

Perspective

Empowering Sustainable Healthcare: The Role of Health Literacy

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Abstract: The imperative of sustainability in healthcare is becoming more pressing due to global health crises, climate change, and the rising burden of chronic diseases. Sustainability in healthcare involves social, economic, and environmental dimensions, each important for equitable and robust healthcare delivery. Health literacy may play a central role in embracing all three dimensions, bridging the gap between complex health information and individuals' capability to understand and use it effectively: In fact, as a factor influencing the link between adverse social and economic conditions and subsequent health issues, health literacy could represent a practical target for mitigating health disparities within various demographic groups, thereby enhancing social sustainability. Furthermore, when people possess a solid understanding of their health conditions and the necessary steps for health management, they can contribute to a reduction in generated healthcare costs. Finally, health literacy and environmental health literacy equips individuals and communities with the knowledge and skills to understand how environmental factors affect health and empowers them to take proactive measures to protect the environment, potentially reducing the environmental impact of healthcare services. Therefore, integrating health literacy into education curricula and healthcare professional training is crucial for promoting sustainability. Despite some known barriers to the advancement and improvement of health literacy, such as limited awareness of its importance, the collaboration between academia, healthcare institutions, and community organizations is a path to follow to overcome these challenges.

Keywords: healthcare; sustainability; health literacy; social determinants of health; health equity; health education; health communication; health promotion



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1. Introduction: Health Literacy and the Imperative of Sustainability in Healthcare

The landscape of global health is continuously evolving and confronting emergent challenges that need innovative, resilient, and sustainable solutions: With the global health crises, climate change, and the increasing burden of chronic diseases, the call for sustainable healthcare systems has become more pressing. The domain of sustainable healthcare encompasses three core dimensions, namely social, economic, and environmental sustainability, and each of these dimensions is essential to promoting holistic healthcare delivery that is equitable and robust at the same time [1].

Social sustainability in healthcare is embodied in the principles of equity, inclusivity, and social justice, and it emphasizes the importance of delivering healthcare services in a manner that is culturally competent and responsive to the diverse needs of the population. Ensuring social sustainability in healthcare promotes health equity and enables the provision of patient-centered care, which is key in improving health outcomes across various demographic groups [2]. Central to achieving a sustainable healthcare is the empowerment of individuals and communities through the enhancement of health literacy (HL). Economic sustainability in healthcare involves the wise utilization of resources to ensure that healthcare services are affordable and accessible to all segments of the population; it highlights

the importance of cost-effectiveness and efficiency in healthcare delivery, promoting a milieu where the healthcare resources are optimally allocated to meet the health needs of the population [3]. Environmental sustainability, on the other hand, underscores the relationship between the healthcare sector and the natural environment: The healthcare sector is a significant contributor to environmental degradation, with its substantial carbon footprint and waste generation [4]. Transitioning towards environmentally sustainable healthcare practices is key to mitigate the environmental impact of this sector and contribute to broader societal efforts to combat climate change.

HL is defined as “the combination of personal competencies and situational resources needed for people to access, understand, appraise and use information and services to make decisions about health” [5]. It bridges the gap between complex health information and individuals’ capability to understand and use this information effectively, thus promoting informed decision making, self-management, and community engagement in health matters. Low HL correlates with increased hospitalizations, reduced engagement with preventive services, and, generally, with diminished health status and higher mortality rates [6]. However, HL is not only an individual endeavor but also an organizational pursuit. Organizational health literacy (OHL) refers to the ways in which organizations help individuals to navigate, understand, and use information and services to take care of their health [7]. A health-literate healthcare organization is better positioned to support individuals in making informed health decisions, which is fundamental to sustainable healthcare action. By promoting a culture of OHL, healthcare services can contribute significantly to improving patient engagement, healthcare quality, and the overall sustainability of healthcare systems. Furthermore, HL is not confined to the individual level but has profound implications at the societal and political levels [8]. Indeed, HL can be seen as a widespread skill: a resource distributed within the social network, a collective property defined as distributed HL [9]. By promoting good information for people to guide them towards making healthful decisions, the groundwork is laid for a more sustainable and resilient healthcare system. As an example, customized, structured, and community-based interventions aimed at improving HL might be key for type 2 diabetes mellitus self-management [10]; lower HL levels are also associated with worse cardiovascular diseases outcomes [11].

By investigating the relationship between HL and sustainability in healthcare, the present manuscript explores the role of HL in catalyzing the transition towards sustainable healthcare, highlighting its potential impact on individual and community actions, education, and policy. As this is a perspective paper, our primary aim is to outline potential future research directions and suggest policy development rather than conduct a systematic analysis of the literature. Based on existing frameworks and research, this perspective suggests future research directions and encourages policy development.

2. The Social Sustainability: Health Literacy as a Determinant of Health

Healthcare systems strive to deliver services to promote health, prevent diseases, and improve the health outcomes of the population [12]. However, human health also depends on social matters [13], and healthcare systems operate within the complex framework of numerous societal challenges, including an inequitable resource distribution and escalating healthcare needs [14]. Therefore, the concept of social sustainability, which implies both the fair distribution of health and safety resources and providing equal opportunities to access these resources [15], has increased its importance in the last years [16]. The social sustainability of a healthcare system is strictly linked to the determinants of health, in particular to socioeconomic disparities, traditionally measured through levels of education, income, and/or occupation that are widely regarded as the primary underlying causes of health disparities [17]. Understanding and addressing these determinants is crucial for creating a healthcare system that is socially sustainable [16]. This is where HL comes into play, also considering that there is a consistent relationship between HL and health outcomes (such as improved disease management, reduced hospitalizations, and better overall health status in those with higher HL), while part of the literature tends to consider

HL as an independent determinant of health [18]. Therefore, HL, as any other determinant of health, can contribute to generating disparities but the particular relationship between HL and the other determinants of health can be also viewed as an opportunity for the public health response to addressing these disparities.

Indeed, in all reported population surveys, there is a strong evidence of a social gradient of HL [18]. Individuals with higher levels of education, safer employment, and higher income typically enjoy improved access to health information and greater resources to use this information effectively [19]. As a result, adverse social and economic factors consistently correlate and are associated with lower levels of HL within communities, and as expected, the strongest association of HL has been shown with educational levels [20,21].

Moreover, there is evidence [19,22] suggesting that HL acts as a mediator in the relationship between socio-economic determinants and specific health outcomes, behaviors, and utilization of health services. This association implies that HL may serve as a factor influencing the link between adverse social and economic conditions and subsequent health issues, showing itself as a potentially modifiable variable compared to other social and economic factors. Practically, HL can be considered as both a “risk” when considered as a determinant of health, thus generating disparities, but also as a solution due to its mediating effect and the relatively ease with which HL can be improved. Therefore, strengthening HL in the population and increasing the OHL of healthcare services could represent a practical strategy to mitigate health disparities that exist within various demographic groups, enhancing the social sustainability of the healthcare system [23].

Nevertheless, it is essential to recognize that this approach should not be regarded as a justification for disregarding socio-economic determinants that contribute to the underlying disparities in the distribution of power, resources, and opportunities.

3. The Economic Sustainability: Health Literacy and Appropriateness of Care

The aging population and the epidemiological transition from acute to chronic diseases contribute to increasing demands for healthcare access [24]; moreover, a threat to the long-term sustainability of healthcare systems is expected to be caused by the increasingly expensive new medical technologies [25,26]. The COVID-19 pandemic has exacerbated this already unstable situation by leading to an increase in catastrophic health spending among populations due to the surge in demand for medical care and, more generally, to an increase in health spending worldwide; many countries still grapple with significant health spending pressures [27–29]. Furthermore, the current political and economic environment continues to have major consequences for the health sector [30].

HL may play a role in reducing the impact of the current economic crisis of the healthcare systems. It could be argued that, on the contrary, HL can increase healthcare costs: In fact, having the skills, competencies, and motivations to access and navigate the healthcare system could lead to a more likely proactive seeking of services, thus increasing their utilization and the subsequent economic burden. However, according to Schulz and Nakamoto [31] in a brilliant paper describing differences between HL and patient empowerment, this is only the case when a psychologically empowered patient makes risky choices while lacking the adequate knowledge and judgment skills of HL. Conversely, when people possess a solid understanding of their health conditions and the necessary steps for health management, they can contribute to a reduction in generated healthcare costs [32].

Indeed, low levels of HL and the associated health inequalities impose a considerable economic burden on health systems [33]. An analysis of the economic impact of limited HL revealed that it could account for 3–5% of the overall healthcare expenditure in Canada’s health system in 2009, where the associated costs varied between USD 143 and USD 7798 per person [34]. Additionally, a study conducted in the United States estimated that limited HL incurred a cost of approximately USD 73 billion in 1998 [35]. Similarly, Parker et al. [36] suggested that inadequate HL serve as an independent risk factor for escalating costs within the healthcare system. Specifically, individuals with poor HL are expected to experience

increased risks of illness complication and frequent use of emergency services [37]. In contrast, adequate HL encompasses skills that ultimately empower individuals to navigate the healthcare system effectively and make informed health decisions [38]. In other words, health-literate people possess the ability to navigate healthcare services effectively and align the care they receive with their specific health needs. This fosters the delivery of appropriate care in collaboration with healthcare providers [39]. As an example, HL was found to be a strong predictor of medication adherence and participation in preventive interventions [6], including cancer screening programs [40,41]. On the contrary, limited HL is considered to predict significant risks of misuse of health resources available. Indeed, Howard et al. [42] observed an increase in emergency department visits and higher costs among patients with inadequate HL compared to those with sufficient HL.

A growing number of scholars are directing attention to the effects of HL interventions on healthcare costs. A systematic review of strategies to address community hypertension found that educational interventions targeting health behavior change and medication adherence were considered to be cost-effective [43]. Also, in a recent study [44], a tailored HL follow-up in patients with chronic obstructive pulmonary disease was found to be cost-effective. However, studies examining the costs of interventions aimed at increasing HL are heterogeneous, and values of cost-effectiveness differed between studies and fields [45]. Therefore, there is an urgent need for a solid research foundation to assist stakeholders in determining the best interventions according to the context in which they operate.

Nonetheless, the findings of the literature suggest that various determinants contributing to increased healthcare costs may be attributed to limited HL and OHL [39]. There is an increasing commitment by different stakeholders responsible for the effective functioning of the healthcare system to address and possibly solve the challenges posed by limited HL in driving up healthcare costs.

4. The Environmental Sustainability: The Environmental Health Literacy

The healthcare system has a significant impact on environmental sustainability due to the sector's large environmental footprint, which is influenced by factors such as population growth and the use of resource-intensive technologies [46]. Efforts to improve sustainability in the healthcare industry include the greening of infrastructure and the implementation of sustainable practices in medical equipment use [47]. Nevertheless, there is a pressing need for heightened awareness and proactive measures in this domain, urging the establishment of a comprehensive life cycle inventory database for medical devices and drugs, alongside the implementation of standardized sustainability performance metrics [48]. As stated above, HL can increase the appropriateness of use of care, thus reducing the number of services performed and subsequently the impact on the environment. However, to date, the concept of HL has primarily focused on human-centered aspects and has not inherently encompassed environmental sustainability. Moreover, based on our knowledge, no scientific literature has demonstrated the positive effect of a high level of HL on the environmental preservation.

The increasing attention to climate change and to the environmental crisis has prompted the emergence of environmental health literacy (EHL), a recent sub-category of HL. EHL is a multidisciplinary field that integrates aspects from various branches, including health literacy, risk communication, environmental health, communications research, and safety culture. Like HL, EHL encompasses a broad spectrum of skills and competencies, letting individuals to seek, comprehend, evaluate, and use environmental health information to make informed decisions, mitigate health risks, enhance quality of life, and safeguard the environment [49]. EHL empowers individuals and communities to make informed decisions and take action to protect and improve public health, especially in response to climate change [50]; it promotes a deeper understanding of how environmental factors, including air and water quality, pollution, and exposure to hazardous substances, can impact health. Moreover, it encourages proactive behaviors such as reducing carbon footprints, recycling, and advocating for policies that mitigate climate change [50,51]. However, while the topic

is promising, it has been hardly explored and is still a matter of debate. The measurement instruments developed are few and based on different EHL definitions [52], and according to Lindsey and colleagues [50], there is lack of strong agreement among EH professionals about the skills that are essential to EHL: In fact, while it is crucial to acknowledge these limitations, such as the relative lack of research on environmental sustainability within HL and the emerging and partly different nature of EHL, both HL and EHL remain crucial factors for environmental sustainability. HL empowers individuals to make informed decisions about their health, potentially reducing the environmental impact of healthcare services as well as of their negative behaviors. Meanwhile, EHL equips individuals and communities with the knowledge and skills to understand how environmental factors affect health and empowers them to take proactive measures to protect the environment and, as a consequence, more generally, public health. By promoting HL and EHL concurrently, we can foster a more sustainable approach to healthcare that embraces human health as well as environmental well-being. In this perspective, the proposal of the concept of planetary HL is challenging: Planetary health-literate individuals and societies are enabled to sustain and promote their own health, population health, and the planet's health [53].

5. Time to Act: Integrating Health Literacy into Curricula

To promote a culture of sustainability within healthcare systems, it is required to address individual and organizational HL [35]. Researchers are working to develop and refine tools for measuring health literacy and to assess changes in HL level following interventions, and there have been several helpful reviews [6,54–58]. The great majority of reported interventions have been in clinical settings [6] generally focused on older patients [55,58] affected by chronic diseases [56,57]. These reviews collectively provide consistent evidence that individuals with lower HL levels can be identified in clinical settings and, by means of communication adjustments and other mixed-strategy interventions, supported in enhancing their understanding of specific clinical conditions and associated risks and empowered with functional skills to modify behaviors, resulting in improved health outcomes, including reductions in identifiable risks for chronic diseases.

Outside of the clinical setting, the first and foremost strategy to increase HL is to enhance individuals' education. In this perspective, studies conducted in Germany and internationally [59,60] show that the degree of schoolchildren's HL is greatly influenced by their social background, which is in turn associated with a healthy life expectancy, influenced by the family income and educational attainment [61,62].

We need to integrate HL into educational curricula to help young people to develop the knowledge and skills to make informed health decisions, thereby promoting personal and community health while contributing to the broader sustainability goals. The education system is identified as a significant target for enhancing HL by incorporating health knowledge and skills into existing curricula. The inclusion of HL in education curricula is a complex issue, with both potential and challenges. Kilgour [63] and McCuaig [64] highlighted the importance of integrating health messages into the curriculum but also noted the difficulties in doing so. Indeed, initiatives such as teacher-driven programs have demonstrated a positive impact on students' HL scores, indicating the feasibility and effectiveness of such integration. However, studies exhibit significant heterogeneity and have not uniformly adopted a systematic approach that can be easily replicated [65].

While the available evidence-based research is limited, it suggests the need to address health literacy in childhood and adolescence [60,66,67]. Indeed, the knowledge and behavioral patterns developed in adolescence play a crucial role in the establishment of a healthy lifestyle that extends into adulthood, significantly influencing lifelong health outcomes [68]. Particularly, improving HL during this life stage may promote early and more durable healthy behaviors, such as having an adequate physical activity, healthy dietary patterns, and undergoing routine medical check-ups, while also reducing unhealthy lifestyles such as tobacco, alcohol, and illicit drug use as well as risky sexual behaviors leading to unintended pregnancies and sexually transmitted diseases [68–75].

However, to date, there are only a few school programs that address HL [76]. One possible reason for this could be that schools often perceive health literacy and health promotion as competing for instructional time, particularly against core subjects like math or reading.

Therefore, collaboration between curriculum developers, school principals, and teachers is needed to emphasize the connections between HL and existing school subjects, topics, and concepts. Many curricula that encompass learning objectives that are similar to competencies addressed by HL, such as media literacy, information literacy, digital literacy, and critical thinking and communication skills, have already been adopted by numerous schools [77]. Including or connecting HL to existing teaching practices would also help schools to integrate HL in their routines without extra burdens. HL can then be taught either as a standalone subject or be integrated across different school subjects [60]. In addition to directly addressing students' personal HL to encourage behavior change and support the development of healthier behaviors, schools can also be engaged in promoting OHL within their structure [35,78]. Particularly, The "Health-Literate Schools" research project tries to adapt the OHL concept for the school setting using eight standards, each depicting an area within the school organization that can be developed to foster the HL of school-related persons [79]. Consequently, HL must also be included in teacher training and in the school curriculum to achieve high-quality health education [80–82].

Moreover, the aim of integrating HL into professional curricula should encompass health professionals' education, where the transmission of HL principles should represent a practical and meaningful approach to promoting sustainable healthcare practices. Current learning models lack in-depth HL content that includes essential competencies and applications of HL principles [83,84]. In most cases, students are not educated in HL concepts and practices, except in rare instances such as independent courses or clinical rotations [83,85]. Therefore, according to the Institute of Medicine recommendations, health-related professional schools and professional continuing education programs, including medicine, dentistry, nursing, and other professionals, should develop HL curricula and training programs [86]. Similarly, many medical educators and researchers have suggested the importance to integrate HL training into the medical education curricula [87]. In the past, two major challenges have impeded the integration of HL into health professional curricula: the lack of clear guidelines for defining and assessing HL content across programs [88] and limited resources, for example, instructional hours, finances, and faculty availability, which hinder full integration despite organizations recognizing its significance [89]. Research on HL education for health-profession students is currently in an underdeveloped state [90]. However, a set of educational competencies for health professionals has been defined and validated in different countries [91,92] and has led to prioritization of important HL practices [93,94]. Beyond promoting individual HL, it appears crucial to also embed the principles of OHL within healthcare professionals curricula: In so doing, future healthcare practitioners would be equipped with the necessary knowledge and skills to promote and practice HL at an organizational level, to improve communication between professionals and within the different structures of the healthcare galaxy, to create safer pathways for citizens in need for help and care, and finally to warrant and develop sustainability within healthcare organizations, aligning operational practices with broader sustainability goals.

6. Barriers and Opportunities: Navigating the Path Forward

HL might be key for sustainable healthcare; however, numerous barriers limit its advancement and, consequently, the realization of sustainability in healthcare services and systems. The identification of facilitators and barriers in HL development is crucial for crafting effective interventions. Table 1 delineates the various barriers faced and opportunities available for the effective implementation of HL initiatives.

Table 1. Barriers and opportunities for advancement in health literacy.

Barriers	Opportunities
	Policy level
Scarce and heterogeneous scientific evidence required to drive stakeholder decision making	Collaborations between academia, healthcare institutions, community organizations, and policymakers
Health literacy not widely diffused outside of academia	Increasing number of initiatives aimed at raising awareness about health literacy (e.g., Healthy People 2030)
	Education level
Limited resources (e.g., instructional hours, finances, and faculty availability) hinder full integration of health literacy into curricula	Set of educational competencies and prioritizations of health literacy practice have been defined and validated in different countries
Lack of clear guidelines for defining and assessing health literacy content across programs	
	Cultural level
Cultural differences may limit the effectiveness of health literacy interventions on the general population	Increasing attention to the different needs of diverse population to promote health equity and social justice

Perhaps the most significant barrier is that HL is a relatively new concept, which impacts various aspects in different ways. Particularly, the evidence required to drive stakeholder decision-making processes, as described above, is highly heterogeneous, inadequately addressed systematically, and still lacking in some fields, therefore limiting its generalizability and applicability [95]. Furthermore, outside the academic environment, the concept of HL is not as widely recognized as it should be [39]. Initiatives aimed at raising awareness about HL among policymakers, healthcare providers, and the general public are therefore essential; additionally, investing in research to generate more robust and standardized evidence on HL impact across different contexts is crucial. The collaboration between academia, healthcare institutions, and community organizations is a path to follow for the implementation of HL promoting interventions. By overcoming these barriers, we can also enhance the role of HL in building sustainable healthcare practices and improving health outcomes for all. Understanding these dynamics provides insights into how HL can be nurtured and sustained over time, highlighting the importance of longitudinal and multifaceted approaches to HL enhancement [96]. Additionally, the cultural diversity within populations presents both a barrier and an opportunity: It is imperative that HL initiatives are culturally sensitive and tailored to meet the unique needs of different population groups, and in fact, various national initiatives have advocated for addressing HL to promote health equity and social justice. These initiatives present opportunities for advancing HL by fostering a conducive policy environment and garnering the support of key stakeholders in healthcare and education sectors [97]. On a policy level, HL has been recognized as a foundational principle and overarching goal in health initiatives such as Healthy People 2030. By elevating the importance of HL, policy frameworks can promote sustainable healthcare practices that are not only economically viable but also environmentally and socially sustainable [98]. Promoting collaborative efforts among policymakers, healthcare providers, educators, and the community is key in removing barriers for a health-literate society as well as in building a sustainable healthcare system. Investing in research is essential to generate robust evidence on the impact of HL interventions across different settings and populations and for including it in the education context. Lastly, incorporating HL as a fundamental principle and broad goal in healthcare policies and initiatives is vital for increasing awareness and recognition of HL. It is a challenge that requires a collective effort, an ongoing evaluation, and the willingness to adapt to the evolving healthcare landscape.

7. Conclusions

The way towards sustainable healthcare is strictly tied to advancing HL because HL empowers individuals and communities to make informed health decisions, advocate for health-promoting policies, and contribute to a broader sustainability perspective. By addressing the barriers to HL and leveraging the existing opportunities, there is a potential to promote a culture of sustainability within healthcare systems. This undertaking requires a multi-sectoral approach, including policy formulation, education, community engagement, and advocacy: As an example, the integration of HL into educational curricula, policy frameworks, and advocacy initiatives is a significant action towards realizing the overarching goal of sustainable healthcare. However, despite representing a promising field of action, HL should not be considered a panacea for addressing every issue of sustainability in healthcare; by adopting multifaceted and comprehensive approaches that address the complex interplay of social, economic, and environmental factors, we can create more resilient and sustainable healthcare systems that benefit all individuals and communities.

The path forward, although laden with challenges, presents many opportunities to effect meaningful changes in healthcare sustainability, ultimately contributing to better health outcomes and an equitable healthcare system for all.

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