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Determining the Health Literacy Skills of Extension Audiences in Maryland

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Strong health literacy skills empower people to make informed health decisions, especially those with chronic health conditions striving for positive health outcomes. Half of all people living in Maryland report having at least one chronic disease. Research examining the health literacy of Marylanders is limited. This paper reports how establishing a baseline for health literacy levels of Marylanders can identify major factors affecting the health literacy skills of Extension audiences and lays the important groundwork to develop Extension programs and explore the best delivery methods tailored to the needs of subpopulations. Using the Newest Vital Sign, a validated tool that uses the Nutrition Facts label for measuring health literacy, a cross-sectional study surveyed 636 people living in 23 counties and Baltimore City. The tool was adapted to include the new Nutrition Facts label (effective 2020). Results indicated education ($p < .001$), race ($p < .001$), and gender ($p = .02$) were strongly associated with an individual's health literacy. Extension educators should not make assumptions that the health information they provide is easily understood. Further, they should explore the best approaches to assess the health literacy skills of their target audiences to ensure that information is clearly communicated and can be used to make informed health decisions.

Keywords: health literacy, Newest Vital Sign, Extension, health programs

Introduction and Literature Review

Improving health communication by increasing health literacy within U.S. populations is a priority goal outlined in *Healthy People 2030* (U.S. Department of Health and Human Services [HHS], n.d.). The advisory committee that developed the goals and objectives for this public health framework broadened the definition of health literacy to include personal and organizational health literacy. The framework defines *personal health literacy* as the degree to which individuals can find, understand, and use information and services to inform health-related decisions and actions for themselves and others (HHS, 2021). *Organizational health literacy*

focuses on the degree to which organizations equitably enable individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others (HSS, 2021). At the individual level, adequate health literacy skills play a pivotal role in preventing and managing chronic diseases and other health concerns (Miller et al., 2015). Conversely, limited health literacy has been linked to unhealthy lifestyles, including smoking, poor diet, and lack of physical activity, all of which increase the risk of mortality and premature death (Mayberry et al., 2018; Wolf et al., 2007). Individuals with low health literacy skills also tend to have poorer health outcomes and quality of life (Jayasinghe et al., 2016), and they are less likely to use preventive care (Fernandez et al., 2016) compared with those with higher health literacy skills.

According to the 2003 National Assessment of Adult Literacy, only 12% of adults in the United States had proficient health-literacy skills, while more than one-third (36%) had basic or below-basic health-literacy skills and were unable to perform necessary tasks to manage their health (Kutner et al., 2006). In addition, the Centers for Disease Control and Prevention (CDC) reported that nine out of 10 adults struggle to understand and use health information when it is unfamiliar or includes complex terminology (CDC, 2023).

At the organizational level, Cooperative Extension is committed to improving the health literacy of its audiences (Koukel et al., 2018). For instance, the Extension Committee on Organization and Policy (ECOP) developed the 2014 National Framework for Health and Wellness, which identifies health literacy as a key priority (Braun et al., 2014). In 2020, the framework was revised and renamed Cooperative Extension's National Framework for Health Equity and Well-Being. The updated framework continues to reinforce the need to address health inequities among certain populations, such as people of color and those living in rural areas, in regard to how health is communicated and understood (Burton et al., 2021).

Extension educators have the expertise to translate research-based health information into programs and resources for their communities; however, information should be both written and communicated orally at a level that is appropriate for each intended audience (Johnson & Verma, 1990). During the COVID-19 pandemic, people were exposed to an excessive amount of information about the spread and prevention of the virus that was confusing or misleading (or both). Misinformation was especially evident among those with low health literacy skills (Paakkari & Okan, 2020). For Extension educators, this represented a call to quickly disseminate clear, credible information about the virus using multiple innovative education methods to reach target audiences.

Extension's Family and Consumer Sciences (FCS) program is well recognized for its high-quality chronic disease management and prevention interventions (Remley et al., 2018). However, understanding the health literacy levels of potential audiences is crucial for FCS educators to design and offer programs that provide health information that is easily understood.

Six of the top 10 leading causes of death in the United States are diet-related chronic diseases that are preventable by adopting healthy eating habits (CDC, National Center for Chronic Disease Prevention, 2022). In Maryland, heart disease, some types of cancer, stroke, and diabetes are among the top 10 causes of adult deaths in the state. Over 3.5 million people reported having one chronic disease, and nearly 1.5 million had two or more (Partnership to Fight Chronic Disease in Maryland, n.d.). An individual's understanding of a diagnosis and the information needed to manage a chronic health condition effectively can be improved by having adequate nutrition and health literacy skills.

Though some studies have assessed the health literacy skills of Maryland's healthcare professionals (Horowitz & Kleinman, 2012; Koo et al., 2016; Weatherspoon et al., 2015), there is limited research on the health literacy of Maryland's citizens. To the authors' knowledge, no statewide health literacy statistics are available, nor have studies examined the health literacy of Maryland's general population. Therefore, the objectives of this study were to:

- establish a baseline for the health literacy levels of Marylanders,
- identify Extension audiences in Maryland with limited health literacy, and
- identify best methods for reaching these audiences.

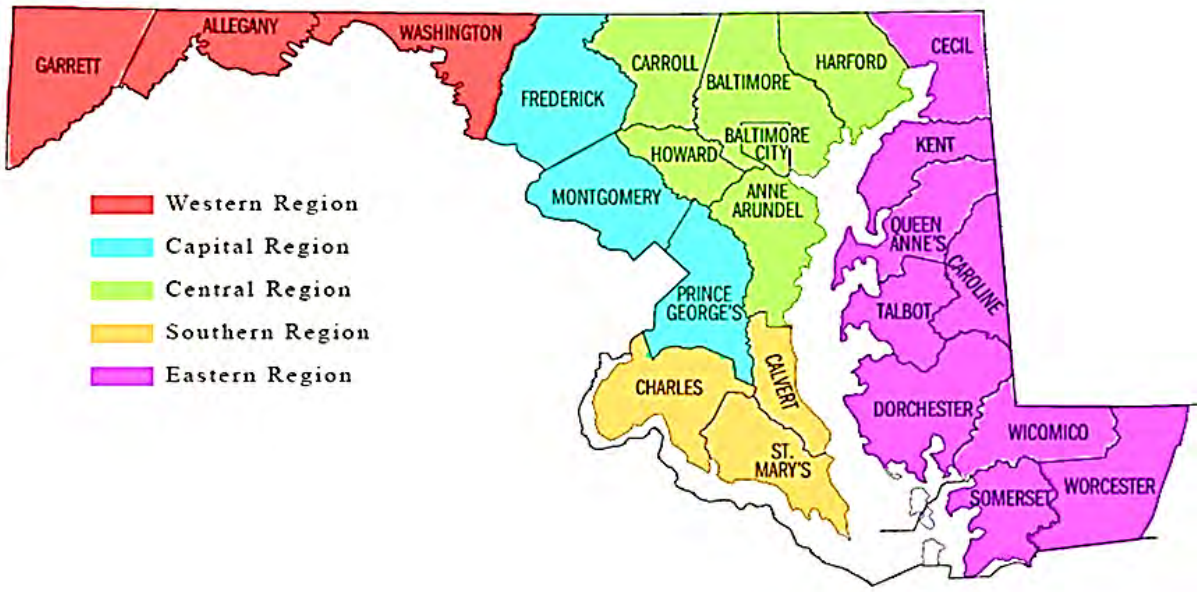
This study focused on consumers' use of the Nutrition Facts (N.F.) label, which is widely utilized by practitioners, educators, and other related audiences to assess health literacy (Mansfield et al., 2020; Persoskie et al., 2017). The label contains nutrient and portion information that is critical for managing diet-related health conditions that are prevalent in the state. In 2020, the Food and Drug Administration (FDA) updated the N.F. label to reflect new scientific information. Also, it made design changes to make it easier for consumers to choose healthy foods (FDA, 2020).

Methods

Study Design and Setting

This cross-sectional study examined the health literacy levels of people living in Maryland. The state's 23 counties and Baltimore City (see Figure 1) were clustered into five geographic regions: western, capital, central, southern, and eastern, which included the entire eastern shore of Maryland. These regions are similar to the programming clusters used by the University of Maryland Extension's (UME) field faculty, who implement health promotion programs in their communities. Regions were then grouped into three categories: (1) rural (i.e., western, eastern, and southern counties), (2) capital (i.e., capital-area counties), and (3) central (i.e., central counties). The Institutional Review Board at the University of Maryland, College Park, Maryland, approved and granted exemption status for this study (1096600-1).

Figure 1. Regional Map of Maryland Counties and Baltimore City



Recruitment

A stratified random sample of participants (n = 636) was recruited by purchasing a contact list from QualtricsXM (https://www.qualtrics.com), a web-based survey software company. The sample was geographically representative of the state's 23 counties and Baltimore City. Eligible participants were required to (a) live in the state, (b) be 18 years of age or older, (c) be able to read English, and (d) consent to the study. Individuals who did not meet the criteria were excluded from the study. Additionally, the authors provided Qualtrics with regional quotas based on current county populations to program into the contact list. Once a quota was reached, no more participants from that region were recruited.

Data Collection

From September 2017 to October 2017, a one-time, online, English-only survey assessing health literacy and key predictors of health literacy was administered through QualtricsXM. Participants were provided a web link directing them to the survey. The first page of the survey was the consent form. Participants interested in completing the survey were instructed to review the form and type in their name as a signature for consent and requirement prior to starting the survey. If people did not type in their names, they were not able to complete the survey and participate in the study. Once participants signed the consent form, they were directed to the survey, which took approximately 7–10 minutes to complete. Individuals who did not complete the required consent form could not access the survey.

Measures

The survey combined two instruments: the validated Newest Vital Sign (NVS) instrument (Pfizer, 2011) and a nutrition knowledge survey. Additionally, the survey included questions about past food label education, program delivery preferences, and demographic information. The NVS instrument, a highly recognized health literacy tool with demonstrated good internal consistency (Cronbach's $\alpha = .76$), was used to measure health literacy (Weiss et al., 2005). (Since its development, the NVS instrument has been adapted and validated for other languages and countries; Weiss, 2018.) The instrument, consisting of a series of six open-ended questions using the pre-January 1, 2020 N.F. label (for ice cream), requires participants to find and use information from the label to make calculations, hence assessing both reading and numeracy skills. For this study, we adapted the tool by using closed-ended questions, offering multiple response options for each question (see Table 1).

Table 1. Adapted Questions and Response Options for the Newest Vital Sign Health Literacy Instrument

Question	Response Options
1. If you eat the entire container, how many calories will you eat?	(1) 576 calories (2) 1,380 calories (3) 1,840 calories (4) I don't know
2. If you are allowed to eat 74 grams of carbohydrates as a snack, how much of this food could you have?	(1) 2/3 cup (2) 1 1/3 cup (3) 2 cups (4) I don't know
3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 grams of saturated fat each day, which includes one serving of this snack food. If you stop eating this snack food, how many grams of saturated fat would you be consuming each day?	(1) 34 grams (2) 38 grams (3) 41 grams (4) I don't know
4. If you usually eat 2,500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?	(1) About 5% (2) About 10% (3) About 20% (4) I don't know
5. Please read the ingredient list below. Pretend that you are allergic to the following substances: penicillin, peanuts, latex gloves, and bee stings. Is it safe for you to eat this snack? *Percent Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs. **Ingredients:** Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.	(1) Yes (2) No (3) I don't know
6. If no, why not?	Open-ended response

Researchers using closed-ended questions in web-based studies have reported higher yield percentages for answers that are identical in both question forms compared with open-ended questions and produce fewer missing data (Reja et al., 2003). Thus, as an example, for Question 1, “If you eat the entire container, how many calories will you eat?”, our adaptation changed the response from being open-ended to close-ended, allowing respondents to choose from one of four possible answers: (1) 576 calories, (2) 1,380 calories, (3) 1,840 calories (correct answer), and (4) I don’t know. We also used the NVS instrument to measure health literacy using the post-January 1, 2020 N.F. label (i.e., in effect January 2020). The same six open-ended questions were adapted to closed-ended questions for the post-January 1, 2020, N.F. label to determine if the FDA’s changes made it easier for consumers to use the label. In line with the NVS instrument implementation and scoring guidelines, each correct answer was scored 1 point, with a maximum score of 6 points (Pfizer, 2011). A score of 0–1 suggests a high likelihood (50% or more) of limited health literacy. A score of 2–3 indicates the possibility of limited health literacy, and a score of 4–6 almost always indicates adequate health literacy (Pfizer, 2011). In this study, a score of 0–3 was labeled as limited health literacy, and a score above 3 was labeled as adequate health literacy. The six questions for both the pre-January 1, 2020, and the post-January 1, 2020 labels were scored separately. In addition to the 12 questions for both N.F. labels, participants were asked one question about prior food label education.

Six demographic questions were asked to understand and explain any differences in Nutrition Health Literacy scores: gender, race, ethnicity, income, education, and geographic location. One question asked about prior food label education (e.g., participation in a class/workshop or reading about food labels in brochures and booklets). One question asked participants to rate the likelihood of attending health-related education programs in seven education program-delivery methods: (1) in-person, (2) web-based live, (3) web-based recorded, (4) mobile app (e.g., cell phone, tablet, etc.), (5) YouTube video, (6) combination of the above methods, and (7) other. Responses were measured using a 5-point Likert scale and were used for internal Extension programming purposes.

Data Analysis

Using SPSS version 24.0 (https://www.ibm.com/products/spss-statistics), we performed descriptive statistics to describe the demographics of the sample. Wilcoxon signed-rank test determined health literacy score differences between the pre-and post-January 1, 2022, N.F. label. Spearman rank correlation assessed associations among variables. Logistic regression examined the effects of independent variables on the dependent variable, that is, the level of health literacy (limited vs. adequate). Independent variables were sociodemographic characteristics and previous food label education (yes/no).

Results

Sociodemographic Characteristics of Study Participants

Table 2 reports the participants' demographic characteristics. Of the 636 participants who completed the survey, approximately one-half (50.2%) were female, and the majority (71.5%) were White. In this sample, a mean ± S.D. age of 46.9 ± 16.5 years and an educational level of bachelor's degree or higher (54.2%) were reported. Less than half of the participants (46.5%) reported household incomes equal to or above $75,000. Approximately 15% of participants resided in the rural region of Maryland; however, most resided in the capital and central regions. Most participants (70.8%) responded that they had never received any food label education; however, approximately one quarter (25.5%) reported receiving some food label education in a class/workshop or reading about food labels in brochures and booklets. Table 2 also shows the comparison between participants' demographic characteristics and their health literacy skills.

Table 2. Participants' Demographic Characteristics and Levels of Health Literacy

	Mean (S.D.) or *N* (%)			
	All (*n* = 636)	**Limited HL[¥] (*n* = 129)**	**Adequate HL[¥] (*n* = 507)**	***p*-value**
Age (range 18–88 years)	46.9 ± 16.5	42.7± 16.2	48.0 ± 16.4	.001**
18–24 years	49 (7.7)	19 (14.7)	30 (5.9)	.002**
25–39 years	206 (32.4)	46 (35.7)	160 (31.6)	
40–60 years	209 (32.9)	40 (31.0)	169 (33.3)	
> 60 years	172 (27.0)	24 (18.6)	148 (29.2)	
Gender				.056
Female	319 (50.2)	55 (42.6)	264 (52.1)	
Male	317 (49.8)	74 (57,4)	243 (47.9)	
Race/Ethnicity				<.001**
White/Non-Hispanic	455 (71.5)	65 (50.4)	390 (76.9)	
Black/African American	109 (17.1)	38 (29.5)	71 (14.0)	
Asian/Pacific Islander	37 (5.8)	13 (10.1)	24 (4.7)	
Hispanic or Latino	26 (4.1)	10 (7.8)	16 (3.2)	
Other	9 (1.4)	3 (2.3)	6 (0.6)	
Education				<.001**
< High school graduate/GED	101 (15.9)	41 (31.8)	60 (11.8)	
Some college or associate degree	190 (29.9)	38 (29.5)	152 (30.0)	
> Bachelor's degree	345 (54.2)	50 (38.8)	295 (58.2)	
Annual Income				.004**
Less than $25,000	66 (10.4)	23 (17.8)	43 (8.5)	
$25,000–$49,999	141 (22.2)	34 (26.4)	107 (21.1)	
$50,000–$74,999	133 (20.9)	24 (18.6)	109 (21.5)	
$75,000 and over	296 (46.5)	48 (37.2)	248 (48.9)	

	Mean (S.D.) or *N* (%)			
	All (*n* = 636)	Limited HL¥ (*n* = 129)	Adequate HL¥ (*n* = 507)	*p*-value
Region				NS
Rural counties	97 (15.3)	17 (13.2)	80 (15.8)	
Capital counties	226 (35.5)	56 (43.4)	170 (33.5)	
Central counties	313 (49.2)	56 (43.3)	257 (50.7)	
Previous Food-Label Education, %				.01*
Never received any education	450 (70.8)	77 (59.7)	373 (73.6)	
Participated in a class/workshop	51(8.0)	15 (11.6)	36 (7.1)	
Read about food labels in brochures	111(17.5)	28 (21.7)	83 (16.4)	
Not sure	24 (3.8)	9 (7.0)	15 (3.0)	
Types of Preferred Education, (Likely to attend, %)				
YouTube	294 (46.2)	67(51.9)	227 (44.8)	NS
Web-base, recorded	287 (45.1)	58 (45.0)	229 (45.2)	NS
Mobile app	242 (38.1)	60 (46.5)	182 (35.9)	NS
Web-based, live delivery	235 (37.0)	57 (44.5)	178 (35.1)	NS
In-person	158 (24.8)	57 (44.2)	101 (19.9)	<.001**
Combination of the above	277 (43.6)	71 (55.0)	25 (22.7)	.005**

Note. ¥ Newest Vital Sign score 0–3 = limited health literacy; score 4 and above = adequate health literacy.
§ Chi-square test of independence and Mann-Whitney U test were used for categorical and continuous variables, respectively. Statistically significant at *$p < .05$; statistically highly significant at **$p < .01$; N.S. = not significant.

Prevalence of Limited Health Literacy and Demographic Associations

The findings revealed that 20.3% of participants ($n = 129$) had a limited health literacy level. When comparing limited health literacy to adequate health literacy groups (see Table 2), the limited health literacy group was younger ($p = 0.001$) and less educated ($p < .001$), had lower income ($p = .004$), and included more racial or ethnic minorities ($p < .001$). A significantly higher proportion of the adequate health literacy group responded that they had never received food-label-related education ($p = .01$). Individuals with limited health literacy preferred in-person education ($p <.001$) as well as a combination of web-based education platforms ($p = .005$).

Key Factors Affecting Health Literacy

Logistic regression was conducted to identify key factors affecting health literacy (see Table 3). The Hosmer-Lemeshow test indicated that the data fit the model well. The logistic regression model was statistically significant ($p < .000$) and explained 21% (Nagelkerke R^2) of the variance in health literacy.

Table 3. Effects of Key Predictors on Health Literacy Levels

Variables	Beta	Exp(B) Odds Ratio	96% Confidence Interval	*p*-value
Constant				
Age ^ 18–24 years				
25–39 years	.02	1.02	.45–2.29	.96
40–60 years	.30	1.35	.60–3.08	.47
> 60 years	.44	1.55	.65–3.72	.33
Gender ^ Male	.54	1.72	1.10–2.67	.02*
Region ^ Rural				
Central	-.26	.77	.38–1.55	.46
Capital	-.02	.98	.50–1.94	.96
Race & Ethnicity^ White/Non-Hispanic				
Asians	-1.34	.26	.12–.60	.002**
African Americans	-.89	.41	.23–.72	.002**
Hispanic/Latino	-.75	.47	.17–1.35	.16
Other	-1.17	.31	.07–1.37	.12
Education ^ ≤High school/GED				
Some college or AA	1.16	3.18	1.73–5.86	<.001**
> BS degree	1.43	4.19	2.24–7.86	<.001**
Annual Income ^ < $25k				
$25,000–$49,999	.45	1.57	.72–3.43	.26
$50,000–$74,999	.43	1.53	.69–3.42	.30
> $75,000	.32	1.37	.64–3.72	.42
Food label education ^ Never received				
Yes (class/workshop, brochures, etc.)	-.16	.85	.52–1.40	.53

Note. ^ Reference category. Statistically significant at *$p < .05$; statistically highly significant at **$p < .01$.

Beta = beta coefficient, Exp(B) = exponentiation of the beta coefficient, which is an odds ratio

Gender, education level, ethnicity, and race were strong predictors of health literacy level. The odds of having adequate health literacy were 1.72 times greater for females ($p = .02$). Individuals with some college or an associate degree were 3.18 times more likely to have adequate health literacy, and those with a bachelor's degree or higher were 4.19 times more likely compared with individuals with high school or less than high school ($p < .001$, $p < .001$), respectively.

Race and ethnicity were also associated with health literacy. Compared to non-Hispanic Whites (reference group), the odds of having adequate health literacy were statistically significantly lower among Asians and African Americans, 74% and 59%, respectively ($p = .002$, $p = .002$). Compared with non-Hispanic Whites, Hispanic and Latino groups also had lower odds (i.e., a lower chance) of having adequate health literacy, but it was not statistically significant. Being male and non-White and having less education were associated with limited health literacy after controlling for covariates.

Comparison of Pre-January 1, 2020, and Post-January 1, 2020, N.F. Labels

Participants' NVS scores for the original and new N.F. labels were compared to determine whether the new changes helped consumers interpret the information more easily. Average NVS scores using the original and new labels were 4.71 ± 1.43 and 4.75 ± 1.45, respectively, indicating participants' scores were above three and that they had adequate health literacy reading both labels. Participants' NVS scores between the original and new N.F. label were not statistically significantly different.

Discussion

Health literacy in Maryland's general population has not been well studied despite the existence of health disparities that disproportionately affect less educated, low-income, and/or racial and ethnic groups in the state. To the authors' knowledge, this is the first study assessing the health literacy of Maryland adults. The following discussion focuses on the three study objectives identified earlier in this article.

Establish a Baseline for the Health Literacy Levels of Marylanders

Adequate health literacy skills are essential for individuals to navigate the complex health system in the United States. As people become more confident communicating with their healthcare providers, they are better able to understand their health-related needs. Adhering to diet, medication, and other instructions provided by their healthcare team empowers them to make more informed decisions about their health.

Extension educators have an obligation to provide health information that is accessible and easy to comprehend for people to improve and achieve personal health-related outcomes. Yet, lacking a baseline metric, it cannot be known if educators are offering needed and relevant programming. Educators may be required to assess the health literacy skills of their audiences to accomplish this. This research helps our Extension team to identify, develop, and/or adapt programs and educational resources tailored to the health literacy skills and the specific health needs of the communities they serve.

Identify Extension Audiences in Maryland with Limited Health Literacy

Results from this study support findings in existing literature that social determinants of health, such as education level, race, and income level, are associated with health literacy levels (Braveman & Gottlieb, 2014). Education was a key predictor of health literacy. Maryland adults in this study who were more educated (i.e., had completed some college and/or earned bachelor's or advanced degrees) had higher health literacy than those who had attended some high school or earned a high school/GED diploma. These results were not surprising and are supported by previous research (van der Heide et al., 2013).

Race/ethnicity was also a key indicator of health literacy, a finding also supported by previous research (Chaudhry et al., 2011). Asian and African American Marylanders had lower health literacy skills compared with their White/non-Hispanic counterparts. This is a concern since chronic diseases are 1.5 to 2 times more prevalent in minority populations. Chronic diseases such as obesity, hypertension, high cholesterol, and diabetes are more prevalent in adult Black populations compared with Whites in Maryland (Maryland Department of Health, n.d.). The highest contributor to medical costs among all health conditions and lost employee productivity is chronic disease-related health problems (Partnership to Fight Chronic Disease in Maryland, n.d.).

Women in this study had higher health literacy than men, a finding supported by previous research (Clouston et al., 2017; Shah et al., 2010). One explanation for the difference in health literacy between males and females is that the NVS instrument requires participants to read and interpret food labels. Women may be more familiar with reading food labels due to their traditional roles in purchasing and preparing foods (Jackey et al., 2017).

Living in a specific geographical region or in a rural or urban area in Maryland was not a predictor of health literacy. Participants living in the capital and central regions of the state were more likely to have limited healthy literacy skills than those living in the rural region; however, the difference between the two regions was not statistically significant. Counties in the capital and central regions have urban, suburban, and rural areas, but we did not ask participants to specify the areas where they lived.

Identify Best Methods for Reaching These Audiences

The role of Extension has traditionally centered on educators delivering programs and resources in person to their audiences. To retain current audiences and recruit new ones, educators may need to pivot and create new learning experiences that are more learner-centered and promote more interaction and participation using multiple delivery methods. For many educators, this may require training in different program delivery methods (web-based instruction, hybrid, podcasts, etc.). In our study, Marylanders with limited health literacy preferred in-person education as well as a combination of web-based education platforms. These results also prompted new research in 2019 to test education program delivery methods (i.e., online and hybrid workshops) in rural communities. This was especially timely during the COVID-19 pandemic when the need for web-based synchronous and asynchronous instruction and audio education programs for audiences with visual impairments were in high demand since in-person education was prohibited. Barriers to web-based and hybrid delivery methods are important to consider, especially with rural populations that may not have adequate access to the internet.

There were some limitations to this study. First, using a stratified sample across regions in the state produced a small number of rural participants and limited diverse ethnic and racial populations. Future studies focusing on specific rural populations and ethnic communities could

provide a more in-depth understanding of health literacy among these populations. Also, the sequence of the appearance of the original and new N.F. labels in the survey might have been a limitation. All participants viewed and responded to questions related to the original N.F. label first, followed by the new N.F. label. Randomizing the appearance of these labels could possibly alter health literacy scores. While the NVS instrument was validated for in-person administration, public health practitioners have used other delivery methods, such as computer or telephone, producing similar results (Mansfield et al., 2018; McKee et al., 2015; Russell et al., 2019). Opportunities for further research include determining health literacy by geographic regions and urban and rural areas. Identifying which education delivery methods work best for limited-literacy audiences represents another potential area for research. Finally, future studies could focus on determining whether the current N.F. label is easier for consumers to use, especially those with low health literacy.

Applications of Study Outcomes

Study results were shared at an FCS in-service meeting to encourage educators to consider the health literacy skills of their audiences when developing health- and nutrition-based education programs and resources. To further enhance their health communication skills, University of Maryland Extension educators also attended health literacy/clear communication workshops provided by the university's School of Public Health, Horowitz Center for Health Literacy. In these workshops, FCS educators were introduced to the CDC's Clear Communication Index (CCI), designed to assess whether health resources are written in plain language that can be easily understood by the general public (CDC, 2019). Educators began using this tool to incorporate simple, effective, and clear language in current and new written and oral program resources. For example, the CCI was used to score *Recipe Swaps: Common Substitutions for Making Recipes Healthier*, a new peer-reviewed consumer fact sheet; Session 1 of *Dining with Diabetes*, a national Extension program for testing a new online and hybrid course method; and blog postings developed for the FCS team's *Breathing Room* blog.

The N.F. label provides vital nutrient and ingredient information for consumers to make informed decisions about their health. FCS educators updated existing label information in current nutrition-related curriculums by incorporating the new N.F. label and clear and simple messages about how to use the food labels. Including easy-to-understand language in the curriculums allows audiences with limited health literacy who have chronic diet-related conditions and difficulty reading food labels to learn how to choose healthful foods to manage their health.

Conclusions

Adequate health literacy skills play a daily role in the lives of individuals making decisions about their health, whether they are following medical instructions or reading food label information to choose and purchase healthy foods. Indeed, it has been well-documented that health literacy is a

key determinant of health inequities across many groups (Rikard et al., 2016). Those with limited health literacy skills are at a disadvantage in understanding health information. In addition to making poor health-related decisions, they may not recognize the connection between lifestyle choices, such as following a healthy diet and being active, and the impact of those choices on their health.

Extension educators should assess the health literacy skills of their audiences rather than assuming that the health information they provide is easily understood. There are several approaches to assessing health literacy. First, in addition to the NVS instrument used in this study, Ylitalo et al. (2018) identified numerous other screening tools available to formally assess health literacy, including the Test of Functional Health Literacy in Adults (TOFHLA), the Rapid Estimate of Adult Literacy in Medicine (REALM), and the U.S. Health Literacy Scale (HALES). Second, educators could use a simple technique like teach-back—an informal approach that requires participants to summarize information provided during a health-related Extension program to determine if it was communicated effectively and understood. Lastly, the CDC's CCI can be used by educators interested in assessing their current written resources and developing new ones to predict how easily they will be understood and used by their audiences. Assessing and knowing the health literacy skills of a target audience will help Extension educators deliver health information that is written in plain, clear language and that is easily understood.

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