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Health Literacy, Race, and Understanding Health Information Among Women

Adrienne Clark
Walden University

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Walden University

College of Health Sciences and Public Policy

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Adrienne M. Clark

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee

Dr. Chester Jones, Committee Chairperson, Public Health Faculty

Dr. James Rohrer, Committee Member, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2023

Abstract

Health Literacy, Race, and Understanding Health Information Among Women

by

Adrienne M. Clark

MA, Liberty University, 2012

BS, East Carolina University, 2007

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

Walden University

August 2023

Abstract

Health literacy is a topic often referred to by public health professionals to help improve the health of a population. This study used a quantitative approach to understanding health information among women of different races, income levels, household sizes, and education levels within a specific age range. This study used the socio-ecological model for its framework. The overall goal of this study was to improve health disparities and improve health communication one population at a time. Women tend to be the pillar of communities. Having a better understanding of how women understand health information could improve public health outreach. The variables collected in the study are part of the annual Behavioral Risk Factor Surveillance System 2016. This study looked at race, income, marital status, number of children in the household, education level completed, verbal health communication, and written health communication and addressed gaps in research when it comes to specific populations and health literacy understanding. Although this study had multiple variables, income level, race and education were the variables that were significant when it came to understanding health information. Essentially, for women to understand health information there needed to be intentional approaches to those that are within poverty, minority groups and those with low education. The study also showed that there is a lack of information regarding health literacy collected or studied on a consistent and longitudinal basis. The positive social change impact from this study determined to have continued efforts and consistent assessments of health literacy among women and other specific populations of minority, poverty and low education completion.

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Dedication

I would like to thank God first for giving me the gift of knowledge and allowing me to get this to this point in my life. It is said that everyone has a story, and this is just a stop along the way on my journey God has set for me. Secondly, I would like to thank my loving husband who has been there since my acceptance letter into the DrPH program. You have continued to motivate me and help me see through this process, even when I doubted myself. Lastly, I would like to dedicate this to my baby girls Ashton and Averie, who came during this process. I want you both to know that you can do whatever you set your minds to; your parents are a testament to that.

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Section 1: Foundation of the Study and Literature Review

Introduction

Nationally, health literacy has been deemed a significant public health problem, and there have been several strategies to help improve the statistics. The Centers for Disease Control and Prevention (CDC, 2015) stated that only 12% of Americans understand health terminology and are proficient in health literacy, while 30 million others have below basic health literacy levels. Health literacy can be a variety of things, but within this study, it will pertain to written and direct verbal communication from a health professional. Health literacy is an effort to aid inequalities in health between population groups (Batterman et al., 2016). The United States is one of the most powerful countries when it comes to economic growth, but when looking at its healthy life expectancy at birth, it ranks among the lowest countries (WHO, 2022). The challenge is even more significant in the United States regarding health disparities among racial groups. The United States is one of the leaders in the world of health care, but many African American women are not using preventive care services (Lukachko et al., 2015). In order to empower women, they must understand their health and the communications around it. Health literacy is a multidimensional term critical for health care and utilization. Health literacy could be the ability for an individual to understand writing or verbal information given to them by a health professional or understand medications or consultations.

Problem Statement

Health literacy is a serious public health concern and finding a solution to the problem is one of the goals of “Healthy People 2030” initiative. However, this is a continued effort from the “Healthy People 2020” initiative. This study examined various variables and their relationship with written and verbal health literacy among women of different races.

In public health, interventions have been attempted and implemented in communities, but they are only effective if participants and communities are willing to receive the help (Johnson, 2014). Batterham et al. (2016) stated that it is known that there are various levels of differences when considering socioeconomic status and health literacy levels. For instance, Brabers et al. (2017) specified that those with at least a high school education or degree are better able to understand health materials and information from their doctor than those that do not have a degree. The issue with public health occurs when the health outcomes could be improved if the individual received proper health communication delivered at their level of health literacy (Kino & Kawachi, 2020).

Purpose of Study

The purpose of this research is to explore if there is an association between women and their self-reported understanding of health information compared to women of other races, income, and education levels. The research examined if women understand the health information given to them verbally by a health professional or in written form. The dependent variable in this study is the response to two health literacy questions found within the Behavioral Risk Factor Surveillance System (BRFSS). The

independent variable is race, and covariates of income, marital status, number of children, and education level.

In the United States, racial and ethnic disparities in health have been identified and described in several studies. Health literacy is still an evolving concept in public health. Individuals and communities with high levels of health literacy have been proven to have better health statuses and improved healthcare system use (Rudd, 2015). It is known that health literacy is a problem, but there has been little research that looks at cultural communication as being a barrier to low health literacy. Looking at the race, income per household, and education level compared to understanding health information will give a better picture of this issue in public health and health literacy (Kino & Kawachi, 2020).

Women make up a large part of society, but when it comes to improving their health, there are still opportunities for social justice (Noonan et al., 2016). A possible improvement in health literacy among the population could help close the gaps in health care disparities. Throughout the years, there has been a misconception that because women tend to age gracefully, they are automatically healthy. However, mortality, diabetes, obesity, and breast cancer rates say different (Belgrave & Abrams, 2016). Health literacy plays a role in the rates of many diseases that continue to rise.

Health literacy does not mean an individual cannot read; health literacy examines whether the individual understands health information. Historically, women, specifically minority women, are left out of vital studies. This could be one reason behind low health literacy rates (Speight et al., 2017). However, federal government-based surveys tend to

encompass all populations. Engaging women should be a priority in public health research, which could help increase health literacy rates. To understand cultural and linguistic barriers, the populations must be present in the research (Sanders et al., 2016).

The role of women within the community could play a critical role in advancing health disparity research. Research has shown that if minority women were given the knowledge, they would share it with the community (Hempstead et al., 2018). The barrier could be the way they are given the information. The information is not given in terms that they can understand. Women have not been a focus in public health, and their health continues to decline. To better understand health care information, the information the population receives needs to speak to them (Belgrave & Abrams, 2016). If we can increase health literacy, health disparities should reduce, and there should be an increase in health equity for women.

Research Questions and Hypotheses

RQ1: What is the relationship between women's verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level?

H_0 1: There is no relationship between women's verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level.

H_A 1: There is a relationship between women's verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level.

RQ2: What is the relationship between women's understanding of written health information given by a provider and their race when controlling for their income, marital status, number of children, and education level?

H₀1: There is no relationship between women's understanding of written health information and their race when controlling for covariates of their income, marital status, number of children, and education level.

H_A1: There is a relationship between women's understanding of written health information and their race when controlling for covariates of their income, marital status, number of children, and education level.

Theoretical Foundation for the Study

The social-ecological model (SEM) is a framework used for prevention. This model considers the complexity of individual, interpersonal, and community factors (Scholmerich & Kawachi, 2016). SEM is a multi-level approach and realizes that health literacy has multiple bands of influence. This study looked at the individual and interpersonal levels of SEM. The individual and relationship level was examined by the self-reported responses of regarding their understanding of verbal and written health information compared to other women.

The SEM theory recognizes that one concept affects another. In this case, if we can examine women's barriers to health literacy, then we can better serve those that have relationships with women. As stated before, research shows that if given the knowledge, women will share it with their family, friends, and community (Hempstead et al., 2018).

Health literacy is a skill that one must acquire to achieve optimal health. Communication is generally challenging but becomes more problematic when it involves health information and terminology. Health communication is rapid and ever-changing. To change a behavior or better understand its research, one must look at all the factors or barriers that could contribute to the problem. Women's health and health literacy are complex topics, and using the SEM helped determine some of the cultural beliefs, knowledge, attitudes, and barriers that are present (Hempstead et al., 2018).

Nature of the Study

Recent studies have looked at health literacy compared to African American's socioeconomic class and health disparities, but little was mentioned regarding health care and health care access (Stormacq et al., 2019). Health care access and health disparities are known issues for minorities, but if we peel back the layers as to how public health professionals communicate with the population and if they understand the information given, we may discover something (Wilkins et al., 2020). With this knowledge, public health professionals should be able to relate to the population they are serving and could possibly change their current practices to accommodate different populations.

This cross-sectional study used the BRFSS 2016 survey to analyze the responses from women of different races and their understanding of health information. There are two questions within the survey that ask explicitly if the individuals understand health information. The dependent variable in this study were the responses to the two health literacy questions within the BRFSS 2016. The independent variable used were their race

with the covariates of their household income, marital status, number of children, and education level.

The data were collected was from the BRFSS 2016. The BRFSS is produced by the Centers for Disease Control and Prevention. Although more recent BRFSS data were available, they were not used because the health literacy questions were omitted from the most current editions.

Literature Search Strategy

For the literature review, I used the Walden University Library as the primary source to conduct my research with the databases provided. In addition, search engines such as Google Scholar, PubMed, World Health Organization, and PLOS were used as references.

The key search terms and combinations of terms used are below:

1. African American health literacy
2. Health literacy among populations
3. Healthcare and health literacy
4. African American women and health literacy
5. Health literacy in the African American community
6. Health literacy by culture
7. Health literacy and health disparities
8. Social disparities and health literacy
9. African American health literacy
10. Health literacy among populations

11. Healthcare and health literacy
12. Women and health literacy
13. Women's roles within the household
14. African American women and health literacy
15. Health literacy in the African American community
16. Health literacy by culture
17. Cultural differences with health literacy
18. Health literacy and health disparities
19. Social disparities and health literacy

The referenced literature are articles dated between 2015 and 2021, except for some articles that provided strength for the research and have not been replicated. All the literature found throughout is peer-reviewed and from reputable journals within the United States. In my research, I reviewed over 110 articles on various topics regarding health literacy, and as noted in the references, I used and identified 50 that could contribute to this study.

Scope of Literature

The literature used in the study was from a wide array of databases. The articles were peer-reviewed and were published between 2004 and 2021. The oldest article was published in 2004, and the newest one was published in 2021. In the case of research, there has been little research specifically looking at a woman's race and health literacy.

Literature Review Related to Key Variables

In the following literature review, I present relevant findings that contribute key variables to the research. The key variables were written and verbal health communication, women, health literacy, race, household income, marital status, and education level.

Healthcare Utilization, Access, and Health Literacy

Health literacy has been associated with health care outcomes and utilization. Rasu et al. (2015) looked at health literacy based on the information delivered by a physician. The physician and patient relationship are critical in an individual's health literacy level. Healthcare utilization comes into effect if the patient understands the health information given by the physician at the time of visit. Studies show that many adults have difficulty understanding health information. The first step is for individuals to gain access to health care, but when they are with their physician, they need to be provided information that is understandable and in plain language (Wittink & Oosterhaven, 2018).

Research on health literacy traditionally looks at the population that has the disparity and tries to find the “why.” What can be done for the population to increase their health literacy level? There is also research that examines physicians administering this information and if they can do it effectively (Rajah et al., 2017).

The article by Rowlands et al. (2015) added to the conversation around health care information and access. The lack of health care information and availability for care tended to correlate toward lower health literacy levels. In different populations, the barriers to care and information drive health literacy for a specific population. In

conjunction with the articles on care and access to health information, these two factors play a large part in the gap in health disparities among populations (Purnell et al., 2016). Health disparities and literacy should be examined on a population-by-population basis to improve each population's status. However, health care access and utilization among populations can differ vastly.

The emergence of the COVID-19 pandemic has shined a light on health literacy and healthcare access. It has shown to be the greatest global challenge for the health care industry (Abdel-Latif, 2020). Health literacy allows individuals to make appropriate health decisions. With the disparities already faced in some populations, this quickly became an emergency. COVID-19 taught the United States and the world that nations should invest more in the health literacy of their people to prepare them for health emergencies and pandemics and help with disease management (Abdel-Latif, 2020).

Health literacy and healthcare access or medical care have been the focus of the public health field for years, but research has shown that health literacy needs to take a broader approach to obtain the change it needs for populations (Vamos et al., 2020). The gaps in research show that individuals must improve their health literacy, but it has been proven that it is not a one-size-fits-all answer. Health literacy programs and interventions need to consider education across a population, not just medical care; this includes schools, homes, workplaces, religious institutions, and government (Vamos et al., 2020).

Culture and Health Literacy

Health literacy and culture mirror the previous conversation regarding population. Currently, health information is given in a general tone to all populations. Health literacy

limitations should be considered a cultural issue, and the problem-solving measures should mimic the culture (Batterman et al., 2016). Matthew and Plough (2016) introduced the term “culture of health” to tie the need for health information and health care tailored to the population. There is a need to close the gap with health literacy, but a possible solution could be cohesion between the demand for better health and the culture.

Singer et al. (2016) researched how culture plays a pivotal role in health research, and why research should look closely at the difference between cultures. The differences in culture should be a significant factor in health intervention programs and communications, which drives the health literacy level of the population.

The type of communication is a factor that research still lacks regarding health literacy within a specific population. Christy et al. (2017) examined underserved populations and the influence communication has on their health. The study confirmed what we already know that underserved populations have lower health literacy, but in addition to looking at the culture, public health should consider the religious beliefs and society of the population.

Health Communication

Health literacy is essential to advance or improve public health; the way you communicate with populations is even more critical. Hoover et al. (2015) stated that communication vehicles used to broadcast information to populations should be tailored to that specific group. Research showed that some communication types are more effective than others and change based on the message and the population audience. Rudd

(2015) complemented that research and stated that communication should be tailored to specific demographics and reading levels.

Health communication should not only think about written text but also make information visual. Yetton et al. (2020) examined how visual graphics strengthened an article about African Americans and breast cancer within the community. The visual graphics allowed the author to better illustrate their point and sparked more conversations between patients and healthcare professionals. Visual health information can speak to people and help aid difficult conversations about health topics that individuals may be embarrassed to speak about.

In the literature findings, what needs to be studied is the types of communication given to specific populations and the actual level of understanding of the audience it reaches. Public health currently has a one-size-fits-all model regarding health communication (Valero et al., 2016). As a result, some groups do not understand the information. Additionally, if they cannot relate to the message, this can cause an increase in health disparities. This study had variables that were not controversial, and researchers believed there were missed groups regarding health literacy and health information production.

Health Literacy and a Population's Health Status

Health literacy is the background for individuals being able to obtain optimal health. Millions of Americans are affected by low health literacy rates, which also contributes to their risk for poorer health (Cajita et al., 2016). Health communication information is vital for improving a population's health status. Research has shown that

low health literacy and education can affect health status, medication compliance, obesity, cancer, or other chronic illnesses (Rust et al., 2015). This research and the variables used will help public health professionals gain a better understanding of the health literacy level in women and, with that knowledge, create social change with health professionals in their communication efforts.

Health communication is important to reduce health disparities among populations. These populations could be based on gender, race, income level, or current health problems. Studies have shown that individuals with low health literacy tend to have greater health challenges. Luo et al. (2020) looked at the responses to the BRFSS 2016 health literacy questions and if those who were prediabetic had lower health literacy responses than those who did not have prediabetes. The results showed what most would assume that prediabetics had lower health literacy rates, and those individuals might benefit from increased awareness and communication from their healthcare professionals.

Health literacy is an integral part of health communication. Public health professionals strive to help society understand issues; sometimes, the issues are complex and have multi-level solutions. To improve health literacy levels, research will need to dissect populations and learn how to communicate better with them. The programs, interventions, and campaigns developed and implemented by health professionals need to think about education across the whole population (Vamos et al., 2020).

Definitions

The BRFSS 2016 determined the two health literacy questions that are proposed. The independent variable of women's race was defined as what group the participant said

best represented them. The covariates are their household income, marital status, number of children, and education level. Household income was defined as annual household income from all sources. The marital status asked participants which category is current for them: married, divorced, or widowed. The number of children was defined as how many children under 18 currently live in the household. The education level was defined as the highest level of education completed by the participant (CDC, 2017).

Assumptions

The assumptions of this study were that all the participants who answered the questions were asked voluntarily and placed correctly in the correct age, income, and racial category. The survey was self-reported, so this should not be an issue unless there were a misunderstanding or misclassification from the surveyor on the telephonic responses. The socio-ecological model was based on the long history of conceptualized thinking on human development (Moran et al., 2016). Health communication has studied the SEM when looking at the individual level of the model, but recent research has spread to the family and neighborhood levels.

Scope and Delimitations

The boundaries for this study were strict as it was only look at women within the United States and compared their race, household income, marital status, number of children, and education level backgrounds. This specific aspect was chosen because research has shown that women find empowerment in sharing health information they obtain. However, there continues to be a health disparity gap for the population (Hempstead et al., 2018).

Significance

The importance of health literacy is a global health issue, but within the United States, it is currently a goal for *Healthy People 2030*, specifically under health care access and quality. This research has allowed public health professionals to understand better what types of communications are needed for women in different communities. Currently, public health communication is broad enough that it does not address the racial and ethnic disparities in a community or even speak in a language that individuals may understand (Betancourt et al., 2016). Health communication is an aspect of health literacy, and it plays a critical role in a woman's health status. Rowlands et al. (2015) stated that the individuals most needing health information have the least amount of access to it.

Health information is complex and hard to understand. The significance of this study was to determine if a woman's race, marital status, number of children, household income, and education level were factors in understanding their health information. If these factors are known, then it may lead to a conversation around developing health information for specific populations instead of a one-size-fits-all model (Abdel-Latif, 2020).

The findings in this study could help with other minority groups and public health communication tactics. The problem that public health professionals may face when it comes to decreasing disparities and educating the population is that we are not communicating in a way that is effective for them. Communication is fundamental, but communication around health can be challenging.

There is a difference between literacy, health literacy, and cultural literacy, and this study examined health literacy among different cultures. The information obtained can help create social change among health professionals and the information given to different populations. The change will happen when health information caters specifically to the population it is trying to reach, whether it is based on that population's race, gender, or culture (Abdel-Latif, 2020). The information needs to be written in terms they identify with and understand. This will allow health professionals to tailor information for specific populations instead of the general public.

Summary and Conclusions

Health literacy is essential when it comes to health communication. Health literacy is associated with health behaviors and outcomes (Sansom-Daly et al., 2016). Communication and communication style are key factors in health literacy. A population has a better chance of improving health if the practitioners can cater to that population and translate the health information in a way that helps them realize it is a priority for them (Shalfer et al., 2016). This research dissected a group of women within the United States to better understand their health literacy level. Section 2 describes the research design chosen along with information regarding data collection.

Section 2: Research Design and Data Collection

Introduction

Section 1 explored how health communication is essential to increasing women's health literacy levels. However, if increasing health literacy levels is the end goal, there needs to be a better understanding by public health professionals on if women understand the information they are receiving from health professionals in verbal or written context. Health communication is complex, and additional research may show that health information needs to be tailored for specific demographics and that their education level may not be a leading factor in the health disparity among races (Rajah et al., 2017). This quantitative study examined the association between women and their understanding of health information. The section includes the methodology that was used to investigate these questions. It details the research design and approach to the study.

Research Design and Rationale

This research study used a quantitative, cross-sectional research design with secondary data analysis. Cross-sectional designs allow researchers to compare variables at the exact second in time (Spector, 2019). There are advantages to using a cross-sectional analysis. The advantages are it is inexpensive to gather the data and can be done within a short time frame, while ruling out relationships among variables (Spector, 2019). The limitations of this type of design are that cross-sectional designs cannot study rare diseases since it needs a comparison. Health literacy works for this study, as it is not rare, and there are previous data on the subject.

This cross-sectional design was chosen to examine women's understanding of health information compared to race, income, marital status, number of children, and education level. The design allowed for correlational analysis among the variables. A cross-sectional research design is used in self-reported surveys because it can help analyze connections between variables (Spector, 2019).

Methodology

Population

The defined population in this study was women in the United States surveyed in the BRFSS of 2016 (CDC, 2017). There were 486,303 records. The researchers used over-sampling to represent the different racial and gender groups accurately. The BRFSS data were weighted for those states that did not participate and account for oversampling; therefore, it is a fair representation of women within the United States.

Sampling Procedure

The BRFSS is a secondary data source from the CDC. The secondary data set was chosen because it was specific to the population's understanding of healthcare, race, income, and education level. The BRFSS survey was initiated in 1984 with only 15 states and in 2016 all 50 states, including the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands. The survey was for adults 18 and older who reside within the United States. The BRFSS is a telephonic survey that gives a questionnaire that lasts about 18 minutes (CDC, 2017). For the survey to be completed, each state had to produce a landline list of participants for the survey. The BRFSS is conducted by the CDC and is a reputable source and there are currently no permissions needed to use this data source.

The BRFSS is a large data set, so this research used G*Power 3.1.9.7 to calculate the sample size for the study. The logistic regression sample size test was used, and the type of power analysis was a priori. The odds ratio was 2.333, alpha of 0.5 and a power of .95. The total sample size required for the study is 312, with a power of .95. This research used all available cases for the study, so there will be no need for a random sample. Those that did not answer or that do not read health information will be “zeroed” out of the analysis.

Instrumentation and Operationalization of Constructs

As mentioned above, the instrument used in this study was the 2016 BRFSS. The survey consists of a standard set of questions used by all the states. The objective of the yearly survey was to collect information specific to each state on various health topics. The 2016 BRFSS included the following topics: health status, health care access, health literacy, and health-related quality of life questions (CDC, 2017). Each year the BRFSS is released there are core questions and then focus questions associated each survey.

Operationalization

The 2016 BRFSS survey was a secondary database used for this study. Health departments use the survey results to understand the health characteristics of their populations. The individuals in the study were 18 years of age and older. The BRFSS website hosts information about each state and how these data can be used. The number of questions could vary depending on the response of the participants.

The dependent variable in this study was the response to the health literacy questions mentioned below. The two questions are centered around health literacy,

specifically in the 2016 BRFSS. The first question was, “How difficult is it for you to understand information that doctors, nurses, and other health professionals tell you?” and the second question was, “How difficult is it for you to understand written health information?” These two questions were coded as ordinal with “very easy coded as = 1,” “somewhat easy coded as = 2,” “somewhat difficult coded as = 3,” and “very difficult coded as = 4.” The independent variable of race was nominal where those who identified as “white was coded as =10,” “Black or African American coded as = 20,” “American Indian or American Native coded as = 30,” and “Pacific Islander coded as = 40.”

Four covariates were used for the study: household income, marital status, number of children, and education level. The income variable was ordinal, were “income less than \$50k coded as = 06,” “income more than \$50k but less than \$75k coded as = 07,” and “income more than \$75k coded as = 08.” The marital status variable was presented as married, divorced, widowed, separated, never married, or unmarried. The number of children variable was presented with the number of children that were under the age of 18 living within the household. Participants responded with the exact number or stated there were none. The variable education level was present as ordinal where “completed grades 9-11 was coded as = 3,” “grade 12 or GED coded as = 4,” “college 1 year to 3 years coded as = 5,” and “college 4 or more coded as = 5.” In the analysis, the individuals that responded with “don’t know/not sure” or “Refused” or they do not read health information, they were zeroed out of the analysis. Table 1 below illustrates the variables, description, codename found in the BRFSS codebook, and the type of variable.

Table 1*Description of Variables*

Variable	Description	Codename	Type of variable
Understanding verbal health information	How difficult is it for you to understand information that doctor's nurses and other health professionals tell you?	UNDRSTND	Ordinal, dependent
Understanding written health information	How difficult is it for you to understand written health information?	WRITTEN	Ordinal, dependent
Race	What race do you identify as?	RACE	Nominal, independent
Income	Household income	INCOME2	Ordinal, covariate
Education	Education level completed	EDUCA	Ordinal, covariate
Marital status	If the participant was married, widowed, divorce, etc.	MARITAL	Ordinal, covariate
Number of children	Number of children within the household under 18	CHILDREN	Nominal, covariate

Data Analysis Plan

Data analysis for this study was conducted using the SPSS software version 27 with the addition of G*Power 3.1.9.7 software to calculate the sample size since this is a logistic regression method. It used the two questions within the survey that showed the

health literacy level of the participants. The individuals that did not respond to the question were “zeroed” out of the analysis.

The following questions were answered with the study:

RQ1: What is the relationship between women’s verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level?

H_01 : There is no relationship between women’s verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level.

H_A1 : There is a relationship between women’s verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level.

Statistical Plan

The first research question had four key variables: response to the survey question in the BRFSS for women’s race, income, marital status, number of children, and education. The dependent variable used was the response to the question, “How difficult is it for you to understand information that doctors, nurses, and other health professionals tell you?” The independent variables used were race and the covariates of women’s income, marital status, number of children, and education. Using logistic regression, the null hypothesis is rejected if $p < .05$.

RQ2: What is the relationship between women's understanding of written health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level?

H_01 : There is no relationship between women's understanding of written health information and their race when controlling for covariates of their income, marital status, number of children, and education level.

H_{A1} : There is a relationship between women's understanding of written health information and their race when controlling for covariates of their income, marital status, number of children, and education level.

Statistical Plan

The second research question had four key variables: response to the survey question in the BRFSS, race, income, marital status, number of children, and education. The dependent variable used was the response to the question, "How difficult is it for you to understand written health information?" The independent variables used were race and covariates, income, marital status, number of children, and education. Using logistic regression, the null hypothesis was rejected if $p < .05$.

The dependent variables were both ordinal, so they were split in the middle and made those who answered "very easy and somewhat easy" coded with a = 1 and those that answered "very difficult and somewhat difficult" coded with a = 0. Doing this allowed for there to be two groups and a clear line between those who understood and those that do not understand. In similar studies that used these health literacy questions,

the groups were also split to show a clear line of understanding for health literacy (Kino & Kawachi, 2020).

Threats to Validity

This quantitative study was a secondary analysis of the 2016 BRFSS. The survey collected data about U.S. residents regarding their health, chronic health conditions, and risk behaviors (CDC, 2017). The data applied were only for individuals 18 and older and deemed an adult. The data were collected from 50 states, including the District of Columbia, Guam, the U.S. Virgin Islands, and Puerto Rico. This survey was conducted using landlines and cellular telephones, which helped improve the validity and data quality (CDC, 2017). The BRFSS tends to have a low response rate, and there was some selection bias regarding who was surveyed. Response rates for the BRFSS were calculated using standards set by the American Association of Public Opinion Research. The response rate for the BRFSS 2016 was 47.7% for landline responses and 46.6% for cell phone respondents. Although there were biases reported on specific questions in the BRFSS 2016, the two questions that were used for this study did not have any reported biases.

Ethical Procedures

Ethical issues are essential regarding research and data collection. The validity and integrity of the research are dependent on it (Barocas & Boyd, 2017). The BRFSS requires strict protocols for the survey and the interviewers, and the retention among the interviewer from year to year is high among states (CDC, 2017). Therefore, individuals trained to administer the survey have a low turnover rate. In this study, the data and

research collected and analyzed were on a secure device with password encryption on a personal computer. Prior the analysis of the data information, the data set was scrubbed of all information that was not pertinent to the study using the SPSS software system. I was the only person that had access to the data for the study. I was able to keep the study subjects' information private and protected by these methods. The topic of the study did not cause of conflict of interest.

A Walden Institutional Review Board application was submitted, and the study was approved prior to data collection, data analysis, and reporting of data results. The information for the BRFSS is publicly available on the CDC website. The data obtained from the CDC were accompanied with a codebook that illustrated the various codes, which was also publicly available.

Summary

BRFSS continues to be a high-quality source of research from each state, as it started in 2011 (CDC, 2017). The data set used within the BRFSS each year can help health professionals with various questions, interventions, or programs. The BRFSS 2016 focused on health literacy which is why it was used for this study. Each year, the BRFSS changes some of the core questions to reflect a goal topic. The questions tend to rotate yearly depending on even and odd-numbered years (CDC, 2017). To understand health literacy and with a lack of national surveys focused on health literacy, the questions within the BRFSS give a picture of what may be happening within society. The questions may help to create, implement, and change current public health practices and programs geared toward health literacy. In Section 3, the results and finding analysis is presented.

Section 3: Presentation of the Results and Findings

Introduction

This quantitative study aimed to examine the association between women and their understanding of health information. I designed the research question to determine the association between variables of women, such as their race, education level, income, marital status, and the number of children within the household. I tested the two hypotheses using logistic regression.

This section presents the data analysis findings that address the research questions and hypotheses. This section is divided into subsections: data management and descriptive analysis, variable manipulation, and missing data imputation. In the first section, I describe the data collection and the participants' responses. The second subsection is the descriptive statistics used to describe the demographic. In the third section, I review the statistical analysis for each question and the results.

Data Collection of Secondary Data Set

The data for this cross-sectional study were collected with the 2016 BRFSS, which is collected annually by the Centers for Disease Control and Prevention (CDC, 2016). The study sample size included all the available data, which was 275,631 individuals.

Data Subset and Variable Manipulation

The two dependent variables consisted of whether the participants understood written or verbal health information from a provider. The BRFSS was originally not weighted, so I used the Sample Design Stratification Variable, the Primary Sampling Unit

and the Final Weight given with the data set to produce a weighted sampling. Originally, the dependent variables were nominal, with responses of very easy, somewhat easy, very difficult, and somewhat difficult. I converted these dependent variables into binominal, dummy variables for the logistic regression analysis: understand or do not understand. The independent variables of race, household income, education level completed, marital status, and the number of children were based on the participant's demographic information. The variable race remained the same: White, Black, Other, Multiracial, and Hispanic. Marital status remained a nominal variable, with the responses being married, divorced, or never married. Initially, the number of children was a continuous variable ranging from 1 and up. I transformed the number of children into an ordinal variable, grouping participants into having 1 child, 2 children, 3 children, 4 children or 5 or more children. Originally household income was ordinal, which remained the same for the study, as well as the education level completed, remained the same.

Missing Data Imputation

This study used a cross-tabulation analysis to determine the number of available cases for each research question. Based on the cross-tabulation results, all the variables could show a valid percentage of available cases. As a result, I could still perform the logistic regression data analysis to examine whether there was an association between understanding written health information and verbal communication among women.

This study required descriptive cross-tabulations to illustrate the frequency of the variables (race, income level, education level, marital status, and the number of children) compared to the written and verbal understanding of health information. The following

tables are paired with one of the two dependent variables: verbal or written understanding of health information.

Results

I divided this into two sections. The group of tables directly below represents verbal health information and a paired dependent variable, and the second group showcase written health information and a paired dependent variable.

Table 2 represents the cross-tabulation of the understanding of verbal information and race. The degrees of freedom was 4 with a sample size of 51,649. The p, value was less than .05, making it statistically significant.

Table 2

Cross-Tabulations of Verbal Understanding of Health Information and Race

	Verbal	Do not understand	Understand	Total
Race				
	White	2067	34861	36928
	Black	571	6825	7396
	Hispanic	564	4828	5392
	Other race	127	1254	1381
	Multiracial	45	507	552
Total		3374	48275	51649

Note: N=51.649; p<.05

Table 3 represents the variable education level completed compared to understanding of verbal health information. It is shown that 52,202 participants were included. The p-value was less than .05. The table illustrates the comparison of understanding based on the completed education level. The largest percentage individuals that did not understand

verbal health information give were those that did not complete high school (23%), followed by those that just completed 12th grade or a GED program (10%).

Table 3

Education Level and Verbal Communication

	Do not understand	Understand	Total
Education			
Did not complete HS or GED	853	3,582	4,435
Completed 12th grade or GED	1,370	13,366	14,736
College 1yr through 3yrs	761	14,277	15,038
College 4 years or more	455	17,538	17,993
Total	3,439	48,763	52,202

Note: N=52.202; p<.05

Table 4 represents the variable of children within a household compared to verbal health information. The households that had five or more children were placed into one category. The sample size was 14,417. The p-value was .266 which is larger than .05, meaning the number of children in a household was not significant to understanding verbal health information.

Table 4*Number of Children and Verbal Communication*

	Do not understand	Understand	Total
Child			
1 Child	353	5624	5977
2 Children	258	4706	4964
3 Children	141	2045	2186
4 Children	46	680	726
5 or more children	26	350	376
No children	10	178	188
Total	834	13583	14417

Note: N=14,417; $p > .05$

In Table 5, the variables of marriage status and understanding of verbal health information was compared. The sample size was 52,202, with 34,615 participants being in a married relationship. The p-value was less than .05, which indicates marriage status is significant in understanding verbal health information.

Table 5*Marital Status and Verbal Communication*

		Do not understand	Understand	Total
Status				
	Married	2030	32585	34615
	Divorce	717	7572	8289
	Never married	692	8606	9298
Total		3439	48763	52202

Note: N=52,202; p<.05

The final table in this illustrates income level and verbal cross tabulation. The graph shows that of those surveyed, 11,375 of the participants had households of more than \$75k. The graph also shows that 93% of individuals understood health information, while 6% did not understand verbal health information.

Table 6*Household Income and Verbal Communication*

	Do not understand	Understand	Total
Income Level			
Less than \$10k	449	2550	2999
Less than \$15k	361	2575	2936
Less than \$20k	410	3648	4058
Less than \$25k	409	4170	4579
Less than \$35k	299	4592	4891
Less than \$50k	225	5822	6047
Less than \$75k	218	6231	6449
\$75k or more	246	11375	11621
Don't know or unsure	594	3872	4466
Total	3211	44835	48046

Note: N=48,046; p<.05

The second set is understanding written health information paired with the other variables. Table 7 illustrates written health information and race. There was a total of 51,573 participants that answered, and most of those participants identified as White. The p-value was less than .05 indicating that race is significant in understanding of written health information.

Table 7*Race and Written Communication*

		Do not understand	Understand	Total
Race				
	White	3824	33048	36872
	Black	877	6507	7384
	Hispanic	947	4440	5387
	Other race	214	1164	1378
	Multiracial	54	498	552
Total		5916	45657	51573

Note: N=51,573; p<.05

Table 8 illustrates written health information and the completed education level of the participants. There was a total of 52,124 participants and the largest number of those participants completed 4 or more years of college. The p-value was less than .05, which indicates that education level is significant in understanding health information.

Table 8*Education and Written Communication*

		Do not understand	Understand	Total
Education				
	Did not complete HS	1453	2996	4422
	Complete 12 th or GED	2405	12310	14715
	College 1 yr through 3yrs	1322	13688	15010
	College 4 or more years	820	17157	17977
Total		6000	46124	52124

Note: N=52,124; p<.05

The number of children and written health information were represented in Table 9.

There was a total of 14,84 participants and many of them either had one or two children.

The crosstabulation shows that a total of 12,994 of the respondents understood written health information. Note that only 167 of the participants did not have children. The p-value was less than .05 which indicates that there is significance in having children and understanding written health information.

Table 9

Number of Children and Written Information

	Do not understand	Understand	Total
Child			
1 Child	607	5350	5957
2 Children	433	4529	4962
3 Children	209	1969	2178
4 Children	82	643	725
5 or more children	39	336	375
No children	20	167	187
Total	1390	12994	14384

Note: N= 14,384; p<.05

Table 10 shows the crosstabulation of marital status and written health information.

There was a total of 52,124 participants and a majority of those were married (34,570).

The table shows that 30,770 of the married participants understood health information compared to the 3,800 of married participants not understanding written health information. The p-value was .05 for this crosstabulation which indicates that the variables are significant.

Table 10*Marital Status and Written Communication*

		Do not understand	Understand	Total
Status				
	Married	3800	30770	34570
	Divorce	1107	7171	8278
	Never married	1093	8183	9276
Total		6000	46124	52124

Note: N=52,124; p<.05

Table 11 shows the crosstabulation of household income level and written health information. There was a total of 45,341. A total of 11,139 of the respondents made more than \$75,000 per household and they understood written health information. From the households that are under the income poverty level within the United States (\$20k or less), about 20% do not understand written health information. The p-value is less than .05, which indicates there is significance between household income and understanding written health information.

Table 11*Household Income and Written Communication*

	Do not understand	Understand	Total
Income Level			
Less than \$10k	708	2287	2995
Less than \$15k	601	2332	2933
Less than \$20k	678	3370	4048
Less than \$25k	656	3914	4570
Less than \$35k	513	4369	4882
Less than \$50k	456	5582	6038
Less than \$75k	412	6031	6443
\$75k or more	471	11139	11610
Don't know or unsure	1020	3436	4456
Total	5515	42460	45,341

Note: N=45,341; p<.05

Logistic Regression Analysis

To answer the two research questions, the dependent variables, written information, and verbal information were transformed into binomial variables, and the independent variables were converted into dummy variables. I conducted a logistic regression analysis to determine whether there was an association among women and their understanding of health information. Logistic regression is used to determine the likelihood of an event happening, and in this case, it is to predict, depending on the independent variables, that women understand health information (Austin, 2017).

Research Questions and Hypotheses

RQ1: What is the relationship between women's verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level?

H_0 1: There is no relationship between women's verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level.

H_A 1: There is a relationship between women's verbal understanding of health information given by a provider and their race when controlling for covariates of their income, marital status, number of children, and education level.

The logistic regression model indicated that women's race, income, education, marital status, and the number of children did predict the understanding of verbal health information among women (Table 12). The reference category for the dependent variable was 0 vs 1. The number 0 was assigned to those that did not understand, and 1 was assigned to those that understood. The variable of marital status gave those that were married a p value of .001 (OR .912, $p=.001$), meaning that there was significance and those that were divorced carried a p value greater than .05, (OR .995, $p=.857$) which indicated no significance when looking at verbal health information.

The next variable was if women in the study had children and the number of children within the home. Women had between one and four children. For women with one child (OR 1.019, $p=.404$), two children (OR 1.024, $p=.411$), three children (OR .906, $p=.029$), and four children (OR .935, $p=.277$). As shown, the women with one, two, and

four children have a p value greater than .05, which indicated no significance in understanding health information. The women that had three children have a p value less than .05, which indicates a significance in understanding of health information.

The education variable showed that all the categories had a p value of less than .05 which indicated there was significance in the test. The variable of race showed that Caucasian women (OR 1.935) and Hispanic women (OR .637) had a p value of less than .05 ($p = <.001$) with significance, while black women showed no significance with a p value of .249 (OR 1.036) compared to the reference category of Other. The final variable of income showed there was significance since the p-value for all the categories within income were less than .001 ($p = <.001$).

Table 12

Regression Analysis for Understanding Verbal Information

	B	S.E.	df	Sig	Exp(B)	95% C.I. for Exp(B)	
						Lower	Upper
Marriage							
Married	-.093	.029	1	.001	.912	.861	.965
Divorced	-.005	.07	1	.857	.995	.944	1.049
Child							
1 Child	.019	.022	1	.404	1.019	.975	1.064
2 Children	.024	.029	1	.411	1.024	.967	1.084
3 Children	-.099	.045	1	.029	.906	.829	.990
4 Children	-.067	.061	1	.277	.935	.829	1.055
5 or more	-.211	.092	1	.022	.810	.676	.969
Education							
Did not complete HS	.285	.042	1	<.001	1.329	1.223	1.445
Complete 12th or GED	.434	.043	1	<.001	1.544	1.420	1.678

1 year to 3 years	.491	.044	1	<.001	1.634	1.499	1.782
College							
Race							
White	.660	.029	1	<.001	1.935	1.830	2.047
Black	.036	.031	1	.249	1.036	.975	1.101
Hispanic	-.375	.048	1	<.001	.687	.626	.755
Income level							
Less than \$10k	.500	.065	1	<.001	1.649	1.453	1.872
Less than \$15k	.307	.068	1	<.001	1.359	1.190	1.551
Less than \$20k	.366	.060	1	<.001	1.441	1.281	1.622
Less than \$25k	.274	.058	1	<.001	1.315	1.172	1.474
Less than \$35k	.302	.058	1	<.001	1.353	1.208	1.515
Less than \$50k	.307	.055	1	<.001	1.360	1.220	1.515
Less than \$75k	.307	.054	1	<.001	1.359	1.223	1.510

Note: Reference Categories; Race; Other, Education; More than 3 years, Marital Status; Never Married, Number of Children 5 or more, Income Level; \$75k or more.

RQ2: What is the relationship between women's understanding of written health information and their race when controlling for education level, marital status, number of children, and household income?

*H*₀₁: There is no relationship between women's understanding of written health information and their race when controlling for education level, marital status, number of children, and household income.

*H*_{A1}: There is a relationship between women's understanding of written health information and their race when controlling for education level, marital status, number of children, and household income.

The reference category for the dependent variable was 0 vs 1, same as the first research question. The number 0 was assigned to those that did not understand written health information, and 1 was assigned to those that understood written health information. The test of looking at individuals that were married/divorced and understanding of written health information produced a p value greater than .05, which indicates these tests was not significant (married, OR .991, p=.913), (divorced OR 1.179, p=.030).

The number of children was the next variable. Women in the study had between one and four children, and those with five or more was used for the reference category. For women with one child (OR 1.137, p=.062), two children (OR 1.140, p= .136), three children (OR 1.035, p= .791), and four children (OR 1.261, p= .200). As shown, all the variables have a p value greater than .05, which indicates there is no significance in the test in understanding of written health information among women. Education was the next variable. The test showed that all the variables had a p value less than .001, which indicated education level is significant at each of the categories. The following variable of race showed that Caucasian women (OR 1.935), Black women (OR .816), and

Hispanic women (OR .637) had a p value of less than .05, showing significance as well. The final variable income ranged from those that make less than \$10k through those that make less than \$75k. Those that made less than \$10k ($p = .046$) and more than \$50,001, but less than \$75k ($p = .047$) had a p-value that was less than .05, which showed significance (less than \$10k OR .701, less than \$75k OR 1.419). The other variables showed p values larger than .05, which showed no significance.

Table 13*Written Health Information*

	B	S.E.	df	Sig	Exp(B)	95% C.I. for Exp(B)	
						Lower	Upper
Marriage							
Married	-.009	.082	1	.913	.991	.844	1.163
Divorced	.162	.076	1	.030	1.179	1.016	1369
Child							
1 Child	.129	.069	1	.062	1.137	.993	1.302
2 Children	.131	.088	1	.136	1.140	.959	1.355
3 Children	.035	.131	1	.791	1.035	.801	1.339
4 Children	.232	.181	1	.200	1.261	.884	1.799
Education							
Did not complete HS	.408	.087	1	<.001	1.503	1.268	1.783
Complete 12th or GED	1.019	.095	1	<.001	2.771	2.301	3.336
1 year to 3 years college completed	1.434	.109	1	<.001	4.197	3.387	5.201
Race							
White	.274	.085	1	<.001	.001	1.316	1.114
Black	-.204	.081	1	.012	.816	.696	.956
Hispanic	-.332	.133	1	.013	.717	.552	.931
Income level							
Less than \$10k	-.356	.178	1	.046	.701	.494	.994
Less than \$15k	-.302	.186	1	.104	.739	.513	1.064

							43
Less than \$20k	-.214	.173	1	.215	.807	.575	1.132
Less than \$25k	-.262	.170	1	.123	.769	.551	1.074
Less than \$35k	.014	.175	1	.937	1.014	.720	1.428
Less than \$50k	.187	.175	1	.285	1.205	.856	1.698
Less than \$75k	.350	.176	1	.047	1.419	1.004	2.005

Note: Reference Categories; Race; Other, Education; More than 3 years, Marital Status; Never Married, Number of Children 5 or more, Income Level; \$75k or more.

The analysis findings will be interpreted clearly in the next section. The following section gives recommendations and where this study can lead the conversation around health literacy, health information, and women.

Section 4: Application of Professional Practice and Implication for Social Change

Introduction

This quantitative study aimed to examine the association between women's understanding of health information, both written and verbal, and their race, income, marital status, and the number of children. The variables that were used were only some that could be compared, and there could be more in-depth comparisons within each of the variables. The research questions I designed were to look at their understanding of health information. In this section, I interpret the results of the data analysis, indicate limitations within the study, provide recommendations for future studies, and discuss how this work can be used in professional practice and for social change.

Interpretation of the Findings

I sought to answer two research questions regarding understanding health literacy. Using multi-logistic regression analysis to determine the association between women's understanding of written and verbal health information with various variables, it shined more light on the populations needing more attention regarding health literacy. This research demonstrated that health literacy improvement will need to have a multi-discipline approach by public health professionals. The analysis showed that education and race were significant when looking at written information. Interestingly, the income category showed that those that made less than \$10,000 and between \$50,001 to \$74,999 had p values of less than .05 showing significance. The other income categories were greater than .05. In the question regarding verbal health information, race was significant

for White and Hispanic respondents, but not for blacks. The test showed that blacks had a p value of .249. I would deem race, poverty level and education significant.

Health Literacy and Income

Health literacy and income within public health have been believed to show that individuals with low household income tend to have lower health literacy levels (Yitalo et al., 2018). The research here examined women and their household income along with their understanding of health information, both written and verbal. In looking income and women, those that were making less than \$10k per her household had a p-value of less than .05 which showed significance. The same result was for those that were making more than \$75k per household as well.

An article by Fleary and Ettienne (2019) stated that people with lower income and minority race are more likely to have barriers and lower health literacy rates. This was not supported with this research. This research project showed no significance between different income levels and understanding verbal or written health information. This contradicts many findings that are portrayed in public health research. This prompts the need for further research to understand why this is the case. It is possible that the lack of questions regarding health literacy could play a part in the full understanding of a population's health literacy level.

Health Literacy and Race

Race and health literacy in public health tend to be a topic, as those that are of minority decent tend to have lower health literacy levels. The challenge with this research is there has not been a comprehensive analysis of health literacy among races/ethnicity

since 2013. In the study in 2013, it was identified that minorities have below basic levels of health information understanding (Schilinger, 2020). The results of this study showed that although Whites (89%, 94%) still had a higher understanding of written and verbal health information, large percentages of Blacks (88%, 92%) and Hispanics (82%, 89%) understood as well. The study did have a larger White participation group compared to the other races, which is common in most studies. As the argument and the limitations will show, there were a lack of questions regarding health literacy and understanding, so that may play a part in the findings. Research around health literacy and race tends to focus more on health disparities between the two (Muvuka et al., 2020). It is possible that health disparities are an effect of poor health communication and literacy.

Health Literacy and Education

Health literacy and literacy are different, and those that tend to have higher literacy levels may not always have high health literacy levels. This study observed health literacy based on education levels completed and their response to the health literacy questions. The results showed that there was no significant difference between those that completed more than 4 years of college and those that only had a high school diploma or GED. Those that had a 12th grade education or GED responded with 90.9% understanding the information that was given to them, while those that had 4 years or more of college, 97.5% understood. This is a different finding than studies that have examined health literacy and education levels and disparities (Schilinger, 2020). More research on this specific variable is needed to better understand if education level and health literacy are still factors.

In the next section, I speak on the alignment of the social ecological model and the study. In the findings, I used the variables of marital status and number of children in the household to examine at which point women had influence over others they have a relationship with. The SEM is based on relationships and is used for prevention. It was the intentions that this information from these variables would add to the conversation of the model.

Alignment With Theoretical Framework

The SEM focuses on the complexity of an individual and the relationship a person has with their total environment. The model is broken into layers, and in this study, this research sought to observe the individual and the interpersonal levels of the model. Research has shown that, if given the knowledge, women will share it with their family, friends, and community (Hempstead et al., 2018). Based on the results of the analysis, being a woman and no matter what your race, marital status, number of children within the home, income or education level, there was no evidence that they did not understand health information that was given to them verbally and written. The SEM model was chosen to help showcase that depending on certain variables a women would be more of an impact in her community with health information she received. However, the analysis did not allow for that level of clarity because of the limited questions that were posed for health literacy. The analysis did show that women could have a greater impact in their individual and personal levels of the SEM. Women that were married better understood health information, both written and verbal, compared to those that were divorced. It would be interesting to take a better look at these variables to get an understanding why

that is. It could be that a divorced relationship no longer fosters good communication, and, therefore, they may not receive health information from a spouse or maybe visit a health practitioner. There are several scenarios that come to mind when you think about the relationship of women and information transfer.

Limitations of the Study

One major limitation of this study was that the BRFSS 2016 was the only secondary data source that had specific questions regarding health literacy. The BRFSS cycles the focus of questions throughout the years, and with this version, only two questions were available for analysis on health literacy. The other major limitation is that I needed to use the BRFSS 2016. Even though the survey was done more than 5 years ago, it is the only study about health literacy.

Another limitation with using the BRFSS 2016: it is a secondary data source, and the study could be stronger and give more insight if it were a mixed method study. It would add value if there were focus groups or more recent additional surveys were available. It would improve the study to have more specific questions around health literacy and not just two options to choose from.

There was the limitation within the data set; the number of missing cases was relatively high for these two questions. This problem was solved when I used the weighted data set for each variable—using the weighted data allowed for a fair representation of all the variables, specifically when looking at the race. This limitation tends to be an issue with other surveys collected yearly and in mass quantities. There are limitations for the SEM framework that was chosen for this study. SEM is dependent on

changing lifestyles and that tends to be difficult. There is a lack of motivation to change within society, but this model could help with intervention (Fleury & Lee, 2006).

A limitation that some may view from this research is that is based on women. I chose women, as they are a large group within society, but that does limit the research. In future research, it should address all genders. I also used the variable of household income and the categories of household income ranged from \$10k to over \$75k. I would have liked to see larger household incomes so the argument regarding income and health literacy could be clearer.

Recommendations

My first recommendation around the topic of health literacy would be for a governing body to determine what are the levels of health literacy. The Department of Education did an assessment in 2006 regarding health literacy, but nothing is more recent. Ideally, a topic like health literacy should be examined by public health professionals more frequently to determine the gaps.

My recommendation for future research is to examine the relationship between men and women, not just women (Hassan & Masoud, 2021). This study examined the association between these two health literacy questions, race, household income, marital status, education level completed, and the number of children within the home. Some items are known from health literacy compared to one of these variables but not all. For example, low health literacy is usually associated with low income and low income translates into poor healthcare (Meherali et al.,2020). I would also suggest that the research be a mixed-method study instead of solely quantitative study. One of the

problems with secondary data sources is that there is little control over the participants' engagement and data collection. There are questions that a researcher could ask to get a better understanding of the level of health literacy based on the population, and the research could be more intentional and specific.

My final recommendation would be for research to look at subgroups most at risk for health disparities and those at risk of health literacy disparities. It would be interesting to take a closer look into different cultures and their understanding of health information. There needs to be a better communication strategy put out by public health professionals, agencies, and professionals. The general framework that is being used is not making the advancement in public health disparities that is needed. In a study by Tan and Cho (2019), the researchers examined culture appropriateness in health communication. They stated that traditionally the health belief model is used for public health, but the framework needed to be revised to include cultural appropriateness strategies of cultural identity, linguistics, socioeconomic context adaptive measures. In looking at health communication and health literacy, the models we currently use need to be updated to reflex the diverse population, public health currently serves.

Implications for Professional Practice and Social Change

Professional Practice

Public health professionals need to consider health literacy when it comes to improving and moving the needle with health disparities. Research on health literacy shows that low-income and minorities tend to have lower health literacy levels. What is being done about that? What new intervention methods are taking science and research

into account? Although the research here does not show it, culture plays a significant role in health literacy (Samerski, 2019). The lack of research and quantitative data proves that the right questions are not being collected regarding health literacy. The BRFSS 2016 was the last known secondary data source found that has information regarding the health literacy of a large population, but health professionals know that it remains a problem. The question could be, “How do you resolve a problem if research is not being done around the problem?”

In 2019, the world started to face what would become to be a pandemic with COVID-19. COVID-19 showed public and global health professionals that health literacy is an underestimated problem (Okan & Paakkari, 2020). The number of lives lost to the pandemic and the specific populations of minorities affected by the virus show that health information and literacy should be looked at specifically on a level of culture or specific populations or demographics. In the same argument, when health information is translated to the public, it should be broadcast, verbally and written, in a way that resonates with that culture or population.

Positive Social Change

The findings of this research show that health literacy can be obtained in various populations or broken up by various factors but improving health literacy and creating positive social change should take a multi-facet approach. Health literacy should not just look at health care or medical setting as the two research questions observed here but should be across other settings, i.e., school, home, workplace, and government (Vamos et al., 2020). The big two takeaways or actions needed next would be to work across

functions to improve health literacy, and research on health literacy needs to be more frequent and diverse.

Improving health literacy is not a one-size fits all formula, as the current efforts of public health professionals is lacking, in my opinion. To create the positive change needed in society, there needs to be a hard look at the current efforts, what works and what can be improved. As public health continues to evolve, as does the practices and communication of the practitioners toward the public audience.

Conclusion

Health literacy has been deemed a public health problem, and the CDC (2015) stated that only 12% of Americans understand health terminology. Health literacy can be understanding written or verbal health information given to an individual by their health care provider. Women play a vital part in society and the dissemination of health information (Noonan et al., 2016). To make changes within health literacy, public health needs to include and target women with their messaging, possibly with social media (Merchant et al., 2021). The research showed that those that have lower income households, are minority, and that lack education tend to not understand health information. This information is the key takeaway and would help with next steps in improving health literacy levels.

Improving the health literacy level among women does not mean they need help reading; it means the information given to them is not in a way that they can relate to or process (Speight et al., 2017). There are limited studies that show the importance of health literacy among specific demographics or what exact messaging is needed for those

demographics. This study shows that more current and targeted information is needed to identify the problem with health literacy among women. The research also can argue that even though people may answer that they understand health information from their healthcare provider, there is a gap between the understanding and putting that understanding into practice. Research has shown that if minority women were given and fully understood the knowledge about health issues, they would then share with the community (Hempstead et al., 2018). The change to improving health disparities could lie within how health information is given to women.

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