

Rural Adults' Use of Health-Related Information Online: Data from a 2006 National Online Health Survey

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Abstract

Objective: The objective of this study was to examine access and use of health-related information online in rural versus nonrural Internet users, using national data from the 2006 Pew Internet and American Life Project. **Materials and Methods:** A national telephone survey of 2,928 adults in August 2006 yielded a sample of 1,992 adults who use the Internet regularly. A structured interview was administered to assess frequency of Internet use and access and use of health-related information online. **Results:** Most Internet-using rural adults search for health-related information online; two-thirds seek information about specific medical problems and over half seek information about treatment. Three-fifths of rural adults surveyed stated that online health-related information affected the decisions they made in health maintenance and managing treatment of an illness. More than one-third reported being significantly helped by information they found, whereas one-fourth reported being confused. Comparisons between rural and nonrural Internet users suggested that rural users were more likely to seek information about smoking cessation ($\chi^2[1, N=1,990]=7.91, p<0.01$) and mental health issues ($\chi^2[1, N=1,988]=3.71, p=0.05$), less likely to seek information about a particular doctor or hospital ($\chi^2[1, N=1,983]=15.49, p<0.001$), and more likely to report being helped ($\chi^2[1, N=1,534]=5.24, p<0.05$)—but also confused ($\chi^2[1, N=1,592]=9.83, p<0.01$)—by information they found. **Conclusions:** Rural Americans are increasingly using the Internet to acquire information about chronic disease, mental health, doctors, and treatment options. Priorities should include further development and rigorous evaluation of online resources to ensure high-quality, more direct tailoring of resources to rural families and development of tools to assist consumers in assessing the credibility of online information.

Key words: rural, Internet, health information

Introduction

Over the past decade, rural health disparities have been a major priority area in the United States because of limited access to quality healthcare in rural settings.¹ This is important because key mental health risk factors are more prevalent among rural than urban residents, such as older age, limited financial resources, and poor health.²⁻⁵ Several variables may contribute to health disparities in rural settings, including healthcare options, financial resources, transportation barriers, and distances to providers.⁶ Roughly 20% of Americans live in rural areas, but < 10% of physicians practice in these areas, further complicating access.⁷

Health-related informational resources and structured interventions are now available via Internet and other technologies.⁸⁻¹⁰ In a review, Suggs concluded that use of computers, Internet, teleconferencing, smart phones, and related technologies were associated with increased innovation and improved health outcomes.¹⁰ However, Suggs also identified several barriers such as problems with access, quality of information, health and technology literacy, hardware and software compatibility issues, and privacy.¹⁰ One particularly relevant barrier is the digital divide that has historically existed between rural and urban communities.¹¹⁻¹³ Research has shown that rural residents have less access to computers and the Internet than individuals in urban and suburban settings.^{13,14}

The Internet has tremendous potential to serve a meaningful role in healthcare. Eighty percent of U.S. Internet users search for health-related information online.^{14,15} Web-based interventions have been successful in providing education and support for various health domains/topics, including asthma,¹⁶ nutrition,¹⁷ smoking cessation,¹⁸ diabetes,¹⁹ HIV,²⁰ and a wide range of mental health concerns.^{8,21,22} Further, a growing number of physicians have adopted Web-based technologies.¹⁴ Taken together, developments in online health-related resources present a potential opportunity to address rural health disparities and access to quality healthcare. Preliminary studies suggest that rural residents are less likely to search the Internet for general health information.²³⁻²⁵ Much less is known regarding online searches for mental health information, although early findings from Australian studies suggest that Internet resources have high potential value for rural populations.²⁶

The purpose of this study was to investigate reactions to health-related information online in rural and nonrural adults, using data from the Pew Internet and American Life Project. These data provide a unique opportunity to examine rural adults' use of the Internet to

access health-related information, their reactions to this information, and the actions they take based on what they learn.

Methods

A national telephone survey (Online Health Search 2006) of 2,928 adults was conducted between August 1 and August 31, 2006. Interviews were conducted by Princeton Survey Research Associates International, an independent survey research firm with >20 years of experience in designing and conducting interviews globally on a wide range of topics. The survey was conducted under the direction of the Pew Internet and American Life Project, a nonprofit initiative of the Pew Research Center that is funded by the Pew Charitable Trusts to examine the social impact of the Internet.

PARTICIPANTS

Data collected by telephone can systematically underrepresent certain groups in a population. Data were therefore weighed based on Census 2005 parameters (i.e., sex, age, education, race, Hispanic origin, population density, and region) to ensure that sample characteristics were consistent with those of the population of U.S. adults living in households with telephones. All analyses for this article refer to weighted data. Weights were derived using the Deming algorithm, an iterative technique that simultaneously matched the distribution of all weighting variables to their population targets. Participants were 1,992 adults (68% of the full sample) who indicated that they use the Internet "at least occasionally." Their mean age was 43.3 years (median=42; standard deviation=16.9) and 51.7% were women. Racial/ethnic status was 74.9% White, non-Hispanic; 8.9% Black, non-Hispanic; 9.8% Hispanic, and 6.3% other race. Eighty-three percent of participants were employed or retired. Total family income levels were 8.3% under \$20,000, 27.0% between \$20,000 and \$49,999, 16.4% between \$50,000 and \$74,999, 12.9% between \$75,000 and \$99,999, and \$16.0% over \$100,000, with 19.4% missing data. More than one-third (36.1%) obtained a college degree, 27.1% reported some college, 31.4% had a high-school degree only, and 5.4% did not complete high school. Community type (i.e., rural vs. nonrural) used Census Bureau criteria whereby respondents were categorized as "rural" if they reside in a non-metropolitan statistical area (MSA) county. Nonrural participants included "suburban" adults (i.e., living in a portion of an MSA county that is not in a central city) and "urban" adults (i.e., living within a central city of an MSA). Rural adults represented 15.5% of the sample.

MEASURES

The full telephone interview (available online at www.pewInternet.org) assessed demographics, frequency of Internet use, how users spend their time on the Internet, and access and use of health-related information online. Questions measuring access and use of health information online were categorized as follows: (1) types of health information accessed, (2) use of health-related information, and (3) reactions to health-related information.

INTERNET USE

Participants were included in this analysis if they answered affirmatively when asked "Do you use the Internet, at least occasionally?"

TYPES OF HEALTH-RELATED INFORMATION ACCESSED

Sixteen items assessed adults' history of searching online for health information. Participants were asked whether they had "ever looked online" for information about a specific disease or medical problem; a certain medical treatment or procedure; experimental treatments or medicines; alternative treatments or medicines; diet, nutrition, vitamins, or nutritional supplements; exercise or fitness; prescription or over-the-counter drugs; immunizations or vaccinations; how to quit smoking; problems with drugs or alcohol; depression, anxiety, stress, or mental health issues; environmental health hazards; sexual health; a particular doctor or hospital; health insurance; and dental health.

USE OF HEALTH-RELATED INFORMATION ONLINE

Online health information seekers ($n = 1,594$) were asked how they used the information they obtained. First, they were asked "Did you later talk with a doctor or other healthcare professional about the information you found online, or didn't you happen to do this?" Second, "Did the health information you found in your last search online have a major impact on your own healthcare or the way you care for someone else, a minor impact, or no impact at all?" Those indicating that the information had some impact ($n = 854$) were asked six questions about how the information affected their own healthcare routine or the way they cared for someone else. These items, asked in random order, were structured as follows: "Did the information you found online: (a) affect a decision about how to treat an illness or condition? (b) change your overall approach to maintaining your health or the health of someone you help take care of? (c) change the way you cope with a chronic condition or manage pain? (d) affect a decision about whether to see a doctor? (e) lead you to ask a doctor new questions, or to get a second opinion from another doctor? and (f) change the way you think about diet, exercise, or stress management?"

REACTIONS TO THE INFORMATION

Ten questions assessed participants' reactions to health-related information online in the context of their most recent search. These questions were administered to all participants who indicated they had searched for health-related information online ($n = 1,594$). The first eight questions were administered in random order. The interviewer asked "At any point, did you feel ...

1. Overwhelmed by the amount of information you found online
2. Eager to share your new health or medical knowledge with others
3. Confused by the information you found online
4. Relieved or comforted by the information you found online
5. Frustrated by a lack of information or an inability to find what you were looking for online

6. Confident to raise new questions or concerns about a health issue with your doctor
7. Frightened by the serious or graphic nature of the information you found online
8. Reassured that you could make appropriate healthcare decisions”

The final two questions asked about perceptions of harm or help: “Finally, have you or has anyone you know been seriously harmed by following medical advice or health information you found on the Internet?” and “Have you or has anyone you know been significantly helped by following medical advice or health information you found on the Internet.”

PROCEDURE

Random-digit-dial methodology was used to recruit adults living in U.S. households with telephones. New pieces of sample were released daily and were kept in the field for at least 5 days. A minimum of 10 attempts were made to complete an interview before a case was dropped. Call attempts occurred on different days and at different times to maximize likelihood of contact. Once contact was made, interviewers asked to speak with the youngest adult man currently in the home. If an adult man was not available, interviewers asked to speak to the youngest adult woman. This procedure has been found to yield samples that closely approximate the population with regard to age and gender.²⁷ Of the residential phone numbers in the sample, 75.7% were contacted by an interviewer; 38.3% agreed to participate in the survey, which is typical for a national telephone survey.²⁸ The eligibility rate for households among those agreeing to participate was 86.1%. The completion rate for interviews was 93.7%.

Results

We examined rural respondents’ prevalence of seeking health-related information online, their use of online health information, and their emotional reactions to the information. All prevalence estimates among rural and nonrural respondents are reported in *Tables 1–3*. Nonrural adults were more likely than rural adults to rate their health status as “excellent” or “good” (vs. “fair” or “poor”) ($\chi^2[1, N=1,976]=12.78, p<0.001$). However, rural adults did not differ from nonrural adults with regard to other health-related characteristics (e.g., having visited a doctor in the past year and having a chronic health condition).

TYPES OF HEALTH INFORMATION SOUGHT

With respect to the types of health-related information sought online, rural adults were more likely than nonrural adults to report seeking information related to smoking cessation ($\chi^2[1, N=1,990]=7.91, p<0.01$) and mental health issues ($\chi^2[1, N=1,988]=3.71, p=0.05$). In contrast, rural adults were less likely than nonrural adults to seek information about a particular doctor or hospital ($\chi^2[1, N=1,983]=15.49, p<0.001$). Rural and nonrural adults did not differ with respect to their likelihood of seeking all other types of online health-related information assessed in this survey (*Table 1*).

Table 1. Adults' Access of Specific Types of Health-Related Information Online (n= 1,992)

TYPE OF INFORMATION	% RURAL	% NONRURAL	χ^2
Specific disease or medical problem	64	65	0.06
Specific medical treatment or procedure	52	52	0.04
Experimental treatments or medicine	20	18	0.53
Alternative treatments or medicine	27	28	0.02
Diet, nutrition, vitamins, and nutritional supplements	48	50	0.16
Exercise or fitness	45	40	2.93
Prescription or over-the-counter drugs	37	38	0.04
Immunizations or vaccinations	16	16	0.00
Quitting smoking	14	9	7.91 ^a
Problems with drugs or alcohol	9	9	0.00
Depression, anxiety, or mental health issues	26	21	3.71 ^b
Environmental hazards	20	23	0.79
Sexual health	11	12	0.01
Particular doctor or hospital	20	31	15.49 ^c
Health insurance	27	29	0.56
Medicaid and Medicare	13	13	0.03
Dental health	15	15	0.00

^a $p<0.01$.
^b $p=0.05$.
^c $p<0.001$.

USE OF ONLINE INFORMATION

There was a trend toward statistical significance such that rural adults were nearly 50% more likely than nonrural adults (14.5% vs. 9.9%) to report that their most recent health-related online search had a major impact on their healthcare ($\chi^2[2, N=672]=5.28, p=0.07$). However, rural Internet users did not differ from nonrural users with regard to how they used the online health information they obtained (*Table 2*).

EMOTIONAL REACTION TO ONLINE INFORMATION

Rural adults were more likely than nonrural adults to report being confused by the information they received online ($\chi^2[1, N=1,592]=9.83, p<0.01$). However, they were also more likely to report feeling as though the online information/medical advice had been helpful ($\chi^2[1, N=1,534]=5.24, p<0.05$). Rural and nonrural adults did not significantly differ with regard to other emotional reactions (e.g., relieved, comforted, overwhelmed, and frustrated) to online health information (*Table 3*).

Table 2. Adults' Use of Health-Related Information Online (n = 1,992)

INFLUENCE OF INFORMATION	% RURAL	% NONRURAL	χ^2
Talked with healthcare professional	30	34	1.07
Affect decision about treatment of illness/condition	61	58	0.27
Changed overall approach to health maintenance	60	54	2.06
Changed coping/management of chronic pain	41	39	0.14
Affected decision about whether to see a doctor	38	35	0.51
Led to asking new questions/second opinion	57	54	0.53
Changed thoughts on diet, exercise, and stress management	48	44	0.74

All comparisons were nonsignificant statistically.

Discussion

Health disparities between adults living in rural versus urban areas have been identified as a significant public health concern.^{1,29} Information and communication technologies have long been recognized for their potential to assist in reducing disparities.³⁰ The Internet in particular has been gaining momentum as a vehicle for

Table 3. Adults' Reactions to Health-Related Information Online (n = 1,992)

EMOTIONAL RESPONSE TO INFORMATION	% RURAL	% NONRURAL	χ^2
Overwhelmed by amount of information	28	25	0.64
Eager to share information with others	55	50	1.97
Frustrated by lack of information/inability to find	26	21	2.65
Confident to raise concerns with doctor	59	57	0.63
Frightened by serious/graphic nature	11	10	0.30
Reassured in making appropriate decisions	80	75	1.72
Confused	25	16	9.98 ^a
Relieved or comforted	61	56	2.67
Seriously harmed	3	3	0.01
Significantly helped	38	31	5.24 ^b

^a $p < 0.01$.

^b $p < 0.05$.

accessing health-related information in the mainstream population. Household broadband adoption nearly doubled between 2006 and 2009 (25% and 46%, respectively).³¹ As such, it is important to understand how rural adults are using health-related information online. This is one of the first national studies to characterize and compare rural America's use of and reactions to health-related information online.

Data from this study suggest that rural Americans are generally similar to nonrural Americans in their access, use of, and reactions to health-related information online. Although it is notable that these data are 4 years old, a second survey conducted by the Pew Internet and American Life Project in December 2008³² suggests that changes during the past few years are not clinically meaningful and are occurring gradually. For example, 64% of users sought information about a specific disease or medical problem in 2006 versus 66% in 2008, and 46% of users reported that online health information had no impact on healthcare decisions in 2006 versus 41% of users in 2008. For this reason, we anticipate that findings from the August 2006 survey are still largely relevant today. Data from the 2008 survey were not used for this report because the 2006 survey was more comprehensive in assessing user reactions to online health-related information.

Several key differences also were identified between rural and nonrural Internet users. Rural users were more likely to state that they, or someone they knew, had been "significantly helped" by health-related information online; nearly two in five answered this way. However, one in four also reported having been confused by the information (as opposed to one in six nonrural users). Rural users may be less confident than nonrural users in their ability to discriminate between Web sites that provide high-quality health-related information and recommendations versus sites of lesser quality. It is unclear from these data whether rural/nonrural differences exist in users' skill and experience in assessing quality of online health-oriented Web sites. This is an important question for future research. It is also important for future research to assess whether access, use, and reactions to health-related information online is moderated by the presence of geographic, transportation, educational, and stigma-related barriers to formal help-seeking.

There were also rural/nonrural differences in types of information sought. Rural users' increased likelihood of seeking smoking cessation information online may, in part, be explained by the relatively higher prevalence of cigarette use in rural settings.³³ Possible explanations for rural users' increased seeking of anxiety, depression, and other mental health-related information online are less straightforward. Prevalence of mental health problems appears to be comparable or higher in urban than rural settings.^{34,35} It is possible that rural Americans have stronger preferences and values toward self-reliance and self-management of mental health issues than urban adults.³⁶ Alternatively, this finding may be explained, in part, by rural/nonrural differences in availability and access of quality formal mental health treatment in local communities.

LIMITATIONS

The present study had a number of strengths, including use of a large national sample, structured interview conducted by a highly experienced survey firm, and wide range of questions relating to access and use of health-related information online. There were also several limitations. First, use of random-digit-dial survey methodology limits participation to adults who live in residences with landline telephones. These procedures may underrepresent low-income and young adults.³⁷ Although weighing largely offsets biases in health surveys associated with noncoverage of wireless-only or nontelephone households, bias may still be meaningful in low-income and young adult populations.³⁸ Second, for cost purposes and to increase consistency between sample and population demographic parameters, respondent selection procedures were nonrandom. This may have limited the generalizability of findings. Third, nonresponse error and measurement error also are common sources of bias in telephone surveys and may have had further effects on the generalizability of the data; although response rate for this study was typical for survey studies, we were unable to examine how nonresponders may have differed from responders with regard to their use of online information. Fourth, as noted, these data were collected in August 2006, and changes in adults' access and use of online health information appear to be gradually occurring over time. Replication and extension of these findings will be important to track meaningful trends at the population level.

Conclusions

The Internet has emerged as a key mechanism by which Americans acquire information about health and mental health, healthcare decisions, doctors, and treatment options. The present study's findings demonstrate that rural Americans are no exception. In fact, limited access to some healthcare services in rural areas (e.g., mental health services and smoking cessation groups) may increase reliance on the Internet to learn about appropriate care and/or self-manage symptoms. Strikingly, more than half of the rural online health seekers reported that the information they accessed had an impact on their healthcare decisions. These findings underscore the potential value, and risk, of health-related online information and interventions. Delivery of information and interventions via Internet is a potentially cost-effective way to reach rural Americans about chronic diseases, treatment approaches, and prevention approaches (e.g., diet, exercise, and stress management). Clearly, the role of Internet-based information and interventions in the healthcare system for families in rural settings needs to be better understood. Moreover, it is imperative that Internet-delivered health-related resources be further developed and rigorously evaluated to ensure the highest quality possible.

The present findings underscore the importance of access to high-quality online resources and interventions. To this end, it may be advantageous to tailor information and interventions to address rural families' unique patterns of service use and health risk behavior.³⁹ Needs, beliefs, attitudes, and behaviors that are of particular relevance to rural populations can be addressed via involvement of rural consumers in the development of resources and also with reference to the developing body of research on rural healthcare. Evaluation of

interventions also should track differential effectiveness between rural and nonrural populations to support efforts to reduce healthcare disparities. It is notable that one-fourth of rural adults reported feeling confused by the information they found online. Consumers may need assistance in assessing the credibility of sources and appropriately managing inconsistencies in information. Development of strategies, tools, and educational resources for this purpose is therefore a major priority looking forward. It is hoped that further research will continue to enhance the quality, access, and use of Internet-based information and interventions, as we work toward reducing the significant health disparities facing rural adults.

Acknowledgments

K.J. Ruggiero is a core investigator of VA HSR&D REAP (REA 08-261; PI: Egede) and is supported by VA HSR&D Grant MHI 08-105-2 and NIMH Grants R34 MH77149 (PI: Ruggiero), R01 MH81056 (PI: Ruggiero), and P60 MH082598 (PI: Norris). Dr. J. McCauley is supported by NIMH Grant T32 MH018869. Dr. C.K. Danielson is supported by NIDA K23 DA018686 and NIMH R21 MH086313 (PI: C.K. Danielson). The authors thank Wendy Muzzy of the Medical University of South Carolina and Susannah Fox of the Pew Internet and American Life Project for their valuable assistance.

Disclaimer

Views expressed in this article do not necessarily reflect those of the funding agencies.

Disclosure Statement

No competing financial interests exist.

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Received: November 5, 2010

Revised: December 17, 2010

Accepted: December 23, 2010