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22.1 Introduction

Health literacy is defined as the knowledge and competency of persons to meet the complex demands of health processes [1]. Individuals must be able to evaluate one's own health, the health of one's family, and the community's health in order to understand which influencing factors lead to good health, as well as understanding how to address pertinent issues. Unfortunately, inadequate health literacy is a widespread problem in both non-industrialized and industrialized nations, and it is mostly related to deficient reading skills [2]. One must differentiate however between reading skills and understanding the health information put forth [1].

It is important to differentiate between literacy and health literacy. The term "health literacy" first appeared in peer-reviewed academic literature in 1974 [3]. However, by the author's own report it had nothing at all to do with the current understanding of the concept and was more an accident of English than an intentional representation of a singular concept. The term health literacy began appearing in the academic peer-reviewed literature in earnest in the early 1990s and has experienced nearly exponential growth since these efforts began [4]. In the 1900s

research showed that there was a strong correlation between education and health. As the lack of health literacy has been documented as a realistic healthcare issue, there has been much research and publications to address this problem. Low health literacy is associated with poorer health outcomes and improper use of healthcare. People cannot achieve their fullest health potential unless they are able to take control and understand those things which determine their healthcare services.

In the Institute of Medicine (IOM) report, *Health Literacy: A Prescription to End Confusion*, health literacy is defined as the ability of an individual to obtain, process, and understand basic health information and services needed to make appropriate health decisions [5]. The Patient and Affordable Care Act of 2010 defined health literacy as the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services in order to make appropriate health decisions [6]. An individual's level of health literacy is determined and affected by a multitude of variants. A person must possess basic literacy skills that include the ability to read, write, speak, and compute and solve problems prior to being able to navigate the healthcare system [7]. Additionally, the individual must be able to communicate and listen during interactions.

According to the National Assessment of Adult Literacy only 12% of adults have proficient health literacy [7]. Thus, nearly nine out of ten

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adults may lack the skills needed to manage their health and prevent disease. Fourteen percent of adults (30 million people) have below basic health literacy. These adults were more likely to report their health as poor (42%) and are more likely to lack health insurance (28%) than adults with proficient health literacy [4]. Language barriers, socioeconomic status, and educational attainment influences explained that even people with high literacy skills might have difficulty using information [5].

Specific outcomes associated with low health literacy include, but are not limited to, poor adherence to medical regimes, poor understanding of the complex nature of their own health, a lack of knowledge about medical care and conditions, poorer comprehension of medical information, low understanding and use of preventive services, poorer overall health status, and earlier death [8]. Those with low health literacy tend to use emergency services more often, are hospitalized more often, are readmitted to the hospital over and over, have a hard time understanding numbers, such as cholesterol and blood sugar levels, and medication amounts, and die earlier [7].

22.2 Identification of Patients with Low Health Literacy

Providers and healthcare workers must be able to identify patients with low health literacy to provide optimum care to the full spectrum of their practice. Patients with low literacy have an inclination to present with particular tendencies. The AHRQ Health Literacy Universal Precautions Toolkit defines red flags for low literacy. Red flags for low literacy are listed in Table 22.1.

People with low health literacy are less able to: share health history, with providers, use preventive services, such as early disease screenings, or manage a chronic health problem, such as diabetes or high blood pressure. Low health literacy is linked to: low quality of care, high healthcare costs, poor health outcomes, and increased health disparities.

Table 22.1 Red flags for low literacy

Frequently miss appointments
Submit incomplete registration forms and take a long time to complete forms
Are noncompliance with medication regimes
Are unable to name medications, explain purpose or dosing of their medication
Identify pills by looking at them, not reading the label
Are unable to give coherent, sequential medical histories
Lack follow-through on tests or referrals
Forget his or her glasses and state the need to read materials at home
Seek help only when illness is advanced
Have a tendency to not ask questions or have fewer questions
Have relevant documents related to their medical care tucked away in their purse

22.3 Barriers to Health Literacy

According to the U.S. 2003 National Assessment of Adult Literacy (NAAL), limited health literacy affects some groups more than others. These include the elderly, individuals with limited education, members of minority groups who do not speak English as their first language, and the poor [7]. Additionally, even those individuals that possess good reading skills may still face low health literacy skills due to the fact that they are unfamiliar with medical terms and how the body works, are diagnosed with a serious disease and feel scared and confused, and might have disabilities that make it hard to access health services. Research demonstrates that increased age, low education, low socioeconomic status, and poor reading level are among the major barriers to health literacy [5]. Along with other socioeconomic issues, literature reveals that one of the barriers faced by people having low health literacy level around the world is due to misunderstanding of health information [9]. The ability to correctly read medical information declines with age [10]. Inadequate health literacy is strongly linked with education. Poor understanding of health-related information and ignorance leads to poor management of health among the less educated population, leading to early deaths [5]. A study conducted in 11 European Union countries

concluded that secondary and tertiary education contributes in improving health-related knowledge among individuals [11]. The more a higher level of education is attained, the more health knowledge is improved, personal empowerment is gained, and self-worth is valued [12]. Furthermore, evidence supports cognitive impairment and dementia associated with the elderly leads to difficulty in information processing; however, these are not associated with a lower education level [4, 13]. Low-income populations usually possess low reading skills resulting in low health literacy [10]. A good level of earning contributes positively to managing health and taking proper self-care [11]. A high prevalence of chronic diseases like hypertension, diabetes, and hypercholesterolemia leading to cerebrovascular disease and stroke are among the major barriers to health literacy as all of these diseases affect mental abilities and disables the brain to function properly [4].

22.3.1 The Language of Healthcare

Healthcare professionals have their own culture and language. Many adopt the “culture of medicine” and the language of their specialty as a result of their training and work environment that may affect how health professionals communicate with the public. This communication may not meet the needs of their patients, especially those with low health literacy. For many individuals with limited English proficiency (LEP), the inability to communicate in English is the primary barrier to accessing health information and services. Health information for people with LEP needs to be communicated plainly in their primary language, using words and examples that make the information understandable.

22.3.2 Deficiency in Knowledge of Health Topics

In addition to basic literacy skills, health literacy requires knowledge of health topics. People with limited health literacy often lack knowledge or

have misinformation about the body, as well as the nature and causes of disease. Without this knowledge, they may not understand the simplistic relationship between lifestyle factors such as diet and exercise and the health consequences. They lack the ability to implement self-care activities. In 2014 an American Society of Neuroradiology analysis found that the patient education resources on their web sites failed to meet the guidelines of the National Institutes of Health (NIH) and American Medical Association (AMA) [14]. Members of the public may fail to fully understand website resources and would benefit from revisions that result in more comprehensible information cast in simpler language.

22.4 Health Literacy in Radiology

Literature analysis of the effects of low health literacy in the radiology environment is limited. A movement is growing within radiology to adapt to the changing healthcare environment and focus on a patient-centered approach to improve patient satisfaction, quality, and safety [15]. Included in the pre-imaging or preintervention steps for some radiological examinations are preps or other instructions that must be followed. It is challenging for radiology patients with low health literacy to follow written instructions regarding the home preparation in order for examination completion [16]. In a study regarding bowel preparation for colonoscopies, it was found that patients with low health literacy presented for their colonoscopies without having followed the bowel prep leading to an inferior diagnostic quality of the examination, repeated radiation exposure, or cancellation of the examination [16, 17]. Frequently patients receive written materials for radiological examinations that are written at an elevated reading level and not well understood [14, 18–21]. In a study done on emergency room pediatric patients and the utilization of radiologic testing in this group, it was found that both a minority race and low health literacy were linked with less testing [22]. Failure to obtain the proper testing leads to improper diagnosis and treatment. A comparative analysis of online patient educational resources

was conducted for health literacy in interventional radiology. Researchers found that due to lack of reading skills, online patient education materials are not understood by most which leads to poor examination preparation as well as interpretation of the result in the imaging report [19]. The consequences of unprepared patients undergoing imaging examinations may delay the imaging, as well as cause a delay in treatment [19]. According to research, there is a discrepancy between the level of readability of information provided on the internet and the literacy level of patients; thus, the information is not understood and interpretation is incomplete [23].

22.5 Interventions and Tools for Improving Health Literacy

There is a plethora of information available to assist in the development of educational tools for patients. There are, however, limited studies that examined the impact of different interventions for improving health literacy especially in specific populations [24]. The Centers for Disease Control and Prevention (CDC) website (<https://www.cdc.gov>) offers a multitude of resources to assist in developing health communication and social marketing programs [25]. The U.S. Department of Health and Human Services, National Resource Center for Health IT, offers a guide and checklist, “*Accessible Health Information Technology (IT) for populations with Limited Literacy: A Guide for Developers and Purchases of Health IT*” (<https://healthit.ahrq.gov/sites/default/files/docs/page/LiteracyGuide>), that can be used to develop

and evaluate internet products for consumers on health information [26]. Additionally, the U.S. Department of Health and Human Services, National Cancer Institute, and National Institutes of Health outlines a process for developing publications for people with limited literacy skills called “Clear and Simple: Developing Effective Print Materials for Low-Literate Readers” [11]. A “*Quick Guide to Health Literacy*” is offered by The U.S. Department of Health & Human Services, Office of Disease Prevention and Health Promotion. The *Quick Guide to Health Literacy* is for government employees, grantees, contractors, and community partners working in healthcare and public health fields. The guide provides information on key health literacy concepts; techniques for improving health literacy through communication, navigation, knowledge building, and advocacy; examples of health literacy best practices; and suggestions for addressing health literacy in your organization [11].

Some guideline information targets specific populations, for example, the “*Quick Guide to Health Literacy and Older Adults*” guide provides background information on health literacy, strategies, and suggestions for communicating with older adults. This guide is published by the U.S. Department of Health & Human Services, Office of Disease Prevention and Health Promotion’s [9].

The following tools have been developed for the evaluation of healthcare literacy. These are listed in Table 22.2.

Health finder® is an award-winning federal web site for consumers, developed by the U.S. Department of Health and Human Services and other federal agencies. Since 1997, Health

Table 22.2 Tools for the evaluation of healthcare literacy

Tool name	Source
Universal Precautions Toolkit	www.nchealthliteracy.org/toolkit/
Optimizing Health Literacy and Access Process(Including health literacy needs, assessment, and intervention development)	www.ophelia.net
Building Health Literate Organizations: A guide book for Achieving Organizational Change (Includes excellent case studies and teach-back resources	www.unitypoint.org/healthliteracy-guidebook.aspx
“Always Use Teach-back” Training Toolkit	www.eteachbacktraining.org/
Enliven Organizational Health Literacy Self-assessment Resource50	www.enliven.org.au/library.html
Multidimensional health literacy measurement tools	www.ophelia.net.au/16

Table 22.3 Six levels of evaluation and potential purposes for measuring health literacy

Levels	Potential purposes for measuring health literacy
Individual patients	To problem solve for complex patients, to train staff in responding to differing health literacy needs
Patient groups	To identify common factors that contribute to poor access and health outcomes to plan for services to respond to health literacy needs to inform advocacy activities
Individual health services	To diagnose health literacy strengths and limitations of the target population and how these strengths and limitations contribute to known inequalities of access, participation in health and health outcomes to develop specific strategies for responding to common health literacy limitations community and population settings
Local areas (both health and community services/authorities)	To plan marketing and education strategies across services to assess the ability of community members to participate in community-based health planning activities (critical health literacy) and develop suitable approaches to enable their participation
National surveys (to compare regions and groups)	To identify relationships between health literacy and access, equity and outcomes, in order to develop appropriate health service and public health policies and strategies; plan health education campaigns, or campaigns to support the introduction of new services, screening initiatives (e.g., bowel or skin cancer) or vaccination programs; assess regional “patient difficulty” for planning and funding purposes (assuming that it takes more intensive resources to improve health outcomes for people with low health literacy than it does for people with higher health literacy)
Countries (international comparisons)	Advocacy for governments in countries where there is systemic low health literacy; identify countries that are role models for how to improve health literacy levels of populations

Adapted from: https://ppgenf.fen.ufg.br/up/127/o/Batterham_2016.pdf

finder® has been recognized as a key resource for finding the best government and nonprofit health and human services information on the Internet. Health finder® links to carefully selected information and web sites from more than 1500 health-related organizations [13].

According to Batterham et al. [27] health literacy is multidimensional and must be evaluated at varying levels. They suggest six levels of evaluation and potential purposes for measuring health literacy across the healthcare spectrum which are the following [27] (Table 22.3).

22.6 Improvement of Health Literacy

The healthcare providers across the spectrum must work together to ensure that health information and services can be understood and used by all. We must engage in skill building with healthcare consumers and health professionals. Adult educators can be productive partners in reaching adults

with limited literacy skills. The National Institutes of Health (NIH) and the American Medical Association (AMA) recommend online patient education resources written at a third-to-seventh grade level. Plain Language (www.planlanguage.gov) is a technique to write clear and to the point. It is also a strategy we can use to improve health literacy. Presently, there is not a global organization for health literacy researchers, practitioners, and policymakers. Therefore, there is no known structure through which to contact practitioners, researchers, academics, and policymakers working with health literacy.

The “teach-back” method has been used to assess patient comprehension of medical instructions and has been shown to improve adherence [4, 15]. Literature review confirms that both written and verbal health information combined are necessary to improve the knowledge and level of satisfaction of caregivers at the time of discharging their patients as compared to provision of verbal information only [28]. Repetition reinforces the patient’s knowledge.

The use of available trained professional medical interpreters should be used whenever there is a need and the resource is available. Using family or friends as interpreters is *not* recommended as the interpretation may not have the intended meaning. The International Medical Interpreters Association is one available resource (see <https://www.imiaweb.org/resources/telephoneint.asp>).

22.7 Conclusion

Low health literacy is known to be a “silent killer.” This can be tackled by closing the gaps between health messages and health messengers by using simplified language and including cultural appropriateness [5]. A review of the literature confirms that both written and verbal health information combined are necessary to improve the knowledge and level of satisfaction of care givers at the time of discharging their patients as compared to provision of verbal information only [4, 12].

Despite the diligence worldwide to address low health literacy, it remains a prominent issue in the healthcare setting. Patients are not receiving proper health instructions due to lack of understanding of the information put forth, written and digitally. It has been suggested in the literature that needs based assessments should be performed in order to assist healthcare providers in providing the most comprehensive literature to promote health for patients [15].

There are many tools available to measure health literacy; however, we need to incorporate and evaluate the way healthcare information is presented. Low health literacy has been identified as an ongoing issue in the healthcare environment that must be collaboratively and collectively incorporated into our workflow. Professional societies can play a role in increasing health literacy through promotion of patient-centered care.

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