Technology Use Among Patients in a Nonurban Southern U.S. HIV Clinic in 2015

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Abstract

Background: *Behavioral interventions can be delivered over the Internet, but nonurban subpopulations living with HIV may still have inadequate Internet access to make this feasible.* ***Methods:*** *We report on a survey conducted in 2015 among 150 patients receiving care at a university-based Infectious Disease Clinic serving a nonurban and rural population in central Virginia. Our aim was to determine the rate of computer, tablet, and smartphone usage, as well as Internet access, to inform the delivery of a novel intervention using Internet and mobile technology.* ***Results:*** *The participants' mean age was 46; 111 patients used computers, 101 used smartphones, and 41 used tablets. The results showed that 87% of patients had Internet access. Of those, 49 reported daily Internet use, while 18% reported weekly Internet use, and 33% reported less frequent Internet use.* ***Conclusions:*** *The survey study data suggest that Internet access among nonurban and rural patients with HIV is adequate to support trials testing Internet-delivered interventions. It is time to develop and deliver Internet interventions tailored for this often isolated subpopulation.*

Keywords: *Internet access, m-health, nonurban, people living with HIV, rural*

Introduction

Technology plays a crucial role in the world's healthcare[1] but access to technologies varies by location and subpopulation. Internet health interventions are efficacious but require Internet access.[2] It is unclear whether people living with HIV (PLWH), especially those in more rural areas, have sufficient Internet access to enable use of Internet health interventions. Access to communication technology in the United States has increased over time.[3] In the general population, a computer is still the most widely used device, with 81% of U.S. adults reporting computer access.[4] Computer access varies by race. Whites have the highest desktop/laptop ownership rate at 83%, compared to 70% of blacks. Among people of Hispanic ethnicity, 72% own a desktop or laptop computer,[5] mobile phones are used by the next largest subset of the population.[6] In 2015, 64% of American adults owned a smartphone; this varied by age. Among Americans aged between 18 and 29 years, 85% own smartphones, while among those 65 and older, 27% own smartphones. Smartphone ownership also varies by race, with rates at 61% of whites, 70% of blacks, and 71% of Hispanics.[6] The rate of tablet ownership remains lowest, at 42% in January 2014. Tablet ownership differs by race and ethnicity, with rates of 41% among whites, 34% among blacks, and 45% among Hispanics in 2014.[7]

Beyond the hardware, it is important to know how users connect to the Internet. The Pew report found that 85% of smartphone users have a high-speed wireless connection at home. Ten percent of Americans with smartphones have Internet only through their phone's data plan, which may be limited in rural areas with less broadband access or cellular coverage.

Understanding local Internet access is relevant to intervention design for PLWH. Technology-delivered interventions exist on a continuum in terms of the level of cellular, wired, or wireless signals they require. In areas without much Internet access or with intermittent cellular signals such as those found in mountainous areas, text-based and SMS-based interventions may be the only available technology-delivery systems. In areas with strong cellular signals and patient groups with smartphones, apps and other Internet-based tools may be appropriate, but these may use data that patients must pay for if usage exceeds the data plan, or if patients pay for data as they use it. Finally, in areas with strong broadband signals and affordable rates, patients can take advantage of interactive and engaging Internet interventions with graphics, audio, and video. The few studies available indicate that access continues to improve. In 2007 in a Midwestern U.S. HIV clinic, considerable disparities in access to the Internet and mobile technologies existed across patients.[8] Similarly, in 2009, patients of a university-based HIV clinic in Virginia serving rural and nonurban patients had low rates of computer

usage and strong preference for telephone delivery of health interventions.[9] Even more recently, lack of Internet access was more common among rural patients and contributed to health disparities.[10] These data stand in contrast to high rates of access to the Internet from smartphones and computers among urban PLWH in 2012.[11] We sought to determine the feasibility of using the Internet to deliver an intervention to a nonurban and rural sample of PLWH. Delivering interventions over the Internet can overcome health disparities by removing barriers to access to treatments experienced by some subsets of the population.[1,12] Therefore, determining the Internet access of rural, U.S. Southern people with HIV is critical to determine whether the barriers to care experienced by this population might be addressed by Internet delivery models. This study fills that critical gap in information and describes the mid-2015 rates of computer, smartphone, and tablet possession and Internet use among nonurban and rural patients with HIV from central and western Virginia.

Methods

Study procedures were approved by the University of Virginia Institutional Review Board. Study participation was anonymous.

SETTING

A university-based Infectious Disease Clinic (IDC) provides HIV primary care for 740 patients. The catchment area includes 52 counties in central and western Virginia, with 19 HHS designated as underserved. Most of this 24,000 square mile area is rural. Some patients travel 5 hours to appointments. While the service area is 86% white, 44% of IDC patients are black, and 1/3 are women. Half of female patients are black.

RECRUITMENT

Participants were approached while waiting for appointments. Patients completed a short screener to determine that they were adults living with HIV with an understanding of English. Patients indicating substance use in the past 12 months were invited to complete the survey, as they are the target subpopulation of the planned intervention.

SURVEY

The anonymous survey had nine items in English and could be administered by the research assistant or self-completed in 5 minutes. Participants received a $5 gift card for completing the survey.

ANALYSIS

Access to each device and to the Internet was characterized with descriptive statistics. The differences in access to each device and frequency of Internet use between sex, race, and age quartiles were assessed using chi-square analysis. Only those differences with probabilities of 95% or greater were considered significant.

Results

PARTICIPANTS

Of 153 patients approached, 150 consented, representing 20% of the participating IDCs population. The sample included 94 men and 56 women, with ages ranging from 18 to 80 years, and a mean age of 46. Participants were 78 blacks (52%), 64 whites (43%), and 8 others, including Native American, Hispanic, and biracial people (5%).

SURVEY RESULTS

Most (111 of 150) report access to a computer, while 101 own a smartphone and 41 own a tablet. Only 20 survey participants (13%) reported no access to a computer, smartphone, or tablet and therefore no Internet access.

Table 1 shows how technology access varies by sex, race, and age, and indicates which chi-square analyses found a significant difference in the overall category. In this sample, 79% of men have access to computers compared to 66% of women. Smartphone ownership is nearly equivalent between men (68%) and women (66%). Tablet ownership is significantly more prevalent among men (34%) than among women (16%).

Technology access varies by race. More whites (83%) have computer access than blacks (70%) or others (Hispanic, biracial, and Native Americans, 38%). Smartphone access among blacks (68%) is similar to whites (67%) and others (62%). Tablet access is the least common, occurring among 27% of blacks, 28% of whites, and 25% of others.

Technology access varies by age group. We categorized age by quartile. Computer access was highly prevalent among those aged between 18 and 25 years (91%) compared to 73% of those aged between 26 and 50 years, 71% of those aged between 51 and 75 years, and 63% among those aged between 76 and 80 years. More young people aged between 18 and 25 years (97%) have smartphones than people of other ages, and they have the highest rate of tablet access at 36%.

INTERNET ACCESS

Most survey respondents report frequent Internet use. All the respondents who had access to a computer, smartphone, and tablet had Internet access. Nearly half (49%) reported daily Internet use, while 18% reported weekly Internet use and 33% reported less frequent Internet use. Of the 111 patients reporting computer access, most (79.2%) connect to the

Table 1. Technology Use and Internet Access Responses of 150 Survey Respondents

TECHNOLOGY CHARACTERISTIC	*N* (%)
Computer use	111 (74.0)
Smartphone use	101 (67.3)
Tablet use	41 (27.3)
Computer Internet access	
Wi-Fi	88 (79.2)
Cable	13 (11.7)
Public Wi-Fi	9 (8.1)
Neighbor Wi-Fi	1 (0.9)
No Internet access	1 (0.9)
No computer, N/A	37 (33.3)
Smartphone Internet access	
Data plan	48 (43.2)
Wi-Fi	45 (44.5)
Don't know	5 (4.9)
Tablet Internet access	
Wi-Fi	23 (56.0)
Data plan	15 (56.5)
Cable	1 (2.4)
No tablet, N/A	110 (73.3)

	COMPUTER USE BY RACE*, *N* (%)	SMARTPHONE USE BY RACE, *N* (%)	TABLET USE BY RACE, *N* (%)
African American	55 (70.5)	53 (68.0)	21 (26.9)
White	53 (82.8)	43 (67.2)	18 (28.1)
Other	3 (37.5)	5 (62.5)	2 (25.0)

	COMPUTER USE BY SEX, *N* (%)	SMARTPHONE USE BY SEX, *N* (%)	TABLET USE BY SEX*, *N* (%)
Men	74 (78.7)	64 (68.1)	32 (34.0)
Women	37 (66.1)	37 (66.1)	9 (16.1)

	COMPUTER USE BY AGE QUARTILE, *N* (%)	SMARTPHONE USE BY AGE QUARTILE***, *N* (%)	TABLET USE BY AGE QUARTILE*, *N* (%)
1st age quartile (18–25)	30 (90.9)	32 (97.0)	12 (36.4)
2nd age quartile (26–50)	30 (73.2)	33 (80.5)	13 (31.7)
3rd age quartile (51–75)	29 (70.7)	25 (61.0)	10 (24.4)
4th age quartile (76–80)	22 (62.9)	11 (31.4)	6 (17.1)

INTERNET USAGE BY AGE QUARTILE (*N* = 150)***	LESS OFTEN, *N* (%)	DAILY, *N* (%)	WEEKLY, *N* (%)
1st age quartile (18–25)	1 (3.0)	23 (69.70)	9 (27.3)
2nd age quartile (26–50)	12 (29.3)	21 (51.22)	8 (19.5)
3rd age quartile (51–75)	14 (34.2)	19 (46.34)	8 (19.5)
4th age quartile (76–80)	22 (62.9)	11 (31.43)	35 (5.7)

*$p < 0.05$; ***$p < 0.001$.

Internet through Wi-Fi, 8.1% through public Wi-Fi, 11.7% through cable, and 1% through a neighbor's Wi-Fi. Of the 101 smartphone users, 47.5% use a cellular data plan, 44.5% connect through Wi-Fi, and 4.9% were not sure how they connect. Among the 41 tablet users, 51.1% connect through Wi-Fi, 33.3% connect through a data plan, and 2.2% connect through cable. One tablet user was unsure how they connect. The difference in frequency of Internet usage across age quartiles was statistically significant.

Summary and Conclusions

Parallel with advances in technology ownership and Internet access in the general population, most nonurban and rural PLWH now own computers, smartphones, and/or tablets, and use these devices to access the Internet daily or at least weekly. In this southern U.S. clinic that cares for nonurban and rural patients, most PLWH (67%) use the Internet daily or weekly. Young PLWH utilize technology more, but technology is used across race, sex, and age groups. The results of computer accessibility in this nonurban and rural sample of PLWH are consistent with those found in a survey conducted by the Pew Research Center.[5] Specifically, in both this sample and the Pew study, computers are the most widely accessed device and whites have more access to computers/desktops than blacks. Also, consistent with the Pew Research Center study, this sample's results show that more young people aged between 18 and 25 years (97%) have smartphones than people of other ages. In contrast, racial differences in this study were not significant, although they are in the same direction as in the Pew Research Center findings.[6]

This study of nonurban and rural PLWH from central and western Virginia found relatively high rates of device ownership and Internet access. These findings suggest that the urban–rural digital divide is closing. Moreover, these data suggest that the time is right to test fully featured Internet interventions to address health behaviors and reduce health disparities among nonurban and rural HIV patients.

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Disclosure Statement

No competing financial interests exist.

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