

ORIGINAL RESEARCH

Internet connectivity among rural Alabama veterans: baseline findings from the Alabama Veterans Rural Health Initiative Project

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ABSTRACT

Introduction: The purpose of this secondary data analysis was to characterize the Internet usage of rural veterans ($n=201$) who had either never enrolled, or had previously enrolled but not accessed, Veterans Affairs (VA) health services in at least 2 years. The VA Office of Rural Health (ORH)(ie part of the United States Government Department of Veterans Affairs) is a government agency with the mission to improve access and quality of care for enrolled rural and highly rural US veterans. The ORH seeks to use evidence-based policies and innovative practices to support the unique needs of enrolled veterans residing in geographically remote areas. These individuals represent a population considered to experience health disparities secondary to reduced health care access.



Methods: This study explored the role of the Internet in providing health information and information regarding VA services to rural Caucasian and African American veterans in the southeastern USA. African Americans were significantly younger (50.32 years, SD=13.50, range 22–85 years) than Caucasian rural veterans (58.50 years, SD=13.82, range 21–85 years).

Results: A small majority of veterans ($n=107$; 53.23%) reported 'going on-line to use the Internet or World Wide Web, or to send and receive e-mail'. Among Internet users, multivariate logistic regression showed that neither age nor race/ethnicity predicted using the Internet to access health information or information regarding VA services.

Conclusion: In comparison with population norms, rural veterans displayed lower usage of the Internet; however, there were few practical age differences between young, middle-aged and older rural veterans in use of the Internet for seeking health information. These results suggest a tremendous potential for online outreach efforts to rural veterans seeking health information and information regarding VA services and benefits. The US Federal Government's VA Office of Rural Health is investing in technology-based services and will need to disseminate information regarding the availability of these services to rural veterans.

Key words: aging, healthcare disparities, internet, rural population, USA, veterans' health.

Introduction

Adults across the lifespan are showing increased Internet use. Data from the Pew Internet and American Life Project indicate that although half of the adult Internet population is between 18 and 44 years of age, currently 45% of adults aged 70 to 75 are online¹. This represents the greatest increase in Internet usage between 2005 and 2008 among any adult age group. Notably, from 2005 to 2008 broadband access to the Internet increased for all age groups, with access for 25–64 year olds nearly doubling and access for seniors 65 years and older more than tripling¹. Older generations report using the Internet less for socializing and more for personal research, such as seeking health information. White and colleagues found that 60% of older adults residing in congregate living sites and trained to use the Internet over 5 months still used the Internet on a weekly basis at the end of the project². Further, Mitzner and colleagues found that once older adults have been convinced to adopt a new technology, they become more positive about using it³. The work of Czaja and colleagues suggests that ease of use is the most important element for successful adoption of technology among older adults⁴.

Racial/ethnic and income disparities have been reported in Internet access^{5,6}. These disparities are exacerbated among rural-dwelling populations in the USA, wherein Internet penetration lags behind urban areas (75% vs 89%,

respectively)^{7,8}. Additionally, people who live in rural areas are often older, poorer, sicker and more likely to be uninsured compared to urban residents⁹⁻¹¹. About 20% of the United States (US) population, or nearly 64 million Americans, live in rural areas, which also are usually Health Professional Shortage Areas¹².

Veteran populations are particularly at risk of experiencing worse health, reporting more functional limitations and experiencing poorer health-related quality of life relative to non-veterans^{10,11}. Moreover, approximately 40% of the 8 million veterans enrolled in the Veterans Health Administration (VHA) live in rural areas. Cost and distance have been cited as reasons that military service personnel and veterans do not access healthcare services^{9,13}. Thus, it can be argued that rural veterans are particularly at risk for health disparities, but few studies have explored rural veterans' access to and use of the Internet to seek health information and resources. The purpose of this study is to explore the feasibility of using the Internet to provide health information and information regarding VA services to rural veterans. These individuals are considered particularly at risk of experiencing racial/ethnic, socioeconomic and geographic health disparities. The VA Office of Rural Health (ORH)(ie part of the United States Government Department of Veterans Affairs) is a government agency with the mission to improve access and quality of care for enrolled rural and highly rural US veterans. The ORH seeks to use evidence-



based policies and innovative practices to support the unique needs of enrolled veterans residing in geographically remote areas.

Studies have shown that active military service members and veterans do access the Internet for health information. For example, Luxton et al conducted a survey of the attitudes, awareness and usage behaviors of military service members ($n=48$) regarding online self-care resources¹³. They found that, among service members with a mean age of 30.5 years ($SD=8.2$), individuals used the Internet often to access self-care resources and were receptive to Web-based resources as adjunct tools for self-care, particularly for medical/physical health concerns rather than for mental/psychological health concerns.

However, Wilson and colleagues examined the receptivity of active duty military individuals (M [mean] age = 25.9 years; $SD=5.8$) to Internet-based mental health care and found overwhelming receptivity to technology-based approaches to treatment, including greater acceptance of Internet-based treatment of mental health needs¹⁴. Owens and colleagues successfully used VA listservs to recruit veterans with an average age of 57 years ($SD=10.62$) to complete an Internet survey of post-traumatic stress disorder, guilt, depression and meaning-in-life¹⁵. Together, data from these three studies suggest that active service members^{13,14} and middle-aged veterans¹⁵ have access to the Internet and are open to the use of the Internet to provide health information.

The present study sought to examine Internet usage among rural Alabama veterans who had either never enrolled, or had previously enrolled but had not accessed, VA health services in at least 2 years. This target population is, arguably, at the greatest risk of healthcare disparities due to multiple vulnerabilities, including racial/ethnic, socioeconomic and geographic disparities. Primary research interests guiding this study included whether the veterans used the Internet to access health information and information about VA health services. A priori hypotheses were that older and African American rural veterans would demonstrate significantly less Internet usage than younger and Caucasian rural veterans. It was also expected that, in comparison with national data, rural veterans would show lower rates of Internet usage.

Methods

This paper reports secondary analysis of baseline data from the Alabama Veterans Rural Health Initiative, a pre-post intervention trial designed to enhance veteran enrollment, health care utilization and healthcare delivery to Alabama veterans residing in rural areas⁹. Interviews were conducted between October 2009 and November 2010. A multipronged approach of subject recruitment was used to target rural veterans not currently receiving VA services. The recruitment strategies included a mailed invitation to veterans who were previously enrolled in VA but who had not accessed care in >2 years; direct community outreach to Veterans Service Officers, county government offices, churches, local veteran organizations, civic organizations and individual veterans located in rural counties; and publicly posted IRB-approved flyers. No commercial advertisements were used. Survey data were collected in community settings, such as the home of the veteran or another private location, chosen by the prospective participant (eg a library or civic office).

Participants

Veterans of the US military over the age of 19 years residing in a rural Alabama county in the Tuscaloosa VA Medical Center, Birmingham VA Medical Center and Central Alabama VA Health Care System catchment areas were eligible for study participation. Counties identified for recruitment were selected based on ZIP code designations as rural. Individual residential street addresses in non-rural counties were also eligible if identified as rural per US Census Bureau designation. Forty-five Alabama counties were included, although the majority of respondents came from eight counties located in the northern half of the state.

A total of 205 veterans signed informed consent. Two were excluded after further review showed they did not reside in a rural area. For these analyses focused on Internet connectivity, one individual was excluded due to reporting 'don't know' when asked about Internet use and one was excluded because only this individual reported his race as Asian American. Hence, 201 veterans with an average age of



55.5 years (SD=14.34, range 21–85 years) were included in these analyses: of these 201 veterans, 93% were men, 59% were Caucasian and 41% were African American. Although the survey did not capture the distance between the veterans' home and VA facilities, veterans were asked: 'How long does it take you to get to the healthcare provider?'. Forty-one percent of veterans reported a travel time to provider of less than 15 minutes, 38% reported a travel time of 15 to 30 minutes, 16% reported a travel time of 31 to 60 minutes and 5% reported a travel time of between 61 and 90 minutes.

With regard to education, 94% completed a General Educational Development (GED) test, high school or higher education, with 53% reporting formal education past high school. Over 35% reported working full-time. Eighty-eight percent reported no service-connected disability, 1.5% reported filing for or appealing a service-connected disability claim, 1.5% reported filing for an increase in service-connected disability and 9% reported receiving service-connected disability pay. Twenty-two percent reported having no health insurance or other coverage; 31% reported having no income or household income less than or equal to \$20,000; and 19.5% reported they were looking for work or unemployed. The majority (65%) served in the Army or Army National Guard.

Procedures

Baseline data were drawn from the Alabama Veterans Rural Health Initiative project⁹. A trained veteran community outreach health worker (VCOHW) met with prospective participants and, after thorough review and acquisition of an institutional review board (IRB) approved written informed consent, performed the baseline assessments. Basic demographic information was collected. Within the clinical interview, veterans' responses to specific questions regarding Internet access and Internet access specifically for health information were examined, including: 'Do you ever go on-line to use the Internet or world wide web, or to send and receive email?'; 'Have you ever looked for health or medical information for yourself?'; and 'In the past 12 mo., have you done the following things while using the Internet? ... Looked for information about veterans services, benefits or MY HEALTH-E Vet?'. MY HEALTH-E Vet was launched in 2003 but the

current survey did not capture when veterans enrolled. Therefore, although it is possible that participating veterans in this study could have known about and searched for MY HEALTH-E Vet, it is more likely that these veterans who had not accessed VA services in 2 or more years were unaware of it.

Statistical analysis

Primary outcomes of interest were Internet usage (yes/no), whether the rural veteran accessed health-related information on the Internet (yes/no) and whether the rural veteran was interested in accessing information regarding VA health services on the Internet (yes/no). The mechanism by which rural veterans accessed the Internet (DSL, satellite, dial-up) was also described. Descriptive statistics were calculated for baseline demographic and Internet usage characteristics. Measures of central tendency (mean, median) and variability (standard deviation, minimum and maximum) were calculated for each continuous measure; counts and percentages were calculated for categorical variables. Chi-squared tests were conducted to evaluate racial group and age group differences. To facilitate comparisons across age, the age variable was collapsed into three groups: young adults less than 50 years of age ($n=59$), middle-aged adults aged 50 to 64 years ($n=98$) and older adults aged 65 years and older ($n=44$). Finally, logistic regressions were conducted with race/ethnicity and age included as a continuous variable to predict use of the Internet to access health information for oneself and use of the Internet to access information about VA services, benefits and MY HEALTH-E Vet. All analyses were conducted using SAS v9.2 (www.sas.com) and sample size varied slightly across analyses due to listwise deletion of missing data on specific variables.

Ethics approval

The study (IRB # 00134/09-06) was approved by the Subcommittee on Human Subjects (IRB), Department of Veterans Affairs, VA Medical Center, Tuscaloosa, AL, 35404, # 679.



Results

Sample characteristics

Examining age as a continuous variable, African American rural veterans were significantly younger (50.32 years, SD=13.50, range 22–85 years) than Caucasian rural veterans (58.50 years, SD=13.82, range 21–85 years), $t(200) = 4.43$, $p < 0.0001$. There were also significant racial/ethnic differences in educational attainment, $\chi^2(6, n=202) = 14.98$, $p = 0.02$, with African Americans generally showing higher levels of education. It should be noted, however, that the quality of education for older cohorts of rural African Americans in the southeastern United States is not directly comparable to that of Caucasians, and the higher number of years of education cannot be directly interpreted¹⁶. There were no racial/ethnic differences in employment status, income or active duty status.

Overall Internet usage

A small majority ($n=107$; 53.23%) of the 201 rural veterans reported 'going on-line to use the Internet or World Wide Web, or to send and receive e-mail'. Overall, there were no racial/ethnic differences in Internet usage, not accounting for age differences in the samples. There were, however, significant age differences in Internet usage when age was examined as a continuous variable, $t(199) = 5.57$, $p < 0.0001$, with individuals reporting use of the Internet being significantly younger than those who did not ($M=50.53$, $SD=14.53$, range 21–83 years vs $M=61.06$, $SD=11.93$, range 27–85 years). Among veterans younger than age 50 years ($n=59$), 81.36% reported Internet usage, whereas 44.33% of veterans between the ages of 50 and 64 years ($n=97$) and 35.56% of veterans older than age 65 years ($n=45$) reported use of the Internet (Table 1; Fig1).

Internet usage for health information among active internet users (n=107)

Among those who reported use of the Internet ($n=107$), there were significant racial/ethnic differences in age when age was examined as a continuous variable, $t(105) = 4.40$, $p < 0.0001$. African American Internet users were over 10 years younger, on average, than Caucasian Internet users ($M=43.00$, $SD=11.78$, range 22–65 years vs $M=54.85$, $SD=14.26$, range 21–83 years). There were no racial/ethnic differences in education, $\chi^2(4, n=56) = 7.76$, $p = 0.10$; employment status, $\chi^2(1, n=55) = 0.01$, $p = 0.93$; income, $\chi^2(6, n=55) = 3.17$, $p = 0.79$; or active duty status, $\chi^2(1, n=55) = 0.55$, $p = 0.46$. Over 85% ($n=91$) of veterans accessed the Internet from home, through DSL (42.06%), cable/satellite (28.97%), wireless (6.54%) or other means (2.8%). Only 10.28% of rural veterans who reported Internet access from home used a dial-up modem to access the Internet. Approximately 35% of rural veteran Internet users accessed the Internet from work, 15% from a public library, 8% from someone else's house and 6% from some other place.

Of the rural veterans reporting Internet usage, 51.4% ($n=55$ of 107) reported going online to use the Internet or World Wide Web to look for health or medical information for themselves while 36.45% ($n=39$ of 107) reported going online to look for health or medical information for someone else. Although there were no racial/ethnic differences in looking for health or medical information for oneself (51.47% Caucasian vs 51.28% African American), there were significant age differences when age was examined as a continuous variable, $t(105) = 2.30$, $p = 0.02$. Veterans who used the Internet to acquire health information for themselves were significantly younger than those who did not ($M=45.47$, $SD=14.89$ vs $M=52.51$, $SD=13.99$). It is noteworthy, however, that this age difference in rate of usage is not dramatic and the variability is high. In fact, 54% of veteran Internet users less than age 50 years ($n=48$), 49% of veteran Internet users aged 50 to 64 years ($n=43$) and 50% of veteran Internet users older than age 65 years ($n=16$) used the Internet to seek health information for themselves. Over 78% of veteran Internet users reported being at least somewhat satisfied with the online services they received in the past 12 months, $\chi^2(1, n=102) = 7.81$, $p = 0.005$.



Table 1: Internet usage according to demographic variables (n=201)

Variable	Overall	Internet usage		P-value
		Yes n=107	No n=94	
Age - mean	55.5	50.5	61.0	<0.0001*
Age (years) - %				<0.0001*
<30	5.5	9.4	1.1	
30-49	23.9	35.5	10.6	
50-64	48.3	40.0	57.5	
65-74	11.9	10.3	13.8	
75-84	8.9	4.7	13.8	
>85	1.5	0	3.2	
Race - %				0.1809
Caucasian	59.2	63.6	54.3	
African American	40.8	36.5	45.7	
Work fulltime	35.5	46.2	23.4	0.0008*
Unemployed	19.5	17.9	21.3	0.5504
Education				0.0001*
<12 year	6.5	1.2	11.7	
12 year	40.3	35.5	45.7	
Some coll	40.8	42.1	39.4	
College	12.4	20.6	3.2	
Income				0.0014*
<20K	30.9	23.8	39.1	
21-40K	32.9	27.6	39.1	
41-60K	21.3	28.6	13.0	
>60K	17.7	20.0	8.7	

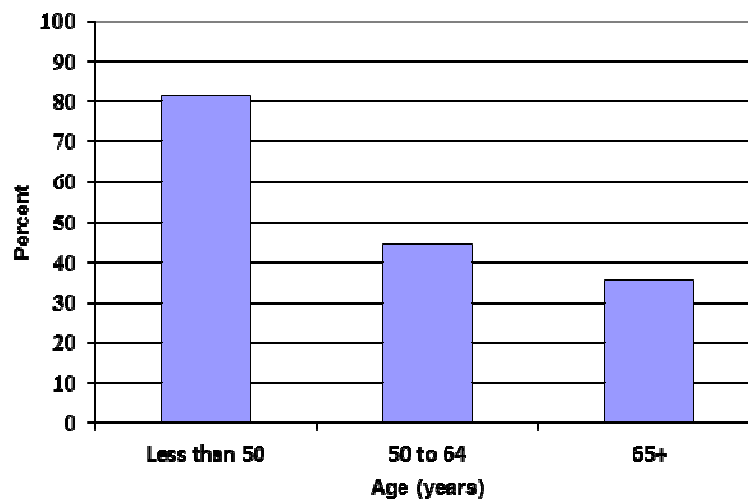


Figure 1: Percentage of rural veterans reporting internet usage according to age.



Accessing the Internet for veterans' services

Among current Internet users ($n=107$), 28.04% ($n=30$) reported that they had looked online for information regarding veterans' services, benefits or MY HEALTH E-Vet. There were no racial/ethnic (23.53% Caucasian vs 35.9% African American; χ^2 (1, $n=107$) = 1.88, $p=0.17$) or age differences in looking for such information regarding VA services (χ^2 (4, $n=107$) = 4.87, $p=0.30$). However, African American veterans who used the Internet to acquire such information were significantly younger than Caucasian veterans ($M=43.00$, $SD=11.77$ vs $M=54.85$, $SD=14.26$, $p<0.0001$).

Multivariate logistic regressions

Due to racial/ethnic differences in age among rural veterans, age and race/ethnicity were included simultaneously as potential predictors of using the Internet to seek health information for oneself and using the Internet to seek information about veterans services, benefits or MY HEALTH-E Vet. In the logistic regression examining use of the Internet to seek health information for oneself, neither age (Wald χ^2 = 0.52, $p=0.45$) nor race/ethnicity were significant (Wald χ^2 = 0.09, $p=0.76$). In the logistic regression examining use of the Internet to seek information about veterans services, benefits or MY HEALTH-E Vet, neither age (χ^2 = 4.9, $p=0.30$) nor race/ethnicity were significant (χ^2 = 1.8, $p=0.17$) (Table 2).

Discussion

Using baseline data from the Alabama Veterans Rural Health Initiative project, this study is one of the first to provide information regarding rural veterans' Internet usage to obtain health information and information regarding VA services⁹. A small majority of rural-dwelling veterans reported using the Internet (approximately 53% of the sample). Although African American veterans in this sample were significantly younger than Caucasian veterans, no racial/ethnic or age differences were found in multivariate logistic regression analyses predicting Internet

usage to obtain health/medical information for oneself or Internet usage to obtain information about VA services.

It is noteworthy that a priori hypotheses regarding racial/ethnic and age differences in Internet usage were not strongly supported. Rates of usage of the Internet among this sample (ie approximately 53% of rural veterans, regardless of age) were much lower than national data¹. It is likely that this finding partially reflects the geographic disparity in Internet access in rural areas in the USA, with Internet penetration in rural areas lagging behind Internet penetration in urban areas (75% vs 89%, respectively)^{7,8}. Moreover, it may be that veterans are a population with particular attitudes toward privacy and the Internet that result in more limited Internet usage. Further, less than half of the individuals in the current study (45%, $n=91$) accessed the Internet from their homes. Such geographic disparities in Internet penetration may have masked potential differences based on race/ethnicity and age. Recent research by one of the co-authors, however, has shown that homeless urban youth regardless of race/ethnicity show similar rates of Internet access to those of university undergraduates (REG)¹⁷. It may be that racial/ethnic disparities in Internet usage are decreasing across time, at least among younger age groups with access to the Internet at school or work.

These data revealed expected age differences favoring younger rural-dwelling veterans in use of the Internet to access health and medical information and to access information regarding VA services. Yet these differences were not remarkable. Fifty-four percent of veteran Internet users less than age 50 years ($n=48$), 49% of veteran Internet users aged 50 to 64 years ($n=43$) and 50% of veteran Internet users older than age 65 years ($n=16$) used the Internet to seek health information for themselves. The geographic disparity in Internet usage is further exacerbated among those 65 years and over, wherein broadband access is still only 16%¹. Other research with veterans has posited that Internet usage is likely more common among those who are 'higher-functioning' in physical and mental health¹⁵. Future research should explore age and physical and mental health differences in Internet usage among veterans who live in urban areas but have not enrolled in or accessed VA health services in more than 2 years.



Table 2: Results of logistic regression predicting using the Internet to seek medical information for oneself among Internet users (n=107)

Variable	Overall	Looked for health information		P-value	Looked for veterans' service information		P-value
		Yes n=55	No n=52		Yes n=30	No n=77	
Age (years) - %				0.7667 [†]			0.3006 [†]
<30	9.4	12.7	5.8		16.7	6.5	
30-49	35.5	34.6	36.5		40.0	33.8	
50-64	40.0	38.2	42.3		36.7	41.6	
65-74	10.3	10.9	9.6		3.3	12.9	
75-84	4.7	3.6	5.8		3.3	5.2	
>85	0	0	0		0	0	
Race - %				0.9850 [†]			0.1704 [†]
Caucasian	63.6	63.6	63.5		53.3	67.5	
African American	36.5	36.4	36.5		46.7	32.5	

[†]Not significant in regression model.

This study has limitations. First, only rural-dwelling veterans from one geographic region (ie primarily northern rural counties) in one state (ie Alabama) were enrolled in this study, limiting generalizability. Additionally, the catchment area served by the Veterans Affairs Medical Centers participating in this study is limited with regard to racial/ethnic diversity. By focusing on a veteran sample, participants were also predominantly men. Another limitation of this study is that it is based on the use of secondary data from a study designed to capture a broad range of issues and not simply Internet use, constraining the variables examined to those available in the Alabama Veterans Rural Health Initiative project⁹ baseline data. For example, information that could have had an impact on the usability of the Internet beyond connection type was not available (ie age/speed/efficiency of the primary computer, perceived hassle accessing information etc). Future population-based data collection efforts should focus on Internet usage for health information and information regarding VA services among veterans across the adult lifespan.

Conclusion

In spite of limitations, these findings support nascent efforts to provide health information and information regarding VA services to rural-dwelling veterans via the Internet. The lack of racial/ethnic differences suggests that similar intervention approaches may be used to enhance rural-dwelling veterans' adoption of Internet health information services. Moreover, the relative satisfaction with Internet services reported by rural veterans who reported use of the Internet combined with findings from other studies suggests receptivity among veterans and active-duty personnel to Internet-based interventions¹³⁻¹⁵. Future public health initiatives should explore methods for increasing Internet use and service adoption among urban and rural veterans with reduced access to or use of face-to-face or in-person health services. Indeed, the US Federal Government's VA Office of Rural Health (part of the Department of Veterans Affairs) is investing in outreach to rural veterans through technologies including telephone-based services, video-conferencing, mobile health clinics, and electronic communication between providers and patients such as secured electronic messaging. As these services become more available in VA health centers,



additional VA resources will be needed to educate rural-dwelling veterans about their use.

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