

The Digital Divide: A Comparison of Online Consumer Health Information for African-American and General Audiences

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Financial support: This work was supported by The DC-Baltimore Research Center on Child Health Disparities, grant #5P20MD00165.

This work was presented, in part, at the American Public Health Association 2007 Annual Program of Health Informatics Information Technology.

Objectives: We sought to assess the quality of health information on internet sites with missions to serve African Americans and to compare the quality to that of sites targeting a general audience.

Methods: Sites were identified by entering "black health," "African American health," and "health" into 2 search engines. Websites were assessed for quality and usability by 2 independent readers using published criteria.

Results: Disease-specific information was found on 64.7% of African-American sites and 86.2% of general sites. Among these sites, 73% of African-American sites listed authors' qualifications, compared to 96% of general sites ($p=0.04$). Sixty-four percent of African-American sites provided date last updated, compared with 100% of general sites ($p=0.001$). The mean literacy level for both types of sites was ~10th grade. The literacy level of African-American sites at governmental and educational domains was lower (NS).

Conclusions: This is the first study to examine critically the quality of health information on Internet sites serving African-American audiences. Our study suggests methods to guide healthcare providers and health educators in counseling patients regarding internet-based health information. The "digital divide" is about quality as well as access.

Key words: African Americans ■ health disparities

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INTRODUCTION

Health disparities take many forms. Access to high-quality health information is one of the more subtle forms of disparities, rising in importance in today's electronic age. In recent years, the internet has become increasingly popular as a source of health information: in 2006, 80% of all Americans searched for health information online,¹ and the numbers have grown over time.²

The use of the internet as a health information source follows the overall rise of internet use. In 2005, approximately 137 million U.S. adults (68%) used the internet, compared with 47% in early 2000.^{3,4} However, lagging in internet adoption are African Americans, persons aged >65 years and the less well-educated.

While the digital divide (the gap between those with and without access to electronic information tools such as the internet) is narrowing, only 57% of African Americans used the internet in 2005 compared with 70% of Caucasian Americans.³ This is in contrast to the adoption of other technology, such as cellular telephones, which is much less divided: in 2004, 73% of African-American adults and 74% of Caucasian American adults had cellular telephones.³ Despite the differences in comfort with and access to online resources, African Americans who use the internet are just as likely as Caucasians or Hispanics to seek health information online, and are more likely to say the internet helps them get healthcare information.^{5,6}

Much is known about disparities in internet access, though little is known about disparities in quality of information. As the digital divide narrows, access to the internet is greater, but the quality of information must be assessed. This is particularly true for health information. With the exception of a few reports highlighting minority health resources on the web, there is no literature comparing the quality of internet-based health information for African-American audiences to that of websites targeting more general audiences.^{7,8}

We conducted an infodemiology⁹ study to assess health information internet sites intended for Afri-

can-American audiences. Although many studies have assessed online consumer health information, and numerous systems for rating the quality of this information have been developed,¹⁰⁻¹⁶ to our knowledge, this is the first study comparing health websites for African-American audiences to that of sites targeting more general audiences.

METHODS

Health information websites with missions to serve an African-American audience were identified and assessed for technical features, quality, and content. We compared these African-American-focused websites to general (i.e., nontargeted) health websites.

Table 1. Websites included in analysis

General Health Site Addresses (URL*)	General Health Site Names	African-American Health Site Addresses	African-American Health Site Names
www.cnn.com/HEALTH	CNN-Health	www.blackwomenshealth.com	Black Women's Health (com)
www.webmd.com	Web MD	www.blackhealthcare.com	Black Health Care
www.healthfinder.gov	Healthfinder	www.blackissue.com/Blackhealthcontents.htm	Black Issue-Health
dmoz.org/Health	Open Directory Project-Health	www.blackwomenshealth.org/site/PageServer	Black Women's Health (org)
www.nytimes.com/pages/health/index.html	NY Times-Health	www.black-network.com/health.htm	Black Network-Health
www.nih.gov	National Institutes of Health	www.blackhealthnow.com	Black Health Now
www.health.com	Health (com)	www.blackamericaweb.com/site.aspx/health/drday/blackhealth	Black America Web
health.discovery.com/medlineplus.gov	Discovery Health Medline Plus	www.blacknews.com	Black News
www.kidshealth.org	Kid's Health	www.blackhealthonline.com/BWHC.html	Black Health Online
www.msnbc.msn.com/id/3032076	MSNBC	www.allaboutblackhealth.com	All About Black Health
www.cdc.gov/travel	Centers for Disease Control	blackvoices.aol.com/black_lifestyle/health_headlines_features_advice	AOL Black Voices-lifestyle
www.who.int	World Health Organization	www.blackdoctor.org/healthy1.cfm	Black Doctor
www.mayoclinic.com	Mayo Clinic	www.blackhealthagency.org.uk/	Black Health Agency
health.allrefer.com	All Refer-Health	www.cbhn.org	California Black Health Network
www.health.org	Health (org)	www.blackrefer.com/health1.html	Black Refer - Health
healthweb.org	Health Web	www2.state.tn.us/health/minorityhealth/Initiatives.html	Tennessee Department of Health-Minority Health
health.ivillage.com	IVillage Total Health	www.cbcfinc.org/Public%20Health/powerhour/index.html	Congressional Black Caucus Foundation, Inc.
www.ghc.org	Group Health	www.nlm.nih.gov/medlineplus/africanamericanhealth.html	National Library of Medicine-Medline Plus-African American Health
		health.nih.gov/result.asp/13	National Institutes of Health - African American Health

Sample Selection (Inclusion/Exclusion in Study)

To select websites for potential inclusion, the search terms “black Health,” “African American health,” and “health” were entered into both Google (www.google.com) and Yahoo (<http://search.yahoo.com/web>) search engines in October 2006. We chose Google and Yahoo because they are the most commonly utilized search

engines, accounting for approximately 75% of all online searches in the United States.¹⁷ The top 20 results from each of these searches were considered for inclusion in the study. A total of 63 sites were relevant for analysis, 34 of which served an African-American audience (hereafter also referred to as “African-American sites”). See flow charts (Figures 1 and 2).

Table 1. continued

General Health Site Addresses (URL*)	General Health Site Names	African-American Health Site Addresses	African-American Health Site Names
www.ghc.org	Group Health	health.nih.gov/result.asp/13	National Institutes of Health–African American Health
www.intelihealth.com	Aetna InteliHealth	www.netwellness.org/centers/aahealth	Net Wellness–African American Health Center
dir.yahoo.com/Health	Yahoo Directory–Health	menshealth.about.com/od/blackhealth/a/Af_amer_stats.htm	About Black American Men’s Health
www.kaiserpermanente.org	Kaiser Permanente	www.omhrc.gov/templates/browse.aspx?lvl=2&lvlID=29	The Office of Minority Health
www.aarp.org/health	American Assn. of Retired Persons–Health	www.mindspring.com/~accesshealth/african.htm	Access Health–African American Health Internet Sites
health.yahoo.com	Health Yahoo	www.kenyada.com/aahealthissues.htm	Mr Kenyada’s African American Health Issues
www.webmd.com/diseases_and_conditions/mental_health.htm	WebMD–Mental Health	www.womenshealth.gov/minority/africanamerican	Minority Women’s Health
en.wikipedia.org/wiki/Health	Wikipedia–Health	groups.msn.com/BowmanSimsAfricanAmericanCreations/fictionqueen.msnw	Bowman Sims African American Creations
www.altmedicine.com	Alternative Health News Online	www.inlandwellness.org/africanamerican	Inland Wellness Information Network–African American Health Initiative
news.yahoo.com/news?tmpl=index&cid=751	Yahoo News–Health	www.aahn.com	African American Health Network
www.azcentral.com/health	Arizona Central Health	www.cdc.gov/omh/Populations/BAA/BAA.htm	Centers for Disease Control Office of Minority Health
www.health.gov	Health (gov)	www.aahc-portland.org	African American Health Coalition, Inc
		www.lib.wayne.edu/shiffman/aaah	African American Health Disparities Information
		www.med.umich.edu/haahc	African American Health Care Project
		www.mckinley.uiuc.edu/multiculturalhealth/AfricanAmericanHealth.htm	Multicultural Health Clearinghouse–African American Health Issues

* Uniform resource locators, prefixed with <http://www> for hypertext transfer protocol, World Wide Web

Table 2. Characteristics of health information websites for African-American audiences and general audiences

Criteria	Brief description	African-American Sites (n=34)	General Sites (n=29)	Fisher's Exact P Value	African-American Sites: Disease-Specific (n=22)	General Sites: Disease-Specific (n=25)	Fisher's Exact P Value
Authority	Qualifications of authors stated	64.71%	86.21%	0.081	72.73%	96.00%	0.040*
Complementarity	Statement that info on the site is to support, not replace, the physician-patient relationship	50.00%	65.52%	0.307	63.64%	72.00%	0.755
Confidentiality	Privacy statement	64.71%	96.55%	0.002**	72.73%	100.00%	0.007**
Attribution	References listed	67.65%	68.97%	1.000	90.91%	80.00%	0.423
Attribution	Date last updated is present	52.94%	93.10%	0.001***	63.64%	100.00%	0.001***
Justifiable and balanced	Claims are supported by evidence, multiple sides discussed	N/A	N/A		90.91%	96.00%	0.593
Transparency	Contact info for technical questions	85.29%	96.55%	0.205	90.91%	100.00%	0.214
Transparency	Contact info for content questions	N/A	N/A	0.803	59.09%	60.00%	1.000
Transparency	Sponsorship or advertisement policy	82.35%	89.66%	0.488			
Health On the Net logo	Accreditation aiming to improve the quality of medical and health info online	17.65%	27.59%	0.378	27.27%	32.00%	0.760
Evidence level	Evidence level or type of study indicated	N/A	N/A		59.09%	80.00%	0.201
Feature-blog	Users can participate in a BLOG, a web log with sequential entries, comments posted in an interactive format	8.82%	31.03%	0.050*			
Feature—search within site	Users can search within the website	55.88%	96.55%	<0.001***			
Feature—discussion board/forum	Users can participate in a discussion board, where user-generated content is posted	32.35%	20.69%	0.396			
Feature—e-mail list	Users can join an e-mail list-serve	32.35%	20.69%	0.396			
Feature—video	Video clips or webcasts available	32.35%	65.52%	0.012*			
Feature—audio	Audio clips available	41.18%	65.52%	0.077			
Features—login option	Users can login for additional access or info	17.65%	55.17%	0.003**			
Content about children/teens	Contains content written about children or teens	44.12%	82.76%	0.002**	63.64%	96.00%	0.309
Content for children/teens	Contains content written for children or teens	5.88%	31.03%	0.017*	9.09%	36.00%	0.171
Disease-specific information	Contains disease-specific content	64.71%	86.21%	0.081			
Sales	Contains links to make purchases	47.06%	65.52%	0.204			
Advertisements	Contains ads	44.12%	62.07%	0.208			

* p≤0.05; ** p≤0.005; *** p≤0.001

Data Collection & Analysis

Quality and usability ratings were identified using published criteria.¹⁰⁻¹⁴ These included attribution, authority, complementarity, confidentiality, justifiability, readability, transparency and other website elements (Table 2).

Each website was assessed independently by 2 reviewers (TK & JW) during March 2007. We developed a set of questions, based on the standards in Table 2 to determine if each of the quality and usability criteria was present. Data abstraction for website assessment was piloted for the first 10% of sites (6 sites). Criteria were then refined to minimize discrepancies. Differences between researchers were resolved by jointly re-reviewing sites. Clarification was necessary on <4% of data points. Complete agreement was attained.

For websites containing disease-specific information, a basic text passage about the disease (asthma, sickle cell anemia, nutrition, cancer or sudden infant death syndrome) was selected and readability determined by assigning a Flesch-Kincaid Grade Level and Flesch Reading ease score. Both are well-established methods for assessing readability.¹⁸

For each criterion, frequencies and descriptive statistics for African-American sites and general sites are presented. Comparisons of categorical data were made between African-American sites and general sites using Fisher's Exact Test for statistical significance using

STATA[®] 10.0 (Stata Corp, College Station, TX). For readability data, comparisons were made with the non-parametric Wilcoxon rank-sum (Mann-Whitney) test.

RESULTS

We report on quality and usability features of 34 health information sites for African-American audiences and 29 general health sites (Table 1). Twenty-two of 34 (64.7%) African-American health sites and 25 of 29 (86.2%) general health sites contained information on specific diseases (disease-specific information). About half (16) of the African-American health sites in the study were located on commercial domains (suffixed with .com), about one-quarter (8) were organizational (.org), one-fifth (7) were governmental (.gov), and the remaining 3 were educational (.edu). Similarly, about half the general health sites in the study were commercial domains (15 of 29), 8 were organizations and 6 were governmental, including 1 international site. There were no educational domains among the general health sites.

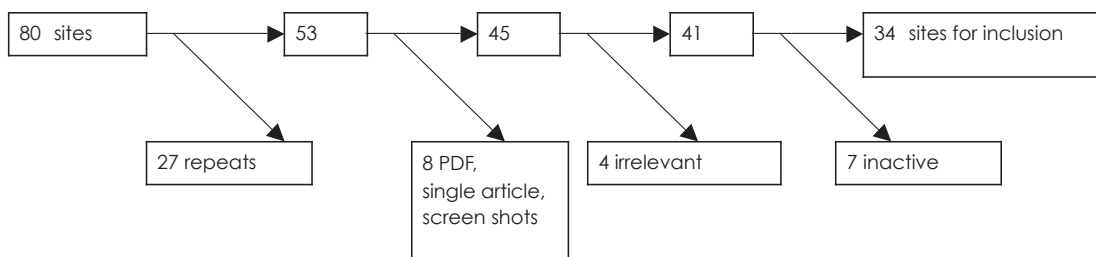
Characteristics of health information websites for African-American and for general audiences appear in Table 2. Among sites with disease-specific information, 73% of African-American sites listed qualifications of authors (including degrees, training or background), compared with 96% of general sites (p=0.04). Approximately two-thirds (64%) of the African-American sites

Table 3. Readability assessments: Flesch Reading Ease score and Flesch-Kincaid Grade Level

	African-American Health Sites	General Health Sites	Wilcoxon Rank-Sum (Mann Whitney)
	Mean (n)	Mean (n)	z Score
Reading Ease			
All sites*	50.6 (22)	49.3 (25)	0.64
GOV and EDU sites	62.7 (7)	45.4 (5)	0.12
COM and ORG sites	45.0 (15)	50.3 (20)	0.29
Grade Level			
All sites*	10.4 (22)	10.5 (25)	0.84
GOV and EDU sites	8.0 (7)	11.5 (5)	0.12
COM and ORG sites	11.6 (15)	10.2 (20)	0.15

* Text passages from all sites with disease-specific information

Figure 1. Flow chart for "African American health" and "black health" site inclusion



that had disease-specific information provided the date it was last updated, compared with 100% of the general sites ($p=0.001$). Almost all sites with disease-specific information (91% of African-American sites and 96% of general sites) contained balanced information supported by evidence. The evidence level of the studies described (i.e., information about the type of study, such as case-control or randomized controlled trial) was included in 59% of the African-American sites and 80% of the general sites. Almost two-thirds (65%) of the African-American sites had confidentiality or privacy statements, compared with 97% of the general sites ($p=0.002$).

More general health sites (82.7%) included content about children and teens, compared to 44.1% of African-American sites ($p=0.002$). Similarly, it was more common for general sites (31%) to contain content directed towards children and teens than African-American sites (5.9%, $p=0.017$). Most sites explicitly stated advertising or sponsorship policies. Two-thirds of the general sites contained links to make purchases (65.5%), compared to slightly less than half the African-American sites (47%).

Frequencies of the various website features (blogs, internal search, discussion boards, e-mail list, video, audio, login) are also shown in Table 2, with comparisons between African-American and general sites. Other notable features appearing on some of the sites included billboard, dictionary, doctor locator, drug finder, easy to read, e-mail page to friend, encyclopedia, events calendar, guestbook, health poll, information on other minority populations, other languages, newsletter, online medical records, quality criteria for links, request a (live) speaker, share your story, symptom solver, and test-your-knowledge quizzes.

When basic text passages on specific diseases were analyzed for readability, the average literacy level was 10th grade for both African-American and general health sites (Table 3). Among African-American health sites, those from governmental and educational domains had text at lower (i.e., easier) literacy levels.

DISCUSSION

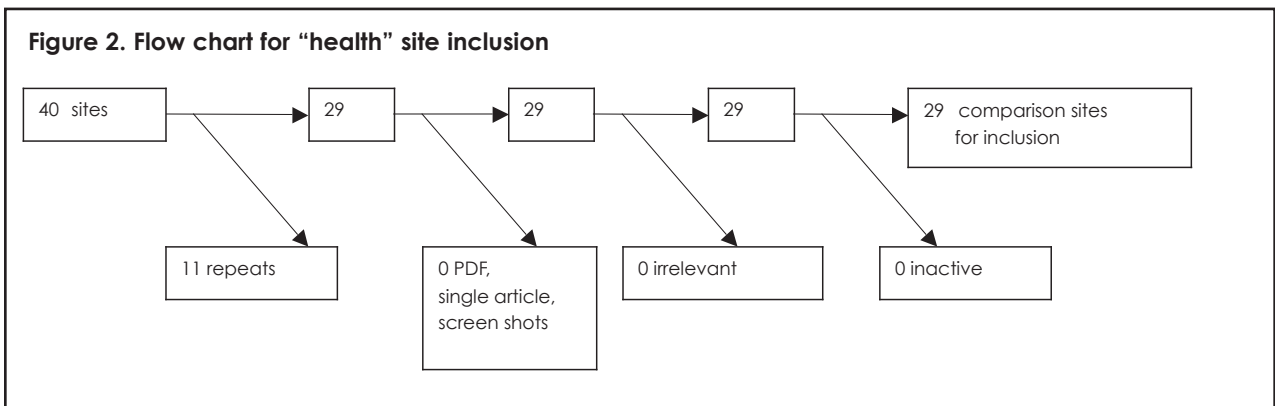
To our knowledge, this is the first study to critically examine and compare the quality of health internet sites serving African-American audiences to sites serving more general audiences. We found the overall quality of health sites targeting African Americans to be lower than that of general health sites. Specifically, significantly fewer African-American websites provided information on author qualifications, date last updated and confidentiality than the more general websites. Without a listing of author qualifications, the reader (website visitor) will not be able to assess whether the information provided on the site has been prepared by trained and qualified health professionals. If date last updated is not present, the reader cannot readily ascertain the currency of the information and therefore determine whether it is outdated and possibly no longer accurate. Confidentiality—respecting the privacy of visitors to a health website and of data relating to individual visitors—relates to a reader’s confidence in the site and the site’s trustworthiness. The American Medical Association has stated in its guidelines for medical and health information sites on the internet that

... health and medical Web sites have a particular obligation to protect the privacy and confidentiality of individuals. Patients and individuals with interest in particular medical conditions should feel confident in obtaining information and using resources on the site, without concern that such use will be identified with them without their permission.¹⁹

This “quality gap” is particularly concerning because the internet is an important source of health information for African Americans, a population already experiencing significant health disparities.²⁰

The importance of health information access, particularly online health information access, in reducing health disparities has been highlighted.^{21,22} However, if traditionally underserved populations gain increased access to internet-based health information, but the quality of the content is poor, the information is unlikely to help to reduce disparities in health. The quality of web-

Figure 2. Flow chart for “health” site inclusion



based health information is an important issue; although variable and difficult to assess, the internet can be a powerful mechanism for helping users improve their health-care decision-making.^{7,23}

How can online information seekers figure out the quality of a website? Simply using search descriptions from commonly used web portals is inadequate.²⁴ Identifying markers on the sites for credibility (such as source, currency, financial disclosure) and trust (such as disclosure of privacy information and mission) are 2 ways. Yet, most consumers are not checking; half of online health information seekers only sometimes, hardly ever or never check the source or date of the information they read online.⁵ The public and healthcare professionals alike must critically assess internet-based health information. All those seeking health information online should be cautioned to look for qualifications of authors and date last updated.

Most sites in our study with information about specific diseases did include references and had justified, balanced content. However, most contained advertisements or links to make purchases; this is problematic in that being too commercial or selling products has been found to be a “credibility killer.”²⁵

While literacy levels were comparable between the African-American and general health sites, at about the 10th grade level, the high reading level for most commercial and organizational sites is a concern. It is of particular concern for the African-American sites, as African Americans with low literacy levels experience disproportionately poorer health outcomes from many preventable diseases.²⁵ Health information should be written at a level of sixth grade or below,²⁶ given that 43% of American adults are at or below a basic prose literacy level.²⁷ In addition, it has been suggested that the process of reading information on the internet may be a harder task than reading printed materials.²⁸ It is commendable that the governmental sites and educational health sites serving African-American audiences achieved lower literacy levels. Information must be both accessible and understandable, if readers are to benefit.

Only 50–72% of sites, both African-American and general, in our study included a statement that the information provided was meant to support—but not replace—the doctor–patient relationship. This statement of “complementarity” is an important concept in building a trusting relationship between patients and healthcare providers to the extent that health information on the internet does not eliminate the need for a medical home.

Our study has several limitations. While it has been reported that the typical health seeker starts at a search site, not a medical site,⁵ our study may not approximate how the public actually conducts searches for information specific to African-American (or other minority) populations. This was not a natural experiment assessing actual consumers of internet-based health information. While the focus of our study is on websites with mis-

sions to serve an African-American audience, the cultural sensitivity and cultural effectiveness of these sites were not assessed. There have been methods proposed to perform this type of assessment for educational materials on individual health topics, such as cancer prevention,^{29,30} and for redesigning educational materials to be more ethnically relevant;³¹ however, these methods focus on print materials and usually require an expert panel or focus groups. In addition, we did not include all possible criteria with which a website can be evaluated, but selected those we believed were relevant to online health information seekers. We also did not describe the specifics of criteria, such as author qualifications; we only assessed for the presence or absence of such criteria. Finally, we did not evaluate the accuracy of the specific content of the health information provided in each website. Instead, we used markers of quality identified in the literature and highlighted by a broad international consensus among specialists in the electronic health information field, health authorities and prospective users.¹⁰ Further investigation of the content regarding specific health or disease conditions would allow a direct assessment of the accuracy of the information, beyond using proxy markers for quality.

In order to reduce “information pollution” in the internet age, providers of online healthcare information need to know their audiences before creating and distributing information.³² It is instructive to consider what might be the “value added” for African-American audiences seeking health information at population-specific websites—that is, why someone might choose to go to a health information website that has a mission to serve African Americans. In this age of new (digital or electronic) media, the social forces and cultural practices shaping how electronic information sources are developed and how people use them are often inadequately recognized.³³ A health information seeker may assume that a website tailored to a specific race/ethnicity/population is more relevant, culturally sensitive or trustworthy. However, data are necessary to determine the degree to which this is true.

Ultimately, all internet sites providing health information should include markers to help users assess their credibility and overall quality. In order to reach and engage users where low literacy is a concern, sites should include video/audio, interactive tutorials and “easy-to-read” sections. Health professionals should also be able to suggest sites that meet a basic level of literacy, currency, trust and credibility, with appropriate referencing, source identification and a balance of information. They should counsel patients of all backgrounds to look for these markers in searching for quality online health information. A practical and directed approach for healthcare professionals would be to recommend that they become familiar with a few quality health sites they can recommend to patients. In addition, physicians should encourage their patients

to ask about internet-based health information they have found, to obtain clarification and a well-reasoned, evidence-based discussion.

CONCLUSIONS

As African Americans who go online are more likely to say that the internet helps them get healthcare information as compared to Caucasians who go online,⁶ this report fills an important gap in knowledge about health information websites targeted to African Americans. Next steps include assessing the cultural relevance of sites serving specific populations, where questions still remain. In addition, while the present research has identified a quality gap, further studies may be able to determine potential reasons for this gap. Reducing the gap in quality of online health information for specific populations is critical in reducing the digital divide as it relates to health disparities. Our findings help guide healthcare providers and health educators in counseling patients regarding internet-based health information.

ACKNOWLEDGEMENTS

We would like to thank the The DC–Baltimore Research Center on Child Health Disparities community advisory board. We thank Dana Best, MD, MPH, for her thoughtful comments about the manuscript and Alan E. Simon, MD, for his key suggestions and statistical guidance.

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