

Health literacy and social determinants of health

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ABSTRACT

Health Literacy and Social Determinants of Health are closely intertwined. Health disparities and inequities, overall health outcomes, understanding health information, and the ability to be fully informed about medical decisions can have long-term consequences. This connection is even more pronounced in rural and underserved urban areas where low health literacy is prevalent. This review seeks to identify correlations between health literacy and social determinants of health. It further proposes to indicate how key constituencies (healthcare organizations, healthcare providers, and patients) can further develop and disseminate health literacy initiatives to improve overall health and wellness. The research team used the Covidence database to screen, review, and extract peer-reviewed research articles for this study. The initial review identified 75 articles based on term harvesting and keyword searches considered relevant to the review. Selection, review, and characterization were performed by three reviewers on a team of four researchers. The articles' focuses are different regarding the observed impact on literacy concerning certain chronic health conditions, rural versus urban population centers, health education, ethnic and racial differentiation, and other variables. There are notable gaps in the current literature that relate to concrete methodologies to address these concerns.

Keywords: health literacy, health outcomes, rural health, rural population, patient education

INTRODUCTION

The Institute of Medicine defines Health Literacy as “the degree to which individuals can obtain, process, and understand basic information and services needed to make appropriate decisions regarding their health.”¹ What does this mean, and why is it important? Health literacy is a skill that includes the literacy and numeracy necessary for individuals to effectively navigate the health care system. Health terminology is like learning a new language; therefore, navigating the healthcare system with low health literacy is like visiting a foreign country when someone does not speak or understand the language. Individuals with low-health literacy risk hospital readmissions because they often do not understand the instructions given when they

are discharged, especially regarding medications or other self-care activities. These individuals may be at risk for over- or under-dosing on medications due to difficulty reading the label. These individuals are at risk for hypo- or hyperglycemic events because they may not understand the different conditions of diabetes and how to manage each situation appropriately. These are only a few examples of the risks low health literacy can have on individuals.

National health literacy statistics indicate that only 12% of adults in the United States have proficiency or a high degree of competency in health literacy. Approximately nine out of ten Americans lack the knowledge to navigate health systems. Americans who have low health literacy cost the nation over 236 billion dollars.² Additional studies that support the correlation between healthcare cost and health literacy are few. For example, Veterans Health Administration (VA) conducted a study over a three-year span among veterans with low health literacy using a generalized linear model. Adjusting for covariates, the

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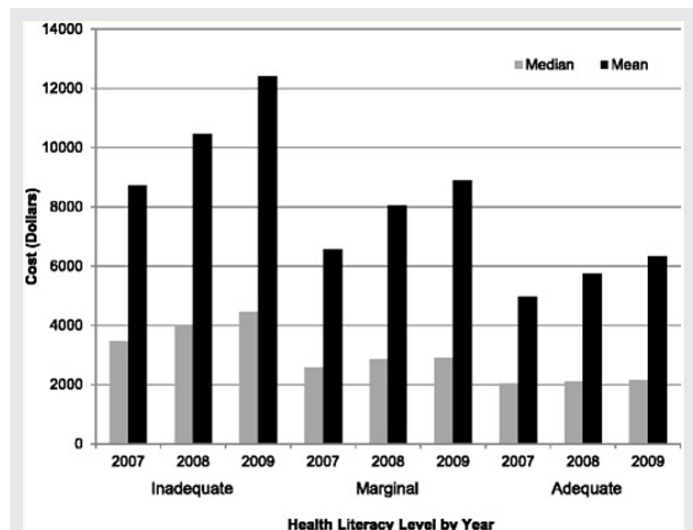


Figure 1. Relationship between health literacy and healthcare cost (Haun, 2015).

results “suggest when controlling for other person-level factors within the VA integrated health system, lower health literacy is a significant independent factor associated with increased healthcare utilization and cost.”³ The VA further indicated the average nominal health care cost per patient increased as the level of health literacy decreased using a health literacy scale based literacy levels that included, “adequate,” “marginal,” and “inadequate.” The cost ranged from \$26,879 for adequate to \$34,289 for marginal and increased yet again to \$36,878 for patients with inadequate health literacy levels (p-value < 0.001) (See Figure 1). The Haun study also presented information relating chronic conditions to health literacy levels that correlates with the increased costs.³ Table 1 details the differences in literacy levels and the prevalence of chronic conditions.

Health status is determined by “the conditions in which we are born, live, and age.”⁴ In addition to genetic determinants of health passed down from parents, there are environmental determinants of health. In addition to physical aspects of the environment, such as altitude and climate, there are social determinants of health. The U.S. Department of Health and Human Services defines Social Determinants of Health (SDOH) as “the conditions in the environments where people are born, live, learn, work, play, worship, and age that affects a wide range of health, functioning, and quality-of-life outcomes, and risks.”⁵ These conditions are divided into

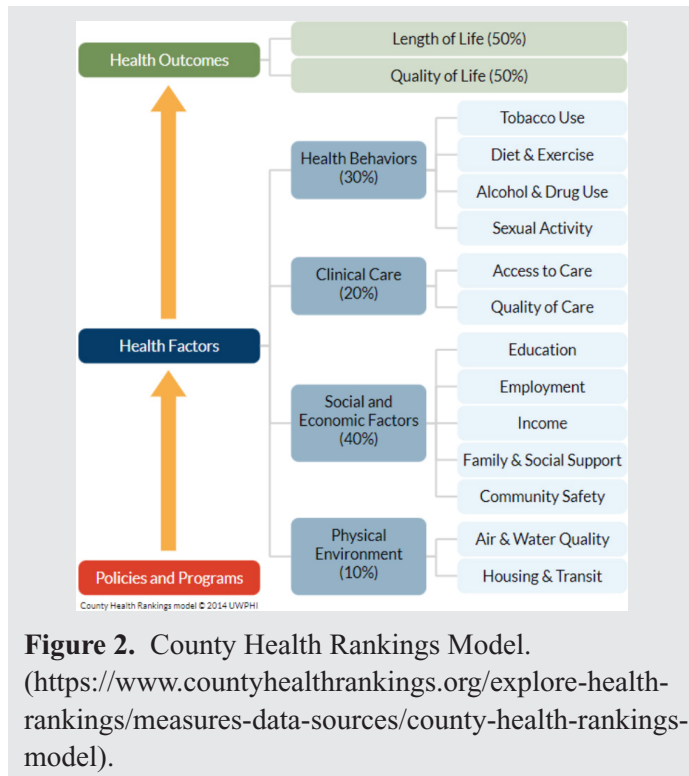
Table 1. Health Literacy Prevalence and Chronic Health Conditions

Health Literacy Level Prevalence per 1000			
Conditions (using HCC)	Inadequate	Marginal	Adequate
Cerebral*	73.1	60	46.9
Heart (CHF)*	359.5	334.4	272.2
Vascular*	162.6	140.1	104.8
Cancer*	191	172	148.8
Diabetes*	366.3	344.3	297.9
Arrhythmias*	204.2	182.3	142.6

*Significant differences between Health Literacy and Disease status (Chi-squared Test) p-value <0.001. (Haun 2015).

five domains: economic stability; education access and quality (health literacy); health care access and quality; neighborhood and built environment; and social and community context. Therefore, health literacy is considered one of the SDOH, and although addressing health literacy is an integral factor to consider, it is not the only solution to addressing health inequities.⁴ There is a lack of research studies that make this connection, but it is not difficult to understand the relevancy. Research about low health literacy alone is abundant, but interventions that address the connection between health literacy and SDOH have not made their way into the main healthcare discussion. Research has associated socio-economic status and education levels with health literacy, identifying educational attainment as the strongest association.⁴ Authors from this recent study have designed a social determinants model to better distinguish the idea of inequity. The model exemplifies the importance of how health literacy and other determinants impact an individual (Figure 2).

Equity is not always understood well and is often confused with equality. According to the Merriam-Webster online dictionary, “equity” is defined as “justice according to natural law or right; freedom from bias or favoritism,” while “equality” is defined as “the state or fact of being exactly the same in number, amount, status or quality.”⁶ Unfortunately, policymakers assume that providing everyone with the same benefit will level the resources and thus give everyone the same opportunities, such as access to healthcare.⁷ Low

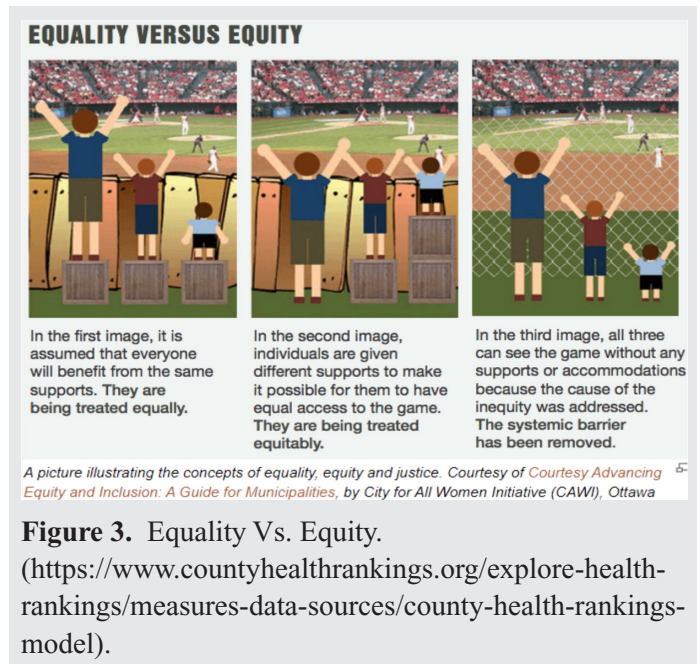


health literacy is one of the inequities that individuals face on a daily basis that leads to unequal healthcare opportunities and poor health outcomes. For example, offering healthcare to everyone based on insurance and income (equity) does not mean that everyone will be able to afford that insurance to cover their healthcare (equality)⁸ (Figure 3). Thus, health outcomes are affected by policies and programs or the lack and availability of these programs for some individuals. It is important to note that clinical care contributes only 20% toward positive health outcomes, while health behaviors, social and economic status, and physical environment factors are the main contributors to overall health outcomes.

METHODS

STUDY DESIGN AND RESEARCH QUESTION

This study is a systematic review of health outcomes based on health literacy coupled with social determinants of health in rural communities, with the review design facilitated through PRISMA standards



and The EBM-SR Research Framework guidelines. It examines factors influencing health outcomes, specifically health literacy among rural populations, with a focus on how social determinants of health combined with health literacy influences health outcomes in rural communities.

SEARCH STRATEGY

A comprehensive literature search was performed using an established research framework to examine the social determinants of health and health literacy on rural health outcomes. The original research question was framed within a PICO (Patient/Population/Problem, Intervention, Comparison, Outcome) design, and search terms were identified through discipline-specific contexts and thorough investigations of the foundational articles. Primary keywords included “health literacy” and “health outcomes,” and Medical Subject Headings (MeSH) applied were “rural health,” “rural population,” and “patient education as a topic.” Records were obtained from PubMed/MEDLINE and Scopus, with additional titles retrieved through citation matching and hand searching.

Both reviews and original investigations were included. After compiling and duplicating all records in Covidence, a record filtering and data extraction

tool, researchers screened and selected articles for inclusion in the study. From an original total of 75, reviewers chose studies that reflected various health outcomes among rural populations. Studies too narrowly focused on a single health outcome or were otherwise immaterial to the condition or context were discounted. Only peer-reviewed English-language research with available electronic full-text publications was included. Conference papers, case reports, and other studies published only in abstract form were excluded. There was no restriction for the year of publication since that could potentially exclude relevant literature. Relevant peer-reviewed studies numbered 37.

Data were extracted from the articles of sufficient quality using the Covidence filtering and data extraction software platform. Extracted data included study design, country, study setting (i.e., clinical, community, national survey), participant characteristics, study variables including the measure of health literacy, and primary, relevant study outcomes. The summary measures varied depending on the study. As the range of methods included made the data unsuitable for meta-analysis, only data from the studies were tabulated. A narrative synthesis of the results was applied to summarize the strength of evidence around the differences in health literacy in rural settings.

RESULTS

The literature continually points out that low health literacy is associated with many issues, including “inadequate health care utilization and poor health outcomes.”⁹ Therefore, being knowledgeable about the population served is essential. In addition to obstacles such as unemployment, low pay, lack of health insurance, and lack of transportation, individuals from the lower socioeconomic group have to face low health literacy, which presents additional obstacles to health care access, follow-up, prevention, and maintenance.

Rural residence is another factor discussed in the literature. In the study conducted by Zahnd et al., intermediate health literacy levels were used as a reference to compare rural residents to urban residents.¹⁰

They found that rural residents have a lower health literacy proficiency level compared to those in urban areas (7.7% vs. 12.7%). Halverson also found that urban residents tend to have slightly higher health literacy levels while rural residents have 33% higher odds of low health literacy. According to Halverson, income and education were lower among rural cancer patients than those living in urban or mixed urban-rural areas, which can result in differences in health literacy levels.⁹ However, after adjusting for confounding variables that included age, gender, race/ethnicity, education, and income, there were no differences in health literacy levels between urban and rural residents. Even though lower health literacy in rural residents is not necessarily due to a rural environment, the older adults and those living in poverty in rural areas are affected by low health literacy. To positively address low health literacy, it is essential for the administrators and providers of these large medical districts where these rural residents seek care to understand the population and adjust their efforts accordingly.

Another factor that has become common in literature is the digital connectivity, which is now a prevalent aspect of healthcare. Most health information is disseminated digitally or virtually, and individuals without Internet services, such as those living in rural areas, may not be able to access this information. This includes access to Telemedicine or Telehealth visits. One study found that combining Internet access and health literacy training is transformational for “achieving positive health literacy outcomes.”¹¹ The lack of health information obtained from the Internet due to availability and connectivity is a factor attributed to rural residents’ lower health literacy status.¹⁰ It is relevant to note that only 13.0% of rural residents, compared to 19.1% of residents living in urban areas ($P < 0.001$), acquire health information from the Internet, including medical appointments, medication refill requests, and medical record portals.

The literature that combines health literacy and SDOH has concluded that SDOH “drives health disparities in acute and chronic illnesses, including the most recent pandemic.”¹² The risk of chronic conditions is higher for individuals who cannot afford to buy healthy food or do not know how to read food labels when prescribed specific diets.¹³ Unfortunately, 80%

of older adults have a combination of one chronic condition and low health literacy levels, increasing their risk for poor health outcomes.¹⁴ Understanding nutrition labels has positive implications for chronic disease management; however, a study indicated that nutrition literacy can impact overall health.¹⁵ The numerous SDOH, with the addition of low health literacy, creates a sizable disadvantage for many individuals.

Studies have also shown that low health literacy adversely affects clinical outcomes, which include perception of the health conditions, adherence to health screenings, and the ability to manage a chronic illness.¹⁰ Individuals with low health literacy are less likely to obtain routine screenings, such as mammograms, pap smears, and colonoscopies. Lower self-efficacy and information-finding skills are barriers for people diagnosed with cancer who also have low health literacy.¹⁶ Those with low health literacy are also less likely to report or seek care when experiencing poor health. Poor adherence, misguided self-perceptions, lack of screening, and ability to manage chronic conditions lead to poor quality of life and high health care costs. In a study by Zahnd et al., it was noted that rural populations have more residents over the age of 50 (42.9% compared to 34.3% in the urban comparison area), are less likely to have a high school diploma (17.4% vs. 14.8%) and are more likely to live in poverty (20.1% vs. 16.8%).¹⁰ These issues, compounded with lack of access to care, distance to care, and lack of insurance, make the rural population even more vulnerable.

One factor that was not previously considered before this literacy review is the effect of low health literacy on adolescents. Addressing health literacy can be identified and addressed prior to adulthood. A research study conducted among seventh graders from eight different middle schools in rural Appalachia demonstrated that energy-balance-related behaviors, body mass index, and quality of life were lower among students with lower health literacy levels.¹⁷ Differences were noted in water consumption, fruit and vegetable intake, physical activity, and sleep in the adolescents who demonstrated higher levels of health literacy. These behaviors can carry forward to adulthood and negatively impact the overall health status of students with low health literacy scores. Fortunately,

interventions have been identified for this age group. For example, school-based literacy programs, such as Advancing Community Health Literacy Education, Vision, and Empowerment (ACHIEVE), can effectively deliver health literacy to rural high school students.¹⁷ The interactive modules developed for ACHIEVE are based on the Theory of Change and are provided in two phases. The first phase is the didactic piece that takes 20–40 minutes, and the second is a community project phase during which the students learn problem-solving skills and strategies to help their communities. A modified version of this strategy and model for adults, called “Transformation for Health,” has been found to effectively address health literacy barriers.¹⁸

Finally, health literacy also contributed to outcomes in the most recent COVID-19 pandemic, which presented numerous health challenges. Given the research presented on the low health literacy factors found in rural communities, it is not surprising that rural communities have been impacted more severely by the pandemic. The mitigating factors “strongly correlated” with health literacy include reduced physical and mental health, higher rates of hospitalization, increased morbidity and mortality.¹⁹

DISCUSSION

The results of this comprehensive literature review were consistent with the literature already published concerning the association between health literacy and poor health outcomes. The correlation between low health literacy and rural status has been determined although, the association between health literacy and poverty or age has not been determined to be a factor, so additional studies are needed in this area. The literature also leads to a further understanding of the correlation between low health literacy and the impact on individuals who live in rural areas due to the limited availability of Internet resources. The World Wide Web can be utilized for Telehealth/Telemedicine appointments. Often, healthcare facilities create portals that can be easily accessed by the patient for appointments, lab/x-ray results, and other information. Although these resources may be obtainable through a cellular device, Internet access is often required and may not be

available in remote rural areas. Equity, once again, is a mitigating factor for health literacy. Even though Internet services are widely available (equality), not everyone has access (equity).⁹ Healthcare facilities, organizations, and providers should try to assess the availability of resources for all patients as part of the initial screening phase of the visit to properly offer resources that will address disparities and inequities associated with poor health outcomes caused by low health literacy. Additional research is needed as technology becomes the driving force for healthcare and how that relates to health literacy. Ideally, the cost of improving health literacy would yield a positive return on investment with reduced community shared healthcare costs, but more study is needed to determine if this result is possible. Overall, health literacy as a social determinant of health will continue to be a contributing factor for poor health outcomes unless the topic is given priority and funding agencies support this type of research.

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