Computer and Internet Use Among Urban African Americans with Type 2 Diabetes

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ABSTRACT Previous studies have identified a “digital divide” between African Americans and whites, with African Americans having substantially lower rates of Internet use. However, use of the Internet to access health information has not been sufficiently evaluated in this population. Therefore, we conducted a telephone survey to determine the prevalence of computer and Internet use among 457 African American adults with type 2 diabetes. Participants were 78% female, with a mean age of 57 ± 11 years, and about one-third had a yearly income $\leq$ \$7,500. Forty percent of the participants reported having a computer at home and 46% reported knowing how to use a computer. Most participants (58%) reported that they had, at some point, used a computer, and of those, 40% reported that they used the computer to find health information. In a stratified analysis, participants with lower education levels (<high school) were less likely to have a computer; older participants, men, and individuals with lower education levels were less likely to know how to use a computer and to use it to search for health information (all $P < .05$). Nonetheless, of the participants who did not know how to use a computer, 66% reported that they would be willing to learn. In addition, 82% reported that they had friends or family in the neighborhood who would let them use a computer. Furthermore, 89% of participants reported that they would use a computer program to manage their diabetes if it were offered free of charge. These data show promise for the willingness of this under-served population to use computers and access health information using the Internet. New programs are needed to explore Internet-based interventions to improve self-management and diabetes care among African Americans.

KEYWORDS African Americans, Computer, Internet, Survey, Type 2 diabetes.

INTRODUCTION

As more Americans own and use computers, it is believed that the Internet may be a great tool to access health information, which may, subsequently, lead to improved health outcomes. Likewise, as many Americans are diagnosed with chronic diseases such as type 2 diabetes, the health status of these individuals will depend on the self-management capability of the patient in addition to care from their providers. Therefore, the need for more effective methods to increase patient self-management

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skills may be addressed, in part, by providing appropriate health information over the Internet.

Although it has been well-established that minorities are the most negatively affected by the digital divide,¹²⁻³ which is defined as the division that exists between people who do and do not have access to modern information technology,³ the Internet can be used to motivate individuals in this population to actively participate in their health care.⁴ In fact, the Internet has already been deemed useful for reaching large numbers of lower-income, less-educated, minority Americans,^{2,5} which can be expected to increase with mounting interests in overcoming the digital divide by providing widespread access in community settings.^{2,3,6}

A recent review article by our group has shown that there are a significant number of computer/Internet interventions focusing on type 2 diabetes (Jackson CL, Bolen S, Brancati FL, Batts-Turner M, Gary TL, unpublished data, 2005); however, there is little known about these types of interventions among African Americans and other ethnic minority populations who suffer disproportionately from this disease and its associated complications. In hopes that health information over the Internet may be a practical approach to assist in the reduction of health disparities,^{3,7,8} there is a great need for research to elucidate how ethnic minorities currently use the Internet as a means for acquiring health information.⁹ Therefore, we conducted a cross-sectional telephone survey to determine (1) the prevalence of computer ownership and use and (2) utilization of Internet to access health information in a sample of urban African Americans with type 2 diabetes.

METHODS

Study Population

The telephone survey was conducted among participants in Project Sugar 2, a randomized controlled trial of nurse case-manager and community health worker interventions to improve diabetes control. All participants were African Americans enrolled in a university-affiliated managed-care organization, and demographic characteristics were retained from a baseline interview completed during this parent study. The eligibility requirements and data collection methods of Project Sugar 2 are reported in detail in a previous article.¹⁰

Survey Items

The investigators developed a standardized questionnaire which consisted of 15 items. There were a combination of open- and close-ended questions focusing on the participants' use of computers and the Internet. Most frequent responses to open-ended questions were coded into categorical variables.

Each participant was asked five main questions (1) "Do you know how to use a computer?" (2) "Do you have a computer?" and (3) "Have you ever used a computer?" Individuals who answered that they never used a computer were asked "What keeps you from using a computer?" which was intended to provide insight into barriers to computer use among the study participants. This question was delivered in an open-ended fashion but was followed by prompting the participant regarding predesignated categories. For example, affordability concerns, nervousness, and being too busy were among a number of responses that we believed were likely to be reported as barriers and were designated as categories before the interview. Moreover, if the participant reported using a computer, our target question was asked (4)

“Have you ever used a computer to find health information?” Furthermore, all participants were asked (5) “If there were a computer program that helped you keep track of your diabetes and it was free of charge, would you use it?” Each participant was also asked to report sources of health information obtained outside the Internet.

In addition to the five main questions, several additional items were assessed. If the participant did not know how to use a computer, we evaluated their willingness to learn and whether or not they had a friend or family member in the neighborhood with a computer who would be willing to let them use it. For all survey items, responses that were coded as “other” were reexamined and categorized if the response was documented at least twice.

Procedure

The research staff were trained to complete the telephone interview by reviewing the survey with an investigator, role playing, and directly observing an interview in progress. The data were then collected between June 2003 and July 2004. Interviewers made multiple attempts to reach participants by calling at various times and by leaving phone messages at the participants' places of residence. An investigator other than the interviewer edited each completed survey to correct transcription errors and examine inconsistencies between interviewers. Furthermore, a quality control check was conducted for each survey to correct errors in the data entry process. Study participants who completed the survey were compensated with a small token gift.

Data Analysis

Data were analyzed using STATA statistical software version 7 (STATA Corp, College Station, TX, USA). The prevalence of each of the five main questions was determined and results were stratified by age, gender, education, income, and marital status. Stratified analyses were conducted using chi-square tests and were considered to be statistically significant if $P < .05$.

RESULTS

Response Rate

All of the 542 Project Sugar 2 participants were eligible for the survey, and 457 interviews were completed; the mean time of completion was 5 minutes. Reasons for lack of participation in the survey included being deceased or incapacitated, having lost-to-follow-up or refusal status for the parent trial, refusing to the telephone survey, or being unable to be contacted. We compared demographic and clinical characteristics between the survey completers ($n = 457$) and noncompleters ($n = 85$), and there were no statistically significant differences.

Sociodemographic Characteristics

The sociodemographic characteristics of the participants are summarized in Table 1. The mean age was 57 years, and 78% of the participants were female. Forty-one percent of the participants had less than a high school education, about one-third were married, and the majority had extremely modest incomes. Several clinical measures were also assessed. The (mean) Body Mass Index (BMI) among the participants was 34.4 kg/m², hemoglobin A1c (7.9%), systolic and diastolic blood pressure (137 mm Hg and 79 mm Hg, respectively). Lastly, about one-half of the participants reported having a mother and sibling with diabetes, and less than one-third had a father with the same condition.

TABLE 1. Selected sociodemographic and clinical characteristics of study participants

	(N = 457)
Sociodemographics	
Female	334 (73.3)
Age (years)	57.5 ± 10.9
Yearly income ≤\$7,500	155 (33.9)
Education	
Less than high school	185 (40.5)
High-school graduate	168 (36.8)
College or more	104 (22.8)
Marital status	
Married	148 (32.4)
Widowed/separated/divorced	209 (45.7)
Never been married	100 (21.9)
Employment status	
Retired/disabled	259 (56.8)
Employed (full or part-time)	155 (34.0)
Unemployed	19 (4.2)
Homemaker/attending school	23 (5.1)
Clinical measures	
Body Mass Index (kg/m ²)	34.4 ± 8.3
HbA1c (%)	7.9 ± 2.1
High-density lipoprotein (mg/dL)	51 ± 14.5
Systolic blood pressure (mm/Hg)	137 ± 20.0
Diastolic blood pressure (mm/Hg)	79 ± 11.3
Family history of diabetes	
Maternal	181 (45.5)
Paternal	98 (28.7)
Sibling	434 (95.0)

All results shown as n (%) or mean ± SD.

Computer/Internet Use Variables

Computer/Internet variables overall and stratified by age, gender, and education are summarized in Table 2. Forty-six percent of the participants reported knowing how to use a computer, and the majority of the participants (66%) who did not know how to use a computer were willing to learn. Moreover, 40% reported having a computer; 60% of the participants who did not have a computer reported having a friend/family member in the neighborhood with one. Of these individuals, most believed that person would allow them to use their computer (82%).

Fifty-eight percent of our participants reported ever using a computer. The most frequently reported places of use (not mutually exclusive) were at work (57%) and home (48%). Thirty percent of the participants used a computer daily, 12% several times a week, and 8% several times a month.

The 42% of the individuals that never used a computer reported several barriers to computer use. The most frequently reported barriers (not mutually exclusive) were not having a computer (57%), not knowing how to use one (57%), and not being interested (43%).

When those who had never used a computer were asked if they could use a computer, where they would feel comfortable using it, the majority (86%) reported

home, and around one-third reported a community center. Most of the participants had at least one person in their home that had ever used a computer (63%). Lastly, of the participants who have used a computer, 40% reported searching for health information over the Internet at least once.

Eighty-nine percent of the participants were willing to use a free computer program to manage their diabetes. Many (44%) who would not use the computer program stated that they were not interested, and others (28%) did not have a computer. Moreover, most of our participants (83%) identified their physician as their primary source of health information; a drug store was the second most frequent response (12%).

Table 2 summarizes computer/Internet usage variables overall stratified by age, gender, and education. Data show that the younger participants were more likely than older participants to know how to use a computer, to have ever used one, and to use a free diabetes-related computer program. Among participants that have used a computer, younger individuals were also more likely to utilize one at a library and to use one to find health information. However, among those that did not know how to use a computer, the older participants were more willing to learn. Furthermore, the females in our study were more likely than men to know how to use a computer, whereas those who have not used a computer were more likely to report not being able to afford one as a barrier. Higher educational levels were associated with computer use and seeking health information over the Internet but not with participants' willingness to use a free diabetes-related computer program. They were also associated with using the computer at work, home, and school, whereas a higher percent of high-school graduates reported having and knowing how to use a computer. In regards to ever using a computer and not having one, participants with less than a high-school education were, respectively, more likely to feel comfortable operating a computer at a community center and a library and to have a friend or family member with one. Lastly, being married and having a higher income were both independent correlates of knowing how to use and having a computer, and income was positively associated with ever using a computer (data not shown).

There were no significant differences between computer/Internet use variables and clinical parameters except for results on systolic blood pressure. Participants who reported ever using a computer and knowing how to use a computer had significantly lower systolic blood pressures (both $P < .05$). Furthermore, those who reported that they would use a free computer program to manage their diabetes had significantly lower blood systolic blood pressures than those who would not participate (135 mm/Hg vs. 143 mm/Hg, $P = .0005$, data not shown).

DISCUSSION

The results of our study suggest that the Internet can be considered reasonably accessible to urban, low-income African Americans with diabetes. Likewise, its potential to aid in the care of type 2 diabetes should be expected to increase as Internet access increases and the younger population with computer skills grows older.

The results regarding our participants searching for health information over the Internet are consistent with past research showing that ~40%, 46%, and 31% of their respective study populations have accessed the Internet to find information about health-related topics.^{2,4,11} Although conducted in a small sample with limited generalizability, there was only one study, to our knowledge, that focused on African Americans. They reported that 38% of their study population searched the Internet for health information.⁵

TABLE 2. Self-reported computer and Internet use of study participants, stratified by age, gender, and education

	Age quintiles					Gender		Education				Total (N = 457)		
	1 (youngest)	2	3	4	5 (oldest)	P	Male	Female	P	<High school	High school		College	P
Computer/Internet variables														
Know how	34.1	23.2	21.8	12.3	8.5	<.001	22.3	77.7	.05	23.2	40.3	36.5	<.001	46.3
Willing to learn*	18.1	18.1	21.3	21.9	20.6	.01	29.4	70.6	.61	51.9	35.0	13.1	.29	65.7
Has a computer	27.3	23.0	20.8	13.7	15.3	.06	31.2	68.9	.08	29.5	38.8	31.7	<.001	40.0
Family/friend with a computer†	19.2	16.7	20.5	21.2	22.4	.78	23.7	76.3	.88	43.6	34.6	21.8	.01	59.5
Family/friend willingness to let participant use‡	20.8	20.0	18.3	22.5	18.3	.09	23.3	76.7	.78	41.7	37.5	20.8	.14	81.6
Ever used	30.2	24.2	21.9	13.6	10.2	<.001	26.4	73.6	.87	27.6	38.9	33.6	<.001	57.9
Where used‡§														
Work	29.8	27.2	20.5	14.6	8.0	.46	23.8	76.2	.29	12.6	43.1	44.4	<.001	56.6
Home	35.4	18.9	24.4	13.4	7.9	.15	31.5	68.5	.07	20.5	40.2	39.4	.04	47.9
School	41.3	17.4	19.6	13.0	8.7	.49	17.4	82.6	.13	41.3	26.1	32.6	.05	17.4
Relative's house	51.7	13.8	17.2	13.8	3.5	.09	20.7	79.3	.47	17.2	44.8	37.9	.43	10.0
Library	57.1	10.7	17.9	10.7	3.6	.02	25.0	75.0	.87	25.0	35.7	39.3	.81	10.6
Barriers to using a computer														
Do not have	15.7	12.0	23.2	25.0	24.1	.19	22.2	77.8	.08	58.3	35.2	6.5	.84	56.5
Do not know how	11.1	11.1	27.8	27.8	22.2	.02	24.1	75.9	.26	57.4	34.3	8.3	.82	56.5
Not interested	10.8	9.6	26.5	24.1	28.9	.46	30.1	69.9	.43	66.3	26.5	7.2	.14	43.5
Cannot afford	16.7	7.7	29.5	23.1	23.1	.02	18.0	82.1	.02	64.1	29.5	6.4	.44	40.8
Afraid/nervous	8.2	6.1	27.3	30.3	18.2	.19	21.2	78.8	.38	63.6	27.3	9.1	.64	17.4

TABLE 2. Continued

	Age quintiles					Gender		Education				Total (N = 457)		
	1 (youngest)	2	3	4	5 (oldest)	P	Male	Female	P	<High school	High school		College	P
Computer/Internet variables														
Comfortable location for potential computer use														
Home	13.5	14.7	20.9	25.2	25.8	.09	25.8	74.2	.22	55.8	36.8	7.4	.17	85.8
Relative's house	12.4	14.8	25.9	25.9	21.0	.31	24.7	75.3	.48	55.6	32.1	12.4	.08	42.6
Community center	15.5	15.5	22.5	22.5	23.9	.63	22.5	77.5	.22	52.1	33.8	14.1	.02	37.8
Library	16.2	13.2	27.9	20.6	22.1	.23	25.0	75.0	.56	45.6	39.7	14.7	<.01	36.0
School	13.4	16.4	20.9	28.4	20.9	.41	19.4	80.6	.06	58.2	34.3	7.5	.99	35.5
Used a computer to find health information‡	40.0	25.7	21.9	7.6	4.8	.01	24.8	75.2	.64	19.1	37.1	43.8	.01	39.5
Willing to use free computer program	24.9	20.4	21.9	17.2	15.7	.001	25.4	74.6	.38	38.6	38.3	23.1	.07	89.3

All results are shown as percent.

* Of those who do not know how.

† Of those who do not have.

‡ Of those who have used.

§ Categories are not mutually exclusive (participants may have had multiple responses).

¶ Of those who have not used.

The Pew Internet & American Life Project described Americans' use of the Internet through data gathered from telephone interviews.¹² Of the 914 nationally representative participants, 59% reported having Internet access. This was similar to the number of participants in our study who used the a computer at least once. Moreover, 79% of Internet users in their study reported searching for health information online; however, we were unable to assess Internet access and use among the African American participants as data was not reported by race. Nonetheless, the findings that women were slightly more likely to use Internet and to have sought health information online were consistent with our findings. Moreover, consistent with our findings were that younger age and higher education level were associated with more Internet use and with seeking health information.

There are several limitations of this study that deserve to be mentioned. First, generalizability may be limited due to the participants being enrolled in a randomized controlled trial. Second, our assessment of computer/Internet use was based on self-reported data. Lastly, this was a cross-sectional study design; therefore, we could not make causal inferences about factors that may have influenced computer or Internet use among our participants. Nonetheless, this study had a relatively large sample of African Americans and was one of few studies, to our knowledge, to evaluate computer and Internet use in this community.

Our study provides two major implications for the future of Internet use among minorities. First, there is a need for the development of programs that are acceptable to older persons and persons with lower educational levels. For example, providing a free diabetes computer program may be effective at increasing self-management skills; 89% of our participants, including those that have never used a computer, were willing to use one if it were provided free of charge. Second, our participants stated that doctors were their number one source of health information; therefore, we should consider this setting along with other settings (e.g., drug store, second most frequent) to promote the utilization of appropriate health information over the Internet. With growing interest in using the Internet as a supplement to diabetes care in minority populations, health professionals should look beyond conventional settings to increase access to the Internet; for example, drug stores, grocery stores, and religious settings may become more acceptable and comfortable for these groups if widely implemented.

It was interesting that 2% of the participants that have used a computer reported using one in a community center, and 38% of the nonusers reported a community center as a comfortable setting in which to use a computer. These data suggest that the addition of computers in this setting may assist in the reduction of the digital divide. In addition, there should also be increased efforts to provide access in locations already deemed acceptable to the community of interest. For example, our data suggest that we should advocate utilization of social capital since 82% of our participants without a computer believed that a friend/family member in their neighborhood would allow them to use their computer.

Based on this study, it is recommended that future research assess computer/Internet access and use to obtain health information among African Americans and other ethnic minorities on a larger scale in hopes of strengthening our ability to draw conclusions about its potential to reduce health-related disparities. Furthermore, as we enhance access to the Internet in these underserved populations, it will be increasingly important for health professionals to focus on providing culturally-appropriate and medically-sound health information. Ultimately, the results of this study should make a significant contribution to literature with a focus on utilizing information technology to enhance type 2 diabetes self-management in the African-American community.

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