Title

Digital Divide and Diabetes Management: A Scoping Review of Internet Access, Technology Literacy, and Health Outcomes in Adults with Type 2 Diabetes

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Abstract

The aim of this scoping review is to understand how Internet avilability, Internet adoption, digital literacy, and digital health services affect health outcomes in adults with Type 2 Diabetes. The review includes peer-reviewed articles published in English in the last 10 years. The inclusion criteria included studies exploring the relationship between Internet and digital access or literacy and diabetes outcomes. The search strategy included databases CINAHL, PubMed, and Scopus, resulting in 27 studies for final analysis. The results indicate a limited understanding how digital inequities affect diabetic health. Higher educational attainment and higher income positively impacts rates of Internet adoption. Older adults and rural inhabitants face disadvantages in managing diabetes due to poor Internet adoption and limited digital literacy. Many populations are willing and ready to use mHealth applications, indepenedent of their ability to use the Internet. Internet and digital inequities can negatively impact knowledge and management of Type 2 diabetes due to barriers in accessing healthcare services, digital self-care management resources, and education published online. Evidence directly linking Internet adoption to diabetes prevalence in the United States was present in one study pbulished in 2014. The direct effects of Internet availability, Internet adoption, and digtial literacy on diabetes outcomes is underexamined. Current population-level data examinging the relationships between these factors is warranted.

Introduction

In 2021, the World Health Organization published a global strategy urging Member States to utilize and expand digital health technologies in ways that provide health services to all in equitable, affordable, and sustainable ways (World Health Organization, 2021). As pressures of the global healthcare worker shortage continues, this call to action highlights the need for populations to be connected to digital health resources (Boniol et al., 2022; Zhang et al., 2020).

In the United States, those experiencing poverty, the elderly, residents in rural areas, and racial/ethnic minorities do not have equitable availability to the Internet and technology (Crawford & Serhal, 2020; Early & Hernandez, 2021; Kruse et al., 2012; Robotham et al., 2016). Even with Internet availabilty, adoption of the Internet and related technologies is limited due to barriers in affordability, percevied value, and limited digital literacy. For populations burdened with chronic diseases, such as Type 2 diabetes (T2D), inadequate digital health care availability may have a negative impact on health outcomes (Turnbull et al., 2021). However, the effects of limited Internet and technology availability and adoption on health outcomes are not well known. The aim of this review is to understand the current knowledge of how Internet or technology availability, adoption, and digital literacy affects health outcomes for adults with T2D.

Rationale. It is important for clinicians, public health workers, and policy makers to understand the effects of the Internet and technology on T2D adults' health outcomes. During the pandemic, data indicate that HbA1c testing for people with diabetes decreased significantly in the United States, glycemic control may have worsened among adults with T2D, medication adherence was negatively impacted, some in-person healthcare

services was not available when needed, and physical activity reduced in some populations (Czeisler et al., 2021; Eberle & Stichling, 2021; Fadini et al., 2021; Fragala et al., 2021; Ratzki-Leewing et al., 2021). Many of these studies cite Internet availability and digital literacy barriers as a potential factor for these outcomes yet these factors were not directly studied.

Objectives. While the concept of the digital divide is not new, there is limited research examining the association of health outcomes of adults with T2D and disparities in Internet availability and adoption. A scoping review was conducted to better understand the knowledge and research for this topic. The research questions guiding this scoping review are as follows:

(1) What is known in peer-reviewed scientific articles, written in the English language, published in the last 10 years about health disparities in adults with Type 2 diabetes who have insufficient availability or adoption barriers to the Internet and related technologies?

(2) What other social determinants of health are impactful on adults with Type 2 diabetes that are present in the literature reviewed?

Materials and Methods

This review follows the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) extension for Scoping Reviews (Tricco et al., 2018).

Eligibility Criteria. Inclusion criteria included peer-reviewed, English language studies published in the last 10 years that include dependent variables of diabetes health outcomes or T2D prevalence with independent variables including Internet/technology

availability, Internet adoption, Internet usage, digital health literacy and the adult population. Exclusion criteria included digital health application studies, Type 1 Diabetes only, letters to the editor, pharmacological studies, studies unrelated to diabetes, studies about genetics or biochemistry, theory articles, and reviews.

Information Sources. Databases queried included CINAHL (through the EBSCO interface), PubMed, and Scopus. No attempt was made to contact the authors of articles identified. All searches were executed on November 29th, 2023. Grey literature was not used in this review.

Search Strategy. PubMed was the first database searched. I used a complex search strategy, with assistance from the University of Missouri Library to formulate the search string. The concepts of digital divide, underserved populations, Internet availability, diabetes, and diabetic outcomes were thoroughly developed with multiple search terms. Embedded within the search are limits for English language, adult population, and publication date in the last 10 years. Search strategy for CINAHL and Scopus were modeled from the PubMed search terms. Full search terms for all data sources are presented in Table 1.

Table 1. Search Strategy and Terms

Database	Search Terms	Limits	Notes	Results (n)
PubMed	(("deprival"[All Fields] OR "deprivation"[All Fields] OR "deprivations"[All Fields] OR "deprive"[All Fields] OR "deprived"[All Fields] OR "deprives"[All Fields] OR "depriving"[All Fields] OR ("divide"[All Fields] OR "divider"[All Fields] OR "dividers"[All Fields] OR "divides"[All Fields] OR "dividing"[All Fields]) OR "disparity"[All Fields] OR ("underserved"[All Fields] OR "underserviced"[All Fields] OR "underservicing"[All Fields]) OR ("access"[All Fields] OR "accessed"[All Fields] OR "accesses"[All Fields] OR "accessibilities"[All Fields] OR "accessibility"[All Fields] OR "accessible"[All Fields] OR "accessing"[All	English Language; Adults 19+ years		194

	Fields])) AND ("Internet"[MeSH Terms] OR "Internet"[All Fields] OR "Internet s"[All Fields] OR "Internets"[All Fields] OR "web"[All Fields]) AND ("diabetes mellitus"[MeSH Terms] OR "diabetes complications"[MeSH Terms] OR "diabetic ketoacidosis"[MeSH Terms] OR "diabetic neuropathies"[MeSH Terms] OR "diabetic angiopathies"[MeSH Terms] OR "diabetes mellitus, type 2"[MeSH Terms] OR "diabetes mellitus, type 1"[MeSH Terms] OR "diabetic nephropathies"[MeSH Terms] OR "diabetic retinopathy"[MeSH Terms] OR "diabetic cardiomyopathies"[MeSH Terms] OR "diabetes prevalence"[All Fields])) AND ((english[Filter]) AND (alladult[Filter]) AND (2013:2023[pdat]))			
CINAHL	TX ((deprival OR deprivation OR deprive OR deprived OR deprives OR depriving OR divide OR divider OR dividers OR divides OR dividing OR disparity OR underserved OR underserviced OR underservicing OR access OR accessed OR accesses OR accessibilities OR accessibility OR accessible OR accessing) AND (Internet OR web)) AND TX ((diabetes mellitus OR diabetes complications OR diabetic ketoacidosis OR diabetic neuropathies OR diabetic angiopathies OR diabetes mellitus, type 2 OR diabetes mellitus, type 1 OR diabetic nephropathies OR diabetic retinopathy OR diabetic cardiomyopathies OR diabetes prevalence))	English language; Peer Reviewed; Publication date: 2013-01-01 to 2023-11-29		345
Scopus	(deprival OR deprivation OR deprive OR deprived OR deprives OR depriving OR divide OR divider OR dividers OR divides OR dividing OR disparity OR underserved OR underserviced OR underservicing OR access OR accessed OR accesses OR accessibilities OR accessibility OR accessible OR accessing) AND (Internet OR web) AND (diabetes AND mellitus OR diabetes AND complications OR diabetic AND ketoacidosis OR diabetic AND neuropathies OR diabetic AND angiopathies OR diabetes AND mellitus, AND type 2 OR diabetes AND mellitus, AND type 1 OR diabetic AND nephropathies OR diabetic AND retinopathy OR diabetic AND cardiomyopathies OR diabetes AND prevalence) AND PUBYEAR > 2012 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j"))	English Language; >2012 to < 2024; article document type; journal source type	2 articles were flagged at retracted (Alessi et al., 2022; Padhy et al., 2022)	2,588 (-2)

Selection Process. All search results were exported to the bibliographic software Zotero (*Zotero*, n.d.) version 6.0.30. Results were combined into a single folder to assist with unified export. Results were exported to a spreadsheet containing publication date,

author(s), title, abstract, publication title, tags (assigned by Zotero), ISSN, digital object identifier (DOI), and relevant URL links. Duplicates were identified by assessing matched title, ISSN, and DOI.

During the screening process, author(s), publication title, keyword tags, ISSN, DOI, and URL were hidden. Screening was executed in three stages. The first stage of screening I assessed the article titles for eligibility criteria. The second stage of screening was a review of the abstract. The final stage of screening utilized full text. All screening was completed manually without the use of automated computer software. During each screening stage, I noted in a "Keep" column on the spreadsheet if the article should be "Y" kept, "N" removed", or "R" reviewed in subsequent stages if the title or abstract were unclear. Selection process was documented in a PRISMA flow diagram utilizing via an online template (Page et al., 2021).

Data Collection Process and Data Items. Data were collected in a review matrix spreadsheet during full text review of each study. Variables collected in the matrix spreadsheet after the screening process included publication date, author(s), title, abstract, digital object identifier (DOI), study objectives, research question(s), study design, population studied, setting, independent variable, dependent variable, sample characteristics, timeframe of study, recruitment/data collection methods, general methods, key findings, limitations, and a relevant summation of the study with key themes.

Syntheses Methods and Critical Appraisal. Syntheses of the evidence was completed by creating individual summaries of the studies. Key themes were identified within the results that align with this review's research questions. Individual study findings were categorized under thematic elements in final synthesis. The quality of

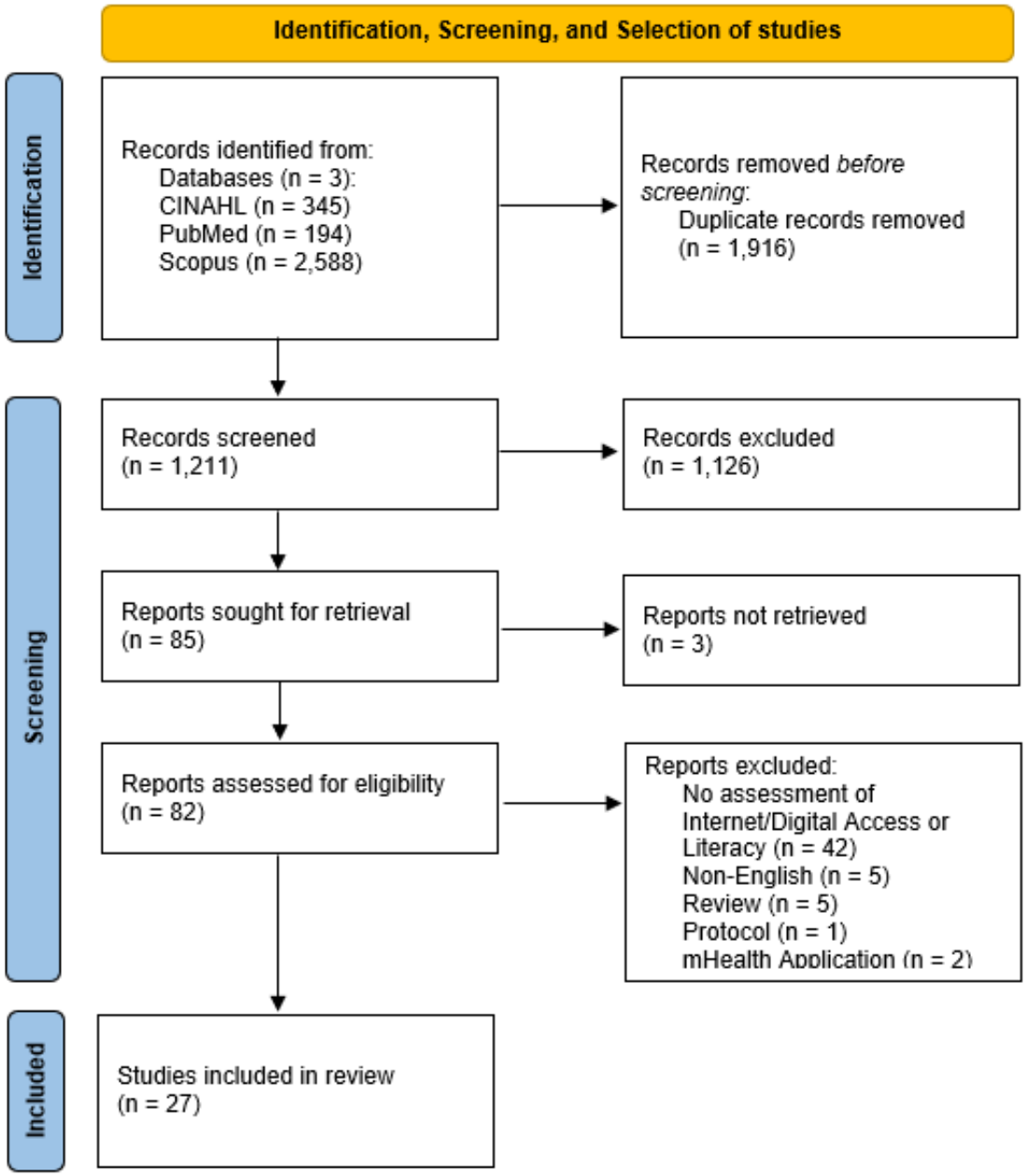
evidence was not systematically appraised. Limitations of the individual articles were reported in the data collection.

Results

Study Selection. After organizing the studies into the review matrix spreadsheet, 1,916 duplicates were removed, leaving 1,211 articles for title and abstract screening. Title screening resulted in 925 studies that met the exclusion criteria and 286 studies evaluation in abstract screening. Abstract screening yielded 85 articles for full text review. Three articles were unable to be retrieved. Full text was reviewed for 82 articles leading to 54 articles excluded. 27 studies were selected for final analysis. See complete PRISMA flow diagram in Figure 2.

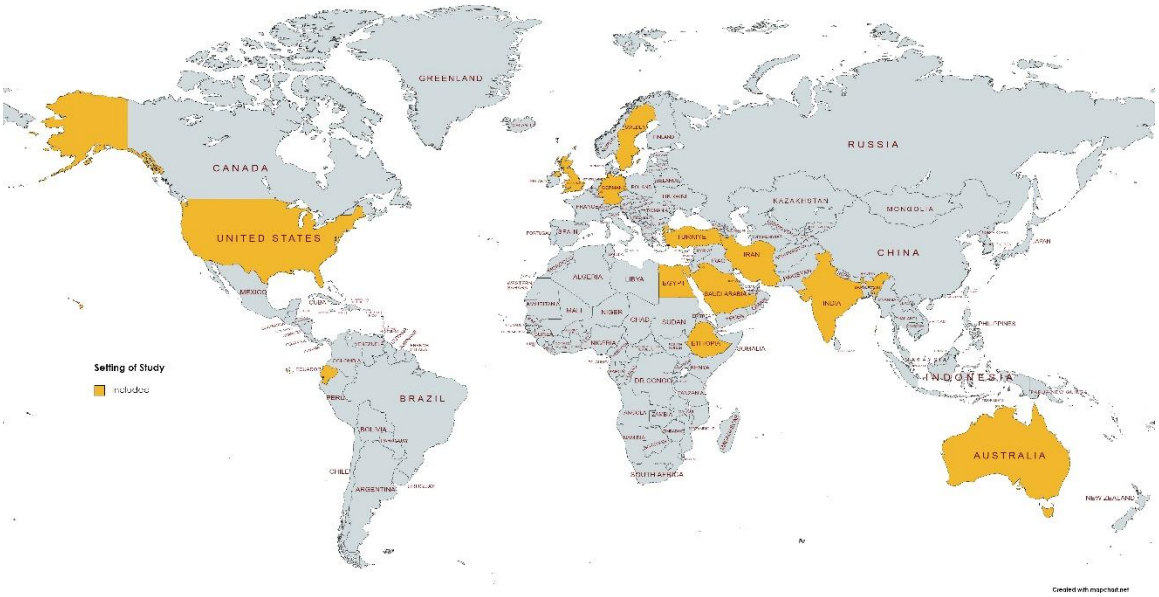
Study Characteristics. Reviewed studies indicate a heterogeneous range of objectives, study protocols, populations, settings, and sampling. The details of each study are presented in the literature review matrix in Table 11 in the Appendix. Notably, seven studies utilized qualitative methodologies including phenomenological research with semi-structured interviews, grounded theory, and content analysis. Other studies were quantitative and were primarily observational and cross-sectional. All studies incorporated diabetes prevalence, self-management, clinical outcomes, or disease knowledge in some way through population sampling or data collection methods. Settings included an international assortment of countries within North America, South America, Africa, Europe, Australia, and Asia. See Figure 3 for a geographic representation of the countries included.

141 *Figure 1 PRISMA Flow Diagram*



142

Figure 2: Geographic View of Study locations



Results of Individual Studies and Syntheses. The full literature matrix including results and syntheses of individual studies is provided in Table 2**.**

Discussion

Summary of Evidence. The evidence provided from these sources indicates an evolving qualitative and quantitative understanding of the effect of the Internet, Internet-related technology and digital literacy on health information-seeking behaviors, health technology usage, health literacy, and management of T2D among varied populations.

Digital Divide and Health Disparities. Digital disparities create challenges in accessing digital health solutions such as telehealth, self-management applications, and patient portals (Chambers et al., 2015; Fuji et al., 2015; Mansour, 2021; Pettersson et al., 2023; Price-Haywood et al., 2017; Ramasamy et al., 2016). Additionally, United States longitudinal data from metropolitan and micropolitan statistical areas suggests that Internet adoption is associated with decreased diabetes prevalence and improvements in

diabetic risk factors (Whitacre & Brooks, 2014). Individuals with limited digital availability and literacy, notably older adults and rural inhabitants, face significant disadvantages in managing chronic conditions like diabetes (Kim et al., 2023; Walle et al., 2023). The complexity of chronic disease management, poor healthcare access, and affordability of the Internet and associated technologies compound this problem. Across many countries, educational attainment and income positively impact the rates of adoption of the Internet and technology (Chérrez-Ojeda et al., 2018; Jemere et al., 2019; Price-Haywood et al., 2017; Ramasamy et al., 2016; Samadbeik et al., 2018; Taibah et al., 2020; Terkeş et al., 2022; Umeh et al., 2015).

Health Information-seeking Behaviors. Multiple studies found that willingness and readiness to use mHealth applications and the Internet for health information were moderate or highly independent of the participant's availability to high-speed Internet (Jemere et al., 2019; Price-Haywood et al., 2017; Samadbeik et al., 2018; Sidhu et al., 2022; Stotz et al., 2021; Terkeş et al., 2022; Walle et al., 2023). From a qualitative perspective, American Indian and Alaskan native adults expressed openness and favorability to online nutrition education and recognize the benefits of online programs despite not all of the participants having a smartphone or adoption of home Internet (Stotz et al., 2021). Punjabi Sikhs in the United Kingdom also expressed a positive disposition to using the Internet as a source of health information, but usage to the Internet was not assessed (Sidhu et al., 2022). Among the five quantitative studies, these all utilized a cross-sectional approach surveying multiple populations with Type 2 diabetes. These articles highlighted favorable attitudes towards the use of the Internet for health information but also highlighted some barriers. The barriers cited include privacy

concerns, lack of digital literacy, and lack of perceived value. Demographically, age and educational attainment were also found to have a relationship with health information-seeking behaviors (Price-Haywood et al., 2017; Terkeş et al., 2022).

Technology Use and Health Literacy. There is relatively good adoption of mobile phones in many populations which allows access to mHealth services and health information but higher educational status and financial affluence appear to positively influence that adoption (Chérrez-Ojeda et al., 2018; Johnson, 2023; Kim et al., 2023; Nguyen et al., 2022; Stotz et al., 2021; Walle et al., 2023). Despite the potential for digital health services to facilitate diabetes self-care management, barriers such as financial limitations, digital literacy, and poor Internet availability persist. Those with limited adoption of digital technology faced greater challenges in understanding medical conditions and education from healthcare providers than their connected peers, suggesting that technology has a relationship with health literacy levels (Fuji et al., 2015; Nguyen et al., 2022; Ramasamy et al., 2016; Rastegari et al., 2022; Yom-Tov et al., 2016).

Limitations. The international and heterogenous mixture of qualitative and cross-sectional quantitative data limits the findings of this review and presents challenges in a concluding synthesis. This presents a limitation for this review but also reveals the limited knowledge in this area.

Second, the inclusion and exclusion criteria must be contextualized in this review. The adherence to the inclusion criteria of English language may have limited the inclusion of significant research conducted in other languages. The exclusion of grey literature may omit data and insights that could enrich the understanding of the

complexities of Internet availability, adoption, and digital literacy. Also, factors such as cultural beliefs, health care policy, and economic infrastructure were not directly studied which leads to an incomplete understanding of the multi-layered nature of health disparities and the digital divide.

A critical appraisal and meta-analysis were not conducted on the obtained articles. Robust reviews such as meta-analysis are needed as more research is conducted in this domain.

Conclusions. These studies suggest a persistent digital divide that includes inadequate Internet availability, limited Internet adoption in some populations, poor digital and health literacy, and socioeconomic barriers that impact the knowledge and management of T2D. Evidence directly linking Internet adoption to diabetes prevalence is limited to a single study (Whitacre & Brooks, 2014). The Internet and digital health technologies can be leveraged to educate and empower individuals and providers to manage diabetes more effectively but disparities in education, income, and cultural norms must be considered. Future research should further explore the relationship of Internet availability, Internet adoption, social determinants of health, and digital health services on health outcomes related to diabetes in more populations within the United States and internationally.

Table 1. Literature Review Matrix

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Taibah et al., 2020)	The paper aims to assess the progress and identify gaps in e-health initiatives in Saudi Arabia, with a focus on rural populations.	Case Study	The focus is on the Saudi Arabian population, with particular emphasis on rural areas.	Saudi Arabia	Not Applicable	Not Disclosed	Analysis of existing e-health programs and policies.	The study uses a conceptual framework based on the World Health Organization's Atlas of eHealth Country Profiles.	Notable progress in e-health, but significant gaps remain in rural areas, including challenges related to access, literacy, and infrastructure.	Case-study paper.	The study expresses the need for focused e-health strategies in rural areas of Saudi Arabia to bridge the digital divide and improve healthcare outcomes, particularly for managing chronic conditions like diabetes.	Rural population lacks Internet availability, literacy, and infrastructure.
(Pettersson et al., 2023)	To describe self-care maintenance, changes in it, and factors related to unchanged self-care in migrant patients with type 2 diabetes during COVID-19. Also, to explore well-being, social support, and healthcare service needs during the pandemic.	Cross-sectional study using a triangulation design with both quantitative and qualitative data collection.	Migrant patients with type 2 diabetes in south-eastern Sweden.	Health center in south-eastern Sweden	79 participants, mostly male (51%), aged 69 ± 11 years, predominantly from the Middle East (47%) and European countries (53%).	June 2020 to September 2020.	Selection by a diabetes nurse from a healthcare center, using a questionnaire in multiple languages.	Quantitative data analyzed using SPSS, qualitative data via directed content analysis.	76% reported changes in self-care maintenance during the pandemic. Changes in physical activity, diet, and healthcare access were noted.	Research on migrant population. Cross-sectional, causal inference not possible. 24% response rate.	The study indicates that migrant patients with type 2 diabetes experienced significant changes in self-care during COVID-19. Challenges included reduced physical activity, dietary changes, and altered healthcare access, highlighting the need for tailored support and communication strategies.	More than half of the participants preferred written letters to communicate with their providers. Limited Internet availability cited as one of three reasons that migrants with chronic disease were negatively affected by the pandemic due to limited access to health care.

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Weyman n et al., 2016)	Assess the information and decision support needs of Type 2 Diabetes patients.	Cross-sectional study with semi-structured interviews and questionnaires.	Patients with Type 2 Diabetes in Germany.	Various healthcare settings in Germany.	Patients with diverse demographic backgrounds, diabetes durations, and treatment types.		Interviews and questionnaires among patients and physicians.	Qualitative and quantitative analysis, including content analysis and statistical evaluation.	Significant use of the Internet for diabetes information, varied diabetes knowledge, and a desire for shared decision-making.	Sample of older adults with Internet adoption didn't match the population. Potential bias of those willing to participate in research were interested in technology.	The authors highlight the importance of Internet adoption and literacy in managing diabetes, emphasizing the need for accurate, accessible online information and decision support tools tailored to individual patient needs. 61.7% report using the Internet to look for health information online. 35.1% who did not look for health information online did not use the Internet.	Adoption of Internet must be considered in sharing health information and decision support
(Samadbeik et al., 2018)	To determine the readiness of patients with chronic diseases in Khorramabad, Iran, to use Health Information Technology (HIT).	Cross-sectional study.	Patients with chronic diseases (respiratory, cardiovascular, renal, diabetes) in Khorramabad, Iran.	Clinics of educational hospitals in Khorramabad, Iran.	Sample Size: 475; majority male (54.88%), married (84.16%), self-employed (40%), with education level below high school or high school (55.12%), urban residents (75.36%).	Conducted in 2016.	Convenience sampling method; PRE-HIT questionnaire.	Data collected using the PRE-HIT questionnaire, analyzed with SPSS version 20.	24.4% of participants had computer experience. Medium level of readiness to use HIT, with highest scores in relationship with doctors and lowest in computer anxiety.	Adoption of the Internet is not directly assessed.	There is medium-level readiness among chronic disease patients to use HIT. Computer experience and sociodemographic factors influence this readiness. The findings suggest the need for improving computer literacy and addressing barriers to HIT adoption.	Education level had a significant association with computer and Internet expertise. Rural inhabitants have readiness for technology usage but authors cite other literature about lack of resources.

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Price-Haywood et al., 2017)	Explore eHealth literacy and strategies to encourage patient portal use among older adults.	Cross-sectional survey.	Older adults (≥50 years) with hypertension or diabetes.	Ochsner Health System, Southeast Louisiana.	247 patients, majority female, diverse in age and chronic conditions.	August 2015 to January 2016.	Systematic sampling with a structured survey.	eHealth Literacy Scale (eHEALS), portal usage and interest assessment.	Positive correlation between eHealth literacy and portal usage. Barriers include privacy concerns, technological literacy, and perceived value.	Single site, survey response bias	Higher eHealth literacy is linked to increased patient portal usage among older adults, suggesting the need for tailored interventions to enhance digital literacy and address specific barriers. "I don't have a computer. If I had one, I would use it [MyOchsner]. I miss appointments all the time and if I had a computer, I could enter them on there and get reminders. I have a cell phone from the government that just calls."	Portal users had higher education and younger age. Some nonusers report a lack of desire to use portal, lack of digital literacy, lack of computer/Internet availability. Most older adults report they would need assistance with tech.

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Chérrez-Ojeda et al., 2018)	To assess the frequency and patterns of ICT usage among Ecuadorian patients with T2DM and their preferences for different types of ICTs.	Cross-sectional survey.	Patients with Type 2 Diabetes Mellitus in Ecuador.	Outpatients from public or private practices in Guayaquil, Ecuador.	248 patients, mean age of 57.7 years, majority female (62.1%), with varying levels of education.	Not disclosed	Anonymous survey distributed to eligible outpatients.	Chi-square test for association, adjusted regression analyses.	SMS was the most used ICT (66.0%). Internet was used by 45.2% of patients for diabetes information. Higher preference for email and SMS among younger patients and those with a superior degree.	Analysis based on survey responses; potential biases in self-reported data.	Adoption of and preferences for ICTs among patients with T2DM in Ecuador are influenced by demographic factors like age and education. Highlights the importance of understanding patient preferences and digital literacy in designing ICT-based interventions for diabetes management, especially in developing countries.	Internet availability reported for only 27.2%. Internet enabled smartphone = 46.8%. Lack of availability impacts health interventions. Education and income associated with higher ICT use.
(Terkeş et al., 2022)	To evaluate technology use and attitudes towards technology in patients with Type 2 Diabetes.	Descriptive study, observational.	250 patients with Type 2 Diabetes at a university hospital in Turkey	Endocrinology and metabolic diseases department, university hospital, Mediterranean region, Turkey.	250 patients, mean age 58.49 years, majority female (66%), varied educational backgrounds.	January to June 2017.	Systematic sampling from a university hospital, using a structured questionnaire and the Attitude Towards Technology Scale.	Analysis of questionnaire responses and Attitude Towards Technology Scale scores.	34.8% used the Internet for health-related information, positive correlation between technology use and favorable attitudes towards technology, influenced by age and educational status.	Attitudes are self-reported, single center study.	Significant use of technology among Type 2 Diabetes patients. Younger, more educated patients exhibit more favorable attitudes towards technology, indicating a potential avenue for digital health interventions in diabetes management.	Favorable attitude towards health information online but tended to be younger and more educated.

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Ramasamy et al., 2016)	To examine the association of sociodemographic and technology use with health literacy among type 2 diabetic individuals	Exploratory cross-sectional study	Type 2 diabetes mellitus (T2DM) patients in Chennai, India	Diabetic clinic of Saveetha Medical College, Chennai, India	100 T2DM patients; more than half were males with an average age of 55 years, mostly married, living in urban settings, and with varied education and income levels	August 2013	Convenient sampling during regular outpatient visits	Modified questionnaires, univariate statistics, chi-square analysis, binary logistic regression, content analysis of open-ended data	Significant association between technology use and health literacy; issues in understanding medical condition and healthcare provider information were more common in individuals with less availability to technology	Based on exploratory design with potential biases in self-reported data and limitations due to the cross-sectional nature. Internet/computer use assessed but not mobile phone/mobile Internet usage. Sampling methodology.	The study reveals the crucial role of technology, particularly Internet availability, in enhancing health literacy among type 2 diabetic patients. Need for improved healthcare access and literacy to aid in better diabetes management, especially in settings where technological disparities exist	Higher health literacy associated with computer and Internet in the home (in sample of patients in India). 40% of participants were familiar with the use of computers. 43% reported Internet adoption .
(Walle et al., 2023)	To assess the willingness of diabetes mellitus patients to use mHealth applications and identify associated factors for self-care management in Ethiopia.	Institutional-based cross-sectional study.	Patients with diabetes mellitus in Ethiopia.	Public hospitals in Ilu Abba Bor and Buno Bedelle Zones, Oromia Regional State, southwest Ethiopia.	398 participants, predominantly male (56.3%), aged 43±14.6 years, with a majority living in urban areas (69.3%).	Conducted from November 12 to December 21, 2022.	Systematic random sampling from public hospitals, using pretested interviewer-administered questionnaires.	Data analysis using Epi Data V.4.6 and STATA V.14, multivariable logistic regression analysis for identifying associated factors.	High willingness (71.4%) to use mHealth applications among diabetes patients. Factors like younger age, urban residence, Internet availability, positive attitudes, and perceived ease and usefulness significantly influenced this willingness.	Based on a quantitative, cross-sectional design with potential interviewer bias, lacking inclusion of private hospitals.	Internet availability and digital literacy have an important role in determining the willingness of diabetes patients to use mHealth applications for self-care. The need for enhancing Internet connectivity, digital literacy, and user-friendly design in mHealth tools to improve diabetes self-care management, especially in low-income settings.	Willingness to use mHealth applications is high but adoption (13.1%) and availability is low (57.2% have smart phone).

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Jemere et al., 2019)	Determine mobile phone access and willingness to receive mobile-based diabetes health services in Northwest Ethiopia.	Institution-based cross-sectional survey.	Patients with diabetes, both male and female, varied age groups.	Northwest Ethiopia, University of Gondar Hospital diabetic clinic	423 systematically selected patients with diabetes.	February to March 2016.	Systematic random sampling; data collected through face-to-face interviews.	Questionnaire-based survey.	High adoption of mobile phones (77.8%) among patients, with a significant portion willing to receive mHealth services (70.5%). Factors like educational status, medication route, and transportation mechanism were significantly associated with this willingness.	Metropolitan area lacked rural participants, interviewer bias -- but mitigated with standardized interview.	Strong potential of mHealth services in diabetes care, highlighting the high adoption of mobile phones among diabetic patients and their willingness to engage with mobile phone-based health services, suggesting a viable route for enhancing diabetes management and education in this population.	Text message or voice call interventions viewed favorably to assist with self-care management of diabetes
(Yoon et al., 2023)	Assess changes in diabetes medication adherence, hospitalizations, and primary care use during the pandemic.	Longitudinal analysis.	High-risk diabetic patients in the Veterans Affairs health care system.	United States	Predominantly male, older adults, various ethnic backgrounds.	2019-2021	Data from the Veterans Affairs health care system.	Analysis of healthcare utilization and medication adherence data.	Despite the shift from in-person to virtual care, medication adherence remained high; however, there were initial reductions in in-person primary care, ED visits, and hospitalizations.	95% male participants. Rural participants favored in-person visits over virtual but unclear as to why.	Shift to virtual care during the pandemic did not significantly disrupt medication adherence among high-risk diabetic patients, suggesting resilience in healthcare delivery systems under emergency conditions.	Rural patients relied more on in-person care. Limited Internet availability hypothesized as factor but not assessed.

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(Yom-Tov et al., 2016)	To analyze how health literacy influences the way Internet users seek and understand information about diabetes.	Observational study analyzing Internet search behavior related to diabetes.	Internet users in the United States searching for diabetes-related information.	Online environment, specifically the Bing search engine	Approximately 2 million people who queried for diabetes-related information on Bing.	3-month period from May 2014 to July 2014	Analysis of search queries and user behavior data from the Bing search engine.	Queries filtered for diabetes-related terms, analysis of user search patterns and dwell times on web pages, health literacy imputed from community-based scores.	People with limited health literacy tend to spend more time on easily readable pages and less on complex ones. They often end their searches prematurely and may struggle to understand high-reading-level content. The study observed differences in the types of information accessed based on health literacy, with limited literacy users browsing more diet and fitness pages.	One search engine data, just search data no individual covariates. Reliability in question. Health literacy was inferred.	There are disparities in how individuals with different levels of health literacy use the Internet to learn about diabetes. Those with limited health literacy face challenges in searching, understanding, and engaging with online health information. This indicates that digital inequalities in health literacy can significantly impact the effectiveness of online resources in educating users about diabetes management and care, suggesting a need for more accessible and comprehensible online health information.	Suggestion that disparities in health literacy exists in population connected to the Internet or using the Internet to search for health information.
(Whitacre & Brooks, 2014)	To explore the impact of broadband adoption rates on community health outcomes.	Observational study using a first-differenced modeling approach.	Residents of 92 metropolitan/micropolitan statistical areas (MSAs) in the USA.	Diverse urban and suburban regions in the United States.	Aggregated data from MSAs with diverse demographic profiles.	2002 to 2009.	Data sourced from the Behavioral Risk Factor Surveillance System and Federal Communications Commission.	Regression analysis with a first-difference approach to examine changes in health outcomes.	Broadband adoption is significantly correlated with changes in 9 out of 24 health measures, including smoking rates and consumption of fruits and vegetables.	Assumption that broadband adoption in 2002 was zero. Limited to MSAs (n=92 observations). Longitudinal data used first-difference approach.	Increasing broadband adoption may influence certain health outcomes, shows potential of broadband as a tool for public health improvement.	Increase in Broadband adoption is associated with slight decreases in rates of individuals with diabetes.

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(Umeh et al., 2015)	To assess the effects of ICT uptake on diabetes prevalence, particularly examining ethnic disparities between South Asian and Caucasian populations.	Observational study using data from the UK Office for National Statistics household survey, analyzed through hierarchical binary logistic regression.	Residents of the UK, with a focus on South Asian and Caucasian ethnic groups.	The study utilizes data from a nationwide survey in the UK.	120,621 participant records from the UK household survey, covering years 2006-2011, with ethnicity classified into 'Caucasian' and 'South Asian' groups.	Data analysis covers 2006 to 2011.	Analysis of archival data from a national household survey.	Hierarchical binary logistic regression analyses, controlling for confounding variables.	ICT uptake was found to modify ethnic differences in diabetes prevalence. Presence of a home computer and mobile phone dependence varied by ethnicity.	Computer definition does not include tablets. Type 1 or Type 2 diabetes not distinguished.	The study highlights the role of ICT in modifying diabetes risk across ethnic groups, showing a significant interplay between technology use, socioeconomic factors, and diabetes prevalence.	A computer at home is associated with higher socioeconomic status and must be considered when thinking about diabetes risk.
(Sharma, 2023)	To explore the association between food insecurity, Internet availability, and diabetes prevalence across different geographic scales.	Observational study using multiscale geographically weighted regression (MGWR).	Counties in Southeastern United States.	Southeastern region of the U.S. (Alabama, Arkansas, Mississippi, Tennessee).	319 counties in the Southeastern U.S.	2019	Analysis of existing data from multiple sources such as the Behavioral Risk Factor Surveillance System and American Community Survey.	MGWR for spatial analysis	Food insecurity and lack of Internet availability were positively associated with diabetes prevalence, with variations across regions	Ecological data, not causal analysis.	Significant influence of food insecurity and Internet availability on diabetes prevalence. Need for targeted public health interventions in regions with higher rates of food insecurity and lower Internet availability.	Counties with a greater number of households without Internet availability were associated with higher levels of diabetes.

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(Hincapie et al., 2019)	To explore barriers to medication adherence in medically underserved (MU) populations and identify opportunities for mHealth adherence interventions.	Qualitative cross-sectional focus group.	Medically underserved patients with chronic conditions at a federally qualified health center in Dayton, Ohio.	Federally Qualified Health Center (FQHC) serving medically underserved areas (MUA) and/or medically underserved populations (MUP) in Dayton, Ohio.	17 patients participated in 4 focus groups, predominantly male, with chronic diseases such as diabetes, dyslipidemia, and/or hypertension, prescribed 3 long-term medications.	Conducted between 2015 and 2016.	Convenience sampling at the FQHC, using focus groups and thematic analysis.	Data collected through focus groups, analyzed thematically using the Health Belief Model as a theoretical framework.	Identified barriers included complexity of medication regimens, changes in daily routine, and technological literacy. Some patients expressed willingness to try smartphone applications, but affordability was a concern.	Small sample of Ohio underserved patients. Diabetes behaviors based on self-report, not validated. Results were not stratified by adoption of home Internet or Smart Phone usage	There are diverse experiences in mHealth for medication adherence. Providing patient-centered approaches to assist patients in constructing individualized medication adherence strategies may lead to better outcomes. 3/17 reported Internet availability at home, 5/17 had smart phone. Results were combined.	Experiences for non mHealth use include too complicated.

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(Nguyen et al., 2022)	Investigate the interaction of social determinants of health (SDoH) in chronic disease management within vulnerable populations.	Qualitative research involving in-depth interviews, neighborhood tours, and clinic visit observations.	Patients with diabetes and community leaders in underserved San Francisco neighborhoods.	Safety-net healthcare settings in socioeconomically deprived San Francisco neighborhoods.	10 patients with diabetes or prediabetes and 10 community leaders; majority Black, average age 62, most earning less than $20,000 annually, and managing multiple chronic conditions.	Data collected in 2019.	Purposive selection; interviews, neighborhood tours, and clinic visit observations.	Qualitative data analysis using Atlas.ti 8 software, applying the NIMHD research framework, focusing on individual, interpersonal, community, and societal levels.	Identified significant SDoH across socioecological levels impacting chronic disease management, including physical disability, housing, neighborhood environment, and structural barriers.	recruitment inclusion required smartphone ownership; limited generalizability from sample, lack of causal connection through model and diabetes outcomes	Complex SDoH across multiple levels in chronic disease management. Suggesting need for tailored interventions in healthcare for vulnerable populations.	20% of participants report not using the Internet, only 40% felt familiar with using a mobile phone. Limited health and digital literacy are individual barriers to chronic disease management.
	To explore the feasibility of online diabetes nutrition education for American Indian and Alaska Native (AI/AN) adults with Type 2 diabetes.	Qualitative study involving focus groups and interviews.	AI/AN adults with Type 2 diabetes and key stakeholders in these communities.	Various AI/AN communities across the United States.	AI/AN adults with Type 2 diabetes, along with healthcare providers and other stakeholders in these communities. Focus group sizes 29 | 22 | 10 | 9	Data collected in August–October 2018.	Participants were recruited for focus groups and interviews across four AI/AN communities.	Focus groups and interviews were conducted, supplemented with surveys to gather demographic data and technology use.	AI/AN adults frequently use smartphones for Internet availability, are open to online diabetes nutrition education, and recognize the potential benefits of such programs.	Higher than average educational attainment for AI/AN population. Participants recruited from diabetic centers, biased towards those with current healthcare usage.	Online diabetes nutrition education is a promising and feasible approach for AI/AN communities, given the widespread use of smartphones and Internet availability. It can potentially overcome barriers to traditional education methods and provide tailored, accessible health information.	81% of participants with T2D report adoption of the Internet (67% from their phone). 90% have adopted and used through a family member. Adoption and use of the Internet for diabetes programs viewed favorably.

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(Fuji et al., 2015)	Explore the use of Personal Health Records for managing diabetes-related health information.	Qualitative study using conventional content analysis.	Patients with Type 2 diabetes.	"Midwest metropolitan city"	59 participants, aged 28-80, predominantly female and white/Caucasian, all high school graduates or higher.	not disclosed	Recruited from internal medicine and endocrinology clinics; data collected through interviews.	Participants received PHR training; interviews conducted to explore PHR use.	Positive experiences included a complete and accessible health record, increased awareness, and behavioral changes. Negative experiences encompassed issues like "out of sight, out of mind," economic and computer literacy barriers, lack of patient-provider engagement, double tracking, and privacy concerns.	Sampling characteristics may limit generalizability.	Mixed experiences with PHR use. While it enhanced awareness and led to behavioral changes in some, others faced barriers like economic constraints, computer literacy challenges, and lack of engagement from healthcare providers, suggesting a need for better integration of PHRs into diabetes care. Participants cited issues with affording and adopting technology and the Internet.	Some participants lacked the financial means to adopt technology. Others lacked reliable Internet availability, even in a public library. Digital literacy cited as a barrier for one participant.
(Dao et al., 2019)	explore factors influencing Type 2 Diabetes Mellitus (T2DM) self-management in general practice.	Qualitative study with semi-structured interviews.	Patients with T2DM and their general practitioners and practice nurses in South West Sydney.	General practices in a low socioeconomic area of Sydney, New South Wales, Australia.	10 patients with T2DM and 17 healthcare providers (10 GPs, 7 practice nurses).	Not disclosed	Purposive sampling: interviews conducted with patients and providers.	Thematic analysis using the socio-ecological model as a coding framework.	Factors influencing self-management included individual (e-health literacy, motivation), interpersonal (family and friends, patient-provider relationship), organizational (affordability, multidisciplinary care), and community levels (culture, self-management resources).	Selection bias due to sampling from clinic. All participants in the study had Internet availability. Small sample from single area.	Diabetes management is complex, influenced by multiple factors beyond individual patient control, suggests the need for comprehensive, multi-level strategies in general practice settings.	Even with Internet availability, they didn't know how to use it according to providers. Patients say they don't know how to appraise the information. Many patients of providers are elderly have not adopted the Internet.

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(Johnson, 2023)	To explore African American veterans' experiences and attitudes towards using the My HealtheVet online portal for diabetes management.	Qualitative study with semi-structured interviews.	Non-Hispanic African American veterans diagnosed with type 2 diabetes.	Veterans Affairs health care system.	35 participants; mostly male, aged 35-73 years, varied educational background and financial stability.	Interviews conducted between March and June 2020.	Participants were recruited from a large Midwestern VA medical center and interviewed via phone.	Inductive thematic analysis of interview transcripts.	Participants valued MHV for convenience but reported barriers like preference for pre-MHV routines and distrust in institutional and technological aspects.	Lack of female representation. All levels of diabetes included. May be different based on severity of illness.	Digital disparities, especially among African American veterans, are influenced by sociocultural factors and personal experiences with technology and healthcare institutions. These factors significantly affect the adoption and effective use of digital health tools like My HealtheVet for diabetes management.	All participants had a cell phone, and most used it to adopt and use the Internet.
(Talebian et al., 2021)	To explore the health information-seeking behavior of diabetic patients.	Qualitative, grounded theory approach.	Iranian diabetic patients.	Healthcare and diabetes centers in Kerman, Iran	18 diabetic patients, both men and women, aged 38-65, with varied educational backgrounds.	Interviews conducted in June 2019.	Purposive sampling, semi-structured interviews.	Data analyzed using the grounded theory approach, with thematic categorization.	Identified five main categories - recognizing information needs, acquiring health information literacy, information seeking barriers, supportive information directing factors, and empowerment. Patients used various sources, including healthcare professionals and the Internet, for health information.	Population potentially biased due to recruitment from diabetes centers.	Range of interactive factors centered on health information acquisition influences the health information-seeking behavior of diabetic patients.	Some patients consult Internet sources for education, but some barriers include lack of trust, overwhelming information, usually consulted doctor first.

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(Sidhu et al., 2022)	Explore knowledge and awareness of T2DM, related risk factors, and views on health seeking behaviors for T2DM information in young Punjabi Sikhs in the UK	Qualitative, phenomenological, semi-structured 1-1 interviews	Young Punjabi Sikh community in UK	Participants were recruited from a Sikh temple and University of Manchester Sikh Society in West Yorkshire and North West England	13 participants, predominantly female, well-educated, living in family homes.	Data collection between December 2018 and May 2019.	Participants were recruited via a Sikh temple and University of Manchester Sikh Society using purposive and snowball sampling. Interviews were audio-recorded.	Inductive thematic analysis of interview data. Purposive sampling, snowball sampling	T2DM is perceived as linked primarily to diet, particularly sugar intake, with less emphasis on physical activity. Gender and cultural norms influence diet and physical activity. The Internet is preferred over healthcare professionals for T2DM information, due to convenience and perceived lack of cultural awareness among professionals.	Limited sampling of males.	Young Punjabi Sikhs in the UK prefer using the Internet for T2DM information, citing its convenience and ease of access compared to the effort required to visit a doctor. This shows the importance of Internet availability and digital literacy in managing diabetes, particularly in culturally specific contexts where traditional practices and gender norms play a significant role	Positive Disposition towards the Internet as a source of health information.
(Kim et al., 2023)	Assess outcomes of the ACTIVATE program, designed to improve monitoring and care of diabetes and hypertension using digital health tools in a rural community.	Quality improvement project, not human subjects research.	Patients with uncontrolled diabetes and/or hypertension in rural California.	Federally qualified health center in rural California	50 patients, majority White and Hispanic or Latino, mean age 55, primarily Spanish-speaking.	April to December 2021.	Recruitment from health center, enrollment survey for demographics, technology access, digital literacy.	Remote patient monitoring, health coaching, data analysis.	Significant improvements in A1c and blood pressure, high engagement and usage of digital health tools.	Participant retention. Small sample size. Occurred during COVID-19, external factors may have influenced results.	The ACTIVATE program demonstrated that targeted digital health interventions with a data-enabled RPM system can improve chronic illness management in rural, underserved communities, addressing challenges such as Internet availability, using cellular data, and digital literacy, with a digital navigator, to enhance diabetes and hypertension outcomes.	44% did not have internet availability. 61% had internet adoption through a cellphone. RPM and digital health solution connected with data-enabled tablet regardless of participants' Internet availability or adoption. The results were positive.

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(Chambers et al., 2015)	Examine the feasibility and effectiveness of a home-visiting intervention for diabetes prevention and management in American Indian youth.	Single-group, pre-post pilot intervention study.	American Indian youth aged 10-19 years, at risk for or diagnosed with Type 2 diabetes.	Rural and isolated American Indian reservation lands.	Predominantly male participants, varied in age, with risk factors for Type 2 diabetes.	Not disclosed	Referrals from local healthcare providers, with data collection through interviews, surveys, and medical assessments.	Multi-faceted intervention involving nutrition, physical activity, and psychosocial support, delivered through home visits and community activities.	Improvement in knowledge and behaviors related to diabetes prevention and management. Few Internet availability (38.6%).	Lack of control cohort. Internet availability was assessed but not a main variable analyzed in the study.	This study indicates that a culturally tailored, family-oriented home-visiting program can positively influence diabetes outcomes and knowledge among American Indian youth.	Few participants report Internet availability, all participants considered "at risk" by BMI or A1c criteria
(Mansour, 2021)	To understand the information-seeking behavior of Egyptian adult patients with Type 2 Diabetes Mellitus (T2DM).	Survey, Cross-sectional	Egyptian adult patients with T2DM.	Outpatient clinics and Egyptian government health centers.	311 Egyptian adult patients with T2DM, diverse in age, gender, and socioeconomic background.	Conducted in April 2021.	Systematic random sampling, using a structured questionnaire	Analysis of survey responses using statistical tools.	High use of Internet/web and social media for diabetes information; significant barriers include privacy concerns, lack of understanding due to scientific terms, and lack of basic infrastructure.	Sample were more educated, most with Bachelor's degrees.	Internet availability and digital literacy influence the information-seeking behavior of Egyptian T2DM patients, with barriers impacting the efficacy of this process.	Lack of Internet availability and digital literacy can create barriers in information retrieval

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(Rastegari et al., 2022)	To delineate patients' functional and critical health literacy and its association with socio-demographic variables and self-efficacy.	Survey-based study employing quantitative methods.	384 participants resembling residents of Isfahan, Iran in terms of educational attainment and self-efficacy.	The study is centered on referrals to Isfahan health centers. Iran.	The sample comprised 384 individuals who were patients, diverse in terms of age, gender, and educational attainment. Mostly female less than 30 years old. Mostly HSD or Bachelor's	Data collection occurred in 2019	Random sample selection with structured questionnaire administration.	Utilization of the Newest Vital Sign (NVS) for functional literacy and the eHEALS for digital literacy aspects, supplemented by Pearson's correlation coefficient and regression analysis.	Over 60% of respondents had inadequate or marginal health literacy levels. Higher education and self-efficacy scores were associated with higher eHealth literacy levels.	Sample were patients, potentially more concerned with their health status. Older adults refused to fill out the eHEALS questions.	The study showed significant gaps in health literacy among Iranian patients, with a notable correlation between higher education levels and improved eHealth literacy. Reveals the importance of targeted literacy interventions in healthcare.	High rates of lower health literacy, Internet availability cited as 90%.
(Taibah et al., 2020)	The paper aims to assess the progress and identify gaps in e-health initiatives in Saudi Arabia, with a focus on rural populations.	Case Study	The focus is on the Saudi Arabian population, with particular emphasis on rural areas.	Saudi Arabia	Not Applicable	Not Disclosed	Analysis of existing e-health programs and policies.	The study uses a conceptual framework based on the World Health Organization's Atlas of eHealth Country Profiles.	Notable progress in e-health, but significant gaps remain in rural areas, including challenges related to access, literacy, and infrastructure.	Case-study paper.	The study underscores the need for focused e-health strategies in rural areas of Saudi Arabia to bridge the digital divide and improve healthcare outcomes, particularly for managing chronic conditions like diabetes.	Rural population lacks access, literacy, and infrastructure.

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(Pettersson et al., 2023)	To describe self-care maintenance, changes in it, and factors related to unchanged self-care in migrant patients with type 2 diabetes during COVID-19. Also, to explore well-being, social support, and healthcare service needs during the pandemic.	Cross-sectional study using a triangulation design with both quantitative and qualitative data collection.	Migrant patients with type 2 diabetes in south-eastern Sweden.	Health center in south-eastern Sweden	79 participants, mostly male (51%), aged 69 ± 11 years, predominantly from the Middle East (47%) and European countries (53%).	June 2020 to September 2020.	Selection by a diabetes nurse from a healthcare center, using a questionnaire in multiple languages.	Quantitative data analyzed using SPSS, qualitative data via directed content analysis.	76% reported changes in self-care maintenance during the pandemic. Changes in physical activity, diet, and healthcare access were noted.	Research on migrant population. Cross-sectional, causal inference not possible. 24% response rate.	The study indicates that migrant patients with type 2 diabetes experienced significant changes in self-care during COVID-19. Challenges included reduced physical activity, dietary changes, and altered healthcare access, highlighting the need for tailored support and communication strategies.	More than half of the participants preferred written letters to communicate with their providers. Limited Internet access cited as one of three reasons that migrants with chronic disease were negatively affected by the pandemic due to limited access to health care.

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(Weyman n et al., 2016)	Assess the information and decision support needs of Type 2 Diabetes patients.	Cross-sectional study with semi-structured interviews and questionnaires.	Patients with Type 2 Diabetes in Germany.	Various healthcare settings in Germany.	Patients with diverse demographic backgrounds, diabetes durations, and treatment types.		Interviews and questionnaires among patients and physicians.	Qualitative and quantitative analysis, including content analysis and statistical evaluation.	Significant use of the Internet for diabetes information, varied diabetes knowledge, and a desire for shared decision-making.	Sample of older adults with Internet access didn't match the population. Potential bias of those willing to participate in research were interested in technology.	The authors highlight the importance of Internet access and literacy in managing diabetes, emphasizing the need for accurate, accessible online information and decision support tools tailored to individual patient needs. 61.7% report using the Internet to look for health information online. 35.1% who did not look for health information online did not have Internet access.	Adoption of Internet must be considered in sharing health information and decision support
(Samadbeik et al., 2018)	To determine the readiness of patients with chronic diseases in Khorramabad, Iran, to use Health Information Technology (HIT).	Cross-sectional study.	Patients with chronic diseases (respiratory, cardiovascular, renal, diabetes) in Khorramabad, Iran.	Clinics of educational hospitals in Khorramabad, Iran.	Sample Size: 475; majority male (54.88%), married (84.16%), self-employed (40%), with education level below high school or high school (55.12%), urban residents (75.36%).	Conducted in 2016.	Convenience sampling method; PRE-HIT questionnaire.	Data collected using the PRE-HIT questionnaire, analyzed with SPSS version 20.	24.4% of participants had computer experience. Medium level of readiness to use HIT, with highest scores in relationship with doctors and lowest in computer anxiety.	Access to the Internet is not directly assessed.	There is medium-level readiness among chronic disease patients to use HIT. Computer experience and sociodemographic factors influence this readiness. The findings suggest the need for improving computer literacy and addressing barriers to HIT adoption.	Education level had a significant association with computer and Internet expertise. Rural inhabitants have readiness for technology usage but authors cite other literature about lack of resources.

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(Price-Haywood et al., 2017)	Explore eHealth literacy and strategies to encourage patient portal use among older adults.	Cross-sectional survey.	Older adults (≥50 years) with hypertension or diabetes.	Ochsner Health System, Southeast Louisiana.	247 patients, majority female, diverse in age and chronic conditions.	August 2015 to January 2016.	Systematic sampling with a structured survey.	eHealth Literacy Scale (eHEALS), portal usage and interest assessment.	Positive correlation between eHealth literacy and portal usage. Barriers include privacy concerns, technological literacy, and perceived value.	Single site, survey response bias	Higher eHealth literacy is linked to increased patient portal usage among older adults, suggesting the need for tailored interventions to enhance digital literacy and address specific barriers. "I don't have a computer. If I had one, I would use it [MyOchsner]. I miss appointments all the time and if I had a computer, I could enter them on there and get reminders. I have a cell phone from the government that just calls."	Portal users had higher education and younger age. Some nonusers report lack of desire to use portal, lack of digital literacy, lack of computer/Internet access. Most older adults reports they would need assistance with tech.

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(Chérrez-Ojeda et al., 2018)	To assess the frequency and patterns of ICT usage among Ecuadorian patients with T2DM and their preferences for different types of ICTs.	Cross-sectional survey.	Patients with Type 2 Diabetes Mellitus in Ecuador.	Outpatients from public or private practices in Guayaquil, Ecuador.	248 patients, mean age of 57.7 years, majority female (62.1%), with varying levels of education.	Not disclosed	Anonymous survey distributed to eligible outpatients.	Chi-square test for association, adjusted regression analyses.	SMS was the most used ICT (66.0%). Internet was used by 45.2% of patients for diabetes information. Higher preference for email and SMS among younger patients and those with a superior degree.	Analysis based on survey responses; potential biases in self-reported data.	Access to and preferences for ICTs among patients with T2DM in Ecuador are influenced by demographic factors like age and education. Highlights the importance of understanding patient preferences and digital literacy in designing ICT-based interventions for diabetes management, especially in developing countries.	Internet access reported for only 27.2%. Internet enables smartphone = 46.8%. Lack of access impacts health interventions. Education and income associated with higher ICT use.
(Terkeş et al., 2022)	To evaluate technology use and attitudes towards technology in patients with Type 2 Diabetes.	Descriptive study, observational.	250 patients with Type 2 Diabetes at a university hospital in Turkey	Endocrinology and metabolic diseases department, university hospital, Mediterranean region, Turkey.	250 patients, mean age 58.49 years, majority female (66%), varied educational backgrounds.	January to June 2017.	Systematic sampling from a university hospital, using a structured questionnaire and the Attitude Towards Technology Scale.	Analysis of questionnaire responses and Attitude Towards Technology Scale scores.	34.8% used the Internet for health-related information, positive correlation between technology use and favorable attitudes towards technology, influenced by age and educational status.	Attitudes are self-reported, single center study.	Significant use of technology among Type 2 Diabetes patients. Younger, more educated patients exhibit more favorable attitudes towards technology, indicating a potential avenue for digital health interventions in diabetes management.	Favorable attitude towards health information online but tended to be younger and more educated.

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(Ramasamy et al., 2016)	To examine the association of sociodemographic and technology use with health literacy among type 2 diabetic individuals	Exploratory cross-sectional study	Type 2 diabetes mellitus (T2DM) patients in Chennai, India	Diabetic clinic of Saveetha Medical College, Chennai, India	100 T2DM patients; more than half were males with an average age of 55 years, mostly married, living in urban settings, and with varied education and income levels	August 2013	Convenient sampling during regular outpatient visits	Modified questionnaires, univariate statistics, chi-square analysis, binary logistic regression, content analysis of open-ended data	Significant association between technology use and health literacy; issues in understanding medical condition and healthcare provider information were more common in individuals with less access to technology	Based on exploratory design with potential biases in self-reported data and limitations due to the cross-sectional nature. Internet/computer use assessed but not mobile phone/mobile Internet usage. Sampling methodology.	The study reveals the crucial role of technology, particularly Internet access, in enhancing health literacy among type 2 diabetic patients. Need for improved digital access and literacy to aid in better diabetes management, especially in settings where technological disparities exist	Higher health literacy associated with computer and Internet in the home (in sample of patients in India). 40% of participants were familiar with use of computers. 43% had Internet in their home.
(Walle et al., 2023)	To assess the willingness of diabetes mellitus patients to use mHealth applications and identify associated factors for self-care management in Ethiopia.	Institutional-based cross-sectional study.	Patients with diabetes mellitus in Ethiopia.	Public hospitals in Ilu Abba Bor and Buno Bedelle Zones, Oromia Regional State, southwest Ethiopia.	398 participants, predominantly male (56.3%), aged 43±14.6 years, with a majority living in urban areas (69.3%).	Conducted from November 12 to December 21, 2022.	Systematic random sampling from public hospitals, using pretested interviewer-administered questionnaires.	Data analysis using Epi Data V.4.6 and STATA V.14, multivariable logistic regression analysis for identifying associated factors.	High willingness (71.4%) to use mHealth applications among diabetes patients. Factors like younger age, urban residence, Internet access, positive attitudes, and perceived ease and usefulness significantly influenced this willingness.	Based on a quantitative, cross-sectional design with potential interviewer bias, lacking inclusion of private hospitals.	Internet access and digital literacy have an important role in determining the willingness of diabetes patients to use mHealth applications for self-care. The need for enhancing Internet connectivity, digital literacy, and user-friendly design in mHealth tools to improve diabetes self-care management, especially in low-income settings.	Willingness to use mHealth applications high but adoption (13.1%) and access is low (57.2% have smart phone).

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(Jemere et al., 2019)	Determine mobile phone access and willingness to receive mobile-based diabetes health services in Northwest Ethiopia.	Institution-based cross-sectional survey.	Patients with diabetes, both male and female, varied age groups.	Northwest Ethiopia, University of Gondar Hospital diabetic clinic	423 systematically selected patients with diabetes.	February to March 2016.	Systematic random sampling; data collected through face-to-face interviews.	Questionnaire-based survey.	High access to mobile phones (77.8%) among patients, with a significant portion willing to receive mHealth services (70.5%). Factors like educational status, medication route, and transportation mechanism were significantly associated with this willingness.	Metropolitan area lacked rural participants, interviewer bias -- but mitigated with standardized interview.	Strong potential of mHealth services in diabetes care, highlighting the high access to mobile phones among diabetic patients and their willingness to engage with mobile phone-based health services, suggesting a viable route for enhancing diabetes management and education in this population.	text message or voice call interventions viewed favorably to assist with self-care management of diabetes
(Yoon et al., 2023)	Assess changes in diabetes medication adherence, hospitalizations, and primary care use during the pandemic.	Longitudinal analysis.	High-risk diabetic patients in the Veterans Affairs health care system.	United States	Predominantly male, older adults, various ethnic backgrounds.	2019-2021	Data from the Veterans Affairs health care system.	Analysis of healthcare utilization and medication adherence data.	Despite the shift from in-person to virtual care, medication adherence remained high; however, there were initial reductions in in-person primary care, ED visits, and hospitalizations.	95% male participants. Rural participants favored in-person visits over virtual but unclear as to why.	Shift to virtual care during the pandemic did not significantly disrupt medication adherence among high-risk diabetic patients, suggesting resilience in healthcare delivery systems under emergency conditions.	Rural patients relied more on in-person care. Internet access hypothesized as factor but not assessed.

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(Yom-Tov et al., 2016)	To analyze how health literacy influences the way Internet users seek and understand information about diabetes.	Observational study analyzing Internet search behavior related to diabetes.	Internet users in the United States searching for diabetes-related information.	Online environment, specifically the Bing search engine	Approximately 2 million people who queried for diabetes-related information on Bing.	3-month period from May 2014 to July 2014	Analysis of search queries and user behavior data from the Bing search engine.	Queries filtered for diabetes-related terms, analysis of user search patterns and dwell times on web pages, health literacy imputed from community-based scores.	People with limited health literacy tend to spend more time on easily readable pages and less on complex ones. They often end their searches prematurely and may struggle to understand high-reading-level content. The study observed differences in the types of information accessed based on health literacy, with limited literacy users browsing more diet and fitness pages.	One search engine data, just search data no individual covariates. Reliability in question. Health literacy was inferred.	There are disparities in how individuals with different levels of health literacy use the Internet to learn about diabetes. Those with limited health literacy face challenges in accessing, understanding, and engaging with online health information. This indicates that digital inequalities in health literacy can significantly impact the effectiveness of online resources in educating users about diabetes management and care, suggesting a need for more accessible and comprehensible online health information.	Suggestion that disparities in health literacy exists in population connected to the Internet or using the Internet to search for health information.
(Whitacre & Brooks, 2014)	To explore the impact of broadband adoption rates on community health outcomes.	Observational study using a first-differenced modeling approach.	Residents of 92 metropolitan/micropolitan statistical areas (MSAs) in the USA.	Diverse urban and suburban regions in the United States.	Aggregated data from MSAs with diverse demographic profiles.	2002 to 2009.	Data sourced from the Behavioral Risk Factor Surveillance System and Federal Communications Commission.	Regression analysis with a first-difference approach to examine changes in health outcomes.	Broadband adoption is significantly correlated with changes in 9 out of 24 health measures, including smoking rates and consumption of fruits and vegetables.	Assumption that broadband adoption in 2002 was zero. Limited to MSAs (n=92 observations). Longitudinal data used first-difference approach.	Increasing broadband adoption may influence certain health outcomes, shows potential of broadband as a tool for public health improvement.	Increase in Broadband adoption are associated with slight decreases in rates of individuals with diabetes.

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(Umeh et al., 2015)	To assess the effects of ICT uptake on diabetes prevalence, particularly examining ethnic disparities between South Asian and Caucasian populations.	Observational study using data from the UK Office for National Statistics household survey, analyzed through hierarchical binary logistic regression.	Residents of the UK, with a focus on South Asian and Caucasian ethnic groups.	The study utilizes data from a nationwide survey in the UK.	120,621 participant records from the UK household survey, covering years 2006-2011, with ethnicity classified into 'Caucasian' and 'South Asian' groups.	Data analysis covers 2006 to 2011.	Analysis of archival data from a national household survey.	Hierarchical binary logistic regression analyses, controlling for confounding variables.	ICT uptake was found to modify ethnic differences in diabetes prevalence. Presence of a home computer and mobile phone dependence varied by ethnicity.	Computer definition does not include tablets. Type 1 or Type 2 diabetes not distinguished.	The study highlights the role of ICT in modifying diabetes risk across ethnic groups, showing a significant interplay between technology use, socioeconomic factors, and diabetes prevalence.	A computer at home is associated with higher socioeconomic status and must be considered when thinking about diabetes risk.
(Sharma, 2023)	To explore the association between food insecurity, Internet access, and diabetes prevalence across different geographic scales.	Observational study using multiscale geographically weighted regression (MGWR).	Counties in Southeastern United States.	Southeastern region of the U.S. (Alabama, Arkansas, Mississippi, Tennessee).	319 counties in the Southeastern U.S.	2019	Analysis of existing data from multiple sources such as the Behavioral Risk Factor Surveillance System and American Community Survey.	MGWR for spatial analysis	Food insecurity and lack of Internet access were positively associated with diabetes prevalence, with variations across regions	Ecological data, not causal analysis.	Significant influence of food insecurity and Internet access on diabetes prevalence. Need for targeted public health interventions in regions with higher rates of food insecurity and lower Internet access.	Counties with a greater number of households without Internet access were associated with higher levels of diabetes.

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(Hincapie et al., 2019)	To explore barriers to medication adherence in medically underserved (MU) populations and identify opportunities for mHealth adherence interventions.	Qualitative cross-sectional focus group.	Medically underserved patients with chronic conditions at a federally qualified health center in Dayton, Ohio.	Federally Qualified Health Center (FQHC) serving medically underserved areas (MUA) and/or medically underserved populations (MUP) in Dayton, Ohio.	17 patients participated in 4 focus groups, predominantly male, with chronic diseases such as diabetes, dyslipidemia, and/or hypertension, prescribed 3 long-term medications.	Conducted between 2015 and 2016.	Convenience sampling at the FQHC, using focus groups and thematic analysis.	Data collected through focus groups, analyzed thematically using the Health Belief Model as a theoretical framework.	Identified barriers included complexity of medication regimens, changes in daily routine, and technological literacy. Some patients expressed willingness to try smartphone applications, but affordability was a concern.	Small sample of Ohio underserved patients. Diabetes behaviors based on self-report, not validated. Results were not stratified by access level (Internet/Smart Phone usage)	There are diverse experiences in mHealth for medication adherence. Providing patient-centered approaches to assist patients in constructing individualized medication adherence strategies may lead to better outcomes. 3/17 reported Internet access at home, 5/17 had smart phone	Experiences for non mHealth use include too complicated.

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(Nguyen et al., 2022)	Investigate the interaction of social determinants of health (SDoH) in chronic disease management within vulnerable populations.	Qualitative research involving in-depth interviews, neighborhood tours, and clinic visit observations.	Patients with diabetes and community leaders in underserved San Francisco neighborhoods.	Safety-net healthcare settings in socioeconomically deprived San Francisco neighborhoods.	10 patients with diabetes or prediabetes and 10 community leaders; majority Black, average age 62, most earning less than $20,000 annually, and managing multiple chronic conditions.	Data collected in 2019.	Purposive selection; interviews, neighborhood tours, and clinic visit observations.	Qualitative data analysis using Atlas.ti 8 software, applying the NIMHD research framework, focusing on individual, interpersonal, community, and societal levels.	Identified significant SDoH across socioecological levels impacting chronic disease management, including physical disability, housing, neighborhood environment, and structural barriers.	recruitment inclusion required smartphone ownership; limited generalizability from sample, lack of causal connection through model and diabetes outcomes	Complex SDoH across multiple levels in chronic disease management. Suggesting need for tailored interventions in healthcare for vulnerable populations.	20% participants report not using the Internet, only 40% felt familiar with using a mobile phone. Limited health and digital literacy are individual barriers to chronic disease management.
	To explore the feasibility of online diabetes nutrition education for American Indian and Alaska Native (AI/AN) adults with Type 2 diabetes.	Qualitative study involving focus groups and interviews.	AI/AN adults with Type 2 diabetes and key stakeholders in these communities.	Various AI/AN communities across the United States.	AI/AN adults with Type 2 diabetes, along with healthcare providers and other stakeholders in these communities. Focus group sizes 29 | 22 | 10 | 9	Data collected in August–October 2018.	Participants were recruited for focus groups and interviews across four AI/AN communities.	Focus groups and interviews were conducted, supplemented with surveys to gather demographic data and technology use.	AI/AN adults frequently use smartphones for Internet access, are open to online diabetes nutrition education, and recognize the potential benefits of such programs.	Higher than average educational attainment for AI/AN population. Participants recruited from diabetic centers, biased towards those with access.	Online diabetes nutrition education is a promising and feasible approach for AI/AN communities, given the widespread use of smartphones and Internet access. It can potentially overcome barriers to traditional education methods and provide tailored, accessible health information.	81% of participants with T2D report access to the Internet (67% from their phone). 90% have access through a family member. Use of the Internet for diabetes programs viewed favorably.

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(Fuji et al., 2015)	Explore the use of Personal Health Records for managing diabetes-related health information.	Qualitative study using conventional content analysis.	Patients with Type 2 diabetes.	"Midwest metropolitan city"	59 participants, aged 28-80, predominantly female and white/Caucasian, all high school graduates or higher.	not disclosed	Recruited from internal medicine and endocrinology clinics; data collected through interviews.	Participants received PHR training; interviews conducted to explore PHR use.	Positive experiences included a complete and accessible health record, increased awareness, and behavioral changes. Negative experiences encompassed issues like "out of sight, out of mind," economic and computer literacy barriers, lack of patient-provider engagement, double tracking, and privacy concerns.	Sampling characteristics may limit generalizability.	Mixed experiences with PHR use. While it enhanced awareness and led to behavioral changes in some, others faced barriers like economic constraints, computer literacy challenges, and lack of engagement from healthcare providers, suggesting a need for better integration of PHRs into diabetes care. Participants cited issues with affording and accessing technology and the Internet.	Some participants lacked the financial means to access technology. Others lacked reliable Internet, even in a public library. Digital literacy cited as a barrier for one participant.
(Dao et al., 2019)	explore factors influencing Type 2 Diabetes Mellitus (T2DM) self-management in general practice.	Qualitative study with semi-structured interviews.	Patients with T2DM and their general practitioners and practice nurses in South West Sydney.	General practices in a low socioeconomic area of Sydney, New South Wales, Australia.	10 patients with T2DM and 17 healthcare providers (10 GPs, 7 practice nurses).	Not disclosed	Purposive sampling: interviews conducted with patients and providers.	Thematic analysis using the socio-ecological model as a coding framework.	Factors influencing self-management included individual (e-health literacy, motivation), interpersonal (family and friends, patient-provider relationship), organizational (affordability, multidisciplinary care), and community levels (culture, self-management resources).	Selection bias due to sampling from clinic. All participants in study had Internet access. Small sample from single area.	Diabetes management is complex, influenced by multiple factors beyond individual patient control, suggests the need for comprehensive, multi-level strategies in general practice settings.	If patients had access, they didn't know how to use it according to providers. Patients say they don't know how to appraise the information. Many patients of providers are elderly and do not have access to the Internet.

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(Johnson, 2023)	To explore African American veterans' experiences and attitudes towards using the My HealtheVet online portal for diabetes management.	Qualitative study with semi-structured interviews.	Non-Hispanic African American veterans diagnosed with type 2 diabetes.	Veterans Affairs health care system.	35 participants; mostly male, aged 35-73 years, varied educational background and financial stability.	Interviews conducted between March and June 2020.	Participants were recruited from a large Midwestern VA medical center and interviewed via phone.	Inductive thematic analysis of interview transcripts.	Participants valued MHV for convenience but reported barriers like preference for pre-MHV routines and distrust in institutional and technological aspects.	Lack of female representation. All level of diabetes included. May be different based on severity of illness.	Digital disparities, especially among African American veterans, are influenced by sociocultural factors and personal experiences with technology and healthcare institutions. These factors significantly affect the adoption and effective use of digital health tools like My HealtheVet for diabetes management.	All participants had a cell phone, and most used it to access the Internet.
(Talebian et al., 2021)	To explore the health information-seeking behavior of diabetic patients.	Qualitative, grounded theory approach.	Iranian diabetic patients.	Healthcare and diabetes centers in Kerman, Iran	18 diabetic patients, both men and women, aged 38-65, with varied educational backgrounds.	Interviews conducted in June 2019.	Purposive sampling, semi-structured interviews.	Data analyzed using the grounded theory approach, with thematic categorization.	Identified five main categories - recognizing information needs, acquiring health information literacy, information seeking barriers, supportive information directing factors, and empowerment. Patients used various sources, including healthcare professionals and the Internet, for health information.	Population potentially biased due to recruitment from diabetes centers.	Range of interactive factors centered on health information acquisition influences the health information-seeking behavior of diabetic patients.	Some patients consult Internet sources for education but some barriers include lack of trust, overwhelming information, usually consulted doctor first.

Citation	Study Objectives	Study Design	Population Studied	Setting	Sample Characteristics	Timeframe of Study	Recruitment Data Collection Methods	Additional Methods Notes	Key Findings	Limitations	Relevant summation of Study	Themes
(Sidhu et al., 2022)	Explore knowledge and awareness of T2DM, related risk factors, and views on health seeking behaviors for T2DM information in young Punjabi Sikhs in the UK	Qualitative, phenomenological, semi-structured 1-1 interviews	Young Punjabi Sikh community in UK	Participants were recruited from a Sikh temple and University of Manchester Sikh Society in West Yorkshire and North West England	13 participants, predominantly female, well-educated, living in family homes.	Data collection between December 2018 and May 2019.	Participants were recruited via a Sikh temple and University of Manchester Sikh Society using purposive and snowball sampling. Interviews were audio-recorded.	Inductive thematic analysis of interview data. Purposive sampling, snowball sampling	T2DM is perceived as linked primarily to diet, particularly sugar intake, with less emphasis on physical activity. Gender and cultural norms influence diet and physical activity. The Internet is preferred over healthcare professionals for T2DM information, due to convenience and perceived lack of cultural awareness among professionals.	Limited sampling of males.	Young Punjabi Sikhs in the UK prefer using the Internet for T2DM information, citing its convenience and ease of access compared to the effort required to visit a doctor. This shows the importance of Internet access and digital literacy in managing diabetes, particularly in culturally specific contexts where traditional practices and gender norms play a significant role	Positive Disposition towards the Internet as a source of health information.
(Kim et al., 2023)	Assess outcomes of the ACTIVATE program, designed to improve monitoring and care of diabetes and hypertension using digital health tools in a rural community.	Quality improvement project, not human subjects research.	Patients with uncontrolled diabetes and/or hypertension in rural California.	Federally qualified health center in rural California	50 patients, majority White and Hispanic or Latino, mean age 55, primarily Spanish-speaking.	April to December 2021.	Recruitment from health center, enrollment survey for demographics, technology access, digital literacy.	Remote patient monitoring, health coaching, data analysis.	Significant improvements in A1c and blood pressure, high engagement and usage of digital health tools.	Participant retention. Small sample size. Occurred during COVID-19, external factors may have influenced results.	The ACTIVATE program demonstrated that targeted digital health interventions can improve chronic illness management in rural, underserved communities, addressing challenges such as Internet access and digital literacy to enhance diabetes and hypertension outcomes.	44% did not have access to the Internet. 60% had access through a cell-phone. Provided solution for those without access. Results were positive.

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(Chambers et al., 2015)	Examine the feasibility and effectiveness of a home-visiting intervention for diabetes prevention and management in American Indian youth.	Single-group, pre-post pilot intervention study.	American Indian youth aged 10-19 years, at risk for or diagnosed with Type 2 diabetes.	Rural and isolated American Indian reservation lands.	Predominantly male participants, varied in age, with risk factors for Type 2 diabetes.	Not disclosed	Referrals from local healthcare providers, with data collection through interviews, surveys, and medical assessments.	Multi-faceted intervention involving nutrition, physical activity, and psychosocial support, delivered through home visits and community activities.	Improvement in knowledge and behaviors related to diabetes prevention and management. Few Internet access (38.6%).	Lack of control cohort. Internet access was assessed but not a main variable analyzed in the study.	This study indicates that a culturally tailored, family-oriented home-visiting program can positively influence diabetes outcomes and knowledge among American Indian youth.	Few participants report Internet access, all participants considered "at risk" by BMI or A1c criteria
(Mansour, 2021)	To understand the information-seeking behavior of Egyptian adult patients with Type 2 Diabetes Mellitus (T2DM).	Survey, Cross-sectional	Egyptian adult patients with T2DM.	Outpatient clinics and Egyptian government health centers.	311 Egyptian adult patients with T2DM, diverse in age, gender, and socioeconomic background.	Conducted in April 2021.	Systematic random sampling, using a structured questionnaire	Analysis of survey responses using statistical tools.	High use of Internet/web and social media for diabetes information; significant barriers include privacy concerns, lack of understanding due to scientific terms, and lack of basic infrastructure.	Sample were more educated most with Bachelors degrees.	Internet access and digital literacy influence the information-seeking behavior of Egyptian T2DM patients, with barriers impacting the efficacy of this process.	Lack of Internet access and digital literacy can create barriers in information retrieval

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(Rastegari et al., 2022)	To delineate patients' functional and critical health literacy and its association with socio-demographic variables and self-efficacy.	Survey-based study employing quantitative methods.	384 participants resembling residents of Isfahan, Iran in terms of educational attainment and self-efficacy.	The study is centered on referrals to Isfahan health centers. Iran.	The sample comprised 384 individuals who were patients, diverse in terms of age, gender, and educational attainment. Mostly female less than 30 years old. Mostly HSD or Bachelor's	Data collection occurred in 2019	Random sample selection with structured questionnaire administration.	Utilization of the Newest Vital Sign (NVS) for functional literacy and the eHEALS for digital literacy aspects, supplemented by Pearson's correlation coefficient and regression analysis.	Over 60% of respondents had inadequate or marginal health literacy levels. Higher education and self-efficacy scores were associated with higher eHealth literacy levels.	Sample were patients, potentially more concerned with their health status. Older adults refused to fill out the eHEALS questions.	The study showed significant gaps in health literacy among Iranian patients, with a notable correlation between higher education levels and improved eHealth literacy. Reveals the importance of targeted literacy interventions in healthcare.	High rates of lower health literacy, Internet availability cited as 90%.

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Other Information

Protocol and Registration. Methods were preregistered prior to screening on the Open Science Framework Registry accessible via doi.org/10.17605/OSF.IO/24ZXD.

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Availability of Data, Code, and other materials. All studies' meta-data were extracted and available prior to screening via the Open Science Framework Registry. Screening and data collection matrix is also available in the Open Science Framework project at https://doi.org/10.17605/OSF.IO/24ZXD