The Healthy Web – Access to Online Health Information for Individuals with Disabilities

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Abstract

Background. The Internet can be an invaluable resource for obtaining health information by people with disabilities. Although valid and reliable information is available, previous research revealed barriers to accessing health information online. Health education specialists have the responsibilities to insure that it is accessible to all users. IDEA and ADA mandate full participation in society by people with disabilities of all ages. Healthy People 2020 also includes objectives aimed at improving health information delivery, comprehension and application in daily life.

Methods. This paper summarizes legal requirements and standards to present health information using technology and offers practical guidelines for accessible health education programs. Accessibility of online information was determined for representative consumer health web sites using an evaluation tool developed by Web Accessibility In Mind (Web AIM). Web sites were evaluated according to four accessibility principles: Perceivable, Operable, Understandable and Robust.

Results. Despite available standards to design web sites without barriers, online health information is not accessible to all users. WAVE revealed accessibility errors on representative consumer health web sites, ranging from zero errors (autism information hosted by the National Library of Medicine) to 15 errors (sleep information from CNN Health). These errors may limit access to users with disabilities.

Conclusions. Implementing guidelines for universal design for learning will diminish the digital divide. Health education specialists may direct consumers to web sites designed with accessibility in mind according to Web Content Accessibility Guidelines.

Keywords: health information, disability, disparity, technology

Introduction

The World Health Organization (WHO) estimated that 650 million people or 10% of the global population have a disability. This number includes 200 million children. Population growth, extended lifespan, advances in medical technology and rehabilitation services will likely cause this number to increase.[1] The National Commission for Health Education Credentialing, Inc. (NCHEC) established responsibilities and competencies for professional health education specialists that include a focus on assessing individual and community needs for health education (Responsibility I) and related competencies: a) distinguishing between behaviors that foster and hinder well-being; b) determining factors that influence learning; and c) identifying barriers and facilitators to the health education process.[2] These responsibilities and competencies require that health education specialists can attend to the special health education needs of people with disabilities including Internet access for health information.

Within the U.S., the number of households reporting Internet access increased more than threefold between 1997 (baseline of 18%) and 2003 (55%).[3] Despite this rapid increase, it can be challenging to access sources of valid and reliable health information and interpret information for personal health enhancement among individuals with disabilities and their caregivers. A report from the Pew Internet & American Life Project on "Chronic disease and the Internet" found that while persons living with a chronic disease or disability were significantly less likely to use the Internet for online health information (even after controlling for age and socioeconomic status), those who did go online were more likely to say that their last experience online was beneficial to them.[4] The focus of this article is on understanding the need to offer accessible online health information to all persons with disabilities; limited access may impact comprehension, volitional health behaviors, and independence.

Background

The US Census Bureau has categorized disabilities by primary impairment, i.e. hearing, visual, cognitive, ambulation, self-care, independent living. Data from the 2008 American Community Survey indicates approximately 12% of Americans have some form of disability, representing more than 36 million. Among persons with disabilities, 4.8% reported cognitive impairment and 5.5% reported limitations in independent living.[5]

It is inadequate to conceptualize disabilities according to a traditional medical model. As stated in a White Paper prepared by the Office of the Deputy President of South Africa on national and international concerns, "Because the emphasis is on the medical needs of people with disabilities, there is a corresponding neglect of their wider social needs. This has resulted in severe isolation for people with disabilities and their families."[6] This illustrates the importance of removing barriers to accessing reliable health information worldwide.

Data from the *Healthy People 2010* (HP2010) *Midcourse Review* is useful to compare health status among persons with different disabilities related to quality of life and disparities. An overarching HP2010 Goal was to promote the health of people with disabilities, prevent secondary conditions, and eliminate disparities between people with and without disabilities in the U.S. population.[7] The National Institutes for Health (NIH) developed a Strategic Plan for Addressing Health Disparities 2004-2008 through its National Network of Libraries of Medicine. Emphasis area 3.1 specifies promoting use of health information by health professionals and the public, in order to attain objective 3.1.1 (i.e., improve delivery of health information, through the development of easy-to-use information resources such as MedlinePlus that are sensitive to cultural diversity issues, educational level, and language).[8]

Two Health Communications and Health Information Technology objectives and related subobjectives germane to this topic are included in the recently released *Healthy People 2020* (HP2020)[9]: Objective 8 - Increase the proportion of quality, health-related Web sites; Objective 8.1 - Increase the proportion of health-related Web sites that meet three or more evaluation criteria disclosing information that can be used to assess information reliability; Objective 8.2 - Increase the proportion of health-related Web sites that follow established usability principles; and Objective 9 - Increase the proportion of online health information seekers who report easily accessing health information.

Baseline data from a 2009 survey conducted by the DHHS Office of Disease Prevention and Health Promotion revealed that 52% of health-related Web sites met three or more evaluation criteria disclosing information that can be used to assess information reliability. Furthermore, the National Cancer Institute reported 2007 baseline data indicating that 37.3% of

online health information seekers could easily access health information. To be achieved by 2020 is 10% improvement in these health communications/information technology objectives for the entire U.S. population, not only individuals with disabilities.[9]

Specific objectives aimed at enhancing health and well-being among individuals with disabilities are featured in HP2020: Objective 2 - Increase the number of Tribes, States, and the District of Columbia that have public health surveillance and health promotion programs for people with disabilities and caregivers; Objective 8 - Reduce the proportion of people with disabilities who report physical or program barriers to local health and wellness programs; and Objective 10 - Reduce the proportion of people with disabilities who report barriers to obtaining the assistive devices, service animals, technology services, and accessible technologies that they need.[10]

Ensuring Access for Persons with Disabilities

Laws affect how health education and services are provided to children and adults with disabilities in the U.S., including the Rehabilitation Act of 1973 (29 U.S.C. 794d), Individuals with Disabilities Education Act (IDEA), and the Americans with Disabilities Act (ADA). The intent of these laws is to permit full participation in society by people with disabilities of all ages. Attainment of this goal has been difficult for some who do not enjoy equal access to health information and services.

A brief overview of each law is useful for the educator who is responsible for planning instruction including retrieving online health information. Section 102 of the Rehabilitation Act of 1973 specifies joint development of an Individualized Written Rehabilitation Program by the vocational rehabilitation counselor and each eligible person, including plans for annual review and revision. The Program must include long-term rehabilitation goals and intermediate objectives, timeline of specific services to be provided, and method of evaluation. Section 103 specifies scope of services to enable gainful employment, including vocational and training programs, training materials, telecommunications, sensory aids and other devices.[11]

Congress amended the Rehabilitation Act in 1998, Section 508, specifying that all federal public web sites including those developed under contract must be fully available to individuals with disabilities. Standards were developed to assist information technologists with implementation of Section 508 across "the full range of electronic and information technologies in the Federal sector, including those used for communication, duplication, computing, storage, presentation, control, transport and production."[12] Further, functional performance criteria are used to determine how easily users with sensory or physical disabilities can "locate, identify, and operate input, control, and mechanical functions and to access the information provided, including text, static or dynamic images, icons, labels, sounds or incidental operating cues."[12]

IDEA was reauthorized by President George W. Bush in 2004 to ensure that state and public education agencies provide services to eligible children and youth. Schools must provide an Individualized Education Program specifying measurable annual goals compatible with the student's academic abilities and functional performance. Children with disabilities will be involved in the general education curriculum including receiving the established course of study in health education.[13]

The ADA of 1990 was amended in 2008 and became law on January 1, 2009 (P.L. 110-325). Disability is defined as having a physical or mental impairment that substantially limits one or more major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment.[14] The language of the law does not specify equal access to Internet technology for health information and services; however, in 1996, Assistant Attorney General for the Civil Rights Division of the U.S. Department of Justice Deval Patrick corresponded with Senator Tom Harkin to clarify this issue:

> The Americans with Disabilities Act (ADA) requires State and local governments and places of public accommodation to furnish appropriate auxiliary aids and services where necessary to ensure effective communication with individuals with disabilities…Covered entities under the ADA are required to provide effective communication, *regardless of whether they generally communicate through print media, audio media, or computerized media such as the Internet* (emphasis added). Covered entities that use the Internet for communications regarding their programs,

goods, or services must be prepared to offer those communications through accessible means as well… examples include providing the web page information in text format, rather than exclusively in graphic format. Such text is accessible to screen reading devices used by people with visual impairments. Instead of providing full accessibility through the Internet directly, covered entities may also offer other alternate accessible formats, such as Braille, large print, and/or audio materials, to communicate the information contained in web pages to people with visual impairments. The availability of such materials should be noted in a text (i.e., screen-readable) format on the web page, along with instructions for obtaining the materials, so that people with disabilities using the Internet will know how to obtain the accessible formats.[15]

During the summer of 2010, The Department of Justice opened a 180-day period to solicit public comment on Proposed Rulemaking on the Accessibility of Web Information and Services Provided by Entities Covered by the ADA. The Department is considering establishing "specific requirements for State and local governments and public accommodations to make their web sites accessible to individuals with disabilities."[16]

To summarize, the number of Americans living with disabilities is anticipated to increase as the population ages. In 2008, there were approximately 60 million persons ages 60 and older in the U.S., an 11% increase from 2004.[17] An estimated 7,918 individuals will turn 60 years old each day during the next decade[18]; this group of adults is more prone to disabling injuries and illnesses. Home, work, leisure and agency environments can be designed to assist individuals with short-term and chronic disabilities to achieve independence.[19] An important step is providing online health information that is trustworthy and accessible to all users.

Web Content Accessibility Guidelines

Health education specialists working with individuals with disabilities must be aware of tools available to design and assess consumer web sites for universal use. Web Content Accessibility Guidelines are useful to evaluate content and layout of web sites, yet it appears that not all developers use these. Using

mainstream web sites as examples, the following sections illustrate how to apply accessibility guidelines in professional practice.

The Worldwide Web Consortium developed initial guidelines to determine accessibility of web content in 1997. Version 2.0 of the Web Content Accessibility Guidelines was published in December of 2008. The Consortium affirms that "for the Web to reach its full potential for people with disabilities, web developers must commit to always designing with accessibility in mind. Failure to do so risks turning a revolutionary solution into yet another barrier in the lives of people with disabilities."[20] The four main principles of accessibility are: *Perceivable, Operable, Understandable and Robust*. A perceivable web site is available to vision and hearing senses through the browser or by using assistive technologies such as screen readers. A web site is judged to be operable if users can use the mouse, keyboard or assistive technology to interact with all elements and obtain important content. Understandable web sites present clear content without ambiguity or distractions. Finally, a robust web site permits access for those using new and older technologies.[20]

It is not difficult for health education specialists to determine accessibility of online health information before recommending web sites to consumers. For instance, WAVE is a free online evaluation tool developed by Web Accessibility In Mind (Web AIM), an initiative of the Center for Persons with Disabilities and Utah State University. WebAIM is a non-profit organization whose mission is "to expand the potential of the web for people with disabilities by providing the knowledge, technical skills, tools, organizational leadership strategies, and vision that empower organizations to make their own content accessible to people with disabilities."[20]

Health education specialists may test the accessibility of an online resource by visiting the WAVE web site found at: http://wave.webaim.org and entering the URL for the resource in the form field provided ("Enter a Web Site Address"). The user may view color-coded embedded icons and indicators of accessibility on the web site. In addition to entering a URL in the WAVE form, web site developers may upload files not publicly available using the Browse feature of the WAVE web site, and check HTML code for accessibility barriers.

Red icons indicate errors of accessibility (e.g., alternative text is not present for an image that has hotspots; form label without any content). *Yellow*

icons reveal alerts that should be checked for possible accessibility issues (e.g., headings are not in a logical order or heading levels are skipped; frame title is not descriptive). *Green* icons indicate need to check for accuracy of accessibility features (e.g. alternative text is present in an image). *Light blue* icons indicate structural, semantic or navigational elements important to accessibility. These errors indicate potential barriers to accessing health information online.

For a comprehensive review of accessibility errors found in web sites for health information, see Zeng and Parmanto[21]; these authors were instrumental in developing Web Content Accessibility Guidelines. *None* of the 108 consumer health information web sites reviewed in their study were without accessibility errors. Further, web sites created by government and educational agencies had fewer errors as compared to commercial web sites. Authors concluded that accessibility barriers are likely the result of limited knowledge among web site developers about accessibility standards, "the lack of effective and efficient evaluation and repair tools, and the pressure to update information on the web site quickly."Authors of this paper participate in an initiative to increase access to reputable health information for persons with disabilities in Alabama. An ongoing challenge is to disseminate electronic information without barriers to use. It is likely that other health education specialists face similar difficulties when providing health information. Web sites with multiple errors should not be recommended for persons with disabilities.

To illustrate use of WAVE to identify accessibility errors, this paper selected four web sites representing one government agency (National Library of Medicine) and three commercial health and medical news and information providers (WebMD, Health.com and CNN Health). Four general health issues were identified to focus the activity (autism, HIV/AIDS, Type 2 Diabetes, and sleep disorders).

WAVE detected no accessibility errors on National Library of Medicine webpage offering consumer information about autism: http://www.nlm.nih.gov/medlineplus/autism.html. Desirable features of this web site include alternative text present in an image, for instance, photograph of a mother, father, son and daughter, accessible to consumers using screen readers.

Many consumers rely on web sites with commercial content for personal health information. Before recommending these sites, health education

specialists should check for accessibility. WAVE examination of HIV and AIDS information posted by WebMD [http://www.webmd.com/hiv-aids/default.htm] revealed six accessibility errors, including a form without corresponding label needed for users with disabilities to select chapters and receive additional web content about the health condition. An omission was lack of alternative text for a linked image permitting consumers to register and receive an HIV/AIDS newsletter.

A second commercial site, Health.com, directed individuals with Type 2 Diabetes to an information page with healthy eating guidelines [http://www.health.com/health/condition-section/0,,20187806,00.html]. WAVE revealed four missing form labels that may prevent use of the web site Search engine and registration for a weekly email with latest health information.

CNN Health is a third commercial web site visited by consumers who seek health information. A search for content on sleep directed the user to a feature page entitled, *The Chart* [http://pagingdrgupta.blogs.cnn.com/2010/11/30/get-some-sleep-night-owl-its-a-real-condition/]. WAVE detected 15 accessibility errors including a link without text, missing form labels, a form element with two associated labels, and image button without alternative text. These errors are likely to limit access to all users.

Conclusions and Recommendations

The aim of delivering useful health information for people with disabilities is relevant to the responsibilities and competencies for the professional health education specialist. In addition, national objectives to enhance the health of the US population and the intent to expand ADA requirements to include Internet access relate to this aim. Responsibilities of health education specialists include previewing health web sites posted by government and nonprofit agencies and commercial entities to determine which offer reliable and accessible content before recommending these for consumer use.

Considerations for health education specialists working in schools include insuring students with and without disabilities have access to and effectively use technology for learning. The rapid growth of access to computers for learners of all ages and abilities is encouraging. This is reflected on an estimated 71% of all students use computers in the home. The most

common applications are games (76%), school assignments (76%), and Internet (72%).[22]

Despite the growth of new consumer information technologies, a digital divide remains for individuals with disabilities. Presence of hardware and software does not guarantee access and use. Schools should develop a vision of how technology can enhance learning and adopt educational goals for the students in the use of technology which includes those with disabilities.[23] How accessible is computer-related equipment, networking and tool software in U S schools? The number of public schools reporting computers with Internet access increased from 35% in 1994 to 100% in 2005. The mean number of computers per school allocated to student instruction doubled during the same period.[24]

Increasing the use of online health information resources requires consumer education. In the school setting, health education specialists may plan opportunities to engage parents and guardians of students with disabilities and those without in the process of learning how to manage personal and family health. Host a technology demonstration as part of a parent-teacher association meeting held after school hours. Highlight technology use among all students during a special event that coincides with a health observance, such as National Wise Health Consumer Month in February. Similar events can be held for the community at large. This is a great opportunity to engage community business partners!

The health education specialist may collaborate with the system technology coordinator and school administrators to determine available technology products and services. Monitor the percentage of students using computer-based assistive or adaptive technologies to compensate for disabilities or limitations. Provide students and families with resources to equalize technology access and learning opportunities. Adopting "universal design" features will benefit all students, for instance providing large monitors with audio output for visually impaired or non-reading students, and a switch-adapted mouse with track ball for students with gross-motor hand control.[25]

Educators must have a sufficient level of comfort using technology products and services. School systems may provide an array of professional development programs with a focus on universal design for learning (UDL). Proponents of UDL recognize student diversity and promote classroom accommodations according to three guidelines: present information in multiple formats and media,

provide multiple means of demonstrating learning, and use a variety of methods to engage student interest and motivate learning.[26] Health education teachers may review Web Content Accessibility Guidelines and develop a list of WAVE-approved web sites to feature in lesson plans. Bookmark links to trustworthy and current informational resources that are accessible to all learners. These efforts should enhance the work of health education professionals in reaching students of all abilities as well as their parents or guardians.

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