Journal of Sociology and Social Work
December 2017, Vol. 5, No. 2, pp. 29-40
ISSN: 2333-5807 (Print), 2333-5815 (Online)

Published by American Research Institute for Policy Development
DOI: 10.15640/jssw.v5n2a4
URL: https://doi.org/10.15640/jssw.v5n2a4

Technology Acceptance among American Indian Older Adults: The Role of Perceived Health, Social Engagement, and Social Support

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Abstract

Internet /Technology use has emerged as an effective source of health/mental health information; however, there is a paucity of research on technology acceptance among American Indian (AI) older adults. This study examined the role of perceived health, social engagement, and social support on technology acceptance using a sample of 227 AI older adults (mean age = 60.7) in South Dakota. A hierarchal regression model showed that older AIs with higher education and higher social support were more likely to accept technology use. Participation in social clubs or organizations was associated with higher technology acceptance, whereas frequency of phone contacts with a child was not a significant factor. Perceived health was not associated with technology acceptance. The findings highlight the importance of social engagement and social support in facilitating AI older adults' learning and acceptance of technology. Future intervention efforts could be directed toward enhancing technology acceptance of AI older adults, particularly for those who are socially, geographically isolated and poorly educated. Greater attention to the ways in which AI older adults' culture, needs, beliefs, and attitudes are implicated in health promoting behaviours and practice could help with designing culturally appropriate Internet-and mobile-based health/mental health interventions for this population.

Keywords: Technology acceptance, social support, social engagement, health/mental health, American Indian older adults

Introduction

Over the past two decades, older adults have comprised the fastest growing population adopting Internet and computer technology. Internet technology provides people with new opportunities to access and share information. Internet access affects users' social relationships (Bargh & McKenna, 2004), employment (Tippins et al., 2006), education (Cobb, 2004), and health or access to health information (Baker, Wagner, Singer,& Bundorf, 2003). Over 86% of American adults use the Internet, including83% of older adults ages50-64 and 59% ages65 years and older (Pew Research Center, 2014).Although existing studies have focused on older adults' Internet usage, usage among American Indian (AI) older adults are significantly absent from these findings.

The current paucity of research on AI Internet use and Internet acceptance is problematic. Internet-based interventions harbor the potential to improve health outcomes (Gross et al., 2017; Ybarra & Eaton, 2005) and health equity given that there are significant health disparities among the AI populations (U.S. Department of Health and Human Services & Office of Disease Prevention and Health Promotion, 2013).

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AI populations experience serious psychological distress at 1.5 times the rate of the general U.S. population (American Psychological Association, 2010).They have high rates of suicide and mental disorders, including depression and posttraumatic stress disorder (PTSD), as well as substance abuse and dependence disorders(Gone & Trimble, 2012; Sarche & Spicer, 2008).Similarly, research have generally found that AI older adults havelower life expectancy (73.5 years vs. 77.7 years) (Indian Health Service, 2014).Significantly higher death rates exist when compared to the general U. S. population, particularly related to chronic liver disease (368% higher), metabolic syndromes such as diabetes mellitus (177% higher), and suicide (68% higher)(Indian Health Service, 2014). These disparities are particularly perplexing, given the legal parameters delineated in treaty agreements with sovereign tribes, which requires the U.S. government to provide adequate healthcare for AI populations (U.S. Commission on Civil Rights, 2004).

Internet technology has been known to increase access to health/mental health-related and non-health-related information and to facilitate communication and social connections transcending geographic distance at a relatively low cost. Older adults who have health problems, ADL/IADL impairments, social, geographic isolation, and transportation barriers are especially likely to benefit from using Internet technology that enables them to carry out numerous tasks (e.g., emails, text messages, bill payment, online shopping, banking, and access to online health-related resources). Older adults' Internet use has been associated with greater social connectedness, increases in social support and social contact, and greater relationship satisfaction. This can lead to decreased feelings of isolation and loneliness and increasing satisfaction with social relationships and social support in older adults (Cotten, Anderson, & McCullough, 2013; Hogeboom, McDermott, Perrin, Osman, & Bell-Ellison, 2010; Sum, Mathews, Hughes, & Campbell, 2008; Wright, 2000).Previous studies indicate that technology utilization may help older adults to maintain independence and health, to support social networks, and to enhance their quality of life (Culley, Herman, Smith, & Tavakoli, 2013; Galambos, Skubic, Wang, & Rantz, 2013). Culley and colleagues (2013) found that technology use may improve the quality of life among older adults by promoting interaction with their families and friends and communication with healthcare providers. Possible determinants of technology acceptance among older adults have been identified, such as younger age, being non-Hispanic white, better health, higher socioeconomic status, perceived ease of use, and strong social networks (Choi, 2011; Jensen, King, Davis, & Guntzviller, 2010;Neter, & Brainin, 2012;Nyqvist, Gustavsson, & Gustafson, 2006; Pew Research Center, 2014;Werner, Carlson, Jordan-Marsh, & Clark, 2011)

Despite the growing significance of technology use in healthcare, surprisingly little attention has been paid to AI older adults' technology acceptance. Research on its determinants in this population is virtually nonexistent. To address this gap in the literature, the present study explored factors associated with technology acceptance in AI older adults. Specifically, we examined whether health and social factors, such as perceived health, social engagement, and social support, are associated with the adoption of technology. We hypothesized that AI older adults with better health perceptions would be more likely to accept technology use, and that AI older adults with a higher level of social engagement and social support would be more like to accept technology use. To our knowledge, this is the first study to identify health and social factors affecting technology acceptance in a large sample of rural AI older adults. The identification of important factors that may facilitate or hinder technology acceptance should prove useful for reducing significant disparities in access to technology, and thus, Internet-based health/mental health interventions for AI older adults.

Characteristics of American Indian Older Adults

AIs comprise a growing population consisting of 567 federally recognized diverse tribes in the U.S. (U.S. Department of the Interior, 2017). The number of AI older adults over the age of 60is projected to increase 280% between 2010 and 2050, from 629,000 to 1,766,000 (U.S. Census Bureau, 2012). Despite their continuous growth, existing literature suggests that there are persistent health disparities among AI older adults, including chronic disease, diabetes, cancer, cardiovascular disease, and lower life expectancy (Chapleski, Kaczynski, Gerbi, & Lichtenberg, 2004; Goins & Pilkerton, 2010; Weaver, 2005). In a comparison study with other racial groups, AI older adults exhibited the highest rates of heart disease, diabetes, asthma, and arthritis (Gallant, Spitze, & Grove, 2010; Kim, Bryant, Goins, Worley, & Chiriboga, 2012). Chronic illness comorbidity was also significantly higher among AI older adults (Kim et al., 2012). When 1,039 rural community-resident AI older adults were surveyed, 57% reported three or more of 11 chronic conditions within a four-cluster comorbidity structure that included cardiopulmonary, sensory-motor, depression, and arthritis (Goins & Pilkerton, 2010; John, Kerby, & Hennessy, 2003).

According to Satter, Wallace, Garcia, and Smith (2010), AI older adults were permanently disabled at six times the rate of non-Hispanic whites ages 55 to 64. Additionally, they reported less physical activity than older white adults (Denny, Holtzman, Goins, & Croft, 2005). In a comparison of white, African American, and AI older adults aged 55 years or older, AI older adults reported the highest rates of functional limitation and self-care disability. Among AI older adults, the risk factors of having a disability include older age, female gender, lower educational achievement and household income, lack of employment, and non-urban residence (Goins, Moss, Buchwald, & Guralnik, 2007).

Simultaneously, AI older adults are at a greater risk than any other racial group for experiencing serious psychological distress, such as depression, post-traumatic stress disorder (PTSD), and mood disorders (Barnes, Adams, & Powell-Griner, 2010; Dickerson & Johnson, 2012; Substance Abuse and Mental Health Services Administration, 2013). Despite depression in older adults being a common problem among the general population, prevalence of depression of older AI populations has been found to vary (Baker-Demmaray, 2012; O'Nell, 1996). A national study with a large sample (*N*=18,078) of AI older adults (aged 55 and above) indicated that approximately 14% of AIs reported depression (Baker-Demmaray, 2012), whereas a study of 309 AI older adults indicated that 18% had significant levels of depression (Curyto, Chapleski, Lichtenberg, Hodges, Kaczynski, & Sobeck, 1998). Still, another convenience sample of 233 AI older adults identified that approximately 11% had depressive symptoms (Roh, Burnette, Lee, Lee, Eaton, & Lawler, 2015). Nonetheless, AI older adults are least likely to receive preventive care and treatment services for mental health disorders that are clearly prevalent among the AI population (Agency for Healthcare Research and Quality, 2013).

Social Support, Social Engagement, and Technology Acceptance

Social support is defined as the emotional, instrumental, and financial assistance obtained from one's social network (Berkman, 1984) and it is a significant determinant of psychological well-being and quality of life among older adults (Kuo, Chong, & Joseph, 2008; Oxman & Hull, 2001). Social support can be provided by both families and friends, and can include providing emotional support during a challenging time or instrumental support, such as offering money for gas (Newsom & Schulz, 1996). Age related losses, such as loss of loved ones or family ties, increase as people age, resulting in increased feelings of loneliness (Singh & Mirsa, 2009).Building a stronger engagement with social clubs, networks, or people in their own community provides social context with other people and greater access to psychological, social, and practical resources to cope with negative life events (Lee, Park, Roh, Koenig, & Yoo, 2017; Roh, Lee, Lee, Schibusawa, & Yoo, 2015). It is possible that participating in social activities with peers, such as socializing and bonding, may alleviate stress by fulfilling a need for belongingness and social connectedness, boost confidence and positive affective moods, and promote the global well-being for older adults.

Internet use increases social support among older adults in general (Heo, Chun, Lee, Lee, & Kim, 2015). For example, Wright (2000) examined social support among older adults that was provided through the Internet and e-mail with 136 participants. One of the findings indicated that satisfaction with providers of online social support was significantly higher for frequent Internet users than for less frequent users. Consistently, research has indicated that greater Internet use increased social contact among older adults, strengthened their social networks, and enhanced social cohesion and a greater sense of community by enabling them to develop new social bonds andby helping them overcome mobility and activity limitations (Hogeboom et al., 2010; McMellon & Schiffman, 2002; Sum et al., 2008).

However, the influence of Internet use on psychological well-being is not monolithic. Indeed, some studies with older adults have not found positive effects of Internet use (Fazeli, Ross, Vance, & Ball, 2013; Slegers, van Boxtel, & Jolles, 2008; White et al., 2002). For example, Slegers and associates (2008) and White et al. (2002) reported that computer and Internet training for older adults had few or no positive effects on outcomes, such as loneliness, mood, and increases in quality of life and autonomy.

Moreover, social support and social engagement are critical factors that affect motivation and behavior intention to use technology (Thatcher, Loughry, Lim, & McKnight, 2007). Older adults with greater social network support from family, children, and peers are more likely to use computers and have more positive computer self-efficacy beliefs and intrinsic motivation for learning. It is plausible that family and network members may provide encouragement and praise, express positive values and expectations, and offer emotional and instrumental assistance for learning and using Internet. Participation in social clubs and organizations may also increase the need for and perceived usefulness of technology connectivity as an effective tool to sustain social ties and connectedness (Choi & DiNitto, 2013).

Clearly, the limited nature and contradictory findings of these studies highlight a need for further research on the role of social influences, such as social support and social engagement, in technology acceptance among AI older adults.

Methods

Participants and Procedures

The sample was drawn from a survey of community-dwelling AI older adults aged 50 or older in South Dakota. After obtaining approval from the Institutional Review Board at the University of South Dakota, data collection took place between January 2013 and May 2013. Participants were recruited from a variety of venues, including local churches, restaurants, social service centers, senior housing facilities, senior centers, food pantries and three pow wows (specifically, Sundance, which is an annual event). Inclusion criteria for participants included being older than 50 years of age and being free of cognitive impairments. The cut off age of over 50 was selected given a lower life expectancy of AI older adults compared to other Americans (Indian Health Service, 2014). A total of 235 AI older adults participated in the study. Eight participants did not complete the questionnaire and were excluded, resulting in the final sample of 227. While questionnaires were designed to be self-administered, trained AI interviewers were available to help anyone who might need assistance. Prior to each survey, interviewers explained the purposes and procedures of the study, the kinds of questions that would be asked (e.g., social support, technology acceptance), and confidentiality of data. All participants gave informed written consent prior to the interview and received $10 cash for their time. The survey took about 30 minutes to complete.

Measures

Technology Acceptance. The Technology Acceptance Model (TAM; Davis, 1986; Venkatesh & Davis, 2000) was used to assess individuals' knowledge of internet use and technology. This scale consisted of 10 items that asked about technology acceptance in the current study. The TAM posits three particular beliefs: 4 items of perceived usefulness,4 items of perceived ease-of-use, and 2 items of behavioral intention. These items include "Assuming I have access to the Internet, I intend to use it"; "Using the internet enhances my effectiveness in my job"; and "I find internet to be easy to use." The internal consistency was high with the present sample (a = .97). This instrument hada 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate higher levels of technology acceptance. Scores on the individual items were summed to calculate total scores.

Social Support. The Multidimensional Scale of Perceived Social Support (MSPSS)was used to measure perceived social network support from family, friends, and significant others (Zimet, Davlem, Zimet, & Farley, 1988). This instrument consists of 12 items and a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The internal consistency with the present sample was high (a = .94). Higher scores reflect higher levels of perceived social support. The total score was computed by summing equally weighted items.

Social Engagement. Social engagement was measured by two items: participation in social clubs or organization and frequency of phone contacts with a child. A single item asked about participation in any social clubs or organizations other than church and used a *yes/no* response format. Also, a single item asked about frequency of phone contacts with a child: "How often do you contact with or talk to a child on the phone?" Participants were asked to rate a statement using a 3-point scale ranging from 1 (*everyday*) to 3 (*more than a week*).

Perceived Health. Perceived health was assessed using a single question that asked participants: "How would you rate your overall health at the present time?" This item was scored on a 4-point Likert scale ranging from 1 to 4 with higher scores reflecting better health perceptions. *Sociodemographic Characteristics.* Socio demographic variables included age (in years); gender (male or female); level of education (in years); and marital status (married, divorced, widowed, never married, and others).

Analytic Strategy

This study first employed descriptive statistics and a correlation matrix to examine socio demographic characteristics and bivariate correlations among the main variables. Secondly, hierarchical regression analysis was used to examine the roles of perceived health, social engagement, and social support on technology acceptance. A hierarchical regression model of technology acceptance was tested by entering the following independent blocks of predictors in order: (1) perceived health and sociodemographic information (age and education), (2) social engagement measures, and (3) social support.

This analysis identified the specific amount of variance in technology acceptance that was accounted for by three different steps (George & Mallery, 2013). No multicollinearity problems were observed among all independent variables, as indicated by tolerance scores that were greater than .89 (Mertler & Vannatta, 2009). Also, very little missing data was indicated (i.e., less than 1%). IBM SPSS Statistics Version 23 was used for data analyses (IBM Corp, 2014).

Results

Sociodemographic Characteristics and Main Variables

Table 1. Sociodemographic and Major Study Variables (in percent, mean, or SD *N*=227)

Age	Ranged from 50 to 95	Mean 60.7(8.4)
Gender	Female	54.3
	Male	45.7
Marital status	Married	36.4
	Divorced	22.5
	Widowed	12.1
	Never married	17.7
	Others (separated, etc.)	11.3
Education	Lower than high school diploma/GED	8.3
	High school diploma/GED	42.3
	Greater than high school diploma/GED	49.4
Perceived health	Poor	3.5
	Fair	25.5
	Good	55.4
	Excellent	15.6
ırticipation of social clubs	Yes	42.4
· organizations	No	57.6
:equency of phone contacts	Every day	51.5
ith a child	Every week	30.4
	More than a week	18.1
ɔcial support	Ranged from 12 to 48	Mean 38.7
echnology acceptance	Ranged from 10 to 70	Mean 46.1(19.9)

Table 1 presents the sociodemographic characteristics and main variables' information of 227 AI older adults. Respondents' ages ranged from 50 to 95, with an average age of 60.7 years. More than half (54.3%) were women, and about 36.4 % were married. Nearly 92% of the respondents had received a high school education/GED or greater. About 71 % answered good or excellent health. Over 42 % participated in social clubs or organizations and over 51 % talked with a child every day by phone.

The mean score of social support was 38.7 (SD =6.9) out of the possible 48, indicating that AI older adults of this study were experiencing a fair level of social support. Scores for technology acceptance averaged 46.1 out of70 (SD = 19.9).

Bivariate Correlations among Major Variables

Table 2 displays the bivariate correlations among key variables, along with means, standard deviations, and ranges. Correlation results revealed that there were positive associations between technology acceptance and three key variables, including level of education (β = .18, p< .01), participation in any social clubs and organizations (β = .19, p< .01), and social support (β = .17, p< .05).AI older adults with higher education, greater participation in social clubs/organizations, and higher social support tended to have higher levels of technology acceptance.

Age, perceived health, and frequency of phone contacts with a child were not associated with technology acceptance.

Hierarchical Regression Analyses

Table 3 summarizes the results of the hierarchical regression analyses.In step one, sociodemographic variables and perceived health explained4.7 percent of the variance (R^2) in technology acceptance of AI older adults. In step two, an addition of social engagement factors (participation in social clubs or organizations and frequency of phone contacts with a child)to step one accounted for 8.2 % of the variance (R^2), an increase of 3.5 % from step one.In the final step, social support was added and explained a total of 10.5 % of the variance (R^2) in technology acceptance, an increase of 2.3 % from step two.

Table 2. Bivariate Correlations among Major Variables (*N*=227)

Variable	1	2	3	4	5	6	7
1. Age	1						
2. Education	-.06	1					
3. Perceived health	-.05	.11	1				
4. Participation of any social clubs	.001	.15*	.17**	1			
5. Phone contacts with a child	-.08	-.17	-.08	-.00	1		
6. Social support	-.15*	.09	.20**	.14*	-.07	1	
7. Technology acceptance	-.09	.18**	.09	.19**	-.07	.17*	1
M	60.69	3.48	2.83	.42	1.98	38.69	46.05
SD	8.42	.85	0.72	.49	1.55	6.88	19.93
Range	50-95	1-5	1-4	0-1	1-7	12-48	10-80

* $p<.05$, ** $p<.01$

In the three steps, greater participation in social clubs/organizations, higher education, and higher social support were significant predictors of technology acceptance. Participation in social clubs or organizations showed the largest β value and was significantly related to higher technology acceptance (β =7.107, $p \leq .05$).

Higher education and greater social support showed the second and third largest β values next to participation in social clubs at the statistical significance levels, and both factors were significantly associated with higher technology acceptance (β =3.528, $p \leq .05$ and β =.483, $p \leq .05$, respectively). Age, perceived health, and frequency of phone contacts with a child were not significant predictors of technology acceptance in the present sample.

Table 3 Coefficients of Hierarchical Regressions for the Role of Perceived Health, Social Engagement, and Social Support on Technology Acceptance of American Indian Older Adults (*N*=227)

	Technology Acceptance		
	B[1] (SE[2])		
	Step 1	**Step 2**	**Step 3**
Demographics/Health			
Age	−.215 (.172)	−.209 (.170)	−.159 (.170)
Education	4.283 (1.699)*	3.484 (1.705)*	3.528 (1.689)*
Perceived health	1.037 (2.053)	−.050 (2.068)	−1.113 (2.109)
Social Engagement			
Participation of social clubs or organization		7.677 (3.062)*	7.107 (3.044)*
Frequency of phone contacts with a child		−.781 (1.051)	−.462 (1.052)
Social Support			
Social support			.483 (.229)*
F test	2.931*	3.173**	3.436**
R^2 total	.047	.082	.105
Adjusted R^2 total	.031	.074	.074

Notes. *p ≤ .05, **p ≤ .01, ***p ≤ .001; [1]Standardized Beta Coefficients, [2]Standard errors

Discussion

The present study examined the role of perceived health, social engagement, and social support in technology acceptance among a community sample of rural AI older adults (*N*=227). To the best of our knowledge, this is the first study to investigate technology acceptance and its health and social determinants among rural AI older adults. Considering tremendous potential for Internet and mobile technologies to improve access to health/mental health services and resources, identifying and understanding factors that influence technology acceptance is a critical step in reducing the health/mental health disparities of older AIs.

The estimated hierarchical regression model explained a good amount of variance and identified significant predictors of technology acceptance.The most important findings from this study is that social engagement (i.e., participation in social clubs or organizations) and social support were significantly associated with adoption of technology, and that these significances persisted when controlling for other auxiliary variables.AI older adults with higher social support and greater engagement in social networks appear to have higher technology adoption. These results are consistent with prior research showing a positive relationship between technology acceptance and social network support in general populations (Chiu & Liu, 2017; Choi & DiNitto, 2013; Heo et al., 2015; Wright, 2000) and confirm the importance of social connectedness/tiesand social support in facilitating AI older adults' learning and technology acceptance. Social clubs or organizations may provide classes and training sessions for communication technology and Internet use. Participating in training sessions with friends or other club members, such as socializing and bonding, may thus increase information and knowledge of technology, diminish technology anxiety, and promote a sense of competence and computer self-efficacy (Choi & DiNitto, 2013; Cotton et al., 2013).It is also possible that AI older adults with larger social networks may be more likely to participate in web-based health-promoting activities and social events, which, in turn, may enhance their Internet or technology use.

Surprisingly, unlike social engagement through social clubs or organizations, frequency of phone contacts with a child was not associated with technology acceptance of older AIs. These findings seem intriguing considering the centrality of family network support, particularly adult children among older AIs. These findings differ from prior research indicating children and grandchildren as pathways to use the Internet (Russell, Campbell, & Hughes, 2008), but they are somehow parallel to previous studies with other populations reporting changes in the meaning of family support (Roh et al., 2015**)** and the effects of close friendship on technology adoption (Russell et al., 2008).

The exact mechanisms through which social engagement other than family and children has a beneficial effect on technology acceptance have yet to be investigated. One possible explanation is that instead of turning to adult children for computer-related assistance, older AIs may rely on friends or peers in learning to use computers and the Internet. Clearly, more research is needed to better understand the complex relationships between technology acceptance and differing social networks.

In addition, the findings indicate that higher education level is associated with higher technology acceptance, which is consistent with previous studies (Choi, 2011; Jensen, King, Davis, & Guntzviller, 2010; Werner, Carlson, Jordan-Marsh, & Clark, 2011). Numerous research has shown that black and Hispanic individuals were less likely to use the Internet, and one of the strongest determinants of older adults' Internet use was their education level (Choi, 2011; Jensen et al., 2010; Werner et al., 2011). Thus, education may play a critical role in the use of technology among older adults. A higher level of education is potentially associated with greater Internet use as a function of information seeking. That is, highly educated AI older adults are likely to obtain health/mental health-related information and resources through computer and Internet, which may increase their ability to sustain health behaviors and to make successful transition into healthy aging.

In contrast to our prediction, we did not find evidence supporting a positive association between perceived health and technology acceptance. These findings differ from others showing a positive relationship between perceived health and technology adoption in the general populations (Choi, 2011; Gracia & Herrero, 2009; Werner et al., 2011). They are, however, consistent with those indicating no relationship in the general populations (Choi & DiNitto, 2013).These conflicting findings may be attributed to variations in samples, populations, and measures, limiting our ability to compare findings across studies. The lack of evidence on perceived health could have resulted from assessing health status solely through subjective health perceptions. One possible explanation for the finding on perceived health lies with the greater representation of AI older adults in fair/good/excellent categories (96.5%) in the current sample. Subsequent research is needed to ascertain the relationships between technology acceptance and physical health with multiple indicators of health (e.g., physical functioning, blood pressure, chronic disease, etc.) in AI older adults.

Limitations

Some limitations to the present study should be noted. First, the use of a non-probability, convenience sample from a Midwestern state limits the extent to which findings can be generalized to AI older adults elsewhere. Second, selection biases may have affected the findings. For example, the levels of technology acceptance, social engagement, and social support among older AIs who are homebound or institutionalized may be different than those who are actively involved in senior centers, powwows, and social service centers (Nahm & Resnick, 2001). Future studies with more representative samples of older AIs will provide a fuller picture of technology acceptance and social influences that could inform geriatric healthcare advances. Third, the cross-sectional design prevents us from drawing the causal paths of the model. This limitation suggests further need for longitudinal studies. Fourth, data was based on several measures that were originally developed for the Western culture. These measures with Western construct (e.g., social support and technology acceptance) may not be completely congruent with AI culture and social experiences. The reliability and validity of these instruments should be further examined with AI older adults. Additionally, subsequent studies should consider more comprehensive measures of social networks and social engagement that can address various types, nature, roles, and quality.

Implications

The present findings may contribute to the scarce literature examining health and social factors associated with adoption of computer technology among older AIs.This line of inquiry is critical because Internet and other technologies present an enormous potential to address health/mental health disparities and access to quality healthcare (e.g., Web-based interventions for various health/mental health topics and resources, such as smoking cessation, diabetes, asthma, nutrition, and depression) (Ruggiero, Gros, McCauley, Arellano, & Danielson, 2011). Our data underscore the need for public health education and awareness programs that highlight the importance of social engagement and social support in facilitating AI older adults' learning and acceptance of technology. One of the goals of Healthy People 2020 is to improve health care quality, outcomes, and health disparity by utilization of health-related communication and information technology (U.S. Department of Health and Human Services, 2013).There is a dire need to identify and test culturally competent, effective telehealth interventions aimed at improving health outcomes and quality of life among older AIs (Goss et al., 2017; IHS, 2014).

Future intervention efforts could be directed toward promoting social engagement/ties and social support of AI older adults, particularly in the form of social participation and social networks. Technology and Internet training for older AIs should pay special notice to older adults' social connectedness to family, children, friends, peers, and other network members. Our findings call further attention to AI older adults who are socially, geographically isolated and poorly educated, and suggest that Internet and technology training can be most beneficial for these populations. Greater attention to the ways in which AI older adults' culture, needs, beliefs, and attitudes are implicated in health promoting behaviours and practice could help with designing culturally appropriate Internet- and mobile-based health/mental health interventions for this population.

Preparing and applying computer and Internet intervention programs for AI older adults require particular attention to various factors characterizing this population. Empowerment should be taken to develop educational resources and technological specifications that best fit AI older adults and specific individuals' characteristics. Culturally sensitive, tailored services should be promoted to address AI older adults' unique barriers to using and adopting new digital technologies, such as friendlier computer interface and software design (White et al., 2002), improved usability and contents (Selwyn, 2004), as well as the physical environment where learning and computer usage take place (Namazi & McClintic, 2003). The improved practical considerations in combination with advanced technology might prove beneficial for AI older adults' well-being.

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