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Health Literacy and Self-Rated Health among Adults in Delaware: A Cross-Sectional Analysis

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Abstract

Health literacy has been widely recognized as a key factor influencing health outcomes across populations. This study sought to assess health literacy levels by examining individuals' abilities to obtain, interpret, evaluate, and use health information, and to determine how these competencies are associated with self-perceived health status among adults in Delaware. Participants were recruited from 60 faith-based institutions across Delaware that were intentionally selected due to their service to predominantly minority communities. The sample size was calculated to account for the clustered nature of the study design using a Mixed Methods approach. In total, 1,095 individuals completed a structured questionnaire that included the 16-item short form of the European Health Literacy Survey (HLS-EU-Q16). Statistical analyses included summary measures, internal consistency testing, chi-square analyses, and ordinal logistic regression.

Findings indicated that nearly half of the respondents exhibited limited health literacy, with roughly equal proportions classified as having inadequate or problematic levels. Limitations in health literacy were evident across all assessed domains, including healthcare, disease prevention, and health promotion. Health literacy was significantly associated with self-rated health, as individuals with inadequate health literacy were substantially less likely to report better health than those with adequate literacy skills, with odds reduced by approximately 64%. The findings underscore the central role of health literacy in shaping individuals' health perceptions and outcomes. The widespread challenges reported in navigating, interpreting, and applying health information across multiple health domains suggest an urgent need for coordinated, statewide strategies to strengthen health literacy in Delaware.

Keywords: Health literacy, Self-rated health, Adults, Delaware

Introduction

Background

This investigation focuses on understanding how health literacy varies among adults in Delaware and how these variations relate to individuals' perceptions of their own health. Health literacy refers to the combination of personal abilities and available social supports that enable people to locate, interpret, judge, and use health-related information and services when making health decisions [1]. These abilities are necessary across multiple areas of health, including navigating healthcare systems, engaging in preventive behaviors, and participating in health-promoting activities [2].

Health literacy does not rely solely on individual knowledge or cognitive skills. Instead, it emerges from the interaction between personal attributes and broader social and institutional environments. Individual-level influences include language proficiency, communication and listening skills, age, socioeconomic conditions, cultural context, life experiences, and mental well-being. Together, these factors shape how people process health information and translate it into action. At the same time, health literacy is strongly influenced by structural conditions that determine how health information is produced, communicated, and distributed [3]. In the United States, responsibility for health communication

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largely rests with healthcare providers, public health practitioners, health systems, media organizations, and private-sector entities, all of which play a critical role in ensuring that health information is understandable and usable by diverse populations [4].

Extensive research demonstrates that health literacy is closely linked to health outcomes [4]. Individuals with stronger health literacy skills tend to experience better health, while populations with limited health literacy often face disproportionate health burdens, reinforcing existing health inequities [5]. Low health literacy has been associated with challenges such as incorrect medication use, misunderstanding treatment instructions, difficulty interpreting food labels, and increased reliance on avoidable emergency and hospital services [6–9]. Moreover, inadequate health literacy has been shown to contribute to suboptimal management of chronic illnesses, poorer self-assessed health, and higher mortality rates [10, 11].

Despite longstanding recognition of its importance, health literacy levels in the United States have remained persistently low over several decades [12, 13]. National survey data indicate that a substantial proportion of adults lack the functional literacy skills needed to effectively manage health-related information, with more than half of U.S. adults demonstrating limited functional health literacy [14]. Further assessments of foundational competencies—including reading, writing, numeracy, speaking, and listening—have revealed that approximately one-fifth of adults perform at the lowest proficiency level, raising serious concerns for population health. These limitations are not evenly distributed, as low health literacy disproportionately affects socially and economically marginalized groups [5, 13].

Studies examining the determinants of health literacy have consistently identified key demographic and socioeconomic correlates, including education, age, race, income, marital status, employment, and social capital [15–23]. In the U.S. context, racial and ethnic minorities, individuals with lower socioeconomic status, men, and older adults are more likely to experience limited health literacy [15, 16, 24, 25]. Racial disparities are particularly pronounced, with minority populations repeatedly shown to have lower health literacy compared to White populations. Educational attainment is generally associated with improved health literacy, often explained by increased access to social resources, knowledge, and health-relevant skills [2, 26]. However, some research suggests that education alone does not fully capture meaningful access to resources, particularly when acquired skills lack social or economic leverage [27].

Economic resources also play a significant role, with higher income levels linked to stronger health literacy skills. Conversely, advancing age is typically associated with declining health literacy, a pattern commonly attributed to age-related cognitive and physical changes [16, 28]. More recent work by Rikard and colleagues has emphasized the importance of social resources in shaping health literacy outcomes. They define social resources as "normative social means that provide economic protection and benefits," encompassing factors such as language use, marital status, and approaches to seeking health information ([5], p.2). Their findings indicate that English language proficiency and being married or cohabiting are associated with higher health literacy, potentially due to increased social interaction and greater economic stability that support access to healthcare services [29].

Delaware's disease burden and prior evidence on health literacy

Patterns of morbidity and mortality in Delaware point to an urgent need for greater attention to health literacy. State-level data indicate that chronic conditions—such as cardiovascular disease, cancer, and diabetes—dominate the leading causes of death, accounting for three of the top five mortality categories [30]. Combined, cardiovascular disease and cancer contribute to nearly two-fifths of all deaths in the state [30]. National surveillance reports further reveal that Delaware consistently exceeds national averages for metabolic conditions. In 2022, 14% of Delaware adults reported having diabetes, compared with 11.6% among adults nationwide [31]. During the same year, an equivalent proportion of Delaware residents reported a diagnosis of pre-diabetes, surpassing the national prevalence of 10.8%. Earlier estimates showed that more than one-third of adults in the state reported elevated cholesterol levels, while over one-third indicated a diagnosis of hypertension [32].

These health challenges are unevenly distributed across populations. Stark racial inequities persist, particularly in infant health outcomes, with Black infants experiencing mortality rates approximately three times higher than those of White infants [33]. When considered alongside evidence on health literacy, these disparities become even more concerning. Historical data suggest that Delaware has long experienced limitations in population-

level health literacy [34]. These estimates are derived from multiple data sources, including the 2003 National Assessment of Adult Literacy—which measured individuals' capacity to read, comprehend, and use written information—as well as the 2010 U.S. Census and the 2011 American Community Survey. Using these datasets, researchers at the University of North Carolina at Chapel Hill generated predictive health literacy scores for U.S. census tracts, with values ranging from 0 to 500 and higher scores indicating stronger health literacy [34]. Although Delaware fares better than some states on certain indicators, important gaps remain. Approximately 11% of adults in the state were estimated to lack basic prose literacy skills, compared with 23% in California, which reported the highest proportion nationally [35]. Nevertheless, self-reported difficulties related to health information were widespread. One-third of Delaware adults indicated challenges understanding health-related materials, while 60% reported difficulty interpreting medical test results. Functional health literacy limitations were also pronounced, as 61% of respondents reported needing help to read healthcare documents [34]. The consequences of these limitations are evident in clinical outcomes. A cross-sectional study examining Black Medicaid beneficiaries with hypertension in Delaware found that individuals residing in areas with basic health literacy levels demonstrated poorer adherence to antihypertensive medications than those living in areas with intermediate health literacy, highlighting the relationship between limited health literacy and compromised treatment adherence [36].

In response to the high prevalence of chronic disease and its implications for quality of life, the Lieutenant Governor of Delaware initiated a statewide program aimed at recognizing entities that demonstrate exceptional leadership in advancing population health. The initiative focuses on four priority domains: emotional well-being, healthy living, prevention and management of chronic disease, and maternal and child health ([33], p.3). Central to this effort is an emphasis on policy, systems, and environmental strategies designed to produce sustained health improvements, rather than reliance on short-term educational interventions [33].

Despite these initiatives, empirical evidence on health literacy in Delaware remains limited. Beyond the studies cited above, few investigations have systematically evaluated the four foundational health literacy competencies—accessing, understanding, appraising, and applying health information—across the domains of healthcare, disease prevention, and health promotion. To address this gap, the present study was conducted in collaboration with faith-based organizations across Delaware as an initial phase of a broader, long-term partnership aimed at improving health literacy among congregational populations. Specifically, the study sought to (1) assess health literacy levels by examining individuals' capacities to obtain, interpret, evaluate, and use health information, and (2) analyze the association between health literacy and self-rated health.

Materials and Methods

Context

The study was conducted through a collaborative partnership between the research team and coordinating bodies representing faith-based institutions throughout Delaware. Partner organizations included, among others, the Interdenominational Ministers Action Council (IMAC), the Interdenominational Ministerial Alliance (IMA), United Methodist congregations, as well as independent churches (such as Presbyterian and Apostolic congregations) and non-denominational faith communities, including churches serving predominantly migrant populations. These organizations are distributed across all three counties in the state and primarily serve communities of color.

Religious institutions represent a central social space for many migrant populations and function as important points of engagement within these communities [37]. Prior research has shown that faith-based organizations often facilitate access to social services, information, and community resources, while also fostering social cohesion, shared identity, interpersonal connections, and access to diverse forms of social capital [38–40]. These characteristics highlight the significance of religious institutions in community life and support their selection as strategic partners for assessing existing health literacy levels and guiding future initiatives aimed at strengthening health literacy within these populations.

Study design: sampling and sample size

The sampling frame comprised 60 faith-based organizations that were intentionally selected based on established relationships between the research team and organizational leadership and membership. These organizations were located across all three counties in Delaware.

To address the clustered nature of the study design, sample size estimation was conducted a priori using a Mixed Methods Test [41]. Calculations were based on a two-sided test with a significance level of 5% ($\alpha = 0.05$) and a target statistical power of at least 90% to detect effects of meaningful magnitude. The analysis indicated that a minimum sample of 720 participants drawn from 60 clusters—averaging approximately 12 individuals per organization—would provide adequate power to detect a minimum difference of 5.00 between group means for a primary outcome variable. Although collective efficacy informed the sample size estimation, it is not examined in the current analysis. The assumed standard deviation of the mean difference was 2.50, with an intra-cluster correlation coefficient of 0.050. All calculations were performed using Power and Sample Size (PASS), version 19.

Membership size varied considerably across participating organizations, ranging from approximately 30 to more than 1,000 members based on leadership-provided estimates. To ensure proportional representation and avoid disproportionate sampling, a variable sampling fraction between 2.5% and 5.0% was applied depending on congregation size. Using this approach, a total of 1,095 participants were recruited from the 60 faith-based organizations across Delaware and included in the study.

Participant recruitment

Study participants were recruited directly through the participating faith-based organizations. Church leaders introduced the study to congregants during regular worship services, providing an overview of the research purpose and outlining eligibility requirements. Eligibility criteria included being 18 years of age or older, residing in the state of Delaware, and holding membership within the participating church. During these announcements, church leaders either read aloud or summarized the informed consent information to ensure congregants were adequately informed.

Individuals who expressed interest and met the inclusion criteria were invited to enroll and complete the survey following church services throughout the study period. Written informed consent was obtained from all participants prior to data collection. To encourage participation, respondents were offered the opportunity to enter a drawing for a $25 gift card. The survey was administered using multiple modalities to maximize accessibility, including QR codes, online links, paper questionnaires, and electronic devices such as tablets or iPads, depending on participant preference and availability.

Instrument

Data were collected using a structured survey instrument composed of three distinct sections. The first section incorporated the short-form European Health Literacy Survey Questionnaire (HLS-EU-Q16), a validated tool designed to assess health literacy in general populations [41, 42]. This 16-item measure evaluates four core health literacy competencies: the ability to locate health information, understand health-related content, critically evaluate health information, and apply such information in daily life. These competencies are examined across three domains: healthcare, disease prevention, and health promotion. Responses are recorded using a four-point Likert scale ranging from “very difficult” (1) to “very easy” (4).

The second section of the questionnaire gathered information on respondents’ sociodemographic characteristics and perceived health status. Variables included age, sex, level of education, marital status, and ethnicity. Self-rated health was assessed using an ordinal scale, with responses ranging from poor (1) to excellent (5).

The final section of the survey focused on participants’ affiliation with their religious congregation. Questions were designed to distinguish between formal members and visitors to ensure accurate classification of respondents. Following consent, trained research assistants facilitated administration of the questionnaire to participants.

Statistical approach

Analytical procedures were implemented to summarize participant characteristics and evaluate patterns in health literacy across domains. Frequency distributions were generated to describe sociodemographic attributes and responses to health literacy items within healthcare, disease prevention, and health promotion contexts. The reliability of the health literacy measure was examined by assessing the internal coherence of the 16-item scale using Cronbach’s alpha.

To operationalize health literacy in alignment with established HLS-EU guidelines, response categories were transformed prior to scoring. Items reflecting difficulty in managing health information were collapsed into a single category and coded as zero, while responses

indicating ease were grouped and coded as one. Aggregate scores were then computed and used to classify participants into inadequate, problematic, or sufficient health literacy categories based on established score thresholds.

Associations between participant characteristics, health literacy classification, and perceived health status were initially explored using bivariate testing procedures. Chi-square statistics were applied to identify variables associated with self-rated health. Factors demonstrating statistically meaningful relationships at this stage were subsequently incorporated into multivariable ordinal regression models. These models were used to estimate the likelihood of reporting higher levels of self-rated health and to quantify the contribution of health literacy relative to other predictors. All analyses were conducted using SPSS version 29, and statistical significance was determined using a probability threshold of 0.05.

Ethics oversight and participant consent

Ethical oversight for this research was provided through formal review and approval by Delaware State University's Institutional Review Board and the Ethics Review Committee of the Ghana Health Service. Both bodies reviewed and approved the study protocol and the data collection instrument in accordance with their respective ethical standards and regulatory frameworks. Participation in the study was voluntary, and informed consent was obtained from all individuals prior to survey administration.

Results and Discussion

Descriptive profile of survey participants

The age distribution of respondents showed a broad spread across adulthood **(Table 1)**. Approximately one in five participants were between 18 and 34 years of age, while the largest proportion—nearly half—fell within the 35 to 64 age range. Older adults aged 65 years and above accounted for roughly 30% of the sample. Women constituted the majority of respondents, representing about two-thirds of the study population.

With respect to marital status, over half of participants reported being married or living with a partner, whereas nearly one-quarter indicated that they were single. The sample was predominantly composed of racial minorities, with more than 80% identifying as Black or African American; individuals identifying as White comprised approximately 11% of respondents. Educational attainment was relatively high, as about 43% reported completion of a college degree and nearly one-quarter indicated holding a master's degree or higher.

Assessment of health literacy revealed that slightly more than half of respondents (52%) demonstrated limited health literacy, classified as either inadequate or problematic. In terms of perceived health status, 15% of participants rated their health as poor or fair, while a smaller proportion—11%—described their health as excellent.

Table 1. Presents a detailed summary of the demographic characteristics, health literacy levels, and self-rated health of the study participants.

Variables	Categories	%	N
Sex	Female	66.5	675
	Male	33.5	340
	Total	100.0	1015
Age (years)	18–24	8.7	90
	25–34	12.4	128
	35–44	13.6	141
	45–54	15.5	161
	55–64	19.8	205
	65 +	30.0	311
	Total	100.0	1036
Ethnicity	Black/African American	81.3	766
	Hispanic	6.6	62
	White	10.5	99

	Other	1.6	15
	Total	100.0	942
Marital status	Single	24.4	251
	Widowed	8.6	88
	Married/Living together	56.6	582
	Divorced/Separated	10.5	108
	Total	100.0	1029
Health literacy	Inadequate	26.7	262
	Sufficient	48.0	471
	Problematic	25.3	248
	Total	100	981
Self-reported health	Poor/Fair	14.6	149
	Excellent	11.0	112
	Very good	31.5	322
	Good	43.0	439
	Total	100.0	1022
Education	Up to high school	34.0	316
	Masters and Higher	23.3	216
	College (Undergraduate)	42.7	397
	Total	100.0	929

Assessment of scale reliability and overview of health literacy responses

The 16-item health literacy scale underwent reliability testing, yielding a Cronbach's alpha of 0.938. This high coefficient demonstrates excellent internal consistency and confirms that the instrument is highly dependable for assessing health literacy.

Within the healthcare-related items, as many as 45% of respondents indicated that at least one of the seven selected tasks was "difficult" or "very difficult" for them **(Table 2)**. Notably, approximately 29% struggled with locating information on treatment options for their health concerns or knowing where to seek professional medical assistance when unwell. Another 22% found it hard to comprehend explanations provided by their doctor, while 16% had trouble following medication instructions given by doctors or pharmacists. Furthermore, 45% reported challenges in determining when it would be appropriate to seek a second medical opinion.

Table 2. Response distribution across health literacy items (Percentages)

Health Domain	Health Literacy Item	N	Very easy (%)	Easy (%)	Difficult (%)	Very difficult (%)
Health Care	How easy is it for you to locate information about treatments for health conditions that affect you?	1086	21.1	50.0	24.8	4.1
	How easy is it to identify where to obtain professional medical assistance when you are unwell?	1085	21.2	49.9	25.1	3.9
	How easy is it to comprehend instructions from your doctor or pharmacist regarding prescribed medications?	1086	28.3	56.1	12.3	3.3
	How easy is it to use information from your doctor to make decisions about your health condition?	1082	15.9	55.0	25.3	3.8
	How easy is it for you to follow treatment or care instructions given by your doctor or pharmacist?	1070	23.9	60.1	13.6	2.3

	How easy is it for you to understand explanations provided by your doctor?	1084	22.1	55.6	18.8	3.4
	How easy is it for you to determine when seeking a second medical opinion may be necessary?	1079	11.9	42.8	39.6	5.7
Disease Prevention	How easy is it to find information on managing mental health concerns such as stress or depression?	1057	12.4	43.8	35.8	8.0
	How easy is it to understand public health warnings related to behaviors such as smoking, alcohol use, or physical inactivity?	1057	29.6	49.3	16.6	4.5
	How easy is it to assess whether media reports about health risks are trustworthy?	1064	8.2	38.9	44.0	8.9
	How easy is it to decide how to protect yourself from illness based on health information in the media?	1061	10.2	42.2	39.0	8.6
	How easy is it for you to understand the reasons for undergoing health screening tests?	1061	28.7	52.9	15.3	3.1
Health Promotion	How easy is it to find information about activities that support mental well-being?	1056	15.0	50.8	28.9	5.3
	How easy is it for you to judge which everyday behaviors influence your health?	1055	11.8	52.4	31.1	4.7
	How easy is it to understand health-related advice from family members or friends?	1066	14.6	51.9	29.7	3.8
	How easy is it to understand media messages about improving your health?	1063	12.4	45.8	36.0	5.7

Within the disease prevention domain, nearly four in ten respondents experienced challenges obtaining information on how to cope with mental health concerns such as stress and depression. Approximately one-fifth reported difficulty understanding public health messages related to behaviors including smoking, insufficient physical activity, and excessive alcohol consumption, while just under one-fifth indicated challenges in comprehending the purpose of routine health screening. In addition, more than half of participants reported difficulty determining whether health-risk information presented in the media could be trusted.

In the health promotion domain, close to two in five respondents reported some level of difficulty across the assessed health literacy items. Specifically, about one-third indicated challenges in locating information on activities that support mental well-being, and a similar proportion reported difficulty interpreting health advice received from family members or friends. With respect to media-based health information, over four in ten respondents reported difficulty understanding guidance on improving health, while over one-third experienced difficulty assessing which everyday behaviors have implications for their health.

Bivariate analyses: background characteristics, health literacy, and self-rated health

Bivariate analyses were conducted to examine the relationship between respondents' background characteristics and levels of health literacy. Age and ethnicity emerged as statistically significant correlates of health literacy **(Table 3)**. Respondents aged 18–24 years demonstrated the highest proportion classified as having sufficient health literacy (59%), whereas those aged 45–54 years had the lowest proportion in this category (40%). A slightly higher proportion of female respondents were classified as sufficiently health literate (50%) compared with male respondents (46%). With respect to ethnicity, individuals identifying as Hispanic exhibited the greatest proportion classified as having inadequate health literacy (40%), compared with Black/African American (22%) and White respondents (20%).

Table 3. Distribution of self-rated health and health literacy levels on the background characteristics

a	Sex		Age						Ethnicity			Health literacy		
Subgroup	Female	Male	18–24	25–34	35–44	45–54	55–64	65+	Black/African American	Other	White	Hispanic	Inadequate	Sufficient	Problematic
Inadequate HL N	153	87	12	35	40	51	54	60	163	1	19	23			
Inadequate HL %	25.0	27.4	14.5	31.3	31.7	34.7	28.3	20.8	22.4	8.3	20.0	40.4			
Problematic HL N	153	84	22	24	31	37	49	75	184	5	36	9			
Problematic HL %	25.0	26.5	26.5	21.4	24.6	25.2	25.7	26.0	25.3	41.7	37.9	15.8			
Sufficient HL N	306	146	49	53	55	59	88	153	380	6	40	25			
Sufficient HL %	50.0	46.1	59.0	47.3	43.7	40.1	46.1	53.1	52.3	50.0	42.1	43.9			
P-value (Health Literacy)	0.513		0.02						0.003						
Poor/Fair SRH %	15.2	12.8	12.5	16.5	10.7	13.9	16.9	14.2	14.5	14.3	10.4	16.1	23.7	8.6	15.6
Poor/Fair SRH N	99	42	11	20	14	22	34	43	109	2	10	10	59	39	37
Good SRH %	42.8	43.2	35.2	42.1	36.6	46.2	44.3	45.9	42.7	35.7	44.8	46.8	46.2	39.0	46.4
Good SRH N	279	142	31	51	48	73	89	139	320	5	43	29	115	177	110
Very good SRH N	207	103	31	34	48	50	60	95	244	4	30	13	56	172	70
Very good SRH %	31.7	31.3	35.2	28.1	36.6	31.6	29.9	31.4	32.5	28.6	31.3	21.0	22.5	37.9	29.5
Excellent SRH %	10.3	12.8	17.0	13.2	16.0	8.2	9.0	8.6	10.3	21.4	13.5	16.1	7.6	14.5	8.4
Excellent SRH N	67	42	15	16	21	13	18	26	77	3	13	10	19	66	20
P-value (Self-Reported Health)	0.546		0.024						0.55				<0.001		

Education	Up to high school	71	23.8	81	27.2	144	49.0	0.31	19.2	59	44.3	136	87	28.3	8.1	25	0.012
	Masters and higher	38	18.4	51	24.8	117	56.8		10.8	23	38.7	82	76	35.8	14.6	31	
	College	95	25.1	98	25.9	186	49.1		12.4	48	44.8	173	119	30.8	11.9	46	

With respect to educational level, respondents holding a master's degree or higher exhibited the greatest proportion classified as having adequate health literacy, accounting for approximately 57% of this group. Results from the chi-square analyses assessing relationships among respondents' socio-demographic characteristics, health literacy status, and perceived health indicated that age, marital status, level of education, and health literacy were all significantly related to self-rated health outcomes **(Table 3)**.

Ordinal logistic regression analysis of self-rated health

Ordinal logistic regression was employed to evaluate the influence of health literacy on self-perceived health status using two modeling approaches: (i) a crude model without covariate adjustment and (ii) a multivariable model adjusted for selected background characteristics, specifically age, marital status, and educational attainment **(Table 4)**. These covariates were included in the adjusted model because they demonstrated statistically significant associations with self-rated health in the preliminary bivariate analyses.

Diagnostic assessments confirmed that the assumptions required for ordinal logistic regression were satisfied for both models. Evaluation of model fit statistics further demonstrated adequate performance. For the unadjusted model, the model fitting information showed a chi-square value of 47.907 ($p < 0.001$), while the goodness-of-fit assessment using the Pearson chi-square yielded a value of 2.275 ($p = 0.685$). Similarly, the adjusted model demonstrated strong fit, with a model fitting chi-square of 69.066 ($p < 0.001$) and a Pearson goodness-of-fit chi-square of 426.374 ($p = 0.193$).

Additional diagnostic testing using the test of parallel lines indicated that the proportional odds assumption held for both models. Specifically, the likelihood of being classified into higher categories of self-rated health remained consistent across outcome thresholds, and predictor effects were stable across response categories (Model 1: $p = 0.695$; Model 2: $p = 0.915$).

Table 4. Ordinal regression estimates for the relationship between health literacy and self-rated health

Variable	Category	Model 1 P-value	Model 1 Estimate	Model 1 Std. Error	Model 2 P-value	Model 2 Estimate	Model 2 Std. Error
Age	18–24	—	—	—	0.355	0.271	0.294
	25–34	—	—	—	0.805	−0.061	0.246
	35–44	—	—	—	0.065	0.415	0.224
	45–54	—	—	—	0.605	−0.104	0.201
	55–64	—	—	—	0.445	−0.140	0.183
	65+ (Ref.)	—	—	—	—	—	—
Health literacy	Inadequate	<0.001	−0.995	0.150	<0.001	−1.023	0.165
	Sufficient (Ref.)	—	—	—	—	—	—
	Problematic	<0.001	−0.594	0.149	<0.001	−0.583	0.154
Education	Up to high school	—	—	—	<0.001	−0.598	0.173
	Masters and Higher (Ref.)	—	—	—	—	—	—

	College (Undergraduate)	—	—	—	0.103	−0.268	0.165
Marital status	Single	—	—	—	0.659	0.132	0.299
	Widowed (Ref.)	—	—	—	—	—	—
	Married/Living together	—	—	—	0.874	0.039	0.249
	Divorced/Separated	—	—	—	0.989	0.004	0.300

The ordinal logistic regression analyses indicate that health literacy and educational attainment are the key determinants of self-rated health. Across both the unadjusted and adjusted models, health literacy exhibited negative ordered log-odds coefficients, indicating poorer perceived health with lower literacy levels. Specifically, negative coefficients were observed for all non-reference categories of health literacy: in Model 1, inadequate health literacy (−0.995) and problematic health literacy (−0.594); and in Model 2, inadequate health literacy (−1.023) and problematic health literacy (−0.583). These findings suggest that individuals classified as having inadequate or problematic health literacy are more likely to report poorer health outcomes compared with those who have sufficient health literacy **(Table 4)**.

Educational attainment was included as a categorical variable, with master's degree or higher serving as the reference category. The estimated ordered log-odds coefficients indicate that respondents with education up to high school had a significantly greater likelihood of reporting lower self-rated health (−0.598, p = 0.001). Although respondents with a college (undergraduate) degree also demonstrated a tendency toward poorer self-rated health (0.268, p = 0.103), this difference was not statistically significant when compared with those holding a master's degree or higher. Overall, these results suggest that lower educational attainment is associated with poorer perceived health, particularly among individuals with no education beyond high school.

The primary aim of this study was to evaluate health literacy levels across four core competencies—accessing, understanding, appraising, and applying health information—and to examine how these competencies relate to self-rated health. Using a standardized and validated short form of the European Health Literacy Questionnaire (HLS-EU-Q16), data were collected from congregants of predominantly minority-serving faith-based organizations across the state of Delaware. The findings revealed that approximately one-quarter of respondents exhibited inadequate health literacy, while an additional one-quarter demonstrated problematic health literacy. These patterns were consistent across the three assessed health domains: healthcare, disease prevention, and health promotion. Such findings further compound concerns regarding Delaware's already unfavorable health profile [30].

Within the healthcare domain, as many as 45% of participants reported experiencing difficulty with at least one of the seven assessed tasks. Although the prevalence of difficulty observed in this study is substantial, comparable patterns have been documented in European contexts. For instance, research conducted in Switzerland among adults aged 58 years and older reported that approximately 35% experienced difficulty with at least one healthcare-related health literacy task [19]. Similarly, a study in Romania found that 21.6% of respondents reported great difficulty in protecting themselves from illness based on health information obtained from the media [20].

In the disease prevention domain, about one-fifth of respondents in the present study reported challenges understanding health warnings related to behaviors such as smoking, physical inactivity, and excessive alcohol consumption—considerably higher than the 2.7% reported in the Swiss study [19]. In the health promotion domain, roughly 40% of participants indicated some level of difficulty. This aligns with findings from van der Heide [22], who reported that accessing health information was perceived as particularly challenging among Dutch adults. In the current study, nearly three in ten respondents reported difficulty locating information on activities that support mental well-being and interpreting health advice from family members or friends.

The mental health–related findings mirror broader global patterns of limited mental health literacy. Meier *et al.* [19] reported that nearly 25% of participants experienced difficulty accessing information related to managing mental health concerns such as stress and depression.

Similar levels of limited mental health literacy have been documented in Romania [20] and Catalonia [21]. In Catalonia, Garcia-Cordina *et al*. [21] found that approximately 17% of respondents reported difficulty obtaining information on managing mental health conditions. Additionally, nearly one-quarter of respondents in the present study reported difficulty determining which everyday behaviors influence their health. The high prevalence of such challenges underscores the persistence of inadequate and problematic health literacy in Delaware, suggesting that limited health literacy remains a significant public health concern in the state [34].

Health literacy was also found to be significantly associated with age, demonstrating a partially inverse relationship. Respondents aged 18–24 years exhibited the highest health literacy levels, with scores declining through middle adulthood up to age 55. Although health literacy scores increased slightly among respondents aged 55–64 and those aged 65 years and older, these levels remained lower than those observed in the youngest age group. The relatively higher health literacy among younger adults compared to older adults may be attributed to age-related declines in cognitive and sensory functioning [16, 28]. Existing evidence suggests that aging is associated with reductions in hearing ability and cognitive processing, which may hinder the comprehension and evaluation of complex health information [20]. Moreover, many health-related tasks require substantial information processing, which may pose additional challenges for older populations [22].

Consistent with existing literature, this study confirms that health literacy is a significant predictor of self-rated health, reinforcing the established understanding that health literacy is a key determinant of health outcomes [4]. Individuals with inadequate or problematic health literacy were more likely to report poorer health than those with sufficient health literacy. Specifically, the odds of reporting better self-rated health were 0.360 times lower for respondents with inadequate health literacy compared with those with sufficient literacy. Similarly, respondents with problematic health literacy had 0.558 times lower odds of reporting higher self-rated health relative to their sufficiently literate counterparts. These findings demonstrate a clear gradient in which higher health literacy corresponds to better perceived health.

The results align with previous studies showing that higher health literacy is associated with improved health outcomes and that disparities in health literacy parallel broader health inequities [5, 11]. Poor self-rated health among individuals with limited health literacy may stem from multiple pathways, including misunderstandings of prescribed medications, medication errors, insufficient knowledge of healthy lifestyle practices, inadequate chronic disease management, and difficulty identifying health-related behaviors in daily life [6–10, 23].

Conclusion

In conclusion, health literacy plays a pivotal role in shaping health outcomes. The substantial proportion of Delaware residents reporting difficulties in accessing, understanding, critically evaluating, and applying health information across healthcare, disease prevention, and health promotion domains highlights the need for coordinated, long-term interventions. The academic–faith-based partnership described in this study represents an important initial step toward addressing these challenges. Systematic efforts to enhance health literacy have the potential to strengthen disease prevention behaviors, improve navigation of the healthcare system, and enhance the public's ability to interpret and act on health promotion messages.

Strengths and limitations

A key strength of this study lies in the strong engagement and commitment demonstrated by community partners, particularly church leaders. Their active involvement facilitated widespread participation among congregants, contributing to a high response rate and supporting the successful implementation of the research. This level of community collaboration enhanced data collection and reflects the feasibility of conducting population-based health literacy research within faith-based settings.

Despite these strengths, several limitations should be acknowledged. First, the cross-sectional nature of the study precludes any inference about causality between health literacy and self-rated health. While associations can be identified, it is not possible to determine whether health literacy influences perceived health status or whether health status affects how individuals assess their health literacy.

Second, although the short-form European Health Literacy Questionnaire (HLS-EU-Q16) used in this study is a validated and widely applied instrument, it relies on self-assessment. Because respondents evaluated their own abilities and challenges, the findings may be

affected by reporting bias, including the potential for either overestimation or underestimation of actual health literacy competencies.

Third, the sampling approach introduces potential selection bias. Participation was limited to individuals who identified as members of the participating churches. Consequently, regular attendees who did not formally identify as members may have been excluded. This restriction may limit the study's ability to fully capture the range of health literacy levels within church communities. While the findings may reasonably reflect the populations of the participating congregations, caution is warranted when extending these results to the broader population of Delaware.

Finally, the measurement of self-rated health using an ordinal scale presents inherent limitations. Although the scale orders responses from poor to excellent, the numerical intervals between categories cannot be assumed to be equal [43]. As with all ordinal measures, the exact distance between response options remains unknown, even though the ranking of health status from lowest to highest is clearly defined.

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