

# Health literacy and adolescents: a framework and agenda for future research

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## Abstract

Health literacy is an important issue in public health today, especially as patients are taking a greater role in obtaining information about their health. Health literacy is commonly defined as ‘the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions’. While there is a large body of literature concerning health literacy and adults, few studies have focused on adolescents. Adolescents may have less interaction with the health care system and lower health care costs than adults, but they are increasingly involved with their health care, especially those with chronic illness. They are frequent users of mass media and other technology to access health information and are a target group for many health-related educational interventions. Adolescents are also at a crucial stage of development, learning skills they will carry with them into adulthood. The goal of this paper is to provide a summary of issues justifying the importance of studying health literacy as it relates to adolescents and to provide a framework and suggestions for future research.

## Introduction

Typically defined as ‘the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions’ [1], health literacy has become an important public health issue. While much research has examined the assessment of literacy in health settings and the association of literacy levels with health outcomes for adults [2], little is known about literacy in health settings and health literacy for adolescents. Early intervention and prevention are crucial from a public health perspective [3]. With an emphasis on prevention, it is assumed that addressing health literacy at an early age can help develop one’s ability to understand health information and improve interactions with the health care system that will lead to positive health outcomes later in life. This paper provides justification, offers a framework and concludes with suggestions for future research in the area of adolescent health literacy.

## Why study adolescents?

Studies have shown that adult patients with low levels of literacy have reported problems completing medical forms, an inability to understand instructions for prescription medications and difficulty comprehending provider instructions [4, 5]. Literacy problems limit the ability to provide medical histories and accurate responses to scales or other questionnaires [6, 7] and are associated with higher use of health services [8–10] and greater

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health care costs [7, 11]. Literacy problems may also result in limited participation in or benefit from health education programs [12] and can influence communication between patients and providers [13, 14]. People with low literacy may not fully benefit from media interventions, campaigns or educational programs due to an inability to read, understand or access the messages [15, 16].

Given that research has documented a strong relationship between literacy and health outcomes for adults, future research should explore topics concerning literacy and health for adolescents. Some might argue that adolescents have less interaction with the health care system than adults [17] and fewer health problems, suggesting that studying health literacy and youth should not be a priority. However, there are several reasons to pursue health literacy research focusing on adolescents.

Studies have shown that literacy is a significant problem for adolescents, as many adolescents are unable to read at the appropriate grade level [18]. *The Nation's Report Card* reported that among a national sample of eighth graders, 26% of students scored below the basic reading level score [19]. A recent study of literacy related to health terms found that 46% of adolescent participants were reading below grade level [20]. Although the study of literacy and adolescents is much more advanced than the study of health literacy, there remains a need to better understand the development of literacy skills, create improved assessment methods and continue to examine how environmental factors such as schools influence literacy [21].

While the study of literacy is important, a specific focus on health literacy is becoming more relevant as adolescents are increasingly involved with their health care [22], regularly interact with the health system and access health information which informs their actions and behaviors. Given the low literacy levels among adolescents, it is unclear how well this age group is able to understand, process and evaluate health information, and while prior research has demonstrated that adolescents are interested in understanding health information, they may find it difficult. A recent survey of young adolescents by the Nemours Foundation reported

~80% of respondents said they were 'very' or 'sort of interested' in learning more about health, but almost a quarter of them (22%) said health information was 'very' or 'sort of hard to understand' [23, 24].

While health literacy has the potential to affect all adolescents, it is especially relevant for teens with a chronic illness. There is a growing prevalence of chronic illness such as asthma, diabetes, cystic fibrosis and mental illness among youth aged 0–17 [25–27]. Adolescents with chronic illness are likely to have more interaction with the health system, as well as greater responsibility for participating in their care and treatment [25]. Studies have found that teens with a chronic illness such as diabetes go online to seek information about managing their illness [28] and that medical providers believe it is important for adolescents with chronic illness to have adequate health literacy skills [29].

Health literacy also requires attention given the large amount of educational materials distributed to youth by health providers, schools and intervention programs. The readability of materials is highly relevant to health literacy, as adolescents cannot use information to guide their choices about health behavior if they fail to understand information provided to them. For example, Richwald *et al.* [30] found that eight of 14 sets of condom instructions were written at the level of a high school graduate, and all were written at a 10th grade reading level or higher, suggesting that many adolescents may be unable to comprehend important information about condoms.

Finally, adolescents are at a crucial stage of development characterized by many physical, emotional and cognitive changes [31]. Adolescents experience advances in cognitive abilities, developing an improved capacity for processing information, thinking more about abstract ideas and using reasoning skills [32, 33]. They are also achieving greater autonomy [32]. These changes make adolescence an appropriate time to begin thinking about health literacy interventions, and improving health literacy at an early age has a direct impact on health literacy later in life as adolescents are acquiring knowledge and setting behavior patterns they will carry with them as they transition into adulthood [34].

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## A framework for adolescent health literacy

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The framework for adolescent health literacy (Figure 1) draws heavily from the Institute of Medicine (IOM) report *Health Literacy: A Prescription to End Confusion*, which presented two frameworks of health literacy [35]. It is also informed by the Ecological Model (EM) [36, 37], which suggests that different levels of influence contribute to individual development and health behavior.

### Individual characteristics

The framework begins by including individual characteristics of adolescents, several of which are included in the IOM framework. The framework depicts how individual traits, such as age, race, gender, cultural background, cognitive and physical abilities and social skills, predict one's health literacy which then determines health outcomes [35].

Media use is a crucial component of an adolescent-specific framework given that adolescents are frequent users of the mass media. Youth aged 8–18 spend almost 6.5 hours per day with some type of media [38]. Media have been shown to influence physical and social development of youth, have been associated with health behavior and are often cited as a source of health information for adolescents [39–44]. Educational television has been linked with advances in literacy, reading comprehension and math skills for children [45]. Given that media has been linked to development, health behavior and literacy, it is reasonable to conclude there may be an association of media use with health literacy [46].

### Peer and parent influences

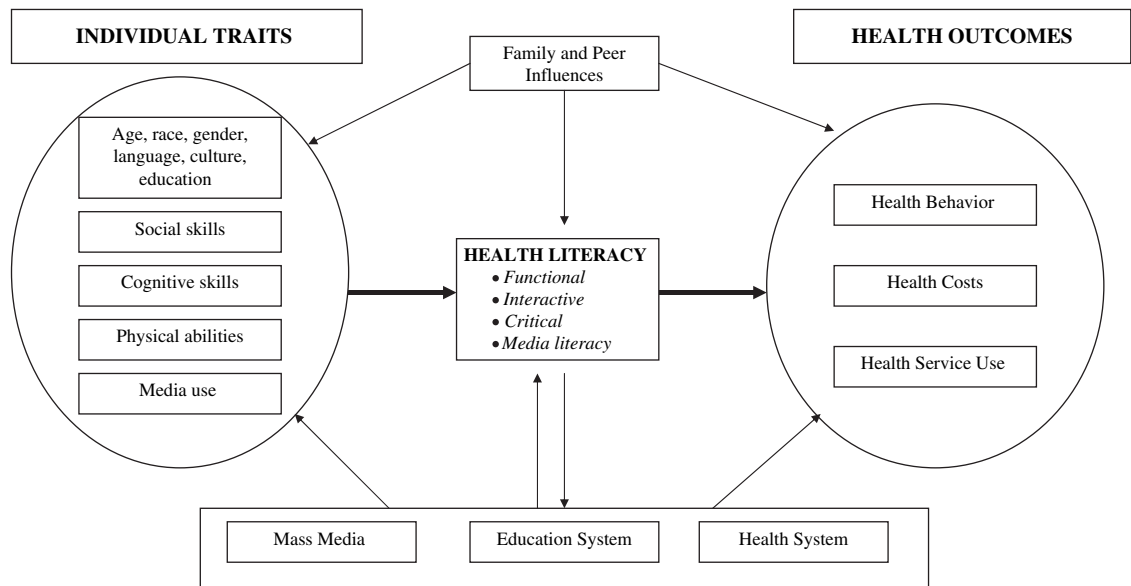
In addition to individual characteristics, peer and parent influences are especially relevant for youth [31, 35, 47]. Figure 1 shows that parents may influence health literacy of adolescents [35]. Prior research has shown a relationship between family factors and school achievement [48]. For instance, reading aloud in the home setting can enhance vocabulary skills [49], and encouraging reading at home is linked with an interest in learning [50].

Parent health literacy can also directly impact health outcomes for this age group. As an example, one study of Latino parents found that people with a higher literacy level were more likely to use medications for their children correctly [51], while another study of children with asthma found that lower literacy of parents was correlated with children's incorrect inhaler use and more visits to the emergency department [52]. Peers have also been shown to have a direct influence on literacy as well as health behavior, given their growing prominent role in the lives of youth as they transition into adolescence [53–56].

### Systems

Another area of the framework concerns systems (media, education and health care). The second framework of the IOM report (p. 34) shows how culture and society, the health system and the education system all serve as potential contributors to the development of health literacy skills, and thus, act as possible areas for interventions [35]. Systems are an area especially important for adolescents as they are still engaged with organizations that can facilitate education programs and other interventions to enhance health literacy skills.

The IOM report and other publications highlight the need for schools to play an important role in improving health literacy for adolescents, as schools have a direct influence on the education and development of adolescents [35, 57]. One of the main goals of the education system is to develop literacy skills. Given that literacy, or the ability to read and write, is an integral part of health literacy, schools therefore play a central role in the development of health literacy skills. Routine literacy instruction offers opportunities to enhance health literacy by building reading and writing skills, and health education classes provide an excellent opportunity to facilitate the development of skills specific to health literacy, such as how to evaluate credible information on the internet. Peterson *et al.* [58] discuss ways teachers can be more involved with teaching health literacy to youth, such as assisting students with comprehension and evaluation of health information as opposed to simply



**Fig. 1.** A framework for studying adolescent health literacy [35, 46].

memorizing the material presented. Lawrence St Leger [59] provides suggestions regarding how schools can teach health literacy, including regular professional development for teachers and the sharing of information with other schools about programs that schools may develop which are proven to be successful.

Although media use is included in individual traits, that variable is specific to an individual's specific media use patterns, and while the IOM report considers media part of culture and society, media is such a pervasive force in the lives of adolescents, it is given its own box in Fig. 1 [41]. Health literacy skills (which include media literacy and critical thinking) are necessary for adolescents to be able to access health information from mass media, understand the content and evaluate the credibility of the information they obtain.

The health system is clearly important to include in a framework of health literacy, given its direct impact on how accessible health care is and how well information is communicated to patients [35]. Readability of materials in health centers, clarity of provider communication with adolescent patients

and interventions in health settings are all crucial to the development of health literacy skills for adolescents.

Figure 1 shows that systems have a direct impact on health literacy and suggests that these systems can also facilitate interventions to improve health literacy, similar to the IOM report [35]. Besides serving as a mechanism for improving health literacy, health literacy can influence the success of systems on adolescent health, noted by the bidirectional arrow between systems and health literacy on Fig. 1. Educational programs implemented in schools or health facilities, or conducted via the mass media, can teach adolescents about health issues such as substance abuse, sexual behavior or motor vehicle safety. However, the success of such interventions is dependent on their target group having the ability to understand the messages being provided.

## Health literacy

Individual traits, peers/parents and systems all combine to influence one's health literacy, which is included in the center of the framework. People often

use education as a proxy measure for literacy in research. However, studies have shown that literacy can act as its own predictor of health issues even when accounting for other variables such as race, education, culture and income [5, 60]. A recently published study by Davis *et al.* [20] tested the Rapid Estimate of Adolescent Literacy in Medicine (REALM-Teen), based on the Rapid Estimate of Adult Literacy in Medicine (REALM). However, there is currently no adequate tool to assess health literacy according to the recent report by the IOM [35]. The Test of Functional Health Literacy in Adults [61] and the REALM [62] have been widely used to measure literacy in health care settings, but the IOM report points out that these instruments mainly assess literacy as it relates to written comprehension and do not test other aspects of health literacy such as the ability to communicate orally or critical thinking skills [35].

Don Nutbeam provides a useful model of health literacy, describing functional, interactive and critical literacy, which together create a progression of development of skills [63]. The first, functional literacy, refers to the basic ability to read and write. Interactive literacy concerns one's ability to coordinate functional literacy and social skills to fully participate in daily activities and communication, while critical literacy addresses a person's potential to evaluate information. Media literacy, the ability to critically evaluate media messages, has been widely studied among youth and has been included as a separate construct [64]. Studies of adolescent health literacy may focus on one or more of these literacy types.

### Health outcomes

The framework concludes by indicating that health literacy influences health outcomes. While much research exists documenting this relationship for adults, it is unclear whether patterns and findings concerning adults would hold true for adolescents because there is little research to date. One of the only studies of adolescents showed that higher literacy correlated with respondent likelihood of having been tested for gonorrhea, even though participants with low literacy were more likely to

believe they were at higher risk for getting the disease [65]. It is plausible that health literacy may be associated with health behavior given that literacy is closely linked with academic achievement [66], and academic achievement has been associated with health behaviors such as substance use and violence among adolescents [67–69]. For example, a study that assessed reading level found an association with reading below grade level and violent behavior [60].

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### Conclusion

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The framework presented includes three main concepts: (i) in accordance with the EM, there are individual, interpersonal and systemic contributors to health literacy, some of which can also serve as intervention points; (ii) there are multiple types of health literacy that deserve attention when assessing health literacy for adolescents and (iii) health literacy potentially affects health outcomes, including behavior, service use and costs. This framework suggests that future research should accomplish the following tasks.

1. Develop and validate tools to measure health literacy in adolescent populations: Much of the research on health literacy and adults has used measures of literacy in health settings. Developing a tool to specifically measure health literacy skills for adolescent is crucial as a building block for future research. Scales and questionnaires should allow for self-administration when possible for inclusion in large-scale surveys and should include measures for different types of health literacy skills, such as functional and critical literacy.
2. Study predictors of health literacy levels among adolescents: Conducting studies to understand the association of individual traits with health literacy skills and to compare academic achievement measures with scores on assessments of health literacy are just some of the possible ideas for this category of research.
3. Examine the relationship between adolescent health literacy and health outcomes, including behavior, health care service use and costs: Once

measures are created to assess health literacy, resulting scores can be used as predictor variables for behaviors or other health outcomes of interest. Although similar research has been conducted for adults, it is necessary to understand these relationships for adolescents to inform interventions. By controlling for individual traits and other influences previously determined as predictors of the outcomes of interest, researchers can better understand the role health literacy may play for adolescent health.

4. Develop and evaluate interventions that can promote a greater understanding of health information for adolescents: Interventions to enhance health literacy skills may include programs that can be conducted in school or health care settings and can potentially use mass media (such as medical drama shows or health web sites) to teach health literacy skills to adolescents. Creating and evaluating interventions that are varied according to content, target group and setting of administration will lead to programs that can enhance health literacy skills among adolescents.

In addressing each of these research priorities, studies should consider focusing on specific populations to account for cultural, societal, technological and systemic differences. A report by the RAND Corporation concluded that adolescent literacy varies by race and socioeconomic status [70], and a recent study using REALM-Teen found gender and race differences [20], emphasizing the need to study specific groups of adolescents in an effort to reduce health disparities [24].

While this paper focuses on the United States, health literacy among adolescents is important for all industrialized and developing countries, but the issues may be different for each country and the framework may need to be altered. Varying attributes among countries means different approaches of addressing health literacy may be warranted [71], and global indicators of health literacy should be considered [72].

Although the framework does not specifically rely on behavioral or other theories, researchers may

apply relevant theories or perspectives to future research and adjust the framework accordingly depending on their research goal and background. For instance, if Social Cognitive Theory is used to explain how adolescents develop health literacy skills, one could restructure the framework into a 'triangle', with bidirectional arrows connecting individual factors, environmental factors (i.e. peer, parent, media influences) and health literacy [73].

Research focusing on health literacy and adolescents will provide important information to assist public health practitioners in understanding how health literacy may affect health behavior and outcomes and in developing ways to provide health literacy skills to adolescents.

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### Conflict of interest statement

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None declared.

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