



Promoting digital health literacy among immigrants in Sweden: opportunities and challenges for healthcare services

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Received: 6 November 2024 / Accepted: 2 May 2025
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Abstract

Aim The digital transformation in healthcare calls for an inclusive approach to promote digital health literacy, to increase access to digital healthcare services. The objective of this study was to explore the key barriers and opportunities experienced by individuals with immigrant backgrounds in Sweden, providing insights to strengthen digital health literacy across the European Union (EU).

Subject and methods A total of 20 participants with immigrant backgrounds in Sweden were interviewed using a semi-structured interview guide developed as part of the EU-funded IDEAHL project. Interviews were conducted in group or individual settings. The data was transcribed and analyzed using qualitative content analyses.

Results Key challenges to digital health literacy were identified, including a lack of support in navigating digital healthcare services. Participants highlighted the potential of digital support tools to simplify healthcare interactions, allowing patients to evaluate symptoms and concerns before consulting healthcare professionals. They also emphasized the importance of integrating cultural considerations to aid healthcare providers in delivering culturally sensitive care. Furthermore, participants noted difficulties in actively participating in shared treatment decisions, often due to cultural beliefs about deferring to healthcare professionals.

Conclusion Expanding access to digital health services requires inclusive interventions to support the integration of minority communities into the digital health landscape. Addressing the diverse needs within immigrant populations is crucial to support equitable digital health access.

Keywords Digital health literacy · Digital transformation · Immigrants

Introduction

The digital transformation in healthcare has reshaped how healthcare services are delivered and accessed (Hameed et al. 2024). Innovations such as electronic health records,

telemedicine, and mobile health applications have the potential to improve public health by improving patient outcomes, increasing efficiency, and expanding access to care (Kasoju et al. 2023). However, realizing these benefits depends on individuals possessing the necessary skills to effectively navigate on digital health platforms (Arias López et al. 2023). This makes digital health literacy—the ability to find, understand, evaluate, and use digital health information—a crucial factor for promoting proactive and preventive health behaviors (van Kessel et al. 2022). Higher levels of digital health literacy not only empower individuals to make informed decisions about their well-being but also help prevent health disparities in the digital healthcare landscape (Arias López et al. 2023).

One critical challenge is the emergence of the digital health divide, which refers to the unequal ability among individuals to access and benefit from digital technologies

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(Bitomsky et al. 2024). Marginalized groups, such as immigrants, are often more vulnerable to digital exclusion, facing barriers such as limited language proficiency, lack of technological skills, and unfamiliarity with healthcare systems (Pérez-Escolar and Canet 2023). For immigrants in Sweden, these challenges are further compounded by cultural differences and previous experiences with healthcare that may differ from those in their country of origin (Bywall et al. 2024).

Digital health literacy has become a growing public health concern in Sweden, especially for vulnerable populations like older adults and immigrants (Bergman et al. 2021). Despite Sweden's high level of digitalization, research highlights substantial disparities in digital health access and use among migrant populations (Wångdahl et al. 2014). Recognizing this, Swedish policymakers emphasize the need for a comprehensive national strategy to strengthen digital health literacy across all population segments (Bywall et al. 2024). Without targeted interventions, the digital health divide risks deepening social inequalities and undermining efforts to create an inclusive healthcare system (Shaw 2023). This challenge is now being addressed through the newly established IDEAHL strategy, which aims to improve digital health literacy across the EU.

Globally, initiatives such as the World Health Organization's efforts to promote digital health literacy exemplify a unified effort to address health disparities (Borges do Nascimento et al. 2023). These initiatives highlight the importance of culturally tailored resources and targeted training for vulnerable populations, including immigrants.

This study was part of the EU-funded project, the *Improving Digital Empowerment for Active Healthy Living* (IDEAHL) project, supported by the European Commission (101057477), which aims to map and enhance individuals' ability to navigate the complex digital health landscape and establish a framework for digital health literacy.

This IDEAHL study specifically aimed to explore the key barriers and opportunities experienced by individuals with immigrant backgrounds in Sweden, providing insights to strengthen digital health literacy across the EU.

Methods

The IDEAHL project included 14 EU partners. A co-creation approach engaging a diverse range of digital health literacy stakeholders—including citizens, healthcare providers, researchers, policymakers, experts, and vulnerable groups was implemented to gather valuable insights. This inclusive method was applied across 10 EU member states, supporting collaboration and knowledge exchange.

This study presents findings from co-creation sessions conducted with immigrants in Sweden, aimed at identifying

barriers and opportunities to improve digital health literacy within this group. Using a co-creation approach, group and individual sessions were held in community settings such as libraries and language cafés, facilitated by a volunteer organization that supports immigrants in learning the Swedish language.

Participants

As part of the IDEAHL project's co-creation sessions aimed at developing an EU-wide strategy, 20 participants with immigrant backgrounds in Sweden were interviewed in 2023. Potential participations were approached at the libraries or language cafés, venues where immigrants often gather to learn about Swedish society and language. Information about the IDEAHL project and study details was provided in both oral and written formats. Researchers and participants were previously unacquainted, and eligibility criteria included being over 18 years old and capable of providing informed consent. All participants provided informed consent prior to participation, and the study was approved by the Swedish Ethical Review Authority (Dnr: 2022–05670-01).

Data collection and analysis

Data for this study were gathered through individual and group interviews with individuals from immigrant backgrounds in Sweden, focusing on their experiences with digital health literacy. A semi-structured interview guide, developed within the framework of the IDHEAL project (see Table 1), was used to facilitate the interviews. The interviews were conducted either in group settings or individual settings, based on the participants' preferences and comfort. All interviews were recorded, transcribed verbatim, and analyzed using qualitative content analysis (Elo and Kyngäs 2008). This analytical approach was selected for its ability to systematically identify themes, patterns, and key insights, offering a nuanced understanding of the barriers and opportunities related to digital health literacy among immigrant communities.

The qualitative content analysis followed a step-by-step process: (1) Familiarization with the data: Each transcript was thoroughly reviewed multiple times by the first author KSB to develop a comprehensive understanding of the content. (2) Coding: Significant segments of the data were identified and assigned codes that captured the core meanings of participants' statements. (3) Categorization: Codes were organized into sub-categories based on observed similarities and patterns, enabling a structured analysis. (4) Theme Development: The sub-categories were further refined into main categories, representing the primary themes that emerged from the data.

Table 1 Interview guide

Introduction (information about the purpose and space for questions) (10 min)

- Describe the purpose of IDEAHL and Digital Health Literacy
- Complete consent form (5 min)
- Answer a short questionnaire with background questions (5 min)
- Start voice recording and begin the focus group

Questions:

- How often do you seek information about your health online?
- What do you use to search for information, mobile, app, etc.?

When you search online for health information, how easy or difficult is it for you (40 min):

- To assess whether you can trust the information?
- To understand the information?
- To use the information to solve a health problem?
- To determine if the information is suitable for you?
- To find the exact information you are looking for?
- To visit different websites to check if they offer similar information on a topic?
- To use the right words or search queries to find the information you are looking for?
- To assess whether there are financial interests of the information provider?

Break (10 min)

When you write a health-related message on a digital device, how easy or difficult is it for you to (30 min):

- Express your opinions, thoughts, or feelings, or ask a question in writing on social media including online forums?
- Clearly formulate your written message when communicating with a healthcare provider?

Summary of the discussion (10 min)

- Space for clarification and questions (10 min)
- Conclude, stop the voice recording, thank the participants, and ensure they have contact information for Karin Schölin Bywall, the responsible researcher

This iterative analysis process ensured that categories accurately represented participants' perspectives. The analysis revealed four primary themes: (1) Diverse digital engagement, (2) Navigation of online health platforms, (3)

Promoting digital health literacy for informed healthcare interactions, and (4) Challenges and opportunities (see Table 2).

Table 2 Qualitative content analysis

Code	Sub-category	Main category
Digital literacy: family support vs. personal engagement Exploring digital health literacy perspectives Habits of digital use and reliance on online information	Diverse digital engagement among immigrants in Sweden	Diverse digital engagement
Utilization and limitations: insights into online health information platforms Diverse approaches to information search: from Google to YouTube	Digital health literacy among immigrants in Sweden: navigating online health information	Navigation online health platforms
Challenges and advocacy: the quest for accessible and reliable health resources Customized digital tools: bridging the gap in immigrants' health information access Navigating language and culture: Advancing communication in healthcare Empowerment through digital health: pioneering accessible resources for immigrants	Empowering immigrants: promoting digital health literacy for informed healthcare interaction	Promoting digital health literacy for informed healthcare interactions
Unveiling online health behaviors: the use of digital platforms among immigrant communities Barrier breakdown: overcoming challenges to access and comprehend health information Digitalizing healthcare: the quest for reliability and accessibility in immigrants' health journey	Digital health literacy landscape for immigrants in Sweden: opportunities and challenges	Challenges and opportunities

Results

This study involved 20 individuals, all identified themselves as newcomers to Sweden. Participants were recruited from non-profit organizations dedicated to helping newcomers learn Swedish. The group was diverse consisting of both men and women across a broad age range, the youngest was 18 years old. Representing several different countries, participants brought a range of perspectives that enriched discussions about their experiences and challenges related to digital health literacy.

Diverse digital engagement

The initial questions revealed varied levels of familiarity with digital technologies among participants, especially concerning smartphone use and online information access. While most participants used digital tools daily, one noted, *“I cannot live without the internet; I use it all the time.”* Yet, there was a distinct divide in how digital tools were applied to search for health information.

One participant shared that they rarely used the internet, preferring to consult relatives for health-related guidance, saying, *“I am a bit unsure about the internet... I’d rather call the healthcare centre to book an appointment.”* Another participant echoed this sentiment, highlighting their dependence on family support for navigating online health resources, suggesting limited confidence in independent digital engagement. This range, from heavy reliance on technology for everyday information to limited trust or avoidance of digital sources underscores the need to address diverse digital health literacy when developing digital health literacy initiatives for immigrants.

Navigating online health information

Participants identified several challenges in accessing digital health information, particularly on the national health portal 1177 in Sweden. An issue raised by several participants was language barriers; one participant remarked, *“I find it hard to understand the medical terms on 1177... I usually call them directly because it’s simpler that way.”* Furthermore, several participants expressed frustration with the lack of search and chat functions, which hindered their ability to locate specific information. As one participant shared *“Sometimes I can’t find what I’m looking for, so I call instead.”*

Google was frequently mentioned as a go-to resource for health information, even amid concerns regarding the reliability of online content. One participant shared, *“I Google health information, but I always double-check by calling 1177.”* This highlights a trend toward verifying

digital information before acting. YouTube also emerged as a valuable tool for several participants, particularly for seeking information in their native languages.

Despite facing challenges, participants recognized the advantages of Sweden’s digital healthcare services. Many expressed appreciations for the convenience of booking appointments and managing prescriptions online, with one participant noting, *“The digitalisation here makes it faster to get prescriptions and see private doctors.”* However, there was a consistent call for more accessible and culturally sensitive digital platforms to better meet the diverse needs of users.

Promoting digital health literacy for informed healthcare interactions

Participants advocated strongly for digital health tools that target specifically to the needs of immigrants, as their unique experiences often differ from those of native Swedish speakers. A widely supported idea was the introduction of pre-appointment tools that allow patients to input symptoms, questions, and preferences before meeting with a healthcare provider. One participant proposed, *“It would be helpful to send digital invitations with a checklist or questions before the appointment... to help the doctor understand what I need,”* reflecting a desire for preparation that could reduce language or cultural misunderstandings during the visit.

The importance of including multilingual support in such tools was emphasized, as some participants noted that Swedish-only platforms posed accessibility challenges. One participant shared, *“If I could describe my symptoms in my language before the visit, it would save so much time,”* underscoring the efficiency that language-customized tools could bring. In addition to pre-appointment input options, there was interest in digital summaries or reminders following appointments, as several participants mentioned difficulty in recalling details of medical advice given verbally. One participant stated, *“Sometimes I forget what the doctor said, and it would help to have a written summary in my language,”* highlighting the value of accessible post-visit resources.

Participants also emphasized the need for culturally aware tools that account for communication preferences, particularly around the use of interpreters and preferred languages. One participant expressed, *“Doctors should know if I need an interpreter or if I prefer communication in my language,”* illustrating that language needs and cultural sensitivity are integral to feeling understood in healthcare interactions. Others noted that while interpreters were sometimes available, a direct indication of interpreter needs in digital systems would ensure that they are automatically provided when needed, reducing potential discomfort during consultations.

Furthermore, some participants suggested the integration of cultural competency into digital tools to better align with immigrants' diverse backgrounds. For example, one participant explained that digital prompts acknowledging cultural sensitivities, such as familiarity with certain medical practices could make interactions smoother and increase comfort with digital health services. They shared, *"If the system knew more about my background, I think I'd feel more understood by the doctor,"* indicating a desire for tools that recognize and respect cultural differences.

In addition, participants highlighted the need for digital resources that provide general health education, helping them build confidence in interacting with healthcare professionals. For example, a participant mentioned that a digital tutorial or simple guide to using Sweden's healthcare system would be beneficial, saying, *"It would be nice to have something that shows how things work here, what to expect when I go to the doctor,"* illustrating a need for preparatory resources to help patients engage meaningfully with digital health systems.

Challenges and opportunities

The participants highlighted several challenges in accessing digital healthcare, including complex language, limited language options, and difficulties navigating digital systems, all of which often resulted in delayed or missed care. The language barrier was a major issue, as many participants struggled with the advanced medical terminology on platforms like 1177. One participant shared, *"I would like more information in simple language, even if it's not perfect Swedish,"* reflecting a common need for clear and accessible health language.

This challenge was exacerbated by the increasing reliance on digital services, which, for some, reduced autonomy in seeking care. One participant explained that their parents, who have limited Swedish skills and technological familiarity, often required family assistance to navigate online healthcare resources like 1177. They added, *"It's difficult for them to access care alone, so they wait until I can help,"* highlighting the risk of delayed or avoided care for individuals without support.

In response to these digital barriers, some participants turned to alternative sources for health information. YouTube, in particular, emerged as a popular resource for viewing health advice in native languages. However, while these channels offered accessibility, participants were cautious about their reliability. One participant explained, *"I look up health information in my language on YouTube, but I know I have to be careful about what's true,"* revealing a tension between the ease of access and the credibility of these platforms.

Traditional and alternative remedies from participants' home countries were also mentioned during the interviews. Some participants shared that family members in their home countries recommended using herbs or other traditional remedies, especially when they encountered obstacles in accessing the Swedish healthcare system or were dissatisfied with available treatments. One participant commented that family back home would often provide health advice or suggest remedies they were more familiar with, stating, *"Sometimes it's easier to use what we know from home if healthcare here is difficult to access."* This indicates a reliance on cultural familiarity, further underscoring the importance of making digital health resources culturally accessible.

Despite these challenges, participants highlighted potential solutions to improve digital health access. Many recommended familiar social media platforms, like Facebook, as user-friendly channels for health information. A participant noted, *"A Facebook page would be helpful because it's something I already use, and I could check health information there in a familiar way,"* suggesting that familiar and accessible platforms could support digital health literacy. Additionally, the idea of follow-up resources, such as post-consultation summaries in multiple languages, was suggested to help patients retain and understand medical guidance after appointments. As one participant explained, *"Sometimes I forget what the doctor said, and it would help to have a written summary in my language,"* indicating the value of accessible, multilingual resources to reinforce care instructions.

Discussion

The objective of this study was to explore the key barriers and opportunities experienced by individuals with immigrant backgrounds in Sweden, providing insights to strengthen digital health literacy across the EU. The analysis of interviews revealed several significant barriers that hinder digital health literacy among immigrants. A primary barrier identified was the lack of support available for utilizing digital solutions within the healthcare system. Participants expressed a strong need for more comprehensive guidance and training on using digital health tools, such as mobile applications and online portals, to access healthcare services effectively. This finding aligns with previous research that underscores the importance of tailored training programs designed to improve digital health literacy among diverse populations (Wang and Luan 2022; Wångdahl et al. 2014; Estrela et al. 2023).

Participants recognized that digital tools could streamline the healthcare process by allowing them to assess their symptoms and formulate questions prior to consultations with healthcare professionals. This potential is further

supported by existing literature, which suggests that digital health tools can empower patients and facilitate better communication with healthcare providers (Viberg Johansson et al. 2023; Brands et al. 2022).

Furthermore, participants emphasized the importance of integrating cultural considerations into digital health tools to ensure culturally sensitive care. This is particularly crucial, as previous studies have demonstrated that culturally appropriate health information can significantly enhance engagement and health outcomes among immigrant populations (Levesque et al. 2020). The absence of culturally sensitive resources in digital platforms highlights a critical gap that must be addressed to improve healthcare access for minorities (Arias López et al. 2023; Hughson et al. 2018; Chang 2019). By developing tools that reflect the diverse cultural contexts of users, healthcare systems can foster greater inclusivity and effectiveness in delivering care. Moreover, individuals from minority cultural backgrounds often encounter challenges when it comes to actively participating in shared treatment decisions (Villadsen et al. 2020). This reluctance is frequently linked to cultural beliefs that discourage questioning healthcare professionals. Participants in our study stressed the importance of promoting patient empowerment and shared decision-making. This aligns with previous research, which indicates that fostering patient empowerment is essential for improving health outcomes, particularly among immigrant populations (Ramos et al. 2019). By ensuring that individuals from immigrant backgrounds are actively engaged in their own healthcare decisions, healthcare systems can enhance health outcomes and increase patient satisfaction with care (Estrela et al. 2023).

In conclusion, the digital divide in healthcare highlights the urgent need for targeted interventions to integrate minority groups into the digital landscape (Smith and Magnani 2019). Recognizing the diverse needs within the immigrant population is vital, necessitating stakeholder involvement in the digitalization process. Digital solutions that specifically address the challenges faced by individuals with immigrant backgrounds must be developed to promote equitable access to digital health resources.

Additionally, it is essential to acknowledge that not everyone may have access to or feel comfortable using digital health technologies. Therefore, healthcare systems should continue to provide non-digital options to ensure broad accessibility and engagement across diverse populations (Kebede et al. 2022). This comprehensive approach will help bridge the gap and foster a more inclusive healthcare environment for all.

The vision articulated in the developed EU strategy aims to inspire other regions worldwide to effectively bridge the digital divide and support an inclusive and equitable digital landscape for modern healthcare (Pisano

González et al. 2024). By tackling the barriers and maximizing the opportunities identified in this study, policy-makers and healthcare providers can work collaboratively to enhance digital health literacy among individuals with immigrant backgrounds. This collaborative effort will not only improve healthcare outcomes for these communities but will also contribute to better health outcomes for all individuals, creating a more accessible and equitable healthcare system overall.

Future research should prioritize evaluating the effectiveness of digital health literacy programs specifically tailored for immigrant populations. Longitudinal studies could offer valuable insights into how these programs impact health outcomes over time and assess the sustainability of digital engagement among diverse groups. Furthermore, qualitative studies examining the experiences of healthcare professionals in providing culturally sensitive digital health services could provide best practices for improving patient-provider communication.

Acknowledgements Our greatest gratitude dedicated to all the respondents who participated in the interviews. Thank you for your time and for sharing your experiences and generous opinions. Additionally, we thank all the IDEAHL consortium colleagues for providing valuable contributions to this study.

Authors' contributions KSB, TN, BA, MPG, and SWA conceptualized the study. KSB and TN performed the interviews. KSB and TN analyzed the interviews and interpreted the data. KSB was the major contributor in writing the manuscript. TN, BA, MPG, and SWA substantially revised the manuscript. All the authors read and approved the final manuscript.

Funding Open access funding provided by Mälardalen University. The [IDEAHL project](#) "Improving Digital Empowerment for Active Healthy Living"—a collaboration between 14 EU partners (including Sweden) and funding by the Horizon Europe Framework Programme under GA 101057477. IDHEAL aims at developing an EU strategy to ensure access and effective use of digital health resources and empower citizens towards active healthy life.

Data availability The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate All participants provided informed consent. The study was approved by the Swedish Ethical Review Authority (Dnr: 2022–05670-01). This research was conducted in accordance with the Declaration of Helsinki and prioritized respondents' privacy and safety. When we requested consent, the respondents were informed that they could withdraw from the study at any time with no explanation and that the ending would not affect the current treatment. Their names were replaced with codes; all personal identifiers were removed so that the persons described, or narratives, were not identifiable.

Conflict of interest Karin Schölin Bywall, Therese Norgren, Marta Pisano Gonzalez, and Sarah Wamala Andersson have no conflicts of

interest to declare. Beatrice Avagnina is employed by Consulta Europa Projects and Innovation.

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References

- Arias López MDP, Ong BA, BorratFrigola X, Fernández AL, Hicklent RS, Obeles AJT, Rocimo AM, Celi LA (2023) Digital literacy as a new determinant of health: a scoping review. *PLOS Digit Health* 2:e0000279
- Bergman L, Nilsson U, Dahlberg K, Jaensson M, Wångdahl J (2021) Health literacy and e-health literacy among Arabic-speaking migrants in Sweden: a cross-sectional study. *BMC Public Health* 21:2165
- Bitomsky L, Pfitzer EC, Nißen M, Kowatsch T (2024) Advancing health equity and the role of digital health technologies: a scoping review protocol. *BMJ Open* 14:e082336
- Borges Do Nascimento IJ, Abdulazeem HM, Vasanthan LT, Martinez EZ, Zucoloto ML, Østengaard L, Azzopardi-Muscat N, Zapata T, Novillo-Ortiz D (2023) The global effect of digital health technologies on health workers' competencies and health workplace: an umbrella review of systematic reviews and lexical-based and sentence-based meta-analysis. *Lancet Digit Health* 5:e534–e544
- Brands MR, Gouw SC, Beestrum M, Cronin RM, Fijnvandraat K, Badaway SM (2022) Patient-centered digital health records and their effects on health outcomes: systematic review. *J Med Internet Res* 24:e43086
- Bywall KS, Norgren T, Avagnina B, Gonzalez MP, Andersson SW (2024) Calling for allied efforts to strengthen digital health literacy in Sweden: perspectives of policy makers. *BMC Public Health* 24:2666
- Chang CD (2019) Social determinants of health and health disparities among immigrants and their children. *Curr Probl Pediatr Adolesc Health Care* 49:23–30
- Elo S, Kyngäs H (2008) The qualitative content analysis process. *J Adv Nurs* 62:107–115
- Estrela M, Semedo G, Roque F, Ferreira PL, Herdeiro MT (2023) Sociodemographic determinants of digital health literacy: A systematic review and meta-analysis. *Int J Med Inform* 177:105124
- Hameed K, Naha R, Hameed F (2024) Digital transformation for sustainable health and well-being: a review and future research directions. *Discover Sustain* 5:104
- Hughson JA, Marshall F, Daly JO, Woodward-Kron R, Hajek J, Story D (2018) Health professionals' views on health literacy issues for culturally and linguistically diverse women in maternity care: barriers, enablers and the need for an integrated approach. *Aust Health Rev* 42:10–20
- Kasoju N, Remya NS, Sasi R, Sujesh S, Soman B, Kesavadas C, Muraleedharan CV, Varma PRH, Behari S (2023) Digital health: trends, opportunities and challenges in medical devices, pharma and bio-technology. *CSI Trans ICT* 11:11–30
- Kebede AS, Ozolins LL, Holst H, Galvin K (2022) Digital engagement of older adults: scoping review. *J Med Internet Res* 24:e40192
- Levesque JV, Gerges M, Wu VS, Girgis A (2020) Chinese-Australian women with breast cancer call for culturally appropriate information and improved communication with health professionals. *Cancer Rep (Hoboken)* 3:e1218
- Pérez-Escolar M, Canet F (2023) Research on vulnerable people and digital inclusion: toward a consolidated taxonomical framework. *Univ Access Inf Soc* 22:1059–1072
- Pisano González M, Fernández García C, López-Ventoso M, Pruneda González L, Rey Hidalgo I (eds), on Behalf of the Ideahl Consortium (2024) IDEAHL European digital health literacy strategy
- Ramos IN, Ramos KN, Ramos KS (2019) Driving the precision medicine highway: community health workers and patient navigators. *J Transl Med* 17:85
- Shaw RJ (2023) Access to technology and digital literacy as determinants of health and health care. *Creat Nurs* 29:258–263
- Smith B, Magnani JW (2019) New technologies, new disparities: the intersection of electronic health and digital health literacy. *Int J Cardiol* 292:280–282
- Van Kessel R, Wong BLH, Clemens T, Brand H (2022) Digital health literacy as a super determinant of health: More than simply the sum of its parts. *Internet Interv* 27:100500
- Viberg Johansson J, Blyckert H, SchölinBywall K (2023) Experiences of individuals with rheumatoid arthritis interacting with health care and the use of a digital self-care application: a qualitative interview study. *BMJ Open* 13:e072274
- Villadsen SF, Hadi H, Ismail I, Osborne RH, Ekstrøm CT, Kayser L (2020) ehealth literacy and health literacy among immigrants and their descendants compared with women of Danish origin: a cross-sectional study using a multidimensional approach among pregnant women. *BMJ Open* 10:e037076
- Wang X, Luan W (2022) Research progress on digital health literacy of older adults: a scoping review. *Front Public Health* 10:906089
- Wångdahl J, Lytsy P, Mårtensson L, Westerling R (2014) Health literacy among refugees in Sweden - a cross-sectional study. *BMC Public Health* 14:1030

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