

e-Health Literacy and Online Health Information-Seeking Behavior in Adults: A Systematic Review

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Background and Objectives: Despite the growing use of the internet as a source of health information, few studies have examined the relationship between eHealth literacy and online health information-seeking behavior among the general adult population. Understanding this association in the general population is important because adults increasingly rely on digital health information to make everyday health decisions. This study aimed to synthesize the existing evidence on the association between online health information-seeking behavior and eHealth literacy across its functional, interactive, and critical dimensions.

Material and Methods: This systematic review was conducted using electronic scientific databases. The authors followed 5 steps review framework which were 1), establish digital library search string; 2) gather study; 3) study selection and refinement; 4) data extraction, and 5) analysis and report. The literature search included all original articles published in English from 2013 to 2023. Data were analyzed accordingly.

Results: We included eleven primary observational studies in this review. Six studies reported that adult with higher health literacy score appear would also have higher health-related internet searching behavior. Two study found a substantial association between the overall eHealth literacy level and the relevance of accessing eHealth information. One study stated that eHealth literacy was associated with three dimensions (type, site, and time interval) of health service utilization. Another study also reported that health literacy has a considerable impact on undergraduates' attitudes toward getting help. However, one study finds no relationship between health literacy and searching for information to better understand their individual test result.

Conclusion: This current review reveals that there was a significant association between health literacy and health information seeking behavior.

Keywords: Adult, Online Health Information, e-Health Literacy, Seeking Behavior

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Introduction

The World Health Organization (WHO) defines health literacy as a person's social and cognitive abilities, including motivation and specific skills required to obtain, comprehend, and process health information in order to sustain good health (1). E-Health literacy, defined as the capacity to search, acquire, interpret, and assess medical information on the internet in order to address or solve a health condition, is necessary for accessing and applying credible health information via the internet (2). Higher levels of eHealth literacy have also been linked to improved health outcomes, as demonstrated by increased medication adherence, improved psychosocial and quality of life, and the adoption of adaptive health practices (3,4). Jiang and Street (5) investigated the health consequences of Internet health information seeking behavior using a moderated mediation pathway model based on the three-stage health promotion model (6). According to their findings, Internet health information seeking behavior influences overall physical and mental health outcomes. This effect is mediated by users' access to social support services, which is positively influenced by their experience accessing health information online (5).

The numerous advantages of medical data available online depend on individuals' eHealth literacy, that is, how capable they are to find, comprehend, appraise, and use online health information to their everyday health-related decisions (7,8). Some features of internet health information seeking behavior, such as frequency and the type of sources it relies on, have proven to be an indirect measure of e-Health Literacy (9).

Despite the exponential growth of the internet's role in healthcare, little research has been done on the general public's e-health literacy and how they use online health information. To our knowledge, we identified only one previous systematic review that examined the relationship between eHealth literacy and online health information-seeking behavior. However, its scope differs from the present review, as it specifically focused on the roles of eHealth literacy and patient-physician communication in the relationship between online diabetes information-seeking behavior and patient outcomes. That review concluded that eHealth literacy and patient-physician communication enhance the positive impact of online diabetes information-seeking behavior on behavioral outcomes among patients with diabetes (10).

Therefore, this study aimed to evaluate the association between the utilization of online health information and e-health literacy among adults in general population. We believe that examining this association in the general adult population is important, given adults' increasing reliance on digital health information for routine health decisions.

Materials and Methods

This section describes the methods used to conduct the Systematic review. This study followed several processes of Systematic review described by Carrera-Rivera et al. in their publication (11). The steps were 1) define PEO and synonym; 2) the construction of research

questions; 3) choose several digital library sources; 4) define inclusion and exclusion criteria; 5) establish quality assessment checklist; and lastly 5) design the "data extraction" form.

Protocol design

We utilized a Systematic review study design to synthesize primary study data to December 2025. This review's design is suitable for synthesizing research findings from independent primary studies for policymakers and implementers. The investigation followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) guidelines for protocol formulation, conduct and design, and results reporting (see Figure 1).

Inclusion criteria

This review included studies that focused on the association between utilization of online health information and e-health literacy among adults across the world. We only examined published studies in the English language. The literature search was conducted between October and December 2025, following the project's implementation timeline. To guide the search, we used the PEO scheme (12), PEO in research means population, exposure, and outcomes. Our objective was to find studies that addressed respondents' utilization of online health information as follows: Population (P) = adult (≥ 18 years old); (E) = e-health literacy; and outcomes (O) = utilization of online health information.

Exclusion criteria

The reviewers excluded studies who involved respondents among health-workers or people with health education degree. It also excluded studies that were unrelated to the topic and abstract-only papers.

Search strategy and searching sources

We used the Boolean combination to perform a thorough literature search across the ScienceDirect, PubMed, and ProQuest databases: ("adult") AND ("information seeking behavior" OR "health information seeking") AND ("online health information" OR "online health behavior") AND ("e-Health Literacy"). The authors also followed the data extraction and content steps given by Carrera-Rivera et al., which were 1), establish digital library search string; 2) gather study; 3) study selection and refinement; 4) data extraction, and 5) analysis and report.

Quality appraisal

All of the selected papers were evaluated for bias risk using the Newcastle-Ottawa Scale for cross-sectional research. The criteria for Newcastle-Ottawa Scale are based on the guidelines provided for scoring (13). Three authors independently assessed each paper critically. Through debate and the participation of another reviewer, the subjectivity issue was resolved.

Definitions of outcome

This review provides evidence linking health literacy to internet health information-seeking behavior. Such knowledge improves comprehension for future implementation. This provides recommendations for a policy intervention program to enhance regulations and promote digital health literacy among individuals.

Results

Characteristics of included studies

Three thousand five hundred records were found to be possibly relevant for the study after a thorough search of three web databases. The 102 papers were found after duplicates were eliminated and the abstracts of the publications utilized in this review were reviewed. After going over the entire material, we eliminated eighty- seven articles since their names and abstracts did not fit the intended purpose of the review. Twelve articles remain to be evaluated after we exclude three because the entire articles were unavailable. Additionally, we eliminated one other publication due to the lack of data about the relationship between literacy ability and information-seeking behavior. As a result, this evaluation contained Eleven papers as shown in **figure 1**. Ten of these were quantitative observational studies, and one was secondary data research (**table 1**). Table 1 also lists the elements present in publications, such as the first author's name and the year of the study, the study design, the study location, the sample size, the statistical analysis method, the study's results, and the quality score. The included studies used a variety of Statistical Analysis Method and effect size measures, including adjusted odds ratios, odds ratios, Spearman's correlation coefficients (r), multiple ordinary least-squares regression coefficients (β), Cohen's f^2 , and one-way ANOVA statistics. Because of this heterogeneity in outcome measures and statistical analyses, the authors were unable to perform a meta-analysis.

Quality Appraisal

We implemented the modified Newcastle Ottawa scale for observational studies. The thresholds for converting the Newcastle-Ottawa scales to AHRQ standards (good, fair, and poor) were 1) good quality: 3 or 4 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome/exposure domain; 2) fair quality: 2 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome/exposure domain; 3) poor quality: 0 or 1 star in selection domain OR 0 stars in comparability domain OR 0 or 1 stars in outcome/exposure domain. The appraisal results for this current review were as follows seven studies considering good quality, one studies were fair quality, and two studies were poor quality (**table 2**).

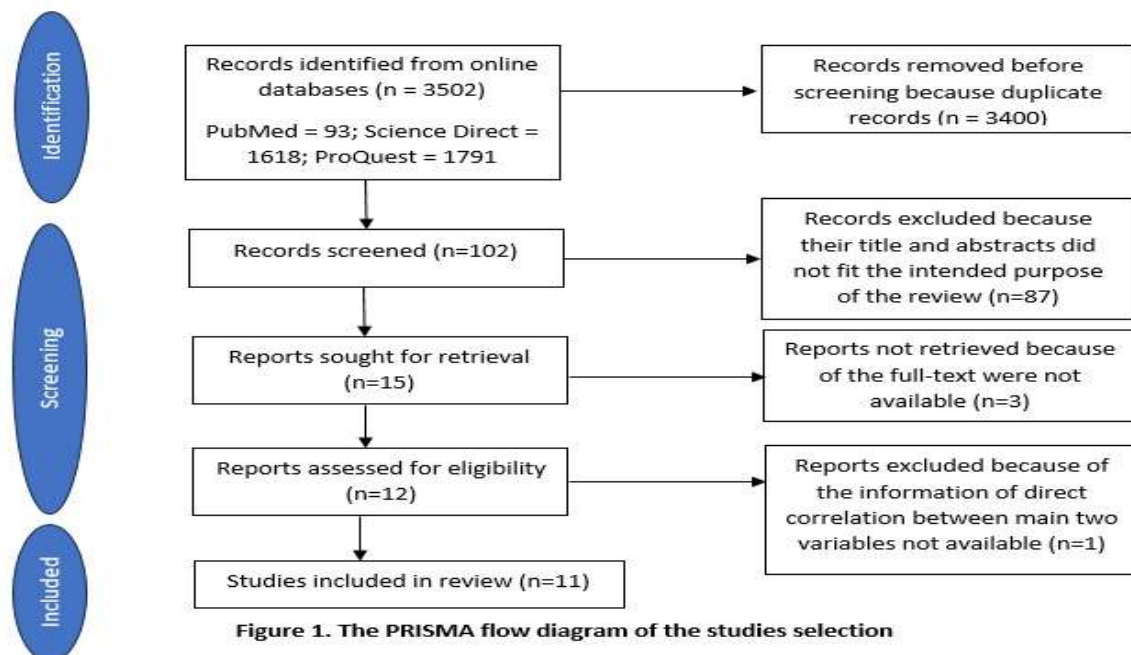


Figure 1. The PRISMA flow diagram of the studies selection

The Association between the Utilization of Online Health Information and e-Health Literacy among Adult

Several studies found a positive association between health literacy and online health information-seeking behavior, reporting that individuals with higher e-HEALS scores demonstrated greater utilization of online health information (8)(14)(15)(16)(17)(18). One study was pointed out specific type of e-health literacy which was critical and interactive was associated with three dimensions (type, site, and time interval) of health service utilization (19). In addition, the authors noted that most studies assessed eHealth literacy using the e-HEALS instrument, although translated into different languages. This suggests that the findings about type of e-health literacy are likely applicable also in other study. However, only study by Luo et al. (2018) explicitly reported the specific eHealth literacy domains in both the Results and Abstract sections.

Other four studies not directly stated the relationship between health literacy and online health information-seeking behavior, but it was implied. One study examining the impact of health literacy on mental health and attitudes toward getting help for their health condition (20). Valizadeh-Haghi et al. (2018) reported that there is a significant correlation between the total score of eHealth literacy and the importance of access to eHealth information (21). Del Giudice et al. (2018) found that there is a substantial association between the overall eHealth literacy level and frequency of internet use for health (22). Study by Sundell et al., (2022) stated that the behaviour of searching for information to better understand specific test results were linked to sufficient health literacy (23).

Table 1. Characteristics of Included Studies of the Association between the Utilization of Online Health Information and e-Health Literacy among Adult

First Author (year)	Study Design	Study Location	Respondent (Sample Size)	Statistical Analysis Method	Instrument	Effect Size	Results
Al-Ruzzieh et al., (2024) (14)	Cross-sectional	All the regions of Jordania	Adults (672)	One-way Anova	The Arabic version of the electronic health literacy scale (e-HEALS) and Arabic version of the online health information utilizing questionnaire (OHIU)	$F=59.67$; $p<0.001$	Those with sufficient health literacy had the highest mean online health information utilization score (41.31), followed by those with problematic (36.51) and inadequate health literacy (32.34). The differences were statistically significant.
Del Giudice et al., (2018) (22)	Cross-sectional	Northeast Italy, Italy	Teenagers and adults without studying or working experiences in the health sector	Spearman's correlation test	Italian version of the e-HEALS	$r=0.15$; $p<0.001$	There is a significant correlation between the total score of eHealth literacy and frequency of internet use for health
Lee et al., (2021) (18)	Cross-sectional	University of Minnesota, United States	Adults aged 18 years or older (614)	Multiple ordinary least-squares regression	Three health literacy items from the Behavioral Risk Factor Surveillance System (BRFSS) Questionnaire	$\beta=.35$; SE 0.12; $p=0.004$	Better health literacy associated with more health-related information-seeking behavior on the internet after adjusting for all other sociodemographic characteristics.
Lim et al., (2022) (17)	Cross-sectional	University Malaya Medical Centre, Kuala Lumpur, Malaysia	Outpatients over 18 years old (381)	Multivariate logistic regression model	e-HEALS and Structural Influence Model for health information-seeking behaviour	AOR=1.26; 95% CI 1.18–1.34; $p<0.001$	Patients with higher e-HEALS scores were significantly more likely to engage in online health information-seeking behaviour
Lu et al., (2021) (8)	Cross-sectional	China	Teenagers and adults' patients (381)	Multivariate coefficient of determination	e-HEALS by Norman and Skinner and by Park and Lee	Cohen's $f^2 = 1.153$; Effects: large	eHealth literacy was positively associated with internet health information-seeking behavior
Luo et al., (2018) (19)	Cross-sectional	Taiwan	College students (489)	Hierarchical multiple regression analysis	Chiang et al's eHealth Literacy Scale (eHLS)	$t_{484}=2.98$ -4.23, $p<0.01$; $t_{484}=2.43$ -2.89, $p<0.05$	Critical and interactive eHealth literacy were related to three aspects of the health services utilization
Millar et al., (2020) (16)	Cross-sectional with secondary data	United States	Adults age 25-65 years old (700)	Binary logistic regression	Program for the International Assessment of Adult Competencies (PIAAC)	Odds-Ratio = 1.012; $p<0.001$	Literacy skills are a statistically significant predictor of using the internet for health information.

Osiesi et al., (2025) (20)	Cross-sectional	Ekiti State, Nigeria	Undergraduates age ≥15 years old (601)	Hayes macro process	Health Literacy Questionnaire (HLQ) and Attitude towards Help-Seeking Questionnaire (AHSQ)	R=0.26; F=6.25; p<0.05	The overall moderation (model summary) of age on the relationship between health literacy and attitude to help-seeking is positive and significant.
Sundell et al., (2022) (23)	Cross-sectional with secondary data	Sweden	Patients age 50–64 years old (416)	Multivariate logistic regression model	Swedish version of The Communicative and Critical Health Literacy scale (S–C & C HL scale)	AOR= 1.29; 95% CI 0.75–2.20	Sufficient health literacy associated with searching for information to better understand their individual test result
Valizadeh-Haghi et al., (2018) (21)	Cross-sectional	West of Tehran, Iran	Patients with dental diseases age 18 years old (171)	Spearman's correlation test	e-HEALS	r=0.33, n=171; p<0.001	There is a significant correlation between the total score of eHealth literacy and the importance of access to eHealth information
Wong et al., (2019) (15)	Cross-sectional	University in Hong Kong, Hong Kong	Patients age ≥16 years old (1194)	Multiple regression analysis	e-HEALS	AOR 1.018; 95% CI 1.011-1.025; p< 0.001	Higher e-HEALS score were significant positive predictors of online health information seeking

Table 2. The modified Newcastle Ottawa scale for observational studies

Author (year)	Selection				Comparability	Outcome	
	Representativeness of the sample	Sample size	Ascertainment of exposure	Non-respondents	The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled	Assessment of outcome	Was follow-up long enough for outcomes to occur
	a) Truly representative of the average ACOS in the community * b) Somewhat representative	a) Justified and satisfactory* b) Not justified	a) Validated measurement tool* b) Non-validated measurement tool, but the tool is available or described * c) No description of the measurement tool.	a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory * b) The response rate is unsatisfactory, or the comparability between respondents	a) The study controls for the most important factor (Childhood asthma) * b) The study control for any additional factor (age, gender, ethnicity) *	) Independent blind assessment*) Record linkage*) Self-report) No description	a) The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value) *



	tive of the average ACOS in the community * c) Selected group of ACOS (e.g. smokers, non-smokers) d) No description of the derivation of the cohort			and non-respondents is unsatisfactory. c) No description of the response rate or the characteristics of the responders and the non-responders			b) The statistical test is not appropriate, not described or incomplete T
Al-Ruzzieh et al., (2024) (15)	*	*	*	*	-	-	*
Del Giudice et al., (2018) (23)	*	*	*	*	*	*	*
Lee et al., (2021) (19)	*	*	*	*	*	*	*
Lim et al., (2022) (18)	*	*	*	*	*	-	*
Lu et al., (2021) (11)	*	*	*	*	*	*	*
Luo et al., (2018) (20)	*	*	*	*	*	*	*
Millar et al., (2020) (17)	*	*	*	*	*	*	*
Osiesi et al., (2025) (21)	*	*	*	-	*	*	*
Sundell et al., (2022) (24)	*	*	*	-	*	*	*
Valizadeh-Haghi et al.,	*	-	*	*	-	-	*

(2018) (22)							
Wong et al., (2019) (16)	*	*	*	*	*	*	*

In Press

Discussion

The majority of primary study in our recent review found positive relationship between e-health literacy and the utilization of online health information among adults in general population. This probably because better health knowledge, more health-promoting behaviors, and increased empowerment are all linked to higher e-health literacy, which promotes ongoing online information searching (24–26).

According to a previous review, nine studies looked at digital health literacy and digital health information seeking (none of which are included in the current review). Of these, seven demonstrated that higher digital health literacy was significantly positively associated with e-information seeking. It also presents conflicting findings about the relationship between digital health literacy and sociodemographic characteristics, although studies generally found that increased digital health literacy was positively associated with improved health outcomes and behaviors (25). Digital health resources are more likely to be viewed as reliable and helpful by adults who feel competent online, which will increase their use (25,27).

Two study in this current review reported that there is a significant relationship between the overall score of eHealth literacy and the importance of accessing eHealth information. This could be because people with higher eHealth literacy are better at finding credible sources, judging quality, and applying knowledge to their personal circumstances, so they naturally view online information as more significant and relevant to their decisions (21,28).

In addition, one study also reported e-health literacy associated with accessing the patient electronic health record and using the online national health information portal. However, it also found no correlation between e-health literacy and searching for information to better understand specific test results. Risk perception and potential affective risk response are likely the causes of this. Because the study's statistical models were created with health literacy in mind, care should be taken when interpreting the findings. Additionally, the majority of participants thought their cardiovascular risk was modest, which could account for the fact that fewer people than anticipated looked up information (23).

One study discovered that critical and interactive eHealth literacy was linked to three factors (type, site, and time interval) of health service consumption (19). Lu et al., (2018) use division of e-health literacy into three types by Nutbeam (1982), which was interactive, critical, and functional e-health literacy. Interactive literacy entails more advanced cognitive and literacy skills that can be used to actively participate in daily activities and apply information gained to one's own circumstances (29). Interactive health literacy can improve one's ability to act freely, increase motivation, and boost self-confidence (30). The most sophisticated cognitive abilities are involved in critical literacy, which may be used to evaluate material critically and apply this knowledge to exert more control over circumstances and occurrences in life (29). Critical literacy enables people to assess health situations, identify advantages and disadvantages, and speak up for themselves (31). Interactive communication is rarely a part of functional health literacy, and it does not give people the tools they need to take initiative

in their own communities (32). Getting health information is not enough; people also need to assess it and apply it to make health-related decisions (19).

The findings of this review suggest that individuals should not only possess adequate health literacy but also develop the digital skills, self-efficacy, and critical appraisal abilities needed to effectively use digital technologies to locate, understand, evaluate, and apply health information. These competencies may enhance individuals' confidence in seeking health information online, improve their ability to distinguish credible from unreliable sources, and support informed health decision-making.

Study Limitations and Strengths: This review only includes observational research; thus, the evidence is not as strong as it would be if there was an experimental investigation. The number of primary studies included in qualitative analysis remains low due to limited availability. Additionally, two studies were rated as having poor methodological quality due to inadequate comparability, as they did not control for potential confounding factors and failed to report the assessment of outcomes. We acknowledge that these limitations may have affected the strength and reliability of the conclusions and could have introduced bias into the findings. However, as this review did not include a meta-analysis and therefore did not statistically pool the results of the included studies, the impact of these limitations is likely less pronounced. Nevertheless, the findings should be interpreted with caution, and readers are advised to consider these limitations when drawing conclusions from this review.

Conclusion

The conclusion of this study suggest that higher health literacy is associated with better engagement in digital health activities, including health-related internet searching, accessing relevant eHealth information, utilizing health services, and seeking help. The overall evidence indicates that health literacy is an important factor in effective use of digital health resources.

Practical implications

The findings of this current review can help shape future research, policies, and interventions aimed at enhancing digital health literacy. For policymakers, the authors recommend developing national digital health literacy standards based on the current average level of digital health literacy and progressively improving these standards to achieve the desired outcomes. The government should also consider integrating digital health literacy into public health education curricula. For healthcare providers, the authors recommend designing and implementing training workshops and seminars tailored to different population groups to improve public digital health literacy. For researchers, further studies are recommended to investigate the factors influencing digital health literacy among specific populations, such as older adults and rural communities. For the general public, participation in both offline and online health literacy courses, workshops, and seminars is encouraged, along with the use of credible and evidence-based health information sources.

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Availability of data and materials: The data analyzed during the current systematic review is available inside the manuscript.

Conflicts of interest: The authors declare no conflicts of interest.

Consent for publication: Not applicable.

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References

- 1) Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health* 2012;12:80. <https://doi.org/10.1186/1471-2458-12-80> PMID:22276600 PMCID:PMC3292515
- 2) Mitsutake S, Oka K, Okan O, Dadaczynski K, Ishizaki T, Nakayama T, et al. eHealth Literacy and Web-Based Health Information-Seeking Behaviors on COVID-19 in Japan: Internet-Based Mixed Methods Study. *J Med Internet Res* 2024;26:e57842 <https://doi.org/10.2196/57842> PMID:38990625 PMCID:PMC11273073
- 3) Filabadi Z, Estebarsari F, Milani A, Feizi S, Nasiri M. Relationship between electronic health literacy, quality of life, and self-efficacy in Tehran, Iran: A community-based study. *J Educ Health Promot* 2020;9:175. https://doi.org/10.4103/jehp.jehp_63_20
- 4) Lin C-Y, Ganji M, Griffiths MD, Bravell ME, Broström A, Pakpour AH. Mediated effects of insomnia, psychological distress and medication adherence in the association of eHealth literacy and cardiac events among Iranian older patients with heart failure: a longitudinal study. *European Journal of Cardiovascular Nursing* 2020;19:155-64. <https://doi.org/10.1177/1474515119873648> PMID:31516036
- 5) Jiang S, Street RL. Pathway Linking Internet Health Information Seeking to Better Health: A Moderated Mediation Study. *Health Commun* 2017;32:1024-31. <https://doi.org/10.1080/10410236.2016.1196514> PMID:27464036
- 6) Street RL. Mediated consumer-provider communication in cancer care: the empowering potential of new technologies. *Patient Educ Couns* 2003;50:99-104. [https://doi.org/10.1016/S0738-3991\(03\)00089-2](https://doi.org/10.1016/S0738-3991(03)00089-2) PMID:12767594
- 7) Shiferaw KB, Tilahun BC, Endehabtu BF, Gullslett MK, Mengiste SA. E-health literacy and associated factors among chronic patients in a low-income country: a cross-sectional survey. *BMC Med Inform Decis Mak* 2020;20:181. <https://doi.org/10.1186/s12911-020-01202-1> PMID:32762745 PMCID:PMC7407428



- 8) Lu X, Zhang R. Association Between eHealth Literacy in Online Health Communities and Patient Adherence: Cross-sectional Questionnaire Study. *J Med Internet Res* 2021;23:e14908. <https://doi.org/10.2196/14908> PMID:34515638 PMCID:PMC8477298
- 9) Zrubka Z, Hajdu O, Rencz F, Baji P, Gulácsi L, Péntek M. Psychometric properties of the Hungarian version of the eHealth Literacy Scale. *The European Journal of Health Economics* 2019;20:57-69. <https://doi.org/10.1007/s10198-019-01062-1> PMID:31098883 PMCID:PMC6544600
- 10) Peimani M, Stewart AL, Ghodssi-Ghassemabadi R, Nasli-Esfahani E, Ostovar A. The moderating role of e-health literacy and patient-physician communication in the relationship between online diabetes information-seeking behavior and self-care practices among individuals with type 2 diabetes. *BMC Primary Care* 2024;25:442. <https://doi.org/10.1186/s12875-024-02695-9> PMID:39736551 PMCID:PMC11684279
- 11) Carrera-Rivera A, Ochoa W, Larrinaga F, Lasa G. How-to conduct a systematic literature review: A quick guide for computer science research. *MethodsX* 2022;9:101895. <https://doi.org/10.1016/j.mex.2022.101895> PMID:36405369 PMCID:PMC9672331
- 12) Audrey Q. PEO Framework for Developing Answerable Research Questions | A Guide to Formulating Qualitative and Quantitative Research Questions with PICO and Literature Searching. <https://SystematicliteraturereviewsCom/Peo-Framework/> 2025.
- 13) Wells G, Welch V, Losos M, Tugwell P, Shea B, O'Connell D, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomised studies in meta-analyses. <https://Ohri.ca/En/Who-We-Are/Core-Facilities-and-Platforms/Ottawa-Methods-Centre/Newcastle-Ottawa-Scale> 2026.
- 14) Al-Ruzzieh MA, Al-Helih YM, Al-Soud Z. e-Health literacy and online health information utilization among Jordanians: A population-based study. *Digit Health* 2024;10. <https://doi.org/10.1177/20552076241288380> PMID:39391858 PMCID:PMC11465314
- 15) Wong DK-K, Cheung M-K. Online Health Information Seeking and eHealth Literacy Among Patients Attending a Primary Care Clinic in Hong Kong: A Cross-Sectional Survey. *J Med Internet Res* 2019;21:e10831. <https://doi.org/10.2196/10831> PMID:30916666 PMCID:PMC6456826
- 16) Millar RJ, Sahoo S, Yamashita T, Cummins PA. Literacy skills, language use, and online health information seeking among Hispanic adults in the United States. *Patient Educ Couns* 2020;103:1595-600. <https://doi.org/10.1016/j.pec.2020.02.030> PMID:32115313
- 17) Lim HM, Wong SS, Yip KC, Chang FWS, Chin AJZ, Teo CH, et al. Online health information-seeking behaviour of patients attending a primary care clinic in Malaysia: a cross-sectional study. *Fam Pract* 2022;39:38-45. <https://doi.org/10.1093/fampra/cmab099> PMID:34423368
- 18) Lee HY, Jin SW, Henning-Smith C, Lee J, Lee J. Role of Health Literacy in Health-Related Information-Seeking Behavior Online: Cross-sectional Study. *J Med Internet Res* 2021;23:e14088. <https://doi.org/10.2196/14088> PMID:33502332 PMCID:PMC7875696
- 19) Luo YF, Yang SC, Chen A-S, Chiang C-H. Associations of eHealth Literacy With Health Services Utilization Among College Students: Cross-Sectional Study. *J Med Internet Res* 2018;20:e283. <https://doi.org/10.2196/jmir.8897> PMID:30361201 PMCID:PMC6231732

- 20) Osiesi MP, Fajobi OO, Aribamikan CG, Adekoya AF, Okocha SN, Babalola AT, et al. Impact of health literacy and knowledge on mental health and attitude towards help-seeking among undergraduates: the moderating effect of gender and age. *Health Educ* 2025;125:375-408. <https://doi.org/10.1108/HE-11-2023-0114>
- 21) Valizadeh-Haghi S, Rahmatizadeh S. eHealth literacy and general interest in using online Health information: a survey among patients with dental diseases. *Online J Public Health Inform* 2018;10. <https://doi.org/10.5210/ojphi.v10i3.9487>.
- 22) Del Giudice P, Bravo G, Poletto M, De Odorico A, Conte A, Brunelli L, et al. Correlation Between eHealth Literacy and Health Literacy Using the eHealth Literacy Scale and Real-Life Experiences in the Health Sector as a Proxy Measure of Functional Health Literacy: Cross-Sectional Web-Based Survey. *J Med Internet Res* 2018;20:e281. <https://doi.org/10.2196/jmir.9401> PMID:30381283 PMCID:PMC6246968
- 23) Sundell E, Wångdahl J, Grauman Å. Health literacy and digital health information-seeking behavior - a cross-sectional study among highly educated Swedes. *BMC Public Health* 2022;22:2278. <https://doi.org/10.1186/s12889-022-14751-z> PMID:36471284 PMCID:PMC9724302
- 24) Kim K, Shin S, Kim S, Lee E. The Relation Between eHealth Literacy and Health-Related Behaviors: Systematic Review and Meta-analysis. *J Med Internet Res* 2023;25:e40778. <https://doi.org/10.2196/40778> PMID:36716080 PMCID:PMC9926349
- 25) Yuen E, Winter N, Savira F, Huggins CE, Nguyen L, Cooper P, et al. Digital Health Literacy and Its Association With Sociodemographic Characteristics, Health Resource Use, and Health Outcomes: Rapid Review. *Interact J Med Res* 2024;13:e46888. <https://doi.org/10.2196/46888> PMID:39059006 PMCID:PMC11316163
- 26) Xie L, Zhang S, Xin M, Zhu M, Lu W, Mo PK-H. Electronic health literacy and health-related outcomes among older adults: A systematic review. *Prev Med (Baltim)* 2022;157:106997. <https://doi.org/10.1016/j.ypmed.2022.106997> PMID:35189203
- 27) Jung SO, Son YH, Choi E. E-health literacy in older adults: an evolutionary concept analysis. *BMC Med Inform Decis Mak* 2022;22:28 <https://doi.org/10.1186/s12911-022-01761-5> PMID:35101005 PMCID:PMC8805227
- 28) Mengestie ND, Yilma TM, Beshir MA, Paulos GK. eHealth Literacy of Medical and Health Science Students and Factors Affecting eHealth Literacy in an Ethiopian University: A Cross-Sectional Study. *Appl Clin Inform* 2021;12:301-9. <https://doi.org/10.1055/s-0041-1727154> PMID:33827143 PMCID:PMC8026260
- 29) Nutbeam D. The evolving concept of health literacy. *Soc Sci Med* 2008;67:2072-8. <https://doi.org/10.1016/j.socscimed.2008.09.050> PMID:18952344
- 30) Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health* 2012;12:80. <https://doi.org/10.1186/1471-2458-12-80>. PMID:22276600 PMCID:PMC3292515
- 31) Mitchell B, Begoray D. Electronic Personal Health Records That Promote Self-Management in Chronic Illness. *OJIN: The Online Journal of Issues in Nursing* 2010;15. <https://doi.org/10.3912/OJIN.Vol15No03PPT01>



32) St Leger L. Schools, health literacy and public health: possibilities and challenges. *Health Promot Int* 2001;16:197-205. <https://doi.org/10.1093/heapro/16.2.197> PMID:11356758

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