices can the user make?

- | | |
|---------------------------------|----------------------------------|
| -Bulletin board/discussion list | -Chat room |
| -Tracking tool | -Ask the expert |
| -Link to other resources | -Sign-up for reminder/newsletter |
| -Phone option | -Go - jump to desired area |
| -Other | |

Anticipatory guidance

1. Is there a relapse prevention component available?
2. Is there a managing temptations component available?
3. Is there a maintaining motivation component available?

Arrange follow-up

1. Is a follow-up timeframe specified?
 2. Are reminders used to keep users in touch with the program?
 3. Is continuing participation encouraged?
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most costly diseases by the *Healthy people 2010* report (USDHHS, 2000).

Two hundred and ninety-four (294) websites providing programs for one or more of the seven targeted problem areas were identified through online searches, medical information journals, articles and ads in the popular press. Of the websites identified, 21 (7%) of the URLs were not valid when the evaluation was conducted. A total of 273 valid websites were screened by two Masters-level reviewers, trained in library science and public health, independent of the developers of the evaluation criteria. The reviewers rated the websites on the presence of each of the 5 A's for effective health behavior change treatment on the Internet. Kappa was calculated for each criterion to assess the agreement between the raters, or inter-rater variability. The Kappa for the five categories ranged from .84 to .93 (M = .88). Kappa values between .80 and 1.00 represent almost perfect agreement.

A third individual reviewed a site when the two raters disagreed.

Full review

Full reviews were conducted on programs that met at least four of the five screening criteria: advise, assess, assist, anticipatory guidance and arrange follow-up. Forty-two programs met four or more criteria, which represented 15 percent of the programs screened. However, reviews were conducted on only 37 programs due to access problems at the time the reviews were conducted between 10 October 2000 and 23 February 2001. Table 2 provides a breakdown of the reviewed programs by behavior. Table 3 shows the breakdown of full review sites by type.

Table 2. Programs reviewed by behavior

Behavior	No. of programs
Smoking	12 (32.4%)
Diet	10 (27%)
Exercise	6 (16.2%)
Diabetes	7 (18.9%)
Asthma	1 (2.7%)
Depression	1 (2.7%)

Table 3. Types of full review sites

Type	No. of sites
Specialty single behavior	16
Health portal	14
Pharmaceutical companies	3
Business-to-business	4
Employer	4
Product purchase required	1

Findings

Five A's for effective health behavior change treatment on the Internet

The '5 A's for effective health behavior change treatment on the Internet' (advise, assess, assist, anticipatory guidance and arrange follow-up) provide minimum criteria for a program to have the potential for providing behavior change. The 5 A's were seen as necessary, but not sufficient, for determining the efficacy or effectiveness of websites.

Assess The types of assessments varied greatly across the programs, and were dependent on the specific behavior. For example, in the area of asthma, there were two types of assessments: risk assessments for children, and assessments of how effectively the asthma is being controlled. In the area of diet, the most prevalent were BMI and weight, followed by exercise level and stage of change. Management of diabetes included blood glucose levels, assessments of diabetes risk and exercise level. The only assessment in the depression site was the Zung Depression Scale. The exercise programs included many different assessments with age, fitness level, personality and weight being the most prevalent. Smoking programs most often included assessments of nicotine dependence, stage of change and tempting situations.

Advise Evaluators examined whether the rationale of the assessment was given. Thirty programs (81%) provided the rationale all of the time and 19 percent some of the time. Eight of the programs (22%) explicitly stated the source and scientific basis of their assessments all of the time, 17 some of the time and 12 did not give this information.

Assist Evaluators also examined the feedback that was provided based on responses to assessments. Feedback from 31 of the programs (84%) followed appropriately from all of their assessments. For six of the programs (16%), there was a disconnect between users' answers to the assessment and the feedback given. For example, if a participant responded to a question that they do not eat meat, the feedback indicated that the individual needs to cut back on their intake of meat.

Feedback from assessments was evaluated using three types of tailoring. With general or no tailoring, all participants received the same feedback, regardless of their responses to assessments. With segmented tailoring, participants were grouped based on a specific variable and feedback was the same for everyone in that group. With individualized tailoring, feedback was based on more than one variable and was designed specifically for that individual. There is growing consensus that individually tailored health communication represents one of the most promising modalities for health behavior change (Kreuter, Strecher, & Glassman, 1999).

Because tailoring was based on individual assessments and programs typically included more than one assessment, each site could be evaluated as having more than one of the above types of tailoring. Eleven programs included some form of general or non-tailored feedback; 37 programs provided segmented feedback and only five programs provided feedback that was individualized. Only a minority of programs (30%) stated that their feedback was based on guidelines from established groups, such as AMA or ADA. Examples of feedback strategies are shown in Table 4.

Anticipatory guidance Twenty-seven of the programs (73%) offered some form of anticipatory guidance to prevent relapse. Eleven (30%) provided guidance on managing tempting

Table 4. Assist strategies by behavior

<i>Behavior</i>	<i>Examples of suggested strategies</i>	
Smoking	Get social support Increase knowledge Set quit date Nicotine replacement therapy	Tracking Advice Substitutions Rewards
Diet	Increase knowledge Skill development Get social support Set goals	Diet plans & programs Advice Tracking
Exercise	Exercise programs Focus on advantages Social support Increase knowledge	Tracking Advice Goal setting Rewards
Diabetes management	Increase knowledge Tracking Advice	Focus on advantages Goals Overcoming obstacles
Pediatric asthma management	Utilize health care provider	Increase knowledge
Depression management	Encouragement	Medication

situations; nine (24%) on preventing relapse to the unhealthy behavior; and seventeen (46%) on maintaining the behavior change or staying motivated.

Arrange follow-up Four programs (11%) specified when the participant should come back to the program, and eight programs (22%) used daily or weekly e-mail reminders to keep users in touch with the program. Other ways programs arranged follow-up included: having participants check after three to six months to track their progress; when participants complete activities in one stage, they are directed to move on to the next stage or to work on another behavior; having participants come back and take the assessment; or encouraging daily participation.

Behavior change theories and variables

Five programs (14%) explicitly stated that they were using the Stages of Change Theory or model. The Theory of Planned Behavior, Social Learning Theory, Theory of Reasoned Action and the Transtheoretical Model were each being used by a single, separate site. None of the other

programs stated that they were using other behavior change theories or variables.

Multiple behaviors

There is currently much research interest about changing multiple behaviors. Twenty-nine of the evaluated programs (78%) were part of a site that addressed multiple behavior risks. Diabetes management programs are multiple behavior by nature because they address behaviors that impact on the management of diabetes, such as diet, exercise and medication adherence. In addition to the four specific behavioral areas targeted in this project, other behavioral areas included stress management, sexual behavior, blood pressure management and medication management. Of the 29 multiple behavior programs, 11 of them (38%) were integrated, that is, they integrated the assessment and feedback across multiple behaviors was integrated, and 18 of them (62%) were modular, that is, the assessments and feedback were kept separate among the behaviors.

Interactivity

The Internet is specifically designed to allow programs to provide the maximum amount of

interaction with a computer. However, much of the health information that is currently on the Internet does not take advantage of this potential. Rather, 'brochureware' (placing print materials on the Internet with no changes), has become commonplace. To evaluate the level of interactivity of programs, reviewers looked specifically for different categories of interactive tools within each site.

All programs had an assessment. Eighteen programs (49%) included a chat room, seven of which were moderated by a professional. Twenty-seven programs (73%) gave the option of using a bulletin board or discussion list. Eighteen programs (49%) had an 'ask the expert' function. The majority of the 'ask the expert' functions were in the form of the experts choosing select questions to answer and display on the site. Eighteen programs (49%) included a tracking tool (a function to chart progress and aspects of disease management). In addition, participants were able to sign up for e-mail reminders or newsletters in 26 of the programs (70%).

Accessibility and security

Personal health information may be very sensitive. To protect users, programs should take reasonable steps to prevent unauthorized access. Twenty-eight programs (76%) required registration with a password to access the entire site. Four programs (11%) were restricted to members (employees). Eleven (30%) of the programs indicated a secure server was being used as indicated by the prefix 'https' in the Web address. Twenty-eight programs (76%) required that cookies be enabled to access the site, with 10 of these offering a non-cookie version. Twenty-four of the programs (65%) warned the user about the cookies being used.

Privacy and confidentiality

Privacy is very important to consumers who are sharing personal health behavior information over the Internet. Three advocacy and trade groups, TRUSTe, HON and HiEthics, have accepted privacy criteria that were used in this evaluation (Health Internet Ethics, 2000; Health on the Net Foundation, 1997; TRUSTe, 2000). The vast majority of programs (92%) had a privacy policy statement posted that was one click away from the homepage of the program, and 49 percent had a privacy endorsement or

seal from TRUSTe, HON or HiEthics, with the majority of endorsements from HON. Thirty programs (81%) indicated how the information collected from users was being used, and 23 programs (62%) stated what security procedures were in place to protect loss, misuse or alteration of information (e.g. firewalls, encryption and secure databases).

Goals and audience

When consumers go to a behavior change site, it is important that they are informed that the goal of the program is to help change a behavior, and not simply to provide information. Most behavior change programs are doing this. Clear identification of the goals of an application and the program's intended audience help guide consumers to programs that are appropriate for them. Twenty programs (54%) clearly identified their intended audience. Of those, the intended audience included adults over the age of 18, parents of children with asthma, employees of specific companies and smokers. Thirty-one of the programs (84%) explicitly stated their goals for users (e.g. to quit smoking) while five of the programs (14%) implied their goals by their focus. These statements informed the consumer that the site was there to help them change their behavior. Only one site did not state its intended goal.

Accountability

Many Internet companies have come under scrutiny for not allowing direct contact between site users and 'real people' working at the site. When questions arise concerning health behavior change content on a site, it is important that users of the site are able to address their concerns, or know where to direct questions. All of the programs had some form of contact; ranging from 100% for e-mail contact for users with questions about content to 46 percent including a phone contact number.

Evaluation

None of the programs included a statement about how the program was being evaluated for effectiveness. However, six programs had mechanisms, including e-mail and online forms, for eliciting user feedback specifically for evaluation. One of the programs asked if the user changed their behavior by using the program

and one of the programs also asked if the user's knowledge, skills or attributes improved by using the program. Overall, these programs were attempting to change health behaviors, but there is currently no way of knowing whether they are efficacious.

Discussion

This study reports on intensive analysis of 37 public websites selected from nearly 300 sites that offer programs on health behavior change. These 37 sites have an impressive series of strengths. They all have at least four of the 5 A's that are assumed to be the minimum criteria needed to produce the potential for health behavior change. Almost all of the programs (92%) had privacy protection policies and most (76%) had confidentiality safeguards. All of the programs had some form of interactivity and all were free.

In spite of the impressive strengths of these top programs, there are major weaknesses that could lead to future improvements. For example, individually tailored communications are viewed as one of the most promising approaches to health behavior change. Only five (13.5%) of the programs assisted users by providing individually tailored feedback. The Web is an excellent, low-cost modality for providing individually tailored communications, but most of the best sites do not utilize such individualized assistance.

Only nine (29%) of the 37 websites are driven by leading theories or models of health behavior change. Theory driven programs can have advantages of building on the system that supports the theory and providing a more coherent and systematic guide to behavior change.

While the majority of the programs (73%) offered some form of anticipatory guidance to prevent relapse, only nine (29%) had systematic relapse prevention components. Given the high rates of relapse across chronic health behavior issues like smoking and exercise, these sites need to enhance their services if they are to help users maintain their behavior changes.

There are considerable variabilities in how these top programs arrange follow-up visits to help users progress over time. Only four (11%) specify when the participant should come back to the program and eight (22%) used regular

e-mail as reminders. Given the low cost of e-mails and elective scheduling, top sites could clearly improve in this area. Research is needed, however, on the best ways to arrange follow-ups on the Web to assure high retention rates in behavior change programs. Given that about 50 percent of participants drop out of person-to-person health behavior change programs quickly and against clinical advice, top websites will need to put more efforts into preventing such drop-outs from computer-to-person programs. If Internet programs are not brought up to higher standards so as to be able to perform health behavior change effectively then an important opportunity will have been lost. If higher standards are not sought, the public will waste their time on programs that do not make a difference.

Study limitations

This study was a cross-sectional review of one point in time. Future research is needed for longitudinal reviewers to determine if sites are improving. This study was limited to two raters. While three would be preferred, Kappa between the two raters was high.

No consensus exists on what criteria are needed for effective health behavior change programs. The 5 A's represent the best criteria that could be identified in the literature, but they have not been validated. On the other hand, no criteria have been validated for health behavior change on the Internet. The 5 A's do not assume efficacy; the 5 A's only provide minimum criteria where efficacy has a good opportunity of occurring. Efficacy tests are also needed in the future.

Conclusion

Health behavior change on the Internet appears to be in the early phases of development to judge from their study's findings. A good base has been established, but much more development is needed. Much work is needed in the future. Most programs that are most readily available to consumers, mainly through Internet search engines, do not provide the basic components necessary for health behavior change. In the future, search engines may permit use of quality criteria to rank Internet health sites for users. The criteria used in this project could provide

templates as well for developers of programs, consumers looking for quality sites and health professionals seeking to recommend the best sites for disease management and prevention.

It has been estimated that there are between 17,000 and 45,000 health-related sites on the Internet. Results presented here suggest that many health-related sites do not include the basics of health behavior change, and those that do need improvements made in many of the areas believed to be important for the quality of health behavior change programs on the Internet. There is a strong need for more rapid dissemination to the Web of the science of individualized and interactive tailored communications. An objective identified in *Healthy people 2010* recommends increasing the proportion of health-related websites that disclose information useful in assessing their quality (USDHHS, 2000). The results of this study provide a first indication of how health behavior change on the Internet is doing at meeting this objective. As health behavior change on the Internet matures from mere provision of health information to meeting the requirements necessary to produce health behavior change, and as program developers take advantage of the interactive nature of the Internet, the full evaluation criteria used in this study can provide templates for both program developers and consumers.

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