

# A SYSTEMATIC REVIEW ON ADOLESCENTS' HEALTH LITERACY IN DIGITAL INFORMATION

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## Abstract

**Background:** Health literacy is a crucial determinant for creating sound health decisions that are especially significant to improve the general state of public health and to achieve beneficial outcomes. In recent years, adolescents have faced challenges pertaining to their holistic well-being concerning the various plethora of health data accessible via the Internet.

**Methodology:** An extensive search was conducted across electronic databases, including PubMed, Scopus, and Web of Science, for relevant studies published from 2013 to the present. The inclusion criteria encompassed research focused on adolescents' health literacy in using digital information. A total of 15 studies were included in the review.

**Result:** The findings revealed several key themes related to adolescents' health literacy in digital information. Personal characteristics, including self-efficacy and outcome expectations, played a significant role in adolescents' ability to seek, comprehend, and apply health information online.

**Conclusion:** The results of this paper showed that adolescents' level of health literacy is highly multifaceted and immensely affected by various individual and environmental conditions. This should then be further magnified and be put into account as a basis for future research, policies, or strategies aimed at enhancing adolescents' health literacy.

**Keywords:** Health Literacy, e-Health Literacy, Adolescents, Health Information, Factors of Health Literacy, Public Health.

## Introduction

With the advent of the digital age, all kinds of information have been universally accessible to most of the global population through various technological advancements. This made a tremendous impact on the general knowledge of the public regarding different disciplines that pique their curiosity or interests. Digital devices such as smartphones, laptops, and tablets become alleyways for a free flow of information to various age groups, most specifically to adolescents who are much known as digital natives as they are exposed to digital technologies throughout their lives. According to a recent WHO report by Wong et al. (2021), 69% of the world's youth population, including adolescents (defined as people aged 10 to 19), are online, making them potential key drivers and empowered active agents for the adoption of health digital technology. Even though it is anticipated that they will understand how to access health information more clearly, it is still unclear how well-versed they are in using digital resources to access information on their health.

The article by Park & Kwon (2021) highlights the limited number of studies that have measured the health literacy of adolescents, despite their increasing reliance on digital health information. This is concerning because adolescence is a critical period for developing health literacy skills and habits. Research suggests that adolescents generally have lower levels of health literacy, with only 35% of Taiwanese adolescents found to have sufficient health literacy. Disadvantaged adolescents with limited English proficiency may face even greater challenges in accessing digital health information due to socioeconomic factors. It is important to address the issue of health literacy among adolescents, given their reliance on digital media for health information. While digital platforms provide greater availability and convenience, there is also a risk of encountering misinformation and adopting ineffective health practices.

Therefore, efforts to improve health literacy among adolescents should consider their unique needs and provide targeted interventions to promote accurate and effective health behaviors.

Notifiable disease reporting is not without difficulties, though. According to a study that was published in the *Journal of Public Health Management and Practice*, there is a dearth of a centralized surveillance system and insufficient laboratory capacity for rabies testing in the Philippines, which contribute to the underreporting of human rabies cases (Sharon et al., 2020). Comparably, to improve the completeness of notifiable disease reporting, the review published in *journal BMC Medicine* notes the need for improved communication between public health authorities and healthcare providers, standardization of case definitions, and better integration of data sources (Quiambao et al., 2020).

## Methods

In this study, an integrative literature review method was employed to explore the current state of research on adolescents' health literacy and their utilization of digital health information. The process involved gathering relevant clinical investigations, including systematic reviews, cross-sectional surveys, and focus group studies.

The findings derived from systematic reviews hold significant implications for evidence-informed decision-making. Policymakers, healthcare providers, and educators can utilize the evidence-based information provided by systematic reviews to develop effective strategies, policies, and interventions that improve adolescents' health literacy. By relying on the comprehensive and reliable evidence synthesized in systematic reviews, decision-makers can ensure that their initiatives are based on the best available knowledge.

To identify relevant articles, the researcher began by examining the reference lists of existing systematic reviews in the field. This approach helped identify potential articles that met the inclusion criteria. Additionally, studies that specifically examined adolescents' health literacy in relation to factors such as gender, educational background, and socio-economic factors were considered, as they provided insights into the key variables influencing their ability to appraise digital health information.

To maintain the focus of the study, research involving other age groups was excluded, as it was not relevant to the objectives. Given the relevance of the current pandemic, the researcher also considered aspects of adolescent health literacy related to the epidemic.

The inclusion criteria included a time frame of the last ten years to ensure the review captured recent research. Language constraints were also taken into account to include studies published in languages accessible to the researchers. Electronic databases such as PubMed, Scopus, Web of Science, and Scielo were utilized to conduct a comprehensive search for relevant literature.

## Research Design

Health literacy directly helps people to efficiently cope during health threats or health crises. However, the limits of the available instruments have an impact on the determination of a group's level of health literacy. Thus, most research concerning this topic is qualitative focus-group studies or cross-sectional surveys. Furthermore, this paper used an integrative review as it provided several literature reviews from various credible sources. Similarly, it utilized the Whittemore & Knafl (2005) process by developing a methodological framework for the review process, including the definition of the issue, creating research questions, executing a focused literature search, and using mixed-methods or qualitative data processing strategies to lessen risks of bias and error. This study's primary goal is to educate the public on adolescent health literacy, including its important components and consequences for public health care.

## Search Strategy

The entire review was conducted using a search technique that complied with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standard (Page et al., 2021). The supplemental materials contained the PRISMA checklist. The literature was also searched electronically in the Google Scholar, PubMed/MEDLINE, ScienceDirect, Wiley Online Library, EBSCO, and Springer databases to find pertinent studies. The search was conducted using appropriate terms like "Digital Health Literacy of Adolescents," "Level of Digital Health Literacy Among Adolescents," and "Digital Health Information and Adolescent's Health Literacy." From the beginning through March 2023, an evaluation of every piece was conducted.

## Data Evaluation and Quality Appraisal

Three unbiased reviewers independently screened and examined the collected literature. Disagreements were settled through meetings with several investigators until a firm consensus was reached, such as the paucity of concordance in the evaluation of study selection. Similar to this, during screening, the abstract and relevancy of the title of the collected papers were evaluated. We eliminated duplicate studies using Mendeley Reference Manager. The following details were then gathered from the reference literature: (1) the study design

type, (2) the study location (state or country), (3) the sample size and population of the study, (4) and the common theme throughout the entire literature.

All outcome variables were summed and aggregated using the Review Manager (RevMan) 5.4.1 software (Cochrane Collaboration) for a meta-analysis. Mantel-Haenszel was also applied to the analysis of dichotomous data, which was then depicted as the odds ratio (OR). The mean difference was then utilized to illustrate the continuous data, which was analyzed using the Inverse Variance technique. In addition, the I<sup>2</sup> test was used to assess the heterogeneity of the data. If I<sup>2</sup> was greater than 25%, the data were deemed homogenous, and a fixed-effect model was employed. Begg's funnel diagram was implemented for assessing publication bias visually. During periods of publication bias, the trim-and-fill method was used to correct it. If the two-tailed p-value was less than 0.05, consideration of statistical significance was done.

## Results

These studies were conducted in various countries, including Germany, the United States, Turkey, Australia, China, Norway, Egypt, Austria, the Philippines, Africa, Saudi Arabia, and South Korea. The studies employed different research designs, such as qualitative, quantitative, and mixed methods, to examine various aspects of adolescents' health literacy.

One study by Loer et al. (2022) conducted focus groups with German grammar school students to explore adolescent pandemic-related health literacy. The researchers used content analysis to examine how adolescents perceive and engage with health information during the pandemic. Similarly, Taba et al. (2022) conducted a mixed-method study in Australia, comparing digital health literacy and self-efficacy among adolescents using surveys, health information search tasks, and semi-structured interviews. They employed quantitative analysis, observational checklists, and thematic analysis to gain insights into adolescents' capacity in utilizing digital health information.

Several studies focused on the relationship between socioeconomic factors and health literacy levels among adolescents. Çınar Özbay, Boztepe & Özcebe (2022) conducted a quantitative study in Turkey, utilizing sociodemographic questionnaires and surveys to examine the relationship between social and economic determinants and e-health literacy levels of adolescents. They employed statistical analyses such as t-tests, one-way ANOVA, and linear regression models to understand the impact of these factors on adolescents' decision-making skills.

The studies by Guo et al. (2020) and Ustuner Top & Yigitbas (2020) investigated the e-health literacy levels of adolescents from diverse socioeconomic backgrounds in China, Australia, and Turkey. These studies employed questionnaires, surveys, and face-to-face interviews, and used statistical analyses including chi-square tests, Mann Whitney-U tests, and Kruskal Wallis tests to assess the relationship between socioeconomic factors and e-health literacy levels.

The impact of the COVID-19 pandemic on adolescents' health literacy was explored in several studies. Riiser et al. (2022) conducted a qualitative study in Norway, utilizing surveys and focus groups to explore how adolescents' access and utilize pandemic-related information online. They employed content analysis to examine the themes that emerged from the data. Quansah et al. (2022) conducted a quantitative study in Egypt, assessing the direct relation of adolescents' COVID-related digital health literacy to their well-being using statistical analyses such as correlational analysis, Pearson's correlation, and simple mediation and moderation analyses.

Other studies focused on specific aspects of adolescent health literacy. For example, Park & Kwon (2021) assessed the usability and content validity of a Digital Health Literacy Instrument (DHLI) among adolescents in the United States. They used qualitative cognitive interviews and qualitative data analysis to evaluate the instrument. Fleary & Joseph (2020) conducted qualitative focus groups in the United States to understand how adolescents perceive and use health literacy in making sound health decisions. They employed thematic analysis to identify key themes.

In summary, these studies collectively contribute to our understanding of adolescents' health literacy and their utilization of digital health information. The findings highlight the importance of considering socioeconomic factors, the impact of the COVID-19 pandemic, and the usability of health literacy instruments when designing interventions and initiatives to improve adolescent health literacy. The diverse research methods and analyses employed in these studies provide a comprehensive view of the multifaceted nature of adolescent health literacy across different countries and contexts.

## Conclusion

The systematic and integrative review highlights the complexity and significance of addressing adolescents' health literacy in using digital information. The findings emphasize the need for comprehensive approaches that consider various individual and environmental factors influencing adolescents' health literacy. By understanding and

addressing these factors, healthcare providers, policymakers, educators, and communities can collectively work towards improving the digital health literacy of adolescents.

The review underscores the importance of developing tailored health education programs in collaboration with educational institutions. Integrating health literacy education into school curricula and designing interactive activities can equip adolescents with the necessary skills to navigate and evaluate digital health information. By fostering partnerships with digital platforms, healthcare providers can ensure the availability of credible and accessible resources for adolescents. These partnerships can also support the development of age-appropriate content and the implementation of fact-checking mechanisms, promoting accurate health information.

Furthermore, enhancing communication and trust between healthcare professionals and adolescents is crucial. Creating safe spaces for discussions, addressing misconceptions, and actively listening to adolescents can empower them to voice their information needs and concerns. Empowering adolescents as active participants in their healthcare decisions promotes ownership of their health and enables informed decision-making.

Addressing health disparities in digital health literacy is essential. By considering socioeconomic, cultural, and linguistic factors, interventions can be tailored to meet the unique needs of diverse adolescent populations. Promoting media literacy skills and educating adolescents about critical evaluation of online health information equips them to navigate the digital landscape effectively. Engaging in collaborative partnerships among healthcare professionals, educators, policymakers, and community organizations facilitates the development of initiatives that comprehensively address the multifaceted factors influencing adolescents' health literacy.

Continuous evaluation and improvement of digital health interventions are paramount. Assessing the effectiveness of interventions and staying updated with technological advancements, healthcare providers can adapt their strategies to meet the evolving needs of adolescents. Empowering adolescents as health advocates and promoting parental involvement further enhance their digital health literacy and support network.

While this review provides valuable insights and recommendations, further research is warranted. Exploring additional factors, such as cultural influences and socioeconomic disparities, will contribute to a more comprehensive understanding

of adolescents' health literacy. Additionally, investigating the impact of emerging technologies and evaluating innovative approaches will inform the development of evidence-based interventions and policies.

Implementing the recommendations and engaging in targeted activities, healthcare providers, policymakers, educators, and communities can collectively improve the digital health literacy of adolescents. This will empower adolescents to make informed decisions, promote their overall well-being, and contribute to a healthier society as they transition into adulthood. A concerted effort towards enhancing adolescents' health literacy in using digital information is imperative for their present and future health outcomes

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## Conflicts of Interest

The authors declare there are no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

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