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Advancing Health Equity in Oman: Integrating Health Literacy and Digital Health Literacy into National Policy

Amna Alabri (PhD) 

Assistant Dean/Assistant Professor, College of Creative Industries, Department of Mass Communication, University of Technology and Applied Sciences, Nizwa, Sultanate of Oman

amna.alabri@utas.edu.om

Abstract

This paper proposes a strategic policy framework to integrate Health Literacy (HL) and Digital Health Literacy (DHL) into Oman's national development agenda, in line with the goals of Oman Vision 2040. Framing HL and DHL as modifiable social determinants of health, this paper investigates their potential to enhance public engagement, reduce disparities, and support health system resilience. The central research question is how Oman can develop a comprehensive health and digital health literacy strategy that draws on international best practices while also being responsive to its local social, cultural, and systemic contexts. A qualitative policy analysis was conducted, drawing on global HL frameworks, including the World Health Organization (WHO) Guide, Germany's National Action Plan, Portugal's life-course approach, and Turkey's 2022–2026 Strategic Plan. In addition, grey literature and regional policy documents were reviewed to assess policy gaps and readiness across the MENA region. The findings reveal a regional void in HL policymaking, characterized by fragmented, short-term initiatives that lack structural integration, particularly in the digital health domain. In response, this study proposes a national strategy comprising seven key policy actions: (1) establishing a multisectoral HL governance structure, (2) embedding HL within healthcare systems, (3) advancing digital equity, (4) integrating HL into formal education, (5) supporting community-led initiatives, (6) developing robust evaluation frameworks, and (7) addressing misinformation. This research provides theoretical insights into the policy-level integration of HL/DHL and offers practical recommendations tailored to Oman. It also provides a replicable framework for other countries seeking to integrate HL/DHL into inclusive and resilient health reform agendas.

Keywords: Health Literacy (HL); Digital Health Literacy (DHL); Health Policy; Oman Vision 2040; Health Equity

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1. Introduction

1.1 Background

Despite the unprecedented availability of health information in the digital era, equitable access to reliable health resources remains a significant challenge. Misinformation—amplified by low levels of health literacy (HL) and digital health literacy (DHL)—makes it increasingly difficult for individuals to identify credible sources, particularly during health crises. The combination of these factors erodes public trust in health systems (Ahmed & Rasul, 2022; Kim et al., 2021). The impact is particularly pronounced among populations with limited literacy, inadequate digital skills, and language barriers (Rodon et al., 2022). These individuals often face significant challenges in interpreting health information, navigating digital platforms, and identifying reliable sources. Such obstacles hinder their ability to make informed decisions, ultimately contributing to poorer health outcomes.

In Oman and across the broader Arab region, individual-level barriers to health literacy are compounded by systemic challenges that require coordinated policy action. Limited investment in health promotion and the fragmented delivery of evidence-based information have left vulnerable groups—especially those in rural areas, low-income communities, and migrant populations—at heightened risk of poor health outcomes (Johnson et al., 2024). Cultural taboos and social stigma surrounding sensitive health issues, such as mental and reproductive health, further suppress open dialogue and deter community engagement in preventive care (Al Alawi et al., 2016).

Furthermore, current health communication strategies often neglect the needs of individuals with low literacy or limited proficiency in Arabic, resulting in persistent disparities in service accessibility and comprehension of health information. In Oman and other GCC countries, this challenge is particularly acute, given that migrant workers constitute more than 40% of the population. Linguistic diversity, coupled with limited proficiency in Arabic among many migrants, poses a structural barrier to functional health literacy. Evidence from Oman during the COVID-19 pandemic highlights the implications of such gaps. Al-Sharafi (2022) documented inconsistencies between Arabic and English public health communications. Such inconsistencies expose non-Arabic-speaking populations to higher risks of misinformation and exclusion. Similar trends are evident across the region, where language discordance in healthcare has been associated with poorer health outcomes and reduced patient satisfaction (Alhassan & AlDossary, 2021). Global data further confirm that migrant populations often experience lower health literacy due to limited education and unfamiliarity with the health systems of their host countries (Dias et al., 2014; Wångdahl & Mårtensson, 2014). These findings highlight the urgent need for a national health literacy strategy that incorporates culturally and linguistically inclusive communication as a core policy objective. To reduce inequities and promote meaningful health engagement, national policies must prioritize the development and implementation of communication frameworks that are accessible, community-informed, and responsive to the linguistic and cultural realities of diverse population groups in Oman.

Health literacy (HL) and digital health literacy (DHL) are increasingly recognized as critical, modifiable social determinants of health (SDOH) that influence access to care, self-management capacity, and overall health outcomes. Meta-analyses show that HL interventions significantly improve patient self-management, medication adherence, and chronic disease outcomes, particularly in low- and middle-income countries (Heine et al., 2021; Meherali et al., 2020). Interactive, tailored educational approaches consistently outperform passive information delivery in driving health behavior change (Stormacq et al., 2020). However, despite the rising adoption of digital health solutions, research integrating DHL remains limited, hence constraining our understanding of how HL and DHL together impact health equity (Causio et al., 2024; Mukhtar et al., 2025). While tools such as mobile health apps and telehealth services demonstrate potential to enhance health competencies, their impact is often constrained by socioeconomic disparities and the absence of inclusive digital health policies (Ahmed et al., 2024).

Despite the growing evidence on the effectiveness of health literacy (HL) and digital health literacy (DHL) interventions, their scalability, sustainability, and integration into national health systems remain limited, especially in low-resource settings (Jacobs et al., 2016; Meherali et al., 2020). Many interventions are localized, short-term, or hindered by technological constraints (El Benny et al., 2021). While system-level integration is essential, the uptake and effectiveness of HL and DHL interventions are also shaped by individual and community-level factors such as cultural beliefs, perceived relevance, and trust in institutions. These psychosocial dimensions influence how people engage with health information and whether they act upon it. Therefore, policy frameworks should address structural barriers to promote equitable health outcomes and build resilient systems. Strategies should foster community trust and reflect local values and sociocultural contexts.

1.2 Importance and Relevance of Health Literacy Policies

Research indicates that policies promoting health literacy and culturally tailored digital tools can reduce disparities and improve equitable access to health information and services (Nutbeam & Lloyd, 2021). Community-based interventions that enhance digital competencies and provide localized, trusted sources of information are also vital in combating misinformation and strengthening population health outcomes (Shen et al., 2022). Achieving these benefits requires sustained political commitment, cross-sector collaboration, and strategic investment to foster environments where individuals can make informed, equitable health decisions (Trezona et al., 2018).

As Oman advances healthcare reforms under Oman Vision 2040, enhancing health literacy (HL) and digital health literacy (DHL) emerges as a timely and strategic priority to ensure an inclusive and sustainable health system. HL and DHL are recognized as key social determinants of health, shaping individuals' ability to access, understand, and act on health information. Without targeted policy action, existing gaps may widen health disparities and undermine system efficiency. Oman Vision 2040 emphasizes building "a healthy society free of health risks and hazards." It further highlights that "health is the responsibility of all," calling for technology-driven, high-quality, preventive healthcare services across all levels.

Enhancing HL and DHL directly supports this vision by empowering individuals and ensuring equitable access to health services in an increasingly digital landscape (Oman Vision 2040, 2020).

1.3 Research Objectives and Policy Questions

This paper critically reviews global health literacy (HL) and digital health literacy (DHL) frameworks and policies, with a focus on policy development and digital inclusion. It explores their relevance and applicability to Oman's sociocultural and systemic context, where HL and DHL remain underdeveloped policy domains. The paper further synthesizes international best practices and identifies key gaps in the Middle East and North Africa (MENA) region to develop policy recommendations tailored to Oman's ongoing health system reforms under Oman Vision 2040.

Policy Questions:

- Which global policy frameworks and strategic approaches offer practical and adaptable models for Oman?
- How can Oman's health system effectively incorporate HL and DHL to align with international standards while considering the country's distinct sociocultural and systemic environment?
- What structural, institutional, and digital reforms are needed to promote equitable access to health information and strengthen health system resilience in Oman?

2. Literature Review

2.1 Summary of Existing Research

2.1.1 Health Literacy and Digital Health Literacy

Health literacy (HL) refers to the ability to access, understand, evaluate, and apply health information to make informed decisions about one's health (Nutbeam, 2000). One of the most influential conceptual frameworks is Nutbeam's tripartite model, which categorizes HL into the following three levels (see Figure 1):

- Functional Health Literacy refers to the basic reading and writing abilities essential for understanding simple health information. This includes tasks such as reading medication instructions or appointment slips that enable individuals to follow healthcare guidance.
- Interactive Health Literacy encompasses more advanced cognitive and social capabilities that enable individuals to actively engage in health-related discussions and decision-making. Those with strong interactive health literacy can communicate effectively with healthcare professionals, ask relevant questions, and navigate through the complexities of healthcare systems.

- Critical Health Literacy involves the capacity to analyze and critically appraise health information. Individuals with this level of literacy can assess the reliability of sources, distinguish between credible and non-credible information, and apply their understanding to improve their own health outcomes as well as those of their communities.

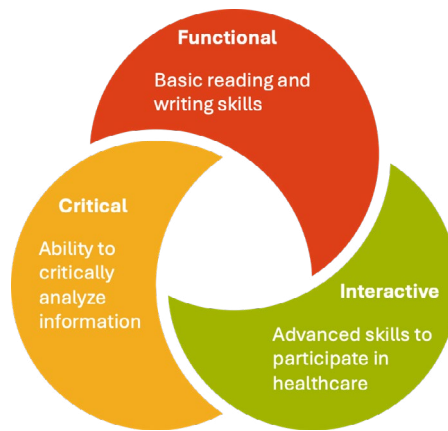


Fig. 1: Nutbeam's Tripartite Model of Health Literacy

Building on this, Sørensen's integrative model conceptualizes health literacy as a dynamic set of skills encompassing the ability to access, understand, appraise, and apply health information. These skills have a direct influence on health behaviors, healthcare utilization, and health outcomes (Cudjoe et al., 2020).

Digital Health Literacy (DHL)—also known as eHealth literacy—extends traditional health literacy by encompassing the skills necessary to navigate digital health environments. Norman and Skinner's foundational eHealth Literacy Lily Model (2006) defines DHL as the ability to find, evaluate, and apply health information from electronic sources to support informed decision-making. It outlines six core literacies, including traditional, health, information, media, computer, and scientific literacies (Figure 2).

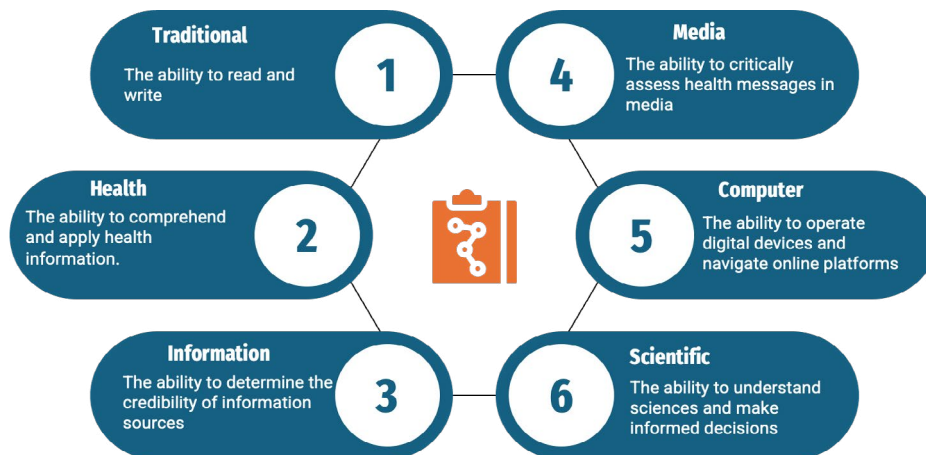


Fig. 2: Norman and Skinner's (2006) eHealth Literacy Model

While this model laid the groundwork, subsequent frameworks have expanded the scope of DHL to account for systemic and contextual factors. Norgaard et al.'s eHealth Literacy Framework (2015) incorporates digital access, trust, and the adaptability of digital services, while the Transactional Model of eHealth Literacy (TMeHL) emphasizes the evolving and socially influenced nature of DHL (Paige et al., 2018). These frameworks highlight the need for policies that build individual digital competencies and address systemic barriers, including digital infrastructure, inclusion, and user-centered design, to ensure equitable access and engagement.

2.1.2 Health Literacy as a Social Determinant of Health

Health literacy (HL) and digital health literacy (DHL) are increasingly recognized as critical social determinants of health (SDOH) due to their direct impact on health equity, chronic disease management, and meaningful engagement with healthcare systems. SDOH encompasses the non-medical factors influencing health outcomes, such as education, income, social environments, and healthcare services (Schillinger, 2021). HL and DHL serve as midstream determinants, shaping how individuals respond to upstream structural inequities and interact with healthcare information and services (Nutbeam et al., 2018).

Low HL and DHL are strongly associated with adverse health outcomes, including reduced use of preventive services, lower treatment adherence, and increased difficulty in managing chronic conditions (Berkman et al., 2011; Schillinger, 2021). These adverse outcomes are intensified during public health crises, such that limited literacy impairs individuals' ability to assess risk, navigate health systems, and distinguish reliable information from misinformation (Ahmed & Rasul, 2022; Rodon et al., 2022). Evidence shows that people with low HL are more susceptible to misinformation, less likely to follow preventive guidance, and less equipped to manage health threats (James et al., 2022; McCaffery et al., 2020; Riiser et al., 2020). The COVID-19 pandemic starkly illustrated these vulnerabilities. In Oman, individuals with lower HL demonstrated significantly lower adherence to public health measures—such as mask-wearing and physical distancing—primarily due to limited understanding of health risks (Alabri, 2024). This demonstrates how low HL can hinder effective public health communication and emergency response.

The burden of low HL and DHL is not equally shared. These literacies are unevenly distributed across populations, reflecting broader structural inequalities. Socioeconomic status, education level, ethnicity, age, and migration status are consistently linked to lower HL and DHL (Nutbeam et al., 2018; Stormacq et al., 2020). Vulnerable groups—including low-income individuals, older adults, ethnic minorities, and migrants—are particularly affected. The digital divide intensifies these inequities, as DHL assumes access to the internet, digital devices, and basic technological skills. These resources are often inaccessible to those in rural areas or facing financial, linguistic, or cultural barriers (Levin-

Zamir & Bertschi, 2018; Schillinger, 2021). Without targeted policies to address these disparities, emerging digital health systems risk reinforcing and widening existing health inequities.

Enhancing HL and DHL offers a high-impact, evidence-based pathway to reduce disparities, strengthen health system engagement, and promote informed decision-making. As midstream determinants, HL and DHL are critical in mediating the effects of broader health inequities. Their impact is maximized when integrated into national health strategies and supported by inclusive communication policies, digital inclusion efforts, and community-based interventions (Nutbeam et al., 2018). Incorporating HL into policy has become essential for fostering fair, resilient, and inclusive health systems. Evidence-based interventions have shown that improving HL enhances treatment adherence, self-management, and preventive care uptake (Heine et al., 2021; Meherali et al., 2020). Similarly, DHL programs that train individuals to navigate telehealth platforms, evaluate online health information, and use health apps can reduce disparities in digital healthcare access (Paige et al., 2018).

2.2 Gaps in Policy

Despite growing global recognition of HL and DHL as drivers of equity and health system resilience, they remain underdeveloped across national policy frameworks in Oman and the broader MENA region. This policy vacuum leaves populations vulnerable to misinformation, health inequities, and disengagement from health services. These challenges were starkly exposed during the COVID-19 pandemic (Alabri, 2024). A review of regional literature reveals that existing efforts primarily consist of descriptive studies or short-term interventions that are disconnected from broader policy frameworks. For instance, studies in Bahrain, Egypt, the UAE, and among migrant populations in Saudi Arabia employed tools like the All Aspects of Health Literacy Scale (AAHLS) and Health Literacy Questionnaire (HLQ) to assess HL (Alhamidi & Alyousef, 2022; Anwar et al., 2020; Awofeso et al., 2017). However, no findings were linked to national strategies. Reviews of Saudi Arabia's e-health infrastructure report advances in digital tools (Alshammari et al., 2021) but emphasize technology and digital infrastructure over population-related determinants of equity, such as DHL.

Johnson et al. (2024) identified scattered HL interventions across GCC countries, but no formal policy frameworks. A related grey literature protocol proposed a regional mapping of HL initiatives but uncovered few structured policies (Johnson et al. 2024). Similarly, while Saudi Arabia's 10-year e-Health Strategy (2011), Qatar's National Health Strategy (2011–2016), and UAE health modernization plans reference digital transformation, they center on infrastructure and service delivery rather than building population-level DHL competencies (Waqas, 2021). Other initiatives, such as the UAE's "Schools for Health" program and HL training in medical curricula (Nair et al., 2023), remain isolated and lack integration into national strategies. A regional scoping review of HL studies in the Eastern Mediterranean (Sarhan et al., 2023) further highlights these gaps, especially among adolescents, with no evidence of coordinated policy development.

In Oman, HL and DHL efforts mirror regional trends. They are fragmented, short-term, and often limited to educational or digital initiatives, if any. The absence of a unifying strategy results in inconsistent messaging across the health, education, media, and technology sectors, limited provider training, and unequal access to credible digital content. Without explicit policy attention to DHL, digital transformation efforts risk deepening the divide—particularly for rural, elderly, and low-income populations. Integrating HL and DHL into national health planning can support the development of inclusive, digitally enabled, and health-literate systems. Prioritizing equity, digital inclusion, community co-creation, and sustainable capacity-building will be critical to closing existing gaps and ensuring long-term public health resilience.

3. Methodology

3.1 Research Approach

This study employs a critical review and policy analysis approach to examine global health literacy (HL) and digital health literacy (DHL) strategies. The objective is to synthesize key policy frameworks, implementation mechanisms, and equity considerations from various international contexts to inform policy development in Oman.

3.2 Scope and Population of Interest

The review focuses on international HL and DHL policies that address both general populations and underserved groups, such as individuals with limited education, older adults, migrant communities, and rural populations. The analysis centers on policy relevance and adaptability to the Omani context.

3.3 Data Sources and Analysis Methods

Data were gathered through targeted searches of peer-reviewed journals, institutional publications, and grey literature. The search covered the period from 2015 to early 2024, using keywords such as *“health literacy policy,” “digital health literacy strategy,” “health equity,” “health communication frameworks,”* and *“national health literacy plans.”* Sources were identified via systematic searches and prioritized if they addressed:

1. Innovative and systems-based health literacy frameworks and policies.
2. Explicit inclusion of DHL strategies.
3. Emphasis on sustainable multi-stakeholder approaches.
4. Evidence of measurable outcomes.
5. Practical relevance for national health systems.
6. Potential adaptability to Oman’s sociocultural context.

A thematic analysis was conducted to identify common policy elements, implementation mechanisms, and evaluation practices. The review focuses on comprehensive policies in countries such as Germany, Turkey, Australia, and the United States, as well as initiatives under the WHO Europe.

4. Findings and Analysis

4.1 Overview of Global Health Literacy Frameworks and Policies

Health literacy (HL) emerged as a priority in national and international health policy, with increasing recognition of its role in advancing public health, reducing health disparities, and supporting health system resilience. Several comprehensive frameworks—led by the World Health Organization (WHO), International Union for Health Promotion and Education (IUHPE), and individual nations—demonstrate a growing commitment to systems-level integration of HL, participatory policy development, and cross-sector collaboration. While DHL is increasingly acknowledged, its implementation remains inconsistent, with few countries fully embedding DHL into strategic planning (see Table 1).

Table 1: Comparison of Global Health Literacy Policies

	Germany (National Action Plan)	Turkey (2022–2026 Action Plan)	WHO European Action Plan	United States (National Action Plan)	Australia (HL National Approach)	EU (HEALIT4EU Study)
Core Principles	Equity-driven, participatory, whole-system	Equity focus, digital outreach, tailored efforts	Co-creation, adaptability, equity-focused	Patient-centered reform, system redesign	Intersectoral collaboration, digital inclusion	Evidence-based model promotion
Strategies	Public awareness; provider training; DHL integration	Digital training; multi-demographic campaigns	Multisectoral collaboration; standard HL benchmarks	Teach-back communication; simplified forms	Integrated HL efforts in schools; preventive health campaigns	Focus on digital infrastructure; training in vulnerable populations
Stakeholders	Government, healthcare sector, NGOs, academics	Government, NGOs, the education sector	Member states, the WHO, and the academic network	Healthcare providers, policymakers, and patients	Government and education policymakers	EU policymakers, digital platforms
Outcomes	Enhanced system responsiveness; limited DHL evaluation	HL increased to 46.1% nationally; better disease services	Plan widely endorsed; measurable outcomes still pending	Modest awareness outcomes; limited digital focus	Promoted health awareness; some system reforms	Highlighted gaps in policy coherence; increased DHL relevance
Challenges	Scalability challenges; limited equity integration metrics (Schaeffer et al., 2020; Sørensen et al., 2021)	Reliance on domestic funding; delayed rollout during COVID-19 (Soganda et al., 2024)	Cross-national coordination challenges (WHO, 2020)	Fragmented systems; lack of DHL metrics (Adriaenssens et al., 2022)	Uneven application; insufficient impact tracking (Trezona et al., 2018)	Inconsistent relevance across member states (Azzopardi-Muscat & Sørensen, 2019)

Germany's National Action Plan on Health Literacy reflects a bottom-up, participatory process involving civil society, academic experts, and organizations (Schaeffer et al., 2021). The framework includes 15 recommendations grouped into four action areas that promote the integration of HL into healthcare and education systems, foster citizen empowerment, and encourage intersectoral collaboration. While DHL is not a core component, Germany's model demonstrates how inclusive governance and systemic alignment can lay the groundwork for expanding digital competencies. In contrast, Portugal's Life-Course Strategy explicitly incorporates DHL into routine care and embeds tools like the Digital Health Literacy Library and "My Health Journal" into its national health infrastructure (Costa et al., 2019). This strategy represents one of the clearest examples of integrated DHL implementation within a national HL framework.

In addition to strategies, tools have been developed to guide the development and evaluation of HL policy. Trezona et al. (2018) introduced a practical framework for analyzing how HL is represented in public policy documents, focusing on policy goals, strategic actions, resource allocation, and monitoring mechanisms. Although initially applied in the Australian context, the framework is adaptable to other settings. It may benefit countries like Oman, where HL and DHL are emerging policy priorities. Complementing this, the Action Network on Measuring Population and Organizational Health Literacy (WHO M-POHL) Stepwise Policy Development Guide provides a globally informed, five-phase planning tool based on the Public Health Action Cycle, which comprises situation analysis, agenda setting, policy development, implementation, and evaluation (Schlacher, 2024). This iterative and adaptable model supports countries in systematically developing health literacy (HL) strategies that are aligned with their specific contexts and priorities. While not explicitly focused on digital health literacy (DHL), the framework's flexible structure allows for integrating digital competencies—such as eHealth skills, digital access, and inclusive technologies—into national HL agendas. Its emphasis on cross-sectoral coordination and evidence-informed action makes it well-suited to supporting comprehensive and scalable HL/DHL policies in diverse settings.

4.2 Key Policy Strategies for Improving Health Literacy

The literature confirms that adequate HL strategies usually encompass digital innovation, community-based delivery, multisectoral collaboration, and commitment at the policy level. When implemented effectively, these strategies enhance individuals' ability to access, understand, and apply health information, thereby improving population health outcomes and system-level equity. The following subsections outline key approaches from recent international practices (see Table 2 and Figure 3).

Table 2: Key Strategies, Strengths, Weaknesses, & Examples

	Digital Tools 	Community-Based 	Policy-Driven 	Integrated Approaches 
Strengths	• Scalable across large populations (Causio et al., 2024; Maranesi et al., 2024) • Immediate feedback and personalized engagement (Fitzpatrick, 2023; Ahmed et al., 2024) • Analytics-driven real-time adaptation of interventions (Causio et al., 2024; Ahmed et al., 2024)	• High cultural relevance and stakeholder engagement (Batterham et al., 2014; Pomerantz et al., 2010; Stormacq et al., 2020) • Builds trust and engagement, especially in underserved populations (Ijiga et al., 2024; Stormacq et al., 2020)	• Institutionalizes systemic health literacy changes (Kickbusch et al., 2013; Rowlands, 2018; Soganda et al., 2024) • Addresses long-term societal inequities through structural reforms (Kickbusch et al., 2013; Rowlands, 2018)	• Synergistic use of digital tools, community-based approaches, and health policies for systemic improvements (Batterham et al., 2014)
Weaknesses/ Limitations	• Limited impact in populations with low digital literacy or access (Palumbo et al., 2021; Choukou et al., 2022) • Usability challenges (e.g., older adults, rural groups) (Palumbo et al., 2021; Vazquez et al., 2023) • Privacy and ethical challenges (Ahmed et al., 2024)	• Challenges with scaling beyond pilot projects (Pomerantz et al., 2010; Arrighi et al., 2021) • Resource-intensive in terms of time and funding for sustainability (Pomerantz et al., 2010; Stormacq et al., 2020)	• Policy evaluations often lack rigorous metrics (Sørensen & Okan, 2020; Rademakers, 2019) • High-level frameworks often face difficulties in local implementation (Rowlands et al., 2018; Sørensen & Okan, 2020)	• Few integrated examples exist in the literature (Jenkins et al., 2023)
Notable Examples	• Telemedicine platforms (Levin-Zamir, 2023) • Chronic disease management tools (Causio et al., 2024) • Online education on combating COVID-19 misinformation (Choukou et al., 2022)	• OPHELIA process (Batterham et al., 2014) • Peer-led computer literacy classes in health centers (Pomerantz et al., 2010)	• Turkey's Health Literacy Action Plan (Soganda et al., 2024)	• The OPHELIA process incorporating community and policy design (Batterham et al., 2014)

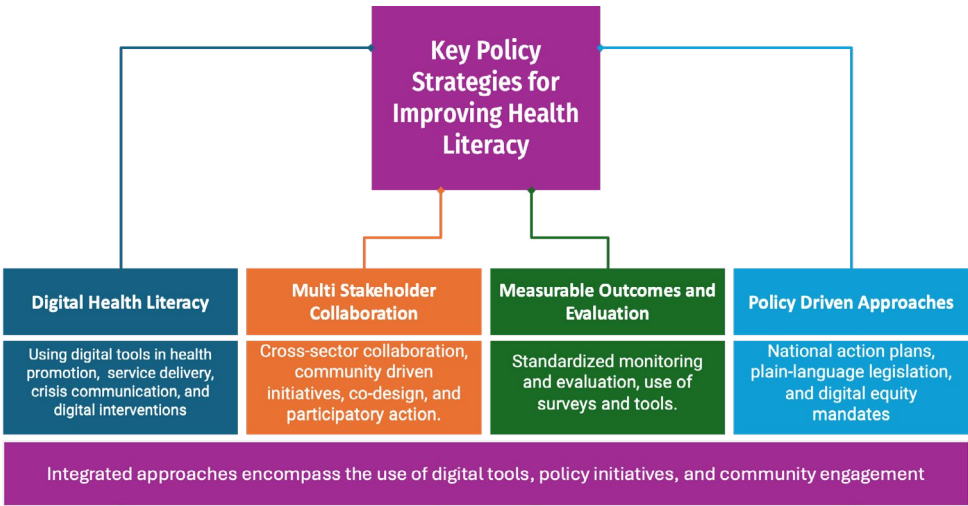


Fig. 3: Key Policy Strategies for Improving Health Literacy

4.2.1 Digital Health Literacy (DHL)

DHL has become increasingly essential due to the widespread use of digital tools in health promotion, service delivery, and crisis communication. Countries like Turkey have demonstrated measurable DHL gains through culturally tailored digital strategies (Soganda et al., 2024), while others have integrated monitoring tools such as the eHealth Literacy Scale (eHEALS) within national surveys (Levin-Zamir, 2023; Pelikan et al., 2019).

Digital health interventions (DHIs)—including mobile apps, telemedicine, and gamified health education—show promise in enhancing comprehension, self-care, and engagement, particularly among underserved populations (Causio et al., 2024; Maranesi et al., 2024). However, robust, long-term evidence of their systemic impact remains limited (Ahmed et al., 2024). Persistent barriers such as poor digital access, low digital competencies, and distrust in digital systems continue to undermine DHL efforts—especially among older adults, rural populations, and those with low literacy (Choukou et al., 2022; Crawford & Serhal, 2020; Palumbo et al., 2021; Widjaja et al., 2024). To maximize impact, DHL must be embedded into broader health equity strategies and supported by inclusive infrastructure, sustained digital capacity-building, and culturally relevant design.

4.2.2 Multi-Stakeholder and Community-Based Approaches

Effective HL strategies depend on coordinated, cross-sector collaboration. Partnerships among government ministries, healthcare providers, educators, health communication specialists, the media, and the technology sector are central to designing and implementing impactful, equity-driven policies (Schaeffer et al., 2020; Sørensen et al., 2021). Germany’s participatory model and the WHO European HL Action Plan exemplify how such collaboration can yield scalable, inclusive outcomes (WHO, 2020). However, gaps remain. For instance, the U.S. National Action Plan lists relevant stakeholders but lacks mechanisms to embed their roles into systemic or DHL strategies (Adriaenssens et al., 2022).

At the local level, community-driven initiatives—such as the Optimizing Health Literacy and Access (OPHELIA) process—showcase the value of co-design, cultural relevance, and participatory action in improving HL outcomes (Batterham et al., 2014; Ijiga et al., 2024). Tailored programs addressing language, cultural, and socioeconomic barriers have proven effective in rural and underserved populations (Arrighi et al., 2021; Stormacq et al., 2020). Yet, many remain confined to small-scale pilots, lacking the frameworks or investment needed for broader replication (Ijiga et al., 2024; Pomerantz et al., 2010). To scale these initiatives, national HL/DHL strategies must embed community co-creation within formal policy structures to ensure that locally effective models inform sustainable, system-wide implementation.

4.2.3 Measurable Outcomes and Evaluation

Global health literacy strategies increasingly call for standardized monitoring and evaluation mechanisms. However, significant gaps remain in demonstrating a measurable and scalable impact. Turkey's 2022–2026 Action Plan presents a notable exception, with national data indicating improvements in HL from 31.9% in 2017 to 46.1% in 2023 (Soganda et al., 2024).

Evaluation tools such as the European Health Literacy Survey (HLS19) and eHEALS are widely used but often require cultural adaptation to ensure validity (Maranesi et al., 2024; Levin-Zamir, 2023; Pelikan et al., 2019). Despite their empirically validated use, many national policies lack robust evaluation frameworks, making it challenging to assess systemic effects or long-term behavior change (Trezona et al., 2018; Vazquez et al., 2023; WHO, 2020). Addressing these gaps requires rigorous and standardized evaluation frameworks, as well as a commitment to integrating longitudinal assessments that measure sustained improvements over time. Beyond measurement, sustained behavioral impact, such as improved adherence to treatments and enhanced disease management, is emphasized as a key measure of intervention success (Maranesi et al., 2024; Vazquez et al., 2023).

4.2.4 Policy-Driven Approaches

A growing number of countries are integrating HL through national action plans, plain-language legislation, and digital equity mandates (Rademakers, 2019; Rowlands, 2018). Turkey's Action Plan and WHO-backed roadmaps emphasize embedding HL in healthcare documentation, health workforce training, and public communication systems (Kickbusch et al., 2013; Soganda et al., 2024). However, many frameworks continue to fall short in offering cost-effectiveness data, clear resource allocation, or policy instruments for scaling successful interventions (Rowlands et al., 2018; Sørensen & Okan, 2020). Addressing these gaps is essential to ensure the long-term success and impact of health literacy policies.

Future HL policies must utilize robust implementation tools, including dedicated funding streams, cost-effective evaluations, and scalable policy instruments. Integrating HL into national budget frameworks and conducting longitudinal impact assessments will also strengthen accountability and sustainability. Additionally, inter-ministerial coordination mechanisms should be established to ensure that HL efforts are integrated across the education, health, and digital sectors.

4.2.5 Integrated and Scalable Approaches

While many health literacy (HL) strategies show promise in specific areas, few achieve comprehensive integration across digital tools, policy infrastructure, and community engagement. Evidence suggests the most substantial outcomes occur when these elements intersect—particularly when digital health tools are co-designed with communities, embedded in national policy, and supported by robust monitoring systems (Batterham et al., 2014; Choukou et al., 2022; Jenkins et al., 2023). To address health disparities effectively, HL and DHL policies must be rooted in the broader social determinants of health. This includes ensuring equitable access to health information, digital technologies, and supportive environments, especially for underserved and marginalized populations (Palumbo et al., 2021; Stormacq et al., 2020; Widjaja et al., 2024).

Together, these strategies reveal that improving health literacy requires a multidimensional approach that blends digital innovation, participatory design, policy reform, and continuous evaluation. As Oman begins to explore the development of a national HL and DHL strategy, these global insights offer concrete building blocks. The following section will examine how these elements can inform policy options, feasibility, and tailored recommendations for Oman’s sociocultural and systemic context.

5. Discussion

5.1 Proposed Policy Reforms

To strengthen Oman’s health system and advance health equity, this paper proposes developing and implementing a national policy or strategy for HL and DHL. The strategy aims to serve as a national guide for confidently and inclusively navigating the evolving health information landscape. It should be integrated across health, education, and digital policy sectors, aligned with Oman Vision 2040, and grounded in principles of inclusivity, systems-level integration, and long-term sustainability (see Figure 4 and Table 3).



Fig. 4: Health Literacy Policy Actions

Table 3: Policy/Strategy Recommendations and Actions

Recommendations	Actions	Examples
1) Establish a National Health Literacy Strategy. Health literacy policies should be formalized into a comprehensive, nationally coordinated strategy.	1.1. Develop a National Action Plan for Health Literacy (NAP-HL), drawing on successful frameworks from Germany (Schaeffer et al., 2020), Turkey (Soganda et al., 2024), and WHO (2020). 1.2. Ensure the strategy is aligned with Oman’s healthcare reform initiatives under “Oman Vision 2040.” 1.3. Integrate HL into Oman’s broader primary healthcare and preventive health frameworks to reduce avoidable healthcare expenditures. Key Components of the strategy: a. Target both traditional and digital health literacy. b. Prioritize groups with low health literacy, such as older adults, rural populations, and migrant workers (Crawford & Serhal, 2020). c. Include a culturally relevant population-wide awareness campaign to build basic health knowledge and promote HL-friendly healthcare communication.	Germany’s National Action Plan (Schaeffer et al., 2020) uses a whole-of-society HL approach to integrate health literacy into education systems, workplaces, and public health campaigns.
2) Integrate Digital Health Literacy into Health Policy. Given Oman’s growing use of digital health tools (e.g., telemedicine platforms and electronic health records), a targeted focus on Digital Health Literacy (DHL) is critical.	2.1. Conduct a national digital health literacy survey, using tools like the eHealth Literacy Scale (eHEALS), to assess population skills and identify gaps (Levin-Zamir, 2023; Pelikan et al., 2019). 2.2. Launch digital literacy programs for underserved populations (e.g., women in rural areas, low-income households) to promote equitable access to health applications. 2.3. Develop user-friendly government-supported digital platforms and health apps that are easy to use and available in Arabic, English, and regional languages. 2.4. Regularly tailor public health messaging on social media platforms to counter misinformation and promote accurate health knowledge (Azzopardi-Muscat & Sørensen, 2019).	Germany and Turkey successfully integrated DHL training and tools into primary healthcare initiatives (Schaeffer et al., 2020; Soganda et al., 2024). NHS England’s strategy to boost digital skills through partnerships with community organizations could be adapted for Oman (Azzopardi-Muscat & Sørensen, 2019).
3) Promote Equity-Driven Approaches to Health Literacy. Oman has diverse socio-economic and geographic challenges, including remote rural populations with limited access to health services and digital infrastructure. Policies must prioritize equity to ensure all groups benefit.	3.1. Develop health literacy action plans tailored to marginalized populations, especially low-income communities, migrants, and those with disabilities. 3.2. Partner with community leaders, educators, and religious organizations to deliver culturally tailored health literacy interventions. 3.3. Subsidize digital technology and internet access for rural or economically disadvantaged populations to bridge the digital divide (Crawford & Serhal, 2020; Yao et al., 2021).	Turkey successfully reduced disparities in HL by using customized education campaigns and multilingual outreach for underserved demographics (Soganda et al., 2024).

Recommendations	Actions	Examples
4) Foster Multi-Sectoral Collaboration and Co-creation. Oman's health literacy strategy should involve actors from diverse sectors, ensuring resilience and scalability through partnerships.	4.1. Create a National Health Literacy Task Force comprising representatives from: - Ministries (Health, Education, Communication, Technology, and Community Development). - Healthcare providers and professional bodies. - Technology innovators (e.g., app developers, telecom companies). - Community and religious organizations. - Academic and research institutions. 4.2. Use participatory co-design processes to ensure that interventions meet end-user needs (WHO, 2020; Schaeffer et al., 2020). 4.3. Encourage private sector involvement to fund and scale health literacy and digital access initiatives.	Turkey successfully reduced disparities in HL by using customized education campaigns and multilingual outreach for underserved demographics (Soganda et al., 2024).
5) Incorporate Health Literacy into Education. Curriculum reform should embed HL and digital health competencies at all stages, from primary schools to universities.	5.1. Introduce health education modules across school curricula, focusing on: - Understanding basic health concepts. - Critical evaluation of online health information. - Skills for navigating digital health apps and telemedicine platforms. 5.2. Train teachers to integrate health literacy into lessons that promote informed decision-making (Okan et al., 2020). 5.3. Develop specialized school-based health campaigns involving parents and communities.	Health literacy education components featured in Australia's National Education Policy and Turkey's Action Plan serve as useful templates (Trezona et al., 2018; Soganda et al., 2024).
6) Strengthen Metrics and Outcome Evaluation. Effective policies require robust tools to evaluate health literacy progress and population impact over time.	6.1. Conduct baseline and longitudinal surveys using tools like HLS19 and eHEALS to monitor HL and DHL levels (Pelikan et al., 2019). 6.2. Set measurable KPIs (Key Performance Indicators) such as increases in HL/DHL levels, improved vaccination rates, and reduced emergency care use (Soganda et al., 2024). 6.3. Develop regional HL benchmarks to standardize outcome monitoring and facilitate global comparisons (WHO, 2020).	Turkey's Action Plan reported measurable improvements in population health literacy scores through survey-based evaluation (Soganda et al., 2024).
7) Combat Health Misinformation. Countering health misinformation is a critical issue, particularly with the spread of disinformation on social media platforms.	6.1. Develop a centralized fact-checking platform in collaboration with public health experts and journalists to verify health information. 6.1. Conduct national media literacy campaigns emphasizing skills to detect and debunk misinformation about vaccines, chronic disease management, and crises (e.g., COVID-19) (Crawford & Serhal, 2020). 6.1. Partner with social media platforms to flag and reduce the visibility of health misinformation targeting Arabic-speaking populations.	The Digital Health Equity Framework proposed by Crawford & Serhal (2020) emphasizes systemic approaches to misinformation.

Key interventions include

5.1.1 Establishing a National Health Literacy Framework

Oman should develop a formal, multisectoral HL policy that explicitly incorporates DHL. The framework should articulate clear goals for implementation, inter-ministerial coordination, and measurable impact. It must be informed by tools such as the WHO M-POHL Stepwise Guide (Schlachter, 2024) and guided by international examples of system-level integration (Kickbusch et al., 2013; Soganda et al., 2024). To avoid the common pitfalls of fragmented or pilot-bound initiatives, the framework must ensure scalability, sustainability, funding mechanisms, and policy continuity.

5.1.2 Integrating HL within the Health System

HL must be embedded as a standard across all levels of care through clinical guidelines, patient communication protocols, provider training, and digital service platforms. Learning from Germany's National Action Plan (Schaeffer et al., 2021), Oman should consider mandating plain-language communication, introducing HL and DHL competencies into medical education, and linking HL performance to quality-of-care metrics. To ensure equitable access, these efforts must also address the country's linguistic diversity by incorporating multilingual communication strategies and culturally adapted materials.

5.1.3 Promoting Digital Inclusion and Technological Innovation

DHL development must go hand in hand with investments in digital infrastructure, especially in rural and underserved areas. Without such foundational support, achieving equitable access to reliable, evidence-based information is not possible. National platforms should adopt user-centered, culturally relevant digital tools that prioritize equity and trust (Costa et al., 2019; Choukou et al., 2022). As demonstrated in Portugal and Turkey, embedding DHL into national platforms and outreach strategies improves uptake and access, especially when tools are co-designed with target users.

5.1.4 Integrating HL and DHL into Education Systems

A life-course approach to HL begins with the education system. Curriculum reform should embed HL and digital health competencies at all stages, from primary schools to universities. This includes fostering skills in information appraisal, media literacy, digital literacy, and self-management to prepare citizens to navigate complex health systems and digital environments.

5.1.5 Supporting Community-based Outreach and Co-creation

Drawing from the OPHELIA model (Batterham et al., 2014), HL and DHL initiatives should be co-designed with communities. Programs must be tailored to the local language, culture, and context to foster trust and uptake. However, to move beyond small-scale pilots, these efforts must be supported

by national funding, embedded within policy structures, and coordinated with local health governance.

5.1.6 Establishing Monitoring, Evaluation, and Capacity-building Systems

Despite global consensus on the importance of evaluation, many national HL/DHL policies lack robust monitoring mechanisms or longitudinal assessment tools. Oman should prioritize the development of a national HL/DHL surveillance system using validated tools such as HLS-EU, eHEALS, and HLS19 (Levin-Zamir, 2023; Pelikan et al., 2019). These tools must be culturally adapted, standardized, and embedded into national surveys. In addition, Oman's HL strategy should:

- Include baseline mapping of HL and DHL levels across population groups.
- Set national benchmarks with clear indicators for equity, access, and impact.
- Establish a longitudinal evaluation framework to measure knowledge gains and sustained behavior change, such as treatment adherence and chronic disease management.
- Invest in capacity-building for health, education, and digital sector personnel to support low-HL/DHL populations and monitor outcomes.

5.1.7 Combating Health Misinformation

Addressing health misinformation requires coordinated, system-level action. Building on the Digital Health Equity Framework (Crawford & Serhal, 2020), Oman should develop a centralized fact-checking platform in collaboration with public health experts, media professionals, and civil society to verify health claims circulating online. National media literacy campaigns are also essential for equipping the public with the skills to critically assess health content, particularly on topics such as vaccination, chronic disease, and public health emergencies. In parallel, collaboration with social media platforms is necessary to identify, flag, and mitigate the spread of harmful misinformation, particularly content targeting vulnerable populations.

5.2 Evaluation of Potential Impacts and Feasibility

Implementing the HL strategy is expected to generate immediate and sustained public health benefits. Enhanced HL and DHL can lead to increased uptake of preventive services, improved chronic disease self-management, better adherence to treatment, greater engagement in digital health services, and reduced vulnerability to misinformation. These improvements contribute to lower healthcare costs, stronger health system resilience, and improved population well-being, particularly during public health emergencies.

Oman is well-positioned to adopt a national health literacy and digital health literacy strategy, supported by its ongoing digital transformation agenda and comprehensive health system modernization under Vision 2040. Existing infrastructure—such as primary healthcare delivery, public education systems,

national eHealth platforms, and inter-ministerial coordination mechanisms—provides strong entry points for cross-sectoral integration of HL and DHL.

Several enabling factors enhance the feasibility of implementation, including the following:

- High-level political commitment to health system transformation.
- Institutional capacity within the Ministry of Health, the Ministry of Education, and the Ministry of Transport, Communications, and IT.
- Growing national focus on innovation, digital equity, and evidence-informed policy.
- Access to globally validated tools (e.g., eHEALS, HLS-EU) for performance measurement and benchmarking.

To fully realize the potential of HL and DHL integration, Oman must implement a series of structural, institutional, and digital reforms. These include:

- Sustained investment in digital infrastructure and equitable access, particularly in underserved and rural regions.
- Longitudinal evaluation systems to monitor progress, measure behavior change, and inform continuous improvement.
- Capacity-building programs for healthcare providers, educators, and digital system designers to support low-literate and digitally excluded populations.
- National communication strategies that foster public trust, cultural relevance, and community co-creation.

5.3 Comparisons with Best Practices

The proposed strategy draws on the following global best practices that have demonstrated positive outcomes in advancing HL and DHL:

- Germany's National Action Plan exemplifies a participatory governance approach that engages civil society, academia, and government actors to embed HL across education and health systems (Schaeffer et al., 2021).
- Portugal's life-course HL strategy offers a model for embedding DHL into daily health system functions and building lifelong skills through tools like the Digital Health Literacy Library and "My Health Journal" (Costa et al., 2019).
- The WHO M-POHL Stepwise Guide outlines a structured policy development process, including situation analysis, agenda setting, intervention design, implementation, and

evaluation. This model offers Oman a roadmap for staged policy adoption (Schlachter, 2024).

- Trezona et al.'s analytical framework provides a practical tool for reviewing existing policy documents and ensuring that HL-related strategies are accompanied by clearly defined goals, resources, and monitoring mechanisms (Trezona et al., 2018).

These strategies and tools underscore the importance of adapting proven models to local contexts while preserving the fidelity to core principles of system integration, stakeholder engagement, and equity. For Oman, a tailored approach that draws from these examples while addressing national priorities and sociocultural factors will be essential to ensure impact and sustainability.

6. Conclusion

6.1 Summary of Key Points

This paper has examined the global policy landscape for health literacy and digital health literacy, synthesizing key frameworks, strategies, and implementation models from diverse health systems. While international examples demonstrate growing momentum for institutionalizing HL—through participatory governance, digital integration, and systems thinking—the operationalization of DHL remains uneven. Oman and the broader MENA region currently lack formal HL/DHL policy frameworks, with most initiatives being fragmented, short-term, and lacking in coordination, monitoring, or scalability. The COVID-19 pandemic further exposed the vulnerabilities created by these gaps, hence revealing the urgent need for structural reforms. Drawing on best practices from countries such as Germany, Portugal, and Turkey, this study proposes a series of actionable policy recommendations tailored to Oman's health system, digital transformation goals, and sociocultural context.

6.2 Final Thoughts on Policy Implications

Integrating HL and DHL into Oman's national policy framework is urgent and strategic. As digital transformation accelerates and public health challenges become increasingly complex, a coordinated, multisectoral approach to HL and DHL is critical for improving health outcomes, strengthening health system resilience, and advancing the goals of Oman Vision 2040. The proposed strategy offers a comprehensive, context-sensitive framework to guide national action. It is grounded in global best practices and reflects key principles of system integration, community participation, and policy sustainability. Embedding HL and DHL across education, healthcare, and digital sectors can enable informed decision-making, enhance public trust in health systems, and reduce disparities linked to geography, literacy, and socioeconomic status. However, realizing these benefits requires more than

a vision. Success depends on strong political leadership, cross-sector coordination, and sustained investment in digital infrastructure, workforce, and outreach. Equally important is establishing monitoring and evaluation systems to track progress, measure impact, and ensure accountability.

6.3 Recommendations for Future Studies

Future research should focus on assessing Oman's current levels of HL and DHL through nationally representative surveys and context-sensitive measurement tools. Evaluations of existing health communication practices will also be necessary to identify structural barriers and to inform program design. Additionally, pilot interventions based on the proposed policy strategies should be implemented and rigorously evaluated to generate local evidence on effectiveness, scalability, and long-term impact. Comparative studies with other MENA countries could further enrich the regional evidence base and support the development of a shared MENA framework for HL and DHL. Finally, special attention should be given to underserved populations, such as rural communities, older adults, and migrant workers, to ensure that national strategies are genuinely inclusive and equitable.

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