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ELECTRONIC HEALTH LITERACY AMONG LINGUISTICALLY DIVERSE PATIENTS IN THE LOS ANGELES COUNTY SAFETY NET HEALTH SYSTEM

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Background: Electronic health (eHealth) literacy may affect telehealth uptake, yet few studies have evaluated eHealth literacy in underserved populations.

Objective: The objective of this study was to describe technology access and use patterns as well as eHealth literacy levels among English-speaking and LEP patients in a Los Angeles safety net health system.

Methods: Patients, aged ≥ 18 years with a diagnosis of diabetes mellitus and/or hypertension, and their caregivers were recruited from three primary care safety-net clinics in Los Angeles County (California) between June – July 2017. Participants' electronic health literacy was assessed by the eHealth Literacy Scale (eHEALS); participants were also asked about technology access and use. We examined these measures in English-speaking and limited English proficient (LEP) Spanish-speaking patients.

Results: A total of 71 participants (62 patients and 9 caregivers) completed the questionnaire. The mean age of the respondents was 56 years old. More than half of participants used a phone that could connect to the Internet (67%). The mean score for 10 eHEALS items was in the moderate range (26/50 points). There was no difference in mean eHEALS between language groups. However, 47% of Spanish-speaking participants "agreed/strongly agreed" that they knew how to use the Internet to answer their health questions, compared to 68% of English-speaking participants ($P < .05$).

Conclusions: In this sample of patients from a diverse safety net population, perceived skills and confidence in engaging with electronic health systems were low, particularly among LEP Spanish-speakers, despite moderate levels of electronic health

INTRODUCTION

Telehealth is defined as the use of electronic information and digital technology to support remote clinical health care.¹ Telehealth services have become a focus point in the transformation of primary care given their potential to increase access, improve health outcomes, and reduce health care costs.² Patient portals (secure websites linked to a patient's electronic health record) are the most well-studied among telehealth services³ and the evidence suggests that the use of patient por-

tals is associated with health benefits like medication adherence^{4,5} and improved chronic disease management.⁶

Telemedicine, another form of telehealth that encompasses telephone calls, video conferencing, and text messaging for the delivery of patient clinical visits and asynchronous health communication, has also been shown to increase access to specialty care, particularly in medically underserved areas.^{2,7} Telemedicine may provide effective primary care when in-person visits are not possible, or when an in-person consultation is not required for the clinical scenario.

literacy. More studies are needed among diverse patient populations to better assess eHealth literacy and patients' digital readiness, and to examine how these patient metrics directly impact telehealth utilization. *Ethn Dis.* 2022;32(1):21-30; doi:10.18865/ed.32.1.21

Keywords: Electronic Health Literacy; Digital Health; Health Disparities; LEP; Safety Net

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This strategy has been successfully employed for chronic disease health education and post-hospitalization discharge follow-up studies.^{2,7}

Despite these positive results and the increasing availability of telehealth across the country,⁸ trends in telehealth use among vulnerable populations (eg, low socioeconomic status, uninsured and underinsured, limited English proficient (LEP), racial/ethnic minority groups, immigrant community) are less encouraging. The term, digital divide, encompasses bar-

The objective of this study was to describe technology access and use patterns as well as eHealth literacy levels among English-speaking and LEP patients in a Los Angeles safety net health system.

riers to telehealth for patients from vulnerable backgrounds.⁹ These are exemplified in past studies that have shown, for example, that older patients, patients with lower education, those from racial/ethnic minority groups, and the LEP are less likely to register for a patient portal compared to non-Hispanic Whites, and are also less likely to use digital functions like online medication refills. These disparities in telehealth engagement

have been documented even at centers like Kaiser Permanente, where digital health implementation has been overall effective.^{5,10} Lack of (or unreliable) Internet access and experience with Internet-connected tools of course contribute to these observed disparities.⁵ However, neither patient demographics nor Internet/technology access barriers fully explain the lower levels of digital engagement in these populations.¹¹ Electronic health (eHealth) literacy, defined as the “ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem,”¹² may be a contributor to the digital divide and this has been under-explored in prior telehealth studies.

In fact, the limited research that does exist suggests that eHealth literacy is a predictor of telehealth uptake. This association has been documented in high-risk patient groups with intense periods of acute care needs: breast cancer, and kidney and liver transplant patients.^{13,14} On the heels of the coronavirus-19 (COVID-19) pandemic’s acceleration into telehealth, one 2020 study of eHealth literacy in an urban, hospitalized, and mostly Black patient population found that nearly a quarter of patients had a low eHealth literacy level and those with low eHealth literacy were less likely to report searching for health information online.¹⁵ Amid the widening digital divide, there exists a dearth of knowledge about digital health use among patients who are LEP. The objective of this study was to describe technology access and use patterns as well as

eHealth literacy levels among English-speaking and LEP patients in a Los Angeles safety net health system.

METHODS

Participants

Participants were recruited between June – July 2017 from three primary care clinics (hospital-based internal medicine clinic, hospital-based geriatrics clinic, and a community-based family medicine clinic) at two locations in the Los Angeles County Department of Health Services (LAC DHS) for focus groups on the LAC DHS patient portal.¹⁶ LAC DHS forms the core of the health care safety net for indigent populations in Los Angeles. It is the second-largest health safety net health system in the United States, predominantly comprising low-income, low-literacy, and LEP patients (more than 50% Spanish-speaking), and other vulnerable patient populations.¹⁶

Adults aged ≥ 18 years with a diagnosis of diabetes and/or hypertension were eligible to participate if they were able to sit for an hour, had at least two primary care clinic visits in the last six months, were proficient in English or Spanish, and were able to answer the eligibility screening questions. Patients were approached for participation in the waiting room before or after their clinic visit. Other individuals involved in the management of the eligible patient’s care and present during their visit were also invited to participate (eg, family, friends, caregivers). Primary care patients with cardiovascular risk (diabetes and/or hypertension) were recruited because they are more frequent users of health care given their chronic disease.^{4,17}

Questionnaire

The bilingual (English and Spanish) questionnaire included items from the eHealth Literacy Scale (eHEALS), items regarding technology access and use, and demographic information. The written questionnaire was administered to patients and caregivers who provided consent and met all of the eligibility criteria. It included all eight questions from the current eHEALS and two (older version) supplementary eHEALS items. Developed in 2006, the eHEALS tool is the only validated instrument to measure eHealth literacy and has been studied and validated for use in adults, patients living with chronic disease conditions, and Spanish-speakers.^{12,18-21} The tool is designed to measure an individual's knowledge, comfort, and perceived skills at finding, evaluating, and applying electronic health information to health problems.¹² For each of the eight items, respondents are presented with a declarative statement related to eHealth literacy such as "*I know what health resources are available on the Internet,*" and asked to rate their level of agreement on a 5-point Likert scale ranging from "strongly disagree" (1 point) to "strongly agree" (5 points). Our questionnaire included two older items from the original eHEALS on perceived usefulness and importance of Internet health resources. The perceived usefulness item asks: "*How useful do you feel the Internet is in helping you in making decisions about your health?*" and respondents rate the perceived usefulness on a 5-point Likert scale ranging from "not useful at all" (1 point) to "very useful" (5 points). The perceived importance item asks:

"How important is it for you to be able to access health resources on the Internet?" and respondents are asked to rate their perceived usefulness on a 5-point Likert scale from "not important at all" to "very important." Thus, the summary score for all 10 eHEALS ranged from 10-50 points with higher scores indicating higher perceived usefulness and perceived skills for using electronic health information.

We also included questions regarding participants' access to digital devices (computer, tablet, smartphone), Internet access, and Internet use patterns (social media, shopping, banking, health information and communication) based on questions from the Pew Research Survey.²² Age, gender, primary language, racial/ethnic background, nativity, level of education, annual household income, chronic disease history, medication use, and health status were also collected in the questionnaire. The English questionnaire was translated into Spanish by the investigators, and back-translated by the study team and LAC DHS interpreter services for cross-validation.

Statistical Analyses

Responses to the eHEALS items were collapsed into three primary categories for analyses: *agree* ("strongly agree" + "agree"), *undecided*, and *disagree* ("strongly disagree" + "disagree") to allow for comparison across groups. The responses to the perceived usefulness and supplementary item were categorized into *useful* ("very useful" + "useful"), *undecided*, and *not useful* ("not useful at all" + "not useful"). Similarly, the responses to the perceived importance item were categorized into *important* ("very impor-

tant" + "important"), *undecided*, and *not important* ("not important at all" + "not important"). We compared total percentages to these response categories. A mean score for the 10 eHEALS items was calculated (range 10-50). Percentages for digital device and Internet access uptake were calculated. Using chi-square, *t* tests, and Wilcoxon rank-sum tests, we examined differences in percentage of each response and mean eHEALS score, across language (English vs Spanish). A significance level of $P=.05$ was predetermined for all statistical analyses. The study was approved by the University of California, Los Angeles Institutional Review Board.

RESULTS

A total of 71 participants (62 patients and 9 caregivers) completed the questionnaire. The distribution of sociodemographic and clinical characteristics by primary language is presented in Table 1. The mean age of the respondents was 56 years old. The majority of the participants identified as Latino/Hispanic (59%) followed by Black/African American (22%), and non-Hispanic White (9%), and were foreign-born (63%). Most participants completed high school or less than a high school education: less than a high school education (39%), high school/GED (26.9%), with less than 15% of all participants having completed college (11.9%) or graduate school (3%, data not shown). More than half of the participants reported an annual household income of less than \$10,000 (55%). All participants were diagnosed with

Table 1. Participant demographic and clinical characteristics

	Total, n=71	English-speaking participants, n=35	Spanish-speaking participants, n=36
Age, years			
Mean (SD)	56.3 (9.5)	54.8 (9.7)	57.8 (9.1)
Gender			
Male	42.0	45.7	38.2
Female	58.0	54.3	61.8
Race/ethnicity **			
White (non-Hispanic, non-Latino)	8.7	17.1	0
Black or African American	21.7	42.9	0
Latino/Hispanic	59.4	22.9	97.1
All Other	10.1	17.1	2.9
Nativity ^a			
USA	37.5	74.2	3.0
Foreign-born	62.5	25.8	97.0
Level of education ^a			
Less than high school	38.8	11.8	66.7
High school/GED or greater	61.2	88.2	33.3
Annual household income			
Less than \$10,000	54.7	44.1	66.7
\$10,000 or higher	45.3	55.9	33.3
Chronic disease diagnosis			
Diabetes	60.6	57.1	63.9
Hypertension	64.8	65.7	63.9
Heart disease	26.8	22.9	30.6
Kidney disease	22.5	28.6	16.7
Liver disease	4.2	5.7	2.8
Asthma	5.6	8.6	2.8
Chronic obstructive pulmonary disease (COPD)	4.2	5.7	2.8
Others	16.9	22.9	11.1
Prescribed any medication by health care provider			
Yes	95.6	94.1	97.1
Self-rated health status			
Excellent or very good	11.4	8.6	14.3
Good	21.4	22.8	20.0
Fair or poor	67.1	68.6	65.7

a. P<.01. Values are percentages unless otherwise indicated.

at least one chronic disease and more than two-thirds rated their health as fair or poor. A large proportion of the group (82%) reported taking at least four prescribed medications (data not shown). Most Spanish-speaking respondents were foreign-born (97%) and had lower levels of educational attainment compared to English-speaking participants (P<.01). There were no other statis-

tically significant differences in the demographic or clinical characteristics between the two language groups.

Digital access and Internet use are shown in Table 2. More than half of participants (52%) reported personal access to a computer, tablet, or laptop at home. Rates of personal access to these devices among English-speaking and Spanish-speaking participants were 63% and 42%, respectively,

though the difference was not statistically significant. Of note, the majority of the sample reported that they used an Internet-connected phone (67%).

Most participants also reported using the Internet (67%), having Internet access at their home (74%), and having someone else in the household who used Internet (61%). Many reported using the Internet for activities like banking (35%), shop-

Table 2. Digital device access and Internet use

	Total, N=71	English-speaking participants, n=35	Spanish-speaking participants, n=36
Digital Device Access			
Personal access to a computer/laptop/tablet at home	52.1	62.9	41.7
Household access to a computer/laptop/tablet	54.9	60.0	50.0
Uses a smartphone (can connect to Internet)	67.6	68.6	66.7
Internet use (home)			
Access to the Internet at home	74.3	79.4	69.4
Access to the Internet outside the home ^a	63.8	75.8	52.8
Household Internet use	60.9	64.7	57.1
Uses the Internet on own	67.1	76.5	58.3
Family member or a friend helps use the Internet	38.6	38.2	38.9
Internet use (daily life)			
Has used the Internet for online banking	35.2	40.0	30.6
Has used the Internet for online shopping ^a	38.6	51.4	25.7
Has used Facebook on a computer/laptop/tablet	47.9	48.6	47.2
Has used Facebook on a phone	54.9	48.6	61.1
Has an e-mail account and uses it regularly	55.1	48.6	61.8
Internet use (health care information)			
Has ever used the Internet to look up health information	53.5	60.0	47.2
Has ever used the Internet to look up information related to personal chronic conditions and/or medical issues	56.3	65.7	47.2
Has ever sent an electronic message to personal doctor	5.6	11.4	0
Has ever received an electronic message from personal doctor	7.3	11.8	2.9
Has ever used a personal electronic patient portal to access health care services	15.7	22.9	8.6

a. $P < .05$. Values are percentages unless otherwise indicated.

ping (39%), social media (55%) and e-mail (55%). More than half of the participants used the Internet to look up general health information (53%) and information specifically related to their chronic disease or medical issues (56%). Reported use of health system digital services in this group was low: only 15% of patients used a personal digital patient portal to access health care services. Even fewer participants reported ever sending (6%) or receiving (7%) an electronic message from their physician.

There were few differences in Internet use patterns between English- and Spanish-speaking participants. However, we did find that English-speaking participants were significantly more likely to have access to the Inter-

net outside their home than Spanish-speaking participants (76% and 53%, respectively, $P < .05$). English speakers also reported more Internet use for online shopping, compared to Spanish speakers (51% vs 26%, $P < .05$). The few participants who reported having ever sent an e-mail to their physician were all English speakers.

A summary of responses to the eHEALS questionnaire are reported in Table 3. The mean composite score for the 10 eHEALS items was 26.4/50 (SD 7.92) and there was no difference in mean eHEALS score between the English and LEP Spanish speakers. The majority of the sample (65%) rated the Internet as useful in helping make health care decisions. Spanish-speaking partici-

pants were more likely to rate the Internet as useful for making decisions about their health compared to English-speaking participants (70% vs 60%; $P < .05$). The majority of participants (73%) responded it was important to be able to access health resources on the Internet.

Levels of perceived knowledge for finding health information on the Internet were also moderate. Most participants agreed that they knew what health resources are available on the Internet (64%) and that they knew how and where to find helpful health resources online (59% and 58%, respectively). Perceived knowledge in Internet use to answer health questions differed between English- and LEP Spanish-speaking participants:

Table 3. Electronic Health Literacy Scale (eHEALS) questions

	Total, N=71	English speakers, n=35	Spanish speakers, n=36
How useful do you feel the Internet is in helping you in making decisions about your health? ^a			
Not useful at all or not useful	16.2	8.5	24.2
Unsure	19.1	31.4	6.1
Useful or very useful	64.7	60.0	69.7
Mean (SD)	3.74 (1.29)	3.71 (1.07)	3.75 (1.50)
How important is it for you to be able to access health resources on the Internet?			
Not important at all or not important	17.9	20.0	15.6
Unsure	9.0	14.3	3.1
Important or very important	73.1	65.7	81.3
Mean (SD)	3.85 (1.28)	3.71 (1.30)	4.00 (1.27)
I know what health resources are available on the Internet			
Strongly disagree or disagree	16.7	14.7	18.8
Undecided	19.7	23.5	15.6
Agree or strongly agree	63.6	61.8	65.6
Mean (SD)	3.59 (1.14)	3.56 (1.05)	3.63 (1.24)
I know where to find helpful health resources on the Internet			
Strongly disagree or disagree	18.2	17.7	18.7
Undecided	24.2	23.5	25.0
Agree or strongly agree	57.6	58.8	56.3
Mean (SD)	3.44 (1.17)	3.53 (1.11)	3.34 (1.23)
I know how to find helpful health resources on the Internet			
Strongly disagree or disagree	23.0	17.6	29.0
Undecided	18.5	26.5	9.7
Agree or strongly agree	58.5	55.9	61.3
Mean (SD)	3.35 (1.24)	3.47 (1.08)	3.23 (1.41)
I know how to use the Internet to answer my questions about health ^a			
Strongly disagree or disagree	20.3	11.8	30.0
Undecided	21.9	20.6	23.3
Agree or strongly agree	57.8	67.6	46.7
Mean (SD)	3.37 (1.15)	3.65 (1.01)	3.07 (1.23)
I know how to use the health information I find on the Internet to help me			
Strongly disagree or disagree	28.8	17.7	40.6
Undecided	18.2	26.5	9.4
Agree or strongly agree	53.0	55.9	50.0
Mean (SD)	3.30 (1.29)	3.50 (1.11)	3.09 (1.44)
I have the skills I need to evaluate the health resources I find on the Internet			
Strongly disagree or disagree	29.7	30.3	29.0
Undecided	21.9	21.2	22.6
Agree or strongly agree	48.4	48.5	48.4
Mean (SD)	3.20 (1.21)	3.18 (1.16)	3.22 (1.28)
I can tell high quality health resources from low quality health resources on the Internet			
Strongly disagree or disagree	33.3	38.2	28.1
Undecided	24.2	29.4	18.7
Agree or strongly agree	42.4	32.4	51.1
Mean (SD)	3.17 (1.24)	3.03 (1.17)	3.31 (1.31)
I feel confident in using information from the Internet to make health decisions			
Strongly disagree or disagree	30.3	29.4	31.2
Undecided	18.2	23.5	12.5
Agree or strongly agree	51.5	47.1	56.3
Mean (SD)	3.20 (1.22)	3.12 (1.15)	3.28 (1.30)
Mean eHEALS for 10 items (SD)	26.38 (7.92)	26.94(7.59)	25.78 (8.35)

a. P<.05; Values are percentages unless otherwise indicated

47% of the Spanish-speaking participants agreed that they knew how to use the Internet to answer their health questions compared to 68% of English-speaking participants ($P < .05$).

Most of the participants agreed that they knew how to use the health information they find on the Internet to help themselves (53%) and felt confident in using information from the Internet to make health decisions (52%). Yet only 48% agreed that they had the skills to evaluate the health resources found on the Internet. Furthermore, only 42% of participants agreed that they could tell high quality Internet health resources from the low quality Internet health resources.

DISCUSSION

This study describes eHealth literacy and patterns of technology use and access among patients served by a large, urban, safety net system. In this linguistically diverse group of patients and caregivers, Internet health resources were largely perceived as useful and important. We observed a moderate level of eHealth literacy as measured by perceived knowledge, skills, and confidence in using the Internet health resources. eHealth literacy levels in this group were similar to a previous study of low-income older Hispanic adults with diabetes,²³ but lower than previous cross-sectional studies of English-speaking adults in the United States.^{14, 24-26}

While most participants agreed that they knew what health resources are available on the Internet and how and where to find them, fewer than half agreed that they had the skills

to evaluate and discern high quality health resources from low quality health resources on the Internet. This is corroborated by the fact that “perceived skills needed to evaluate health resources” and “perceived confidence in distinguishing high quality health resources from low quality health resources” were the lowest scores in the eHEALS assessment in both language groups. These findings follow previous studies of eHealth literacy among older adults showing low levels of confidence in using Internet information to make health decisions²⁴ and concerns about the ability to distinguish between high and low quality health resources on the Internet.^{24,27} Spanish-speaking respondents demonstrated significantly lower levels of confidence in their ability to know how to use the Internet to answer their questions about health than English-speaking respondents. This is a notable discrepancy since Spanish-speaking respondents were also more likely to find the Internet very useful in making decisions regarding their health.

The lower levels of eHealth literacy among these participants may help explain the low levels of telehealth engagement observed in this population. There is some evidence that eHealth literacy mediates eHealth engagement. In a large cross-sectional study of more than 400 US adults with chronic disease, a higher eHEALS score was associated with engaging in eHealth behaviors including individual online information seeking and web-based health indicator tracking.²⁵ Another study of Hispanic patients along the US-Mexico border reported that

higher eHeals scores were associated with a more positive attitude toward telehealth.²⁸ Access to eHealth information is only one aspect of eHealth literacy; perceived confidence in engaging with eHealth information is also important. Increasing patients’ levels of digital competence may represent a means by which to increase telehealth engagement.

Internet use for health information was higher than for online banking or shopping in this sample. Previous research has noted that vulnerable

... fewer than half [of the respondents] agreed that they had the skills to evaluate and discern high quality health resources from low quality health resources on the Internet.

patients are interested in electronic communication as a mode of health care delivery.⁵ While lower income patients access the Internet less, when they do use the Internet, they are more predisposed to do so for health-related information reasons.²⁰ In our study population, reported home Internet access (74%) was lower than the statewide level (81%) during the study time period.²⁹ Previous research has identified the lack of consistent Internet coverage as a barrier to digital

health for vulnerable populations^{5,11,30} Home broadband access has been described as a super social determinant for its role in facilitating access to employment, education, and health care.³⁰ Public health experts have called for the expansion of broadband Internet as a means to address health access disparities and thus improve health outcomes.^{11,30} The importance of ensuring Internet access in vulnerable communities cannot be understated in today's era. The Covid-19 pandemic, which limited in-person health care visits and moved health care to the virtual space, demonstrated the importance of universal Internet access and achieving broadband capability for all neighborhoods. During this unprecedented public health crisis, access to the Internet has also been crucial to other essential services including education, which is associated with better long-term health over the course of a lifespan.³¹

In terms of digital device access, most participants had a smartphone to connect to the Internet while access via a computer, laptop, tablet was lower. These findings are consistent with previous studies demonstrating that low-income, minority populations are more likely to rely on a phone for Internet access.³² There are nuances to this finding, as dependence on a smartphone for health-related tasks may put these populations at certain disadvantage. Larger screens improve the readability of personal health records and health information and thus make a platform more accessible and user-friendly.³³ Especially in the era of surging telemedicine video visits, a larger screen (such as that of a computer) may be more suitable for

the physical examination during a virtual consultation. Evidence shows that patients accessing the patient portal via smartphone only use it less frequently than those accessing via a computer, and this likely disproportionately impacts vulnerable populations.³³ To increase engagement and prioritize the needs of vulnerable populations, health systems must optimize all digital health platforms for a mobile phone interface (phone first).³⁴ This includes ensuring that all desktop features are available for mobile phone use (equity in platform).³⁴

Study Limitations

We recognize several limitations of this study, including the use of a small, convenience sample. There is limited generalizability of our findings to health care systems outside the Los Angeles safety net health system or to persons speaking languages other than English or Spanish. However, this study of diverse patients including those of LEP, Black and Latinx backgrounds contributes important knowledge of eHealth literacy in these traditionally understudied groups. Nonetheless, we recognize the need for additional larger randomized studies of eHealth literacy in these populations.

Patients who agreed to participate in a study may be more motivated to engage in health education and technology use, further limiting the generalizability of the study's findings. The eHEALS tool, though the most common validated measure of eHealth literacy, was originally developed for use in a sample of healthy adolescent and young adults and its use has not been extensively validated in safety-net

populations. Additionally, researchers have suggested that the eHEALS must be refined in order to include additional multidimensional factors that have been recently shown to influence eHealth literacy including self-efficacy and social skills.³⁵ Finally, eHEALS is a measure of self-reported confidence and eHealth literacy and does not capture an individual's actual ability to navigate electronic health information, tools, and resources. Further study on this is needed.

CONCLUSION

Safety net patients with linguistic diversity had moderate levels of eHealth literacy and technology access, but clearly reported barriers to telehealth including a lack of confidence in navigating electronic health information. These results underline the multifactorial nature of patient readiness to engage with telehealth services. Solutions must consider not only technology access, but also the design and perceived usability of telehealth, and patients' individual eHealth literacy.¹¹ A truly patient-centered design will include community stakeholders: organizations that advocate for vulnerable communities, government, digital health developers, health institutions, clinical teams, and patients and their families. Also, the development of comprehensive, patient-centered assessments that evaluate eHealth engagement readiness will be a key first step in ensuring the equitable uptake of telehealth, especially as these digital health services rapidly expand and become an expectation of patient care delivery.

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CONFLICT OF INTEREST

No conflicts of interest to report.

AUTHOR CONTRIBUTIONS

Research concept and design: Valdovinos, Perez-Aguilar, Huerta, Barrios, Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Acquisition of data: Perez-Aguilar, Huerta, Barrios, Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Data analysis and interpretation: Valdovinos, Perez-Aguilar, Huerta, Barrios, Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Manuscript draft: Valdovinos, Perez-Aguilar, Huerta, Barrios, Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Statistical expertise: Valdovinos, Perez-Aguilar, Huerta, Barrios, Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Acquisition of funding: Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Administrative: Valdovinos, Perez-Aguilar, Huerta, Barrios, Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas; Supervision: Gutierrez, Mendez, Abhat, Moreno, Brown, Casillas

REFERENCES

- HealthIT.gov. *What is Telehealth? How Is Telehealth Different from Telemedicine?* Last accessed March 6, 2021 from <https://www.healthit.gov/faq/what-telehealth-how-telehealth-different-telemedicine>
- Centers for Disease Control and Prevention. *Healthcare Workers*. February 11, 2020. Last accessed March 6, 2021 from <https://www.cdc.gov/coronavirus/2019-ncov/hcp/telehealth.html>
- Amante DJ, Hogan TP, Pagoto SL, English TM. A systematic review of electronic portal usage among patients with diabetes. *Diabetes Technol Ther*. 2014;16(11):784-793. <https://doi.org/10.1089/dia.2014.0078> PMID:24999599
- Lyles CR, Sarkar U, Schillinger D, et al. Refilling medications through an online patient portal: consistent improvements in adherence across racial/ethnic groups. *J Am Med Inform Assoc*. 2016;23(e1):e28-e33. <https://doi.org/10.1093/jamia/ocv126> PMID:26335983
- Sarkar U, Karter AJ, Liu JY, et al. Social disparities in internet patient portal use in diabetes: evidence that the digital divide extends beyond access. *J Am Med Inform Assoc*. 2011;18(3):318-321. <https://doi.org/10.1136/jamia.2010.006015> PMID:21262921
- Zhou YY, Kanter MH, Wang JJ, Garrido T. Improved quality at Kaiser Permanente through e-mail between physicians and patients. *Health Aff (Millwood)*. 2010;29(7):1370-1375. <https://doi.org/10.1377/hlthaff.2010.0048> PMID:20606190
- Pearl R, Madvig P. Managing the most expensive patients. *Harvard Business Rev*. 2020. Last accessed November 1, 2021 from <https://hbr.org/2020/01/managing-the-most-expensive-patients>
- US Department of Health and Human Services. *Medicare Beneficiary Use of Telehealth Visits: Early Data from the Start of the COVID-19 Pandemic*. ASPE Issue Brief. July 27, 2020. Last accessed November 1, 2021 from <https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth>
- Dorsey ER, Topol EJ. State of telehealth. *N Engl J Med*. 2016;375(2):154-161. <https://doi.org/10.1056/NEJMra1601705> PMID:27410924
- Garrido T, Kanter M, Meng D, et al. Race/ethnicity, personal health record access, and quality of care. *Am J Manag Care*. 2015;21(2):e103-e113. PMID:25880485
- Rodriguez JA, Clark CR, Bates DW. Digital health equity as a necessity in the 21st century Cures Act era. *JAMA*. 2020;323(23):2381-2382. <https://doi.org/10.1001/jama.2020.7858> PMID:32463421
- Norman CD, Skinner HA. eHEALS: The eHealth Literacy Scale. *J Med Internet Res*. 2006;8(4):e27. <https://doi.org/10.2196/jmir.8.4.e27> PMID:17213046
- Lepore SJ, Rincon MA, Buzaglo JS, et al. Digital literacy linked to engagement and psychological benefits among breast cancer survivors in Internet-based peer support groups. *Eur J Cancer Care (Engl)*. 2019;28(4):e13134. <https://doi.org/10.1111/ecc.13134> PMID:31318132
- Maroney K, Curtis LM, Opsasnick L, et al. eHealth literacy and web-based patient portal usage among kidney and liver transplant recipients. *Clin Transplant*. 2021;35(2):e14184. <https://doi.org/10.1111/ctr.14184> PMID:33278846
- Vollbrecht H, Arora VM, Otero S, Carey KA, Meltzer DO, Press VG. Measuring eHealth literacy in urban hospitalized patients: implications for the post-COVID world. *J Gen Intern Med*. 2021;36(1):251-253. <https://doi.org/10.1007/s11606-020-06309-9> PMID:33078294
- Casillas A, Perez-Aguilar G, Abhat A, et al. Su salud a la mano (your health at hand): patient perceptions about a bilingual patient portal in the Los Angeles safety net. *J Am Med Inform Assoc*. 2019;26(12):1525-1535. <https://doi.org/10.1093/jamia/ocv115> PMID:31373362
- Lyles CR, Sarkar U, Ralston JD, et al. Patient-provider communication and trust in relation to use of an online patient portal among diabetes patients: The Diabetes and Aging Study. *J Am Med Inform Assoc*. 2013;20(6):1128-1131. <https://doi.org/10.1136/amia-jnl-2012-001567> PMID:23676243
- Chung S-Y, Nahm E-S. Testing reliability and validity of the eHealth Literacy Scale (eHEALS) for older adults recruited online. *Comput Inform Nurs*. 2015;33(4):150-156. <https://doi.org/10.1097/CIN.000000000000146> PMID:25783223
- Mitsutake S, Shibata A, Ishii K, Oka K. Associations of eHealth literacy with health behavior among adult internet users. *J Med Internet Res*. 2016;18(7):e192. <https://doi.org/10.2196/jmir.5413> PMID:27432783
- James DCS, Harville C II. eHealth literacy, online help-seeking behavior, and willingness to participate in mhealth chronic disease research among African Americans, Florida, 2014-2015. *Prev Chronic Dis*. 2016;13:E156. <https://doi.org/10.5888/pcd13.160210> PMID:27854421
- Paramio Pérez G, Almagro BJ, Hernando Gómez Á, Aguaded Gómez JI. [Validation of the eHealth Literacy Scale (eHEALS) in Spanish University Students]. *Rev Esp Salud Pública*. 2015;89(3):329-338. <https://doi.org/10.4321/S1135-57272015000300010> PMID:26388346
- Smith A. *U.S. Smartphone Use in 2015*. Pew Research Center. April 1, 2015. Last accessed March 6, 2021 from <https://www.pewresearch.org/internet/2015/04/01/us-smartphone-use-in-2015/>
- Aponte J, Nokes KM. Electronic health literacy of older Hispanics with diabetes. *Health Promot Int*. 2017;32(3):482-489. <https://doi.org/10.1093/heapro/dav112> PMID:26681770
- Tennant B, Stelfox M, Dodd V, et al. eHealth literacy and Web 2.0 health information seeking behaviors among baby boomers and older adults. *J Med Internet Res*. 2015;17(3):e70. <https://doi.org/10.2196/jmir.3992> PMID:25783036
- Madriral L, Escoffery C. Electronic health behaviors among US adults with chronic disease: cross-sectional survey. *J Med Internet Res*. 2019;21(3):e11240. <https://doi.org/10.2196/11240> PMID:30835242
- Arcury TA, Sandberg JC, Melius KP, et al. Older adult Internet use and eHealth literacy. *J Appl Gerontol*. 2020;39(2):141-150. <https://doi.org/10.1177/0733464818807468> PMID:30353776
- Manafò E, Wong S. Assessing the eHealth literacy skills of older adults: a preliminary study. *J Consum Health Internet*.

- 2012;16(4):369-381. <https://doi.org/10.1080/15398285.2012.701163>
28. Ghaddar S, Vatcheva KP, Alvarado SG, Mykyta L. Understanding the intention to use telehealth services in underserved Hispanic border communities: cross-sectional study. *J Med Internet Res.* 2020;22(9):e21012. <https://doi.org/10.2196/21012> PMID:32880579
 29. Ryan C. *Computer and Internet Use in the United States: 2016*. American Community Survey Reports, ACS-39. Washington, DC: US Census Bureau. 2017.
 30. Bauerly BC, McCord RF, Hulkower R, Pepin D. Broadband access as a public health issue: the role of law in expanding broadband access and connecting underserved communities for better health outcomes. *J Law Med Ethics.* 2019;47(S2):39-42. <https://doi.org/10.1177/1073110519857314> PMID:31298126
 31. Dudovitz RN, Nelson BB, Coker TR, et al. Long-term health implications of school quality. *Soc Sci Med.* 2016;158:1-7. <https://doi.org/10.1016/j.socscimed.2016.04.009> PMID:27100212
 32. Pew Research Center. *Usage and Attitudes Toward Smartphones*. April 1, 2015. Last accessed March 6, 2021 from <https://www.pewresearch.org/internet/2015/04/01/chapter-two-usage-and-attitudes-toward-smartphones/>
 33. Graetz I, Huang J, Brand RJ, Hsu J, Yamin CK, Reed ME. Bridging the digital divide: mobile access to personal health records among patients with diabetes. *Am J Manag Care.* 2018;24(1):43-48. PMID:29350505
 34. Casillas A, Abhat A, Mahajan A, et al. Portals of change: how patient portals will ultimately work for safety net populations. *J Med Internet Res.* 2020;22(10):e16835. <https://doi.org/10.2196/16835> PMID:33094732
 35. Paige SR, Miller MD, Krieger JL, Stellefson M, Cheong J. Electronic health literacy across the lifespan: Measurement Invariance Study. *J Med Internet Res.* 2018;20(7):e10434. <https://doi.org/10.2196/10434> PMID:29986848