Formative Evaluation to Assess Communication Technology Access and Health Communication Preferences of Alaska Native People

REVISED REFERENCES, 04/13/2016

Abstract

Objective: Information technology can improve the quality, safety, and efficiency of healthcare delivery by improving provider and patient access to health information. We conducted a nonrandomized, cross-sectional, self-report survey to determine whether Alaska Native and American Indian (AN/AI) people have access to the health communication technologies available through a patient-centered medical home. ***Methods:*** In 2011, we administered a self-report survey in an urban, tribally owned and operated primary care center serving AN/AI adults. Patients in the center's waiting rooms completed the survey on paper; center staff completed it electronically. ***Results:*** Approximately 98% (n = 654) of respondents reported computer access, 97% (n = 650) email access, and 94% (n = 631) mobile phone use. Among mobile phone users, 60% had Internet access through their phones. Rates of computer access (p = .011) and email use (p = .005) were higher among women than men, but we found no significant gender difference in mobile phone access to the Internet or text messaging. Respondents in the oldest age category (65–80 years of age) were significantly less likely to anticipate using the Internet to schedule appointments, refill medications, or communicate with their health care providers (all $p < .001$). ***Conclusion:*** Information on use of health communication technologies enables administrators to deploy these technologies more efficiently to address health concerns in AN/AI communities. Our results will drive future research on health communication for chronic disease screening and health management.

Keywords

Healthcare communication, technology access, colorectal cancer, disease screening, Alaska

Authors

All correspondence should be directed to Renee F. Robinson, Southcentral Foundation, 4105 Tudor Centre Drive, Suite 200, Anchorage, Alaska, USA; rrobinson@scf.cc.

Acknowledgements

This research was supported by the National Cancer Institute funded Regional Native American Community Network.

Introduction

Southcentral Foundation (SCF), a nonprofit tribal healthcare organization, serves more than 65,000 Alaska Native and American Indian (AN/AI) people living in SCF's region of Alaska, including Anchorage, Alaska and 60 rural villages (D. Eby, 1998; D. K. Eby, 2007). SCF is an urban, tribally owned and operated health center that provides prepaid primary care

services. Given its service population, SCF is committed to recruiting AN/AI employees, who make up 54% of a total workforce of approximately 1,400. Through patient engagement, SCF has developed a unique healthcare delivery system, the Nuka System of Care, based on the patient-centered medical home model (D. K. Eby, 2007; Thompson, 2008). This system involves patients, their families, and their providers in every stage of healthcare delivery, while taking into account cultural traditions, social circumstances, family situations, personal preferences and values, and lifestyles (Burke, Menachemi, & Brooks, 2005; Sepucha et al., 2008; Thompson, 2008).

A focus on patients drives clinical practice, system redesign, and program implementation at the SCF. To bring tangible improvements in healthcare, new technologies must be acceptable to the target population, which includes providers as well as patients, and must respond to community healthcare needs (Brown, Copas, Stephenson, Gilleran, & Ross, 2008; Sahm, MacCurtain, Hayden, Roche, & Richards, 2009). Equally important, technological innovation must address the so-called digital divide, which is defined as inequalities in access to information and communication technology stemming from socioeconomic status and geographic residence (Hsu et al., 2005; Kind, Huang, Farr, & Pomerantz, 2005; Wagner, Bundorf, Singer, & Baker, 2005; Whaley, 2004). The digital divide is especially significant in rural communities, whose residents often lack access to information technologies and have little experience using them (Dick, Manson, Hansen, Huggins, & Trullinger, 2007; Wang, Bennett, & Probst, 2011). Nevertheless, healthcare communication technologies (HCT), including email, text messaging, social networking platforms, videoconferencing, and the Internet, are vital to rural health. Promoting their use is a priority for both the Department of Health and Human Services and the Indian Health Service (Carroll et al., 2011; Sequist, Cullen, & Acton, 2011; Sequist, Cullen, & Ayanian, 2005; Sequist et al., 2007).

HCT has been successful in engaging community members with regard to health and well-being in a variety of resource-limited healthcare settings (Armstrong et al., 2009; Buchanan, Morris, & Kauley, 1999; Burdette, Herchline, & Oehler, 2008; Cegala, Street, & Clinch, 2007; Geraghty, Glynn, Amin, & Kinsella, 2008; Hammel, 2003; Jackson et al., 2008; Kleiboer et al., 2010; Lorence, Park, & Fox, 2006; Menachemi, Prickett, & Brooks, 2011; Salovey et al., 2009; Sequist et al., 2005; Street, Gordon, & Haidet, 2007; Street, Makoul, Arora, & Epstein, 2009; Street, O'Malley, Cooper, & Haidet, 2008; Zolfo et al., 2010). The SCF uses a wide array of technologies to deliver and support healthcare services. Initiatives for meaningful use of HCT include developing web-based tools (Doorenbos, Demiris, et al., 2011; Doorenbos et al., 2010; Doorenbos, Kundu, et al., 2011; Garritano & Goldenberg, 2011; Hild, 2004; Kokesh, Ferguson, & Patricoski, 2004, 2011; Patricoski, 2004) and collaborative initiatives to improve the delivery and quality of healthcare services for our patients, including physical, mental, social, and spiritual care (Carroll et al., 2011). However, these tools and initiatives are effective only if they reach their target population and are tailored to meet that population's health needs.

Colorectal cancer (CRC) is one of the leading causes of cancer-related deaths among all US residents, including AN/AI people (Jemal, Siegel, Xu, & Ward, 2010; Kelly, Alberts, Sacco, & Lanier, 2012; Swan & Edwards, 2003). Joint consensus guidelines recommend regular screening for asymptomatic adults 50 years of age and older (Levin, Lieberman, McFarland, Andrews, et al., 2008). CRC screening has been shown to reduce both the incidence of and mortality from CRC, but despite its effectiveness, screening uptake remains suboptimal, and current low-tech interventions such as telephone and postal mail reminders may not address the needs of AN/AIs (Brouwers et al., 2011; Doorenbos, Jacobsen, Corpuz, Forquera, & Buchwald,

2011; Lee, Groessl, Ganiats, & Ho, 2011; Naylor, Ward, & Polite, 2012; Redwood et al., 2011; Sarfaty et al., 2012; Sequist, Zaslavsky, Marshall, Fletcher, & Ayanian, 2009; Yabroff et al., 2011).

Computerized reminders and other HCT have been shown to improve healthcare delivery in a subset of patients with specific health conditions and to assist providers with panel management, such as tracking patient outcomes by provider and monitoring the usage and delivery of screening services. Several studies have shown that automated messaging can improve care and screening for chronic diseases, including cancer (Armstrong et al., 2009; Feldstein et al., 2009; Greaney et al., 2012; Stone et al., 2002; Williams et al., 2011). SCF plans to implement an HCT intervention that includes reminders for chronic disease screening. The intervention will begin with messaging on CRC screening. However, it is unclear whether AN/AI people, especially those older than 50 years, have access to the HCT required to use such a service (Carroll et al., 2011; Dick et al., 2007; Rushing & Stephens, 2011; Sequist et al., 2011; Sequist et al., 2005; Wood et al., 2003). According to the principles of patient-centered care, health system changes should be driven by desired outcomes and align with patient preferences. The outcomes desired by SCF provide an initial framework for developing a formative evaluation, identifying key stakeholders (e.g., patients, providers, and leadership), formulating CRC screening messages, and implementing the intervention.

In 2011, SCF conducted a survey on communication technology to determine whether AN/AI people in SCF's region of Alaska have access to the HCT needed for the planned CRC screening intervention. The results will help to determine the potential reach of the intervention, maximize its success, and lead to improvements in monitoring and managing AN/AI population health.

Methods

Study Design

We performed a nonrandomized, cross-sectional, self-report survey of HCT among AN/AI adults. The survey was administered on paper to SCF patients in the health center's waiting rooms. The survey was written in English, the language predominantly used at the SCF. The survey was also distributed electronically through Survey Monkey to SCF staff. Survey administration to patients began in mid-February 2011; electronic recruitment of staff began on March 4. All surveys were completed by March 18, 2011.

Eligibility criteria included a self-reported age of at least 18 years and current eligibility for care at SCF. As an incentive, all participants were entered in a draw to win one of six $50 gift cards.

SCF is an Alaska Native owned and managed regional health corporation operating under the tribal authority of Cook Inlet Region, Inc. SCF and Alaska Native Tribal Health Consortium (ANTHC) approved all aspects of the study in accordance with requirements for tribal review of research. Additionally, SCF and ANTHC provided prepublication review and approval of this manuscript prior to peer review. The Alaska Area Institutional Review Board of the Indian Health Service also approved all aspects of the study.

Study Instrument

The study instrument was a 15-item survey developed to ascertain health information, technology access (e.g., Internet, mobile phone), use of specific services (e.g., email, text

messaging), anticipated use of HCT (e.g., scheduling appointments, refilling prescriptions), and participant demographics among the study population. The frequency of anticipated HCT use was rated on a 4-point Likert scale (*often, sometimes, rarely,* and *never*). To obtain community approval and engagement, we gave AN/AI community members and tribal leadership a voice in developing the survey. It was based on a nonvalidated instrument, which was shortened for ease of administration with input from tribal leadership and culturally adapted by AN/AI researchers at SCF. Survey questions were designed at an 81% Flesch Reading Ease Readability score and a 3.9 Flesch–Kincaid Grade Level.

Analyses

We used SAS (Version 9.2) for data manipulation and statistical analysis. Descriptive statistics were calculated and gender associations with availability and use of technology were assessed with chi-square tests. Because CRC screening is recommended on the basis of age, we present results for the entire sample as well as for the subsample of participants aged 50 years and older. Associations were considered significant for *p* values less than .05.

Results

Our recruitment methods resulted in a convenience sample of 673 participants (Table 1). Ninety-six percent reported gender, among whom 79% were women. Most participants were employees at the SCF (84%) and of AN/AI descent (72%). The demographics of the full sample were similar to those of the subsample of participants aged 50 years and older (*n* = 168). In the older subsample, 75% were women, 74% were SCF employees, and 68% were AN/AI.

Table 1
Demographic Descriptive Statistics

Characteristic	Entire sample (*N* = 673)		Sample ≥ 50 years (*n* = 168)	
	n	%[a]	*n*	%[a]
Gender				
Female	511	79%	107	75%
Male	135	21%	36	25%
Employment at SCF				
Yes	540	84%	104	74%
No	102	16%	36	26%
Ethnicity				
Alaska Native/American Indian	460	72%	97	68%
Not Alaska Native/American Indian	183	28%	46	32%

[a]Missing count and percentage are not presented, thus *n* will not add up to N. The percentage is of those who specified gender, employment at SCF, or ethnicity.

Approximately 98% of respondents reported having computer access (with or without Internet capability), 97% reported email access, and 94% reported mobile phone use (Table 2). Among mobile phone users, 60% had access to the Internet on their phones. Sixty-one percent of respondents spent 5 to 9 hours per day using a computer, a mobile phone, or the Internet. Ninety percent of participants with text messaging capabilities reported sending text messages, with 65% sending at least one message per day and 40% sending 10 or more messages per day. As shown in Table 2, rates of computer access and email use were higher among women than among men, both in the full sample ($p = .011$ and $p = .005$, respectively) and in the older subsample ($p = .016$ and $p = .011$, respectively). The rate of mobile phone access was also significantly higher for women in the full sample ($p < .001$), but we found no gender difference in the older subsample ($p = .198$). Nor did we find any significant gender differences in Internet access by mobile phone (full sample, $p = .332$; older subsample, $p = .480$) or number of text messages sent daily (full sample, $p = .074$; older subsample, $p = .202$).

Table 2
Reported Technology Access and Use by Age and Gender

	Entire sample (N = 673)			**Sample ≥ 50 years** (n = 168)		
	Female n (%[a])	Male n (%[a])	p[b]	Female n (%[a])	Male n (%[a])	p[b]
Computer availability[c]						
Yes, every day	440 (86)	115 (85)		89 (84)	26 (72)	
Yes, but not every day	61 (12)	12 (9)	.011	15 (14)	5 (14)	.016
No	8 (2)	8 (6)		2 (2)	5 (14)	
Email use						
Yes, every day	397 (78)	102 (76)		76 (72)	22 (61)	
Yes, but not every day	102 (20)	23 (17)	.005	25 (24)	7 (19)	.011
No	10 (2)	10 (7)		4 (4)	7 (19)	
Mobile phone access						
Yes, I have a monthly plan	459 (90)	105 (78)		89 (84)	26 (72)	
Yes, I have a prepaid plan	25 (5)	16 (12)	< .001	6 (6)	5 (14)	.198
No	25 (5)	14 (10)		11 (10)	5 (14)	
Mobile phone Internet access	296 (61)	67 (56)	.332	45 (47)	12 (40)	.480
Number of text messages sent						
10 or more daily	201 (42)	40 (33)		9 (9)	2 (6)	
1 to 9 daily	119 (25)	31 (26)		16 (17)	6 (19)	
Some messages but not daily	125 (26)	32 (26)	.074	50 (53)	11 (35)	.202
I never send texts	38 (8)	18 (15)		20 (21)	12 (39)	

[a]Missing count and percentage are not presented, thus *n* will not add up to N. The percentage is of people who responded to the question of interest and who specified gender.
[b]*p*-value calculated using the X^2 test of independence.
[c]Any computer availability with or without Internet access.

Most participants in the full sample reported that they found the following options useful and would probably use them at least sometimes: email communication with their healthcare providers (78%), online appointment scheduling (76%), online medication refills (75%), and text or email screening reminders (70%). Within the older subsample, slightly smaller majorities reported the same preferences: email communication with their healthcare providers (71%), online medication refills (68%), online appointment scheduling (62%), and text or email screening reminders (61%). SCF employees were more likely than non-employees to anticipate use of HCT to schedule appointments, refill medications, receive text or email screening reminders, and communicate by email with healthcare providers ($p < .001$, $p < .001$, $p = .002$, and $p < .001$, respectively; data not shown). The preferred method for receipt of health information did not appear to differ between the full sample and the older subsample, except that a smaller percentage of the older subsample preferred text messages ($p < .001$). When we examined age distributions at a more granular level (16–25, 26–45, 46–64, and 65–80 years), people in the oldest age category (65–80) were significantly less likely to anticipate using the Internet to schedule appointments, refill medications, or communicate with their providers (all $p < .001$).

Limitations

A key limitation of this study is our use of a convenience sample to increase the speed and ease of data collection and reduce administrative cost. Participants may have self-selected on the basis of interest in technology and may therefore overrepresent technology use in the community. In addition, the large proportion of SCF employees in our sample may have elevated results for HCT access and use. Nevertheless, 84% of SCF employees are also SCF beneficiaries, so their participation may not affect the representativeness of our study sample. An additional limitation of the study was that the survey was offered only in English, and AN/AI people who were not as comfortable or fluent in English may have chosen not to participate.

Discussion

Americans depend on technology to receive and communicate information (Denizard-Thompson, Feiereisel, Stevens, Miller, & Wofford, 2011; Miller & West, 2009; Salovey et al., 2009). However, widespread, equitable access to information technology has been limited by a knowledge divide as well as a digital divide (Goodall, Ward, & Newman, 2010; Haughton, Kreuter, Hall, Holt, & Wheetley, 2005; Hsu et al., 2005; Lorence et al., 2006; Salovey et al., 2009). Those most at risk of poor health outcomes are likely to fall farther behind as health systems increasingly rely on HCT for communication (Sarkar et al., 2011). For example, adoption of digital technologies by older adults has increased, but it is still limited and based on the perceived utility of these tools (Heart & Kalderon, 2013; Tran, Buckley, Bertera, & Gonzales, 2009).

Among AN/AI people aged 50 years and older, our study found rates of access and of reported and anticipated use of digital technologies that were higher than we expected (Goodall et al., 2010; Haughton et al., 2005; Lorence et al., 2006; McNeill, Puleo, Bennett, & Emmons, 2007). Computer access and email use appeared consistent across the entire respondent

population, regardless of age. However, as also observed in the literature, a more granular examination of our age data revealed that anticipated Internet use to manage healthcare needs declined with increasing age (Balfour et al., 2009; Heart & Kalderon, 2013; Tran et al., 2009; Womeodu & Bailey, 1996).

Studies of the knowledge and digital divides have returned conflicting results with regard to gender (Jackson et al., 2008; Swartz, Cowan, & Batista, 2004). Unlike other work, our study found significant differences between men and women in computer access, mobile phone access, and email use. However, it is important to note that our results included a large number of women who were employed at the SCF and thus were likely to have access to computers as part of their daily job activities (Denizard-Thompson et al., 2011).

Across the US, disparities in technology use have been noted in underrepresented populations (e.g., African Americans, Hispanics, AN/AIs; Brodie et al., 2000; Hanauer, Dibble, Fortin, & Col, 2004; Hsu et al., 2005; Jackson et al., 2008; Whaley, 2004). A 2007 study found that among eighth-grade students in public schools, AN/AIs were less likely than all other racial and ethnic groups to use computers at home, resulting in poorer performance on standardized tests (Jackson et al., 2006; Kind et al., 2005). However, the AN/AI participants in our study appeared to be familiar with email and text messaging, and were interested in using these technologies for clinical purposes. Despite anticipated variations, overall community access to and interest in HCT were high.

The digital divide has affected rural communities in such a way that residents often lack experience with technological resources (Dick et al., 2007), whereas urban residents typically have Internet access in their homes, schools, and community facilities (Wang et al., 2011). Because a sizeable portion of the AN/AI population resides in remote areas, expanded Internet access can increase their use of health services through HCT. Access to, use of, and optimization of HCT are vital both to patient-centered care and to the expansion of healthcare services to AN/AI communities (Carroll et al., 2011; Sequist et al., 2011; Sequist et al., 2005; Sequist et al., 2007; Wagner et al., 2005; Watson, Bell, Kvedar, & Grant, 2008). However, HCT-based initiatives will be effective only if they reach AN/AIs and are tailored to meet their unique healthcare needs.

Conclusion

Information on technology access and use enables healthcare providers and administrators to deploy HCT more efficiently and cost-effectively to address health concerns and disparities in AN/AI communities. Outcomes of this formative evaluation will drive future qualitative research on HCT. Our results will facilitate the identification and subsequent engagement of key stakeholders in HCT interventions and contribute to the meaningful use of clinical data. In particular, our findings will assist in developing a telecommunication messaging initiative to promote CRC screening and to better manage and monitor AN/AI population health.

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