

Developing and Evaluating Online Education to Improve Older Adults' Health Information-Seeking Skills

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Structured Abstract

Purpose

To improve older adults' knowledge of and confidence in identifying high quality online health information by developing and evaluating a theory-based educational website with community support.

Scope

The Internet is an important mechanism for transforming medical care, and an increasing number of older adults go online for health information. Online information can be beneficial in fostering educated consumers, but it can also be misleading. An educational program to assist older adults in finding the best available evidence is warranted.

Methods

We conducted focus groups, in-person interviews and pilot tests with community-dwelling older adults to gather information on their health needs and preferences for online learning. We incorporated the findings into a new educational website's content and format. Participants were randomly assigned to the new site or to an alternative and compared in their knowledge, self-efficacy, and internet use.

Results

94 community participants 50 years and older participated in the development and evaluation of Your Health Online: Guiding eSearches. A majority reported searching for information on medical conditions and procedures. Almost all agreed on the importance of interactive education. When compared to a tutorial with similar objectives, participants learned as much and reported being as self-efficacious as comparison group participants. Experimental participants assigned high ratings to the new program for appearance, usability, and usefulness and reported that program participation was likely to improve their next online health search. Your Health Online is feasible and acceptable in a community setting. Future research should explore the program's effectiveness in improving searching behavior.

Keywords online education for older adults; health information searches

Purpose

This study's purpose was to improve older adults' knowledge of and confidence in identifying high quality online health information by developing and evaluating a theory-based educational website with community support. The website was designed for adults who are 50 years of age and older who currently use the internet, and it incorporates their preferences for online learning and health content. Among an online program's beneficial features are that it can be personalized (e.g., users may take as much time as they need), made interactive (e.g., users can receive immediate feedback), and updated regularly. To our knowledge, an educational program that combines these characteristics is not currently available for the growing population of older internet users. According to the Agency for Healthcare Research and Quality (AHRQ), "meeting patients' and caregivers' increased need for health information may improve communication between health care providers, patients, and their caregivers" and "enhance patients' abilities to self-manage chronic conditions and their ability to follow treatment, medication, and monitoring regimens." This study aims to meet the needs of older adults, an AHRQ priority population, more than half of whom are likely to have chronic illnesses such as hypertension or diabetes. The study was a mixed-method, pilot health IT research project conducted with community participation by a multidisciplinary team. Its objectives were to:

1. Identify older adults' perspectives on high quality websites and relevant health topics by convening focus groups and conducting in-person interviews.
2. Develop Your Health Online: Guiding eSearches using the focus groups' and interviewees' advice as well as incorporating models of health-behavior change and adult learning into its content and format.
3. Maximize the usability and accuracy of Your Health Online by conducting a standardized internal review.
4. Pilot test the website among potential users and revise the website based on the results
5. Compare knowledge, skills, self-efficacy internet use and information-seeking behaviors among participants who are randomly assigned to complete Your Health Online or Evaluating Internet Health Information, a tutorial from the National Library of Medicine.

Scope

Background

The Internet has been recognized for many years as an important mechanism for transforming medical care.(1) (2, 3) (4) In 2000, 46% of American adults reported access to the internet, 5% of U.S. households had broadband connections, and 25% of American adults looked online for health information. By 2009, 74% of American adults went online, 57% of American households had broadband connections, and 61% of adults looked online for health information.(5) Health information websites such as MedlinePlus® are accessed by millions of people. MedlinePlus®, reported 52,700,000 unique visitors in October-December, 2011 up from 28,300,000 during the same months in the preceding five years.(6)

According to AARP, 40% of adults 50 years of age or older feel very or extremely comfortable using the internet,(7) and nearly 80% of persons 55 to 64 years and 60% of those 65 and older go online at least once a day.(8) Internet use among people 65 years of age and older has risen significantly from 2009 to 2012.(9) The baby boomers are among the most prolific Internet users, and many of them are now 65 years or older. According to the Pew Internet and American Life Project (<http://pewinternet.org>), which refers to boomers as the “silver tsunami,” their online behavior is similar to that of people in their 30s.(10)

People use the Internet for health information because of several favorable features: the convenience of being able to search for information at any time, unlimited access to inexpensive information resources, the ability to tailor queries, and user anonymity when searching for subject-sensitive health information.(11-14) An additional and important factor influencing Internet use has been the emergence of the patient self-care or partnership model in health care.(15) A key assumption of the model’s proponents is that ability to identify relevant health care information benefits all patients by helping them to ask better questions of their health care providers. Older adults are likely to have had more recent contact with a doctor or other health professional than other age groups,(16) so the ability to communicate effectively with physicians and health care workers is for them an especially important concern.

The Internet is unregulated, and is perceived to be the area where consumers gain access to information with least guidance from information professionals or health professionals.(17) Research has raised concerns about false, misleading, or incomplete online health information.(18) (19) (20) An overabundance of extraneous, irrelevant, or invalid information may place new burdens on health care professionals and detract from their ability to provide care efficiently. The Office of Disease Prevention and Health Promotion (<http://odphp.osophs.dhhs.gov/>) has written that “the potential for harm from inaccurate information is significant.” As a result, *Healthy People 2010* (<http://www.health.gov/communication>) included the “quality of Internet health information sources” as one of its health communication objectives.

This small pilot IT research study was designed to meet the needs of older adults, more than half of whom are likely to have chronic illnesses such as hypertension or diabetes, and who are increasingly(9) going online. (21) It aimed to obviate some of the potential problems associated with online searches by providing guidance in the use of search engines and evaluating who is responsible for a health website’s content, its currency, and accuracy. The study used qualitative and quantitative methods to achieve its objectives.

Settings/Participants

This study was done in conjunction with WISE & Healthy Aging (WHA), a nonprofit, social services organization with a long tradition and deep roots in the Westside and surrounding communities of Los Angeles (<http://www.wiseandhealthyaging.org/cms/home.html>). Participants were recruited through posters, flyers, WHA newsletters, the WHA website, articles in the local newspaper, personal recommendations, and mailings to members and affiliates of the Retired Seniors Volunteer Program (RSVP), for which WHA serves as the headquarters in Los Angeles, California.

Phase 1 of the study included two focus groups and a series of in-person interviews. Eligible focus group and interview participants were 50 years of age or older, had used the Internet at least once in the last year to look for health information, were willing to be recorded, and were willing to meet with study investigators for approximately 90 minutes at WHA or, for the interviews, at a location of their choosing. We chose adults 50 years of age or older

because most people of this age are expert internet users and are likely to continue to rely on it for health information.(22) Phase 3 of the study was the pilot test of Your Health Online. Pilot test participants were 50 years of age or older, had used the Internet at least once in the last year to search for health information and were willing to spend up to 90 minutes to complete an online educational program and answer questions in person or via email about their experience. The study's fourth phase consisted of a comparative evaluation of Your Health Online and Evaluating Health Information. Eligible participants were 50 years of age and older, had used the Internet at least once in the last year to search for health information and were willing to spend up to 70 minutes to complete an online educational program and complete an online questionnaire about their experience. All participants in the study were reimbursed for their time. The study protocol was approved by The Langley Research Institute's Institutional Review Board.

Methods

Study Design

Phase 1. Focus Groups and Interviews. The focus groups took place at WHA for 90 minutes. They were conducted in a flexible semi-structured format to allow participants to bring up topics that mattered to them, to build conversation using comments from the other group members, and to allow the moderator to probe for deeper insights into the comments. Dr. John Beck, the study's geriatrician led the groups. Each session had two note takers and was recorded. Because this study was guided by the Health Belief Model(23) and Knowles' theory of learning(24, 25), the focus group questions leaned heavily on variables (such as barriers to learning) that can be modified by effective education and are associated with both models. The interviews took place at the participants' home or the study's primary office. Dr. Beck conducted all interviews.

Phase 2. Internal Review. Five members of the study team independently reviewed the initial version of Your Health Online. Each member was independently queried as to the site's usability, appearance, and potential usefulness. The PI was responsible for summarizing the results and working with the web designer to correct typographical and other errors that may interfere with the program's effectiveness. Two study team members were required to approve the site's accuracy and usability before the pilot test was to begin.

Phase 3. Pilot Test. Pilot test participants were sent the program's URL by email. They were asked to review the website at a location of their choosing and then to complete a questionnaire about their experience. The purpose of the pilot test was to determine the extent to which the program was feasible for use without assistance from the study team. Based on the results, the study team made revisions to the program as needed.

Phase 4. Evaluation. Evaluation participants were randomly assigned to the experimental or the control group using a computer-generated table of random numbers. All participants in the evaluation were sent an email from WHA that was signed by the CEO urging participation. Those who agreed to participate were directed either to the experimental or control group. People in the experimental group were given a user name and password and asked to complete a questionnaire that was embedded in the education program at its conclusion. People in the control group were asked to go to the National Library of Medicine website for their tutorial. They were also asked to complete a questionnaire. The link to the questionnaire was included in the email asking for participation.

Interventions

In this study, we developed a website, Your Health Online: Guiding eSearches, and compared its performance to Evaluating Health Information: A Tutorial from the National Library of Medicine.

Development and Characteristics of Your Health Online. The conceptual framework for this study is the Health Belief Model because it provides a framework that identifies personal and situational factors likely to influence health behavior.(26) According to this model, the answers to three main questions explain whether or not people will follow a recommended action (and therefore change behavior): (1) Do they feel ready to take action? (2) How do they evaluate the recommended action, in terms of its efficacy, that is, will the action avoid the problem or reduce its severity? (3) Are there any “cues to action” that trigger a change in health behavior? Cues can be external (e.g., a friend gets sick; the person is finally persuaded through education).

Your Health Online is founded on principles of learning and curriculum development, particularly Knowles’ theory, which he called “andragogy.”(24, 25) Knowles’ theory has four basic tenets: (1) Adults should be involved in the planning and evaluation of their curriculum and instruction. (2) Experience (including mistakes) should provide the basis for learning activities. (3) The topics covered must have immediate relevance to their personal life. (4) Curriculum and instruction should be problem-centered rather than content-oriented. We supplemented Knowles’ theory with the ADDIE framework of curriculum development because it incorporates Knowles’ theory of andragogy and advocates evaluation. ADDIE stands for five phases of curriculum development: analysis, design, development, implementation, and evaluation. (27, 28) In the analysis phase, the instructional problem is clarified, the instructional goals and objectives are established and the learning environment and learner’s existing knowledge and skills are identified. In this study, the goals and objectives of the education and its subcomponents were derived from the information we get from the focus groups in-person interviews and pilot test. The design phase of ADDIE’s framework deals with learning objectives, content, exercises and feedback. We based the content of the education on the needs for knowledge and skills identified by the focus groups, interviews, pilot tests and on standards for developers of high quality websites.(29) We used Visual Studio 2010 and SQL server 2008 to build a dynamic site with password authentication for access. The site was hosted on a secure service provider under Internet Information Services (IIS)7.

Choice of the Comparison Intervention: Evaluating Internet Health Information A Tutorial from the National Library of Medicine. We chose this tutorial as a comparison to Your Health Online because it covers many of the same topics that we anticipated addressing in our program. It differed from our planned program in that it is not interactive (no practice exercises, feedback, links, ability to choose topics of interest at will), and it is not directed specifically to older adults. Instruction depends upon a series of slides that move at a fixed pace and a narrator to explain each slide. In addition, to view the tutorial, the user must install the Flash plug-in, version 8 or above.

Figure 1 illustrates some of the important differences in the experimental and comparison sites. As can be seen in Figure 1, the Your Health Online user can select topics at will, the illustration includes older adults, and the site uses an example from NIH Senior Health to make its point, which in this case concerns contacting the site. In contrast, the Evaluating Internet Health Information user can only advance through the program by moving the bar at the bottom of the screen (although there is no indication where the movement will lead) and the illustration is for a general audience.



Your Health Online: Guiding eSearches

- Home
- Introduction
- Instructions
- Internet and Health Information
- What this Guide Tells You
- 10 Questions that Must be Answered
- 1. Who Runs the Site?
- 2. What are the Site's Purposes?
- 3. Do the Site's Purposes and Yours Agree?
- 4. Can You Easily Contact the Site?
- 5. Who Supports the Site?
- 6. Who is Responsible for the Content?
- 7. Is the Information Current?
- 8. What Happens if You Follow the Links?
- 9. Are Testimonials Reliable?
- 10. Is Privacy Protected?
- Resources
- Test Your Knowledge
- Congratulations

Question 4. Can You Easily Contact the Site?

- You should be provided with several ways to contact the site including email and telephone.
- If you are ordering a product, it is useful to know where the product originates to protect yourself in case of returns or concerns about privacy.
- Here is an example of how to contact a site called NIH Senior Health, sponsored by the U.S. Department of Health and Human Services.
- All sites should provide you with an easy way to contact them.



Thank you for visiting NIHSeniorHealth.

- Did you find what you were looking for?
- Do you have a suggestion for improving NIHSeniorHealth?

We cannot respond to questions about your individual medical case, provide second opinions or make specific recommendations regarding therapy. Address those issues directly with your healthcare provider.

Subject of my comment/suggestion (required):

My comment or question (required):

2 of 24 - Clipboard
Item not Collected: Delete items to increase available space

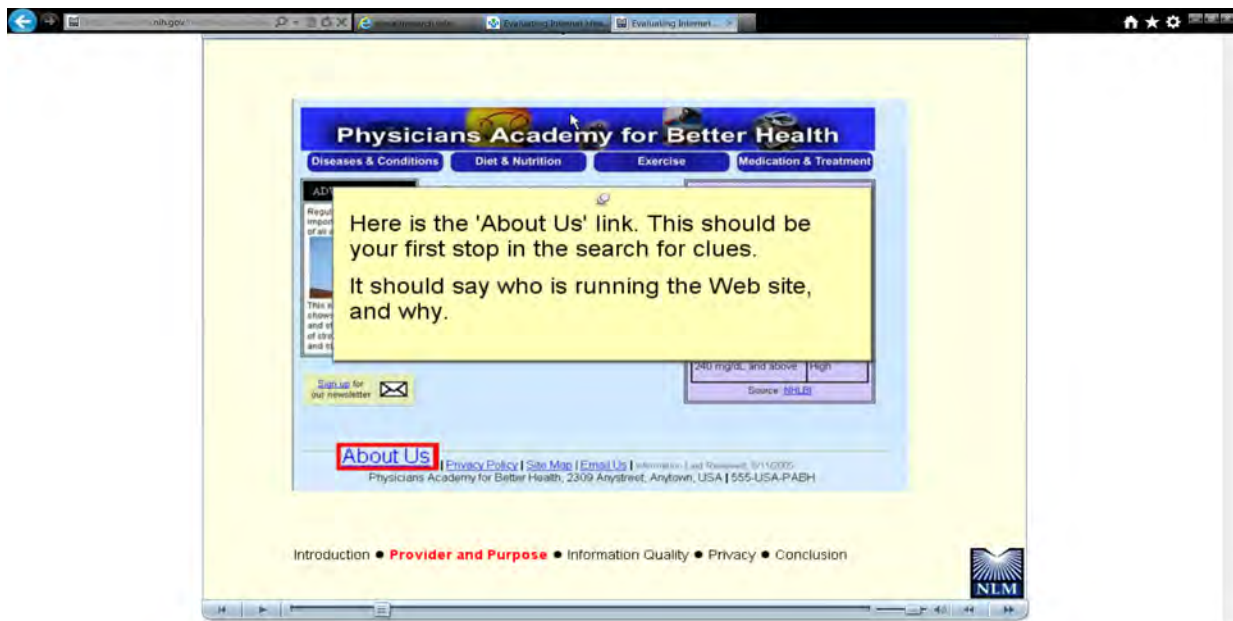


Figure 1 Comparing Your Health Online and Evaluating Internet Health Information

Figure 2. Shows a portion of the interactive exercises found in Your Health Online. Each response choice is linked to an explanation of whether it is correct or not. Figure 3 gives an illustration of some of the links to high quality websites provided by Your Health Online.

Your Health Online: Guiding eSearches

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9. Are Testimonials Reliable?
10. Is Privacy Protected?
Resources
Test Your Knowledge
Congratulations

Exercise 1. Test Your New Knowledge of Online Health Information

Your doctor tells you that you are at risk of developing hypertension. You want to get more information about the condition and how it may affect your health.

Which of the following would you choose to do? Click each choice for a response to that answer.)

A. Do a search on Google.
B. Go to MedlinePlus of the U.S. National Library of Medicine and the National Institutes of Health website
C. Go to understand-high-blood-pressure.com
D. Go to Wikipedia

Exercise 2. Test Your Ability to Do Online Health Searches

You've read that men as they age should regularly be screened for prostate cancer, but you don't understand how this screening is done or how often it should be done.

Which of the following would be good sources for information? (Click each choice for a response to that answer.)

A: MayoClinic.com
B: Lab Tests Online
C: WebMD
D: National Cancer Institute (NCI)

Home
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4. Can You Easily Contact the Site?
5. Who Supports the Site?
6. Who is Responsible for the Content?
7. Is the Information Current?
8. What Happens if You Follow the Links?
9. Are Testimonials Reliable?
10. Is Privacy Protected?
Resources
Test Your Knowledge
Congratulations

Here are the answers:

Exercise 1, Answer A: Do a Google Search

Going to Google and searching using the word "hypertension" will give you 44.9 million sites offering information about hypertension.

Exercise 1, Answer B: Go to MedlinePlus

MedlinePlus is a good source for information. It is a government website that provides unbiased, objective and up-to-date information on hypertension.

Exercise 1, Answer C: Go to Understand-high-blood-pressure.com

This is a website at (link to <http://www.bystolic.com/hypertension/symptoms-causes/?WT.srch=1&guid=154490376>) that was listed in a Google search using the word "hypertension." The first thing to note is that the link to this site ends in .com. This tells you that this is a commercial site. If you go to the bottom of the page, you will see that the site is owned by Forest Pharmaceuticals, Inc. One of their products is featured at the top of the web page and is discussed below the information on hypertension. The discussion of the product is longer than the discussion of hypertension itself. It is important to ask: what is the purpose of this site? It is equally important to remember that only your doctor or health care provider knows your unique and individual health situation. Any questions about treatment should be directed to your doctor or health care provider. He or she can provide knowledgeable answers based on your health history, most recent lab tests and health situation.

Exercise 1, Answer D: Check Wikipedia

As with any website on the internet, it is important to know where content comes from on Wikipedia. Wikipedia describes itself as a website that is "written collaboratively by largely anonymous internet volunteers who write without pay. Anyone with internet access can write and make changes to Wikipedia articles (except in certain cases where editing is restricted to prevent disruption or vandalism). Users can contribute anonymously, under a pseudonym, or with their real identity, if they choose." (<http://en.wikipedia.org/wiki/Wikipedia:About>) The information you find there may be written by a knowledgeable professional in the field of healthcare and medicine – or not. You don't have a way of knowing. It might be wise to start with a website where the source of the information comes from trusted, reliable and

Figure 2. Exercises and Answers in Your Health Online

<p>10. Is Privacy Protected? Resources Test Your Knowledge Congratulations</p>	<p>AARP: Health http://aarp.org/health/ Special sections on health conditions and diseases; long-term care; healthy living; doctors and hospitals; and brain health. The site also offers a drug interaction checker, and you can search for and learn about medicines by name.</p> <p>Administration on Aging Elders & Families http://www.aoa.gov The Department of Health and Human Services/Administration on Aging website assists older people and their families or caregivers to obtain information on aging-related topics and government-sponsored programs. Do you want to know about nutrition services? The Aging and Disability Resource Center? The National Center for Senior Benefits? Are you interested in a Profile of Older Americans? If any of the answer to these questions is "yes," this is your site.</p> <p>The American Geriatric Society/Foundation for Health in Aging http://www.healthinaging.org Offers information on the health and care of older adults and provides a directory of federal government agencies and national not-for-profit organizations. The site also defines "geriatrics," which can be important in deciding when to seek the care of a geriatrician or geriatrics medical specialist.</p> <p>Center for Disease Control's Healthy Aging http://www.cdc.gov/aging/ The best place to go for statistics and research information on aging and on health, for a copy of the latest State of Aging and Health in America report, and for information on the Healthy Brain Initiative. This is a world-class site.</p> <p>Centers for Medicare & Medicaid http://www.medicare.gov/ Official U.S. government site. This is the site to go to for information on Medicare. You can apply for Medicare online, find health and drug plans, learn how to get help with prescription drug costs, and find out how Medicare works with your health insurance.</p> <p>The Geriatric Mental Health Foundation http://www.gmhfonline.org/gmhfi/ Raises awareness of psychiatric and mental health disorders affecting the elderly. The Foundation aims to eliminate the stigma of mental illness and treatment and increase access to quality mental health care. You can find a geriatric psychiatrist on the site and get links to other sites such as Eldercare Locator and the Ethnic Eldercare Network.</p> <p>MedlinePlus Seniors' Health http://www.nlm.nih.gov/medlineplus/seniorshealth.html Created by the National Library of Medicine (NLM), the site contains links to reliable health websites, offers detailed overviews of senior health problems.. This site is among the most reliable for information on aging and health.</p> <p>National Institutes of Health (NIH) Senior Health http://nihseniorhealth.gov/ This website has a spoken language feature and also allows you to increase the contrast and type (font) size. Illustrated and readable, it includes videos and links out to MedlinePlus for additional health information.</p> <p>Agency for Health Care Quality and Research (AHRQ) http://ahrq.gov This government website's mission is to improve the quality, safety, efficiency, and effectiveness of health care. They have videos and podcasts related to topics such as how to navigate the health care system, learn about health care costs, compare medical treatments. This is the place for all health care consumers to go if they want science-based information about their health.</p> <p>ClinicalTrials.gov http://clinicaltrials.gov The U.S. National Institutes of Health, through the National Library of Medicine, has developed this site to provide patients, family members and members of the public with the most current information about clinical research studies.</p>
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Learn How To Search For And Evaluate Scientific Information

Figure 3. Example Links to High Quality Web Sites in Your Health Online

Data Collection

Focus Groups. Because this study was guided by the Health Belief Model, the questions focused on variables that may be modified by an effective program, and the general questions were the same across groups. (30) For example, to get at internet knowledge and experience, a main component of the model, we asked questions like: Which web sites do people currently use for health searches? Which topics are most important? How do they get the information they need? What is the best way of informing older people about the existing of a program such as the one being proposed? How do they go about searching the web? How do they evaluate the accuracy of the information they obtain? We also showed the groups Evaluating Internet Health Information and asked for a critique of the most and least favorable characteristics. We also addressed potential barriers to using the internet, another model variable,(31, 32) and to online learning by asking questions like: How important is audio? Video? How important are large font sizes, graphics, and links in selecting a site? How much time are participants willing to spend on an educational program? If they were the chief web designer, what would participants include in a program about how to search for health information? What would they exclude? (31) (30) We were also concerned with ways to improve self-efficacy, particularly with respect to patient-physician communication, and asked questions about ways that valid information can assist patients in working together with physicians(33) in managing their own health care.

In-Person Interviews. We developed a standard set of questions for the interviews, but allowed additional questions to be raised by participants. We asked them whether they used a specific website to begin their search or a search engine; what topics they researched; how frequently they went online for health information; how they evaluate the quality of health websites and health information; We also asked for advice about the contents and format of a

website that would be useful and appealing. Interviewees were also asked to view Evaluating Internet Health Information and assess its usefulness, usability, appropriateness and appeal.

Internal Review. To assure a standardized review using objective criteria, we adapted the Accessible Health Information Technology (IT) for Limited-Literacy Populations Checklist, a Checklist for Developers and Purchasers of Health IT developed by AHRQ. (29) Reviewers, who were senior team members, answered yes or no to items as the following: Presence of a great deal of white space (fewer words or less dense text), short line length (40-50 characters), and bullets to break up text; use of dark text on light background; ability to run site without requiring Flash, Shockwave, or other plug-ins; ability to display and operate site on all major browsers; home page is simple with a minimal amount of text per screen.

Phase 3. Pilot Test. The pilot test questionnaire asked participants if they learned anything new, how important they think it is that other people who go online for health information have easy access to a site like Your Health Online, and to rate the site's appearance and usability. We also asked participants to tell us if the exercises helped consolidate the knowledge they gained by completing the education. Finally, we asked if the site could benefit from additional audio or visual materials.

Phase 4. Evaluation. All participants completed a 10-minute online survey with questions on demographics; knowledge of standards for identifying and evaluating online health websites; confidence in using the internet for health information, experience with the internet; and assessment of the usability appearance, and usefulness of each of the two programs. Demographic questions asked participants their sex, age, and education. These variables were selected because the Pew Internet and American Life project's findings consistently show that these three factors affect internet use. To determine their knowledge, participants in both groups were asked 8 true-false questions. The questions were developed for the study and tested on three people for clarity and relevance to the topic. Sample questions included: "The information on a website is probably created by the organization that built the site (false)." "If you visit a website that you trust, you can also trust that the links on that site will lead to trustworthy sites (false)." Participants were asked 6 questions to measure their self-efficacy. Four of the six questions were adapted from research done for the Pew Internet and American Life project (<http://pewinternet.org>). Sample questions included: "How confident are you that you can find valid online health information?" The response choices ranged from extremely to not very confident. "How strongly do you agree that your last search led you to speak to doctors and other health professionals?" The response choices ranged from strongly agree to strongly disagree. All questions on internet use and information-seeking were adopted from the Pew Internet and American Life project. They included topics such as why participants last searched (e.g., for information about specific medical problems); whether the search was for themselves or someone else; whether the search helped them; how frequently they search; and how they begin their search (e.g., with a specific website or a search engine). Finally, we assessed the program by asking all participants to tell us if their participation in the study will change the way they now do online searches (make it better or worse or not change it at all); how likely they are to use the information in their next search (definitely use to definitely not use); how much they learned (10 = a great deal to 1 = nothing or almost nothing); whether the site is usable (10 = extremely easy to 1 = extremely difficult). We also asked for a rating of each site's appearance (10 = excellent to 1 = terrible). We asked experimental participants to rate the usefulness of the exercises and interactive links to health-related websites.

Data Analysis

Two members of the study team reviewed the qualitative data obtained from the focus groups, in-person interviews, and pilot test. Each had access to recordings and study notes. They were asked to review the results for common themes. They met in a day-long session for each study phase to discuss their findings and resolve differences. For the evaluation, we computed frequencies and percentages for survey responses. We used the chi square or Fisher's Exact to test for differences between groups and report the exact p-values..

Limitations

This study is a pilot test that relied on the advice and consumer expertise of community-dwelling volunteers who live primarily in Southern California. Thus, the results of the study may not be applicable to older people in other communities. We do not have any evidence suggesting that the study participants' health or information needs differ from those of other older adults in other communities, but we cannot confirm their similarities either. Another potential study limitation is that the development and evaluation of Your Health Online relied on relatively proficient internet users, by default excluding those who are less capable. The website does not include instructions on how to use the internet although it does give detailed information on how to use the website. For example, the site provides instruction on how to enlarge the font and navigate from one section to another. Nevertheless, people who are not internet savvy may not benefit from the site. Perhaps the most serious study limitation is that although the vast majority of study participants stated that they benefited from the site and planned to use the information in their next search, we did not follow-up and measure their actual behavior because it was not within this study's scope to do so. The effectiveness of Your Health Online: Guiding eSearches awaits further research.

Results

Principal Findings

Focus Groups. We conducted two focus groups at WHA. One was conducted in the morning and one in the afternoon during working hours. Nearly all attendees were retired although 5 had part time paying jobs. The first group had 8 participants and the second had 10 participants for a total of 18. Several major themes emerged:

1. The majority of participants used a search engine as an initial portal for health information.
2. No one had heard of Medline Plus, and many participants thought that the National Library of Medicine was a free-standing building. Nearly all had heard of the NIH. Many asked if AHRQ was affiliated with NIH.
3. Many participants said they checked several sites, and if the sites generally agreed, then they accepted the reliability of the information. Few compared the accuracy of the sites they were equating.
4. A list of high quality sites is needed, many said, because most people may know about one or two but very few know about the government sites or how to find them.
5. Nearly all participants agreed that an education program to teach people how to identify and evaluate online health information should not take more than 30 to 60 minutes to complete.
6. Practice quizzes were highly recommended by nearly all participants in both groups.

7. Most older adults are concerned with chronic disease management, medications, and medical procedures, so many participants agreed that an education program should contain links to websites that are appropriate for finding out about these problems.
8. According to the overwhelming majority of participants, The National Library of Medicine tutorial covered very important content. However, most were adamant in stating the tutorial was condescending in tone and that the narrator's voice was distracting at best or irritating at worst. Over half of the focus group participants complained that the NLM site was boring and old-fashioned.

Interviews. We conducted interviews with six people, five of whom were baby boomers. All were employed. This group was much more skeptical of the web than either of the focus groups. For example, one interviewee stated that it was practically impossible at the present time (there may be changes in the future) to avoid giving up some of your privacy in exchange for a "free" Web. According to this interviewee, "most people don't read privacy policies anyway" Also, most internet users, particularly the young, have willingly forfeited privacy as per Facebook and Twitter. Given the importance of privacy, we need to find a way to get people to pay more attention to what they can lose if they ignore the privacy pages." Another interviewee pointed out that he often goes to WebMD, but is aware that when he does so, he must be cautious because he "often finds poor quality information which is outdated."

Five of the six interviewees primarily went to the web only when they had specific reasons (e.g., to learn about a very serious illness they had or to research a son's serious illness). In the course of their research, they became familiar with several high quality sites including the National Cancer Institute and the Mayo Clinic. Two people relied on their health plan's site for information. None of the interviewees had heard of the National Library of Medicine or Medline Plus. Five of the six were unanimous in condemning the NLM tutorial as an unacceptable way to learn. One interviewee said, for example, that she would never have kept listening under actual circumstances; she only did so because she was a study participant. Among the reasons for her distaste included the narrator's "grating voice" and the site's lack of interactivity: no links, no quizzes. The one person who did not dislike the NLM tutorial did criticize it, however, for being static rather than dynamic and interactive. She did think that the narrator's tone and the simplicity of the language may have been an attempt to make sure the message got through to people with varying levels of health literacy. All six interviewees agreed that when they went to the web for health information, they tended to do so more or less uncritically. For instance, they did not check when the site was last updated or if the content was original or came from another site. They were unanimous in their support of an educational website that was interactive, providing links to high quality online information and offering practice in applying knowledge to problems similar to those they might encounter in their next searches.

We used the focus group "themes" and interview results to help guide program development. For instance, Your Health Online has a section devoted to the potential pitfalls of relying on search engines rather than on specific well-regarded websites like MedlinePlus. The program includes links to high quality websites, especially those that contain information on chronic disease management, medication and medical procedures because these are of concern to older people. The basic website instruction takes under 30 minutes to complete. We also tried to make the site graphically interesting and interactive by providing quizzes and a little humor.

Pilot Test. Four people completed the pilot test. As can be seen from Table 1, all participants reported learning new information and planned to use the information in the future. They found the exercises useful and the site usable. The appearance of the site ranged from 6 to 8.

Table 1. Pilot Test Responses

Pilot Test Participant	Learn Anything New	Appearance	Usability	Use or Not	Importance of the Program	Exercises
1	Definitely yes	8	9	Definitely use	Definitely important	Definitely helpful
2	Probably no	8	10	Probably use	Definitely Important	Definitely helpful
3	Definitely yes	7.5	10	Definitely use	Definitely important	Definitely helpful
4	Definitely yes	6.5	8	Definitely use	Definitely important	Definitely helpful

As with the focus groups and interviews, participants' responses helped provide guidance for the continued development of Your Health Online. Among the comments were the following:

- I did the exercises, and I think they are helpful, but I think there should be more. Two questions don't seem like much of a test. Overall, I think the site is well done and would be extremely useful to many people. It is very easy to understand and to navigate. At the moment I would give it an A-, with the minus just because of the minor appearance issues.
- I think all the info about how to critically read websites is valuable. I liked the clues about how to distinguish ads from editorials, including the illustration of the Google page, and the tip to look for info on when the site was last updated. If you added anything, I'd suggest more illustrations like the Google page, to help illustrate points like the placement of paid ads, where to find update info, etc.
- Very useful to have a guide that helps to weed out sites that are unqualified or just trying to sell something.
- As the population ages and health care costs soar, the role of the patient, especially an educated, proactive patient, becomes more important. Doctors have the advantage of medical school, but most patients only have experience in being "managed."
- Despite my prejudice against tests where there's more than one "right" answer, I thought the two questions provided an efficient review of the site content.
- I learned the names of some "best" websites of which I was previously unaware
- Given the audience, I might suggest a larger font (I know about zoom, but does your audience?) and less text per page.
- I found it easy to navigate, until I got to the exercises at the end. That was confusing! I clicked on one answer expecting an explanation of that answer alone, and got a whole, long page of test that addressed all the answers for both exercise 1 and exercise 2. At the least, I would make the two exercises into two separate pages.

Your Health Online: Guiding eSearches: Final Product


We used information from the focus groups, interviews and pilot tests to prepare the final version of the website. The table of contents and a portion of the instructions for using the website are shown in Figure 4.

Your Health Online: Guiding eSearches

Home
Introduction
Instructions
Internet and Health Information
What this Guide Tells You
10 Questions that Must be Answered
1. Who Runs the Site?
2. What are the Site's Purposes?
3. Do the Site's Purposes and Yours Agree?
4. Can You Easily Contact the Site?
5. Who Supports the Site?
6. Who is Responsible for the Content?
7. Is the Information Current?
8. What Happens if You Follow the Links?
9. Are Testimonials Reliable?
10. Is Privacy Protected?
Resources
Test Your Knowledge
Congratulations

INSTRUCTIONS.
Please read these instructions before beginning.

MOVING FORWARD:
You have two choices to move forward:

1. Click on the arrow at the end of the page. It looks like this: 
You will find it in the center of the page. When you click on the arrow, it will take you to the next page.
2. Use the left-hand navigation. It contains the table of contents. If you use the navigation, you can skip around.

MOVING BACK:
You have two choices to move back:

1. Use your browser's back arrow. This can be found at the top of the screen, next to the place where you put in URL's or web addresses.

Figure 4. Table of Contents

Evaluation

Demographics. The experimental and control groups were similar in sex and age, with an average age of 68.5 years (Table 2). The control group had significantly greater attendance at graduate or professional school.

Table 2. Participant Demographics

	Guiding eSearches (Experimental) N = 36		Evaluating Online Health Information (Control) N = 29		P
	n	%	n	%	
Female	23	63.9	17	58.6	0.66
Average age, years	68		67		
Age range, years	56-101		56-95		
Less than high school	2	5.6	0	0.0	0.49
College graduate or more	25	69.5	25	86.2	0.11

Knowledge. Participants in both groups achieved an average score of about 80% on a ten-item scale. The control group was significantly more likely to incorrectly answer “true” to the statement, “Using a search engine is the best way to find reliable online health information” than the control (83.3% versus 66.7% respectively) and to incorrectly answer “true” to the statement, “The information on a health website is probably created by the organization that built the site” (63.3% to 15%).

Self-efficacy. Table 3 shows that participants in both groups (77.8% and 70%) stated that were extremely or very confident in finding valid online health information and agreed that their searches helped them to ask their doctors new questions (72.2 and 76.7%) Fewer than half of either group of participants agreed that their online searches affected their decision to see a doctor.

Table 3. Self-Efficacy

	Guiding eSearches (Experimental) N = 36		Evaluating Online Health Information (Control) N = 29		P
	n	%	n	%	
Extremely or very confident in finding valid information (N = 35)	28	77.8	21	70.0	0.47
Agree or strongly agree: Helped me to speak to doctors and other health professionals	20	57.2	19	63.3	0.61
Agree or strongly agree: Helped me ask my doctor new questions	24	72.2	23	76.7	0.71
Agree or strongly agree: Helped me in treating an illness or condition	18	50	17	56.7	0.58
Agree or strongly agree: Helped me maintain my health or someone else's	22	61.1	20	66.7	0.64
Agree or strongly agree: Affected my decision to see a doctor	16	44.4	8	26.6	0.13

Internet Use. Experimental and control group participants were similar in the frequency and purpose of the search as well as whether they searched for themselves or others (Table 4). More than half of all study participants use the web for information about doctors or other health professionals but not for hospital or other medical facilities. On average, 74% of study participants began their searches with a general search engine, with 24.2% of the study participants beginning searches using a specific website.

Table 4. Participants' Internet Use

	Guiding eSearches (Experimental) N = 36		Evaluating Online Health Information (Control) N = 30		P
	n	%	n	%	
Frequency of online searches					
Once a week or more	5	13.9	8	26.7	0.19
Online is for self	19	52.8	19	63.3	0.38
Reasons for search					
Specific disease or medical problem	34	94.4	30	100.0	0.49
Certain medical treatment or procedure	30	83.3	27	90.0	0.49
Exercise or fitness	22	61.1	16	53.3	0.52
Doctors or other health professionals	20	55.6	18	60.0	0.71
Prescription or over-the-counter drugs (24% of internet users have consulted online reviews of particular drugs or medical treatments. 2011)	23	63.9	18	60.0	0.7457
Hospitals or other medical facilities	14	38.9	10	33.3	0.64
Health insurance	19	52.8	13	43.3	0.44
Alternative treatments or medicine	17	47.2	13	43.3	0.7521
Depression, anxiety, stress or other mental health concerns	12	33.3	13	43.3	0.40
How search is started					
Search engine	25	71.4	24	80.0	0.42
Specific website	10	28.6	6	20.0	
Number of sites visited					
2-3	15	41.7	18	60.0	0.41
3-4	15	41.7	9	30.0	
How much help by following internet advice					
Moderate or major help	17	47.2	13	43.3	0.75
Don't know	2	5.6	5	16.7	0.23
Participation in program will make searching better	33	91.7	24	80.0	0.28
Definitely or probably use information from education in next search	34	94.4	28	93.4	0.99
How much did you learn?					
Number of 9's and 10's	9	25.0	9	27.0	0.83
Number of 1's and 2's	0	0.0	5	15.0	0.02

Program Assessment. Participants in both groups agreed that involvement in the study will make their searching better and that they definitely or probably use the information from the program when they do their next search (Table 5). When asked how much they learned on a scale of 1 to 10, with 10 representing the best score, there was a statistically significant difference between groups, with the control assigning more low scores (1's and 2's). Similarly, the experimental group assigned significantly more 9's and 10's (highest rating) to their site's usability than did the control. About 72% of experimental group participants agreed that the program could definitely or probably benefit from an optional voice-over, and over 90% reported that they found the exercises to be definitely or probably useful.

Table 5. Program Assessment

	Guiding eSearches (Experimental) N = 36		Evaluating Online Health Information (Control) N = 30		P
	n	%	n	%	
Participation in program will make searching better	33	91.7	24	80.0	0.28
Definitely or probably use information from education in next search	34	94.4	28	93.4	0.9999
How much did you learn?					
Number of 9's and 10's	9	25.0	9	27.0	0.83
Number of 1's and 2's	0	0.0	5	15.0	0.02
Site's appearance					
Number of 9's and 10's	11	30.5	9	27.2	0.76
Number of 1's and 2's	0	0.0	2	6.0	0.23
Average (mean)	7.7			7.5	
Usability					
Number of 9's and 10's	27	75	12	40	0.01
Number of 1's and 2's	0	0.0			
Average (mean)	8.2			8.2	
Benefit from an optional voice-over					
Probably and definitely yes	16	72.2	NA		
Usefulness of exercises					
Definitely or probably useful	35	97.2	NA		

Conclusions

We designed and tested the feasibility of an online educational program to teach older adults to identify and evaluate high quality health information websites. 94 people participated in all phases of the study and provided information on the program's content, format, and evaluation. When compared to a tutorial with similar objectives, no differences were found in reported perceptions of learning, knowledge and self-efficacy. Experimental participants assigned the new program high ratings for appearance, usability, and usefulness, and agreed that program participation was likely to improve their next online health search.

Online health information searching among the elderly is likely to grow as the baby-boomers age and the proportion of older adults as a percentage of the U.S. population increases. Aging is associated with decreasing health and increased physician visits. Among the reasons that older adults see their physicians relatively frequently is that they often have multiple, long-term medical problems that require regular care. Over 83% of Medicare patients have at least one chronic condition such as hypertension or diabetes, and 23% have five or more.(21) A survey of over 8,000 people, 35% of whom were 55 years of age and older that was done in conjunction with the Centers for Disease Control and Prevention found that respondents who reported having two or more chronic diseases were more likely to search for online health information than respondents who reported having no chronic disease.(11) This may work for patients' benefit because there is evidence to suggest that Internet-based health information may improve understanding and ability to manage health conditions(1). Research also suggests that patients who ask questions, elicit treatment options, express opinions, and state preferences during physician office visits have measurably better health outcomes than those who do not(34, 35) (36) Moreover, recent surveys show that nearly all patients prefer to be offered choices and to be asked their opinions(37, 38)

Most users are satisfied with the health information they obtain from the web. According to a 2011 survey, one in three adults in the U.S. say they or someone they know has been helped by following medical advice or health information found online, and 10% of adults living with two or more chronic conditions say they or someone they know has received major help from online health information.(39) Even if consumers are pleased with the information, however, its validity is far from certain. Consumers tend to rely on information without being particularly concerned with important quality criteria such as the source of the information, the date it was published or the evidence to support it. In a 2006 survey,(22) Internet users reported that they start at a general search engine when researching health and medical advice online. Just 15% of health seekers said they “always” check the source and date of the health information they find online, while another 10% said they did so “most of the time.” Fully three-quarters of health seekers said they checked the source and date “only sometimes,” “hardly ever,” or “never,” which translates to about 85 million Americans gathering health advice online without consistently examining the quality indicators of the information they find. Further, just 14% of patients living with disability or chronic disease, many of whom are older adults, said they “always” check the source and date of the health information they find online, while another 18% say they do so “most of the time.” Sixty-seven percent of patients with chronic conditions say they check the source and date “only sometimes,” “hardly ever,” or “never.” These figures are not markedly different from the responses provided by other, non-chronically ill users, although people living with chronic conditions are less likely than those with no chronic conditions to say they “never” check the source and date (13% compared with 22%). Marshall and Williams(17) studied how consumers evaluate the quality of health information materials across a variety of medias. They found that the two most important indicators of quality consumers used were organizational authority and the use of plain language

Printable checklists and guides to teach people to evaluate web health information are freely available on the web from the Medical Library Association

(<http://www.mlanet.org/resources/userguide.html>), the National Library of Medicine

(<http://www.nlm.nih.gov/medlineplus/Webeval/Webeval.html>), the National Cancer Institute

(<http://www.cancer.gov/cancertopics/cancerlibrary/health-info-online>) and the U.S. Food and Drug Administration

(<http://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/BuyingMedicinesOvertheInternet/ucm202863.htm>). Nevertheless, many people have difficulty locating, comprehending, and applying health information. Many of this study’s focus group participants stated that the National Library of Medicine was a stand-alone building. Pew’s 2006 survey of seekers of online health information (22) found that 25% of respondents reported feeling overwhelmed by the amount of information they found online, 22% said they felt frustrated by a lack of information or an inability to find what they were looking for online, and 18% said they felt confused by the information they found online. Even Internet-savvy users may experience difficulty searching for health information.(12, 40)

Your Health Online: Guiding eSearches has several features that distinguish it from other educational guides or checklists and make it particularly appropriate for older adults:

1. It is specifically designed for people 50 years of age and older and covers their concerns with medical conditions, medical procedures, and medications.
2. Potential users participated in all phases of program development and evaluation. They monitored the usability and usefulness of the site.
3. The site was built on a health behavior change model, a theory of adult learning, and adheres to a guide for web development

4. It requires no special software to run and has the potential to be accessible at all times on useful on all major browsers. It is compatible with common tablet computers.
5. The site is interactive and has practice exercises, feedback, and the ability to move back and forth across content.

Based on this study's results, we conclude that the Your Health Online: Guiding eSearches is feasible and worthy of continued use. We recommend that in the future, the program be expanded to include more exercises and links to sites and online articles for consumers. We also recommend that future developers consider the value of incorporating instructional videos and an option for a voice-over. Future research should also evaluate the program's effectiveness in improving the way older adults actually search for online health information and if improved searches promote better health and quality of life.

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