

James Madison University

JMU Scholarly Commons

Senior Honors Projects, 2020-current

Honors College

5-9-2020

The health literacy knowledge and skills among undergraduate students

Madelaine Grygo

James Madison University

Follow this and additional works at: <https://commons.lib.jmu.edu/honors202029>



Part of the [Medicine and Health Sciences Commons](#)

Recommended Citation

Grygo, Madelaine, "The health literacy knowledge and skills among undergraduate students" (2020).
Senior Honors Projects, 2020-current. 37.
<https://commons.lib.jmu.edu/honors202029/37>

This Thesis is brought to you for free and open access by the Honors College at JMU Scholarly Commons. It has been accepted for inclusion in Senior Honors Projects, 2020-current by an authorized administrator of JMU Scholarly Commons. For more information, please contact dc_admin@jmu.edu.

The Health Literacy Knowledge and Skills Among Undergraduate Students

An Honors College Project Presented to
the Faculty of the Undergraduate
College of Health and Behavioral Studies
James Madison University

by Madelaine Grygo

April 2020

Accepted by the faculty of the Department of Health Sciences, James Madison University, in partial fulfillment of the requirements for the Honors College.

FACULTY COMMITTEE:

Project Advisor: Theresa Enyeart Smith, Ph.D.
Professor, College of Health and Behavioral Studies

Reader: Maria Wessel, Ed.D.
Professor, College of Health and Behavioral Studies

Reader: Tracey Thomas, DrPH
Professor, College of Health and Behavioral Studies

Reader: Jordan McCann, MPH, CHES
Assistant Director of Health Promotion, University Health Center

HONORS COLLEGE APPROVAL:

Bradley R. Newcomer, Ph.D.
Dean, Honors College

Table of Contents

Acknowledgements.....3

Abstract.....4

Introduction.....5

Review of Literature.....9

Methodology.....18

Results.....22

Discussion & Conclusion.....28

References.....36

Appendices.....42

Acknowledgments

I would like to express my sincere gratitude to James Madison University and the College of Health and Behavioral Studies for giving me the opportunity to further my education and find new passions. This project would not have been possible without the support and willingness of my professor and project advisor, Dr. Theresa Enyeart Smith. I am beyond grateful for her guidance and insight throughout the completion of this project. I also want to extend my appreciation to my readers, Dr. Maria Wessel, Dr. Tracey Thomas, and Jordan McCann, for their reliability and readiness to work with me throughout this research process. I am truly lucky to have had a committee with a strong desire to help me succeed and dedication to the advancement of learning.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Health literacy is defined as the knowledge and skills individuals need to acquire and understand related to health information and services in order to create the best health outcomes for themselves. Those with low health literacy struggle to successfully follow medical instructions, obtain and comprehend health information, and communicate health complications. Low health literacy is correlated with preventable negative health outcomes, such as sexually transmitted infections, obesity, diabetes, lung cancer, and heart disease, which are conditions experienced by a majority of the U.S. population. The most recent estimates suggest that over 75 million U.S. adults are health illiterate, which indicates the need to improve health education and promotion among the U.S. population. One way to improve health literacy is through existing systems of higher education. These institutions have the means to educate and provide students with health resources to contribute positively to the current health literacy status of the population. Although research exists on the health literacy levels of college students, there is a need for more information evaluating the overall health literacy knowledge and skills students have.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Chapter One

Health literacy can be defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (DeMarco & Nystrom, 2010, p. 295). Health literacy plays a significant role in the health and well-being of individuals. Researchers believe that health literacy contributes to the social, mental, physical, and economic prosperity of the population (Liu et al., 2018). Many believe that obtaining, processing, and understanding health information are straightforward tasks, but the ability to follow instructions from medical professionals, communicate health needs, perform health-related tasks, engage in preventative health behaviors, and make the best health decisions prove more difficult than individuals believe (Ickes & Cottrell, 2010). With an estimation of approximately “26% to 36%, or over 75 million English speaking adults in the U.S., having limitations in their health literacy,” researchers are not only noting the prevalence of low health literacy levels but also the need for interventions to be made (Sand-Jecklin & Coyle, 2013, p. 582). In order to combat negative health consequences and create positive health outcomes, research demonstrates that health literacy needs to be a priority in educational settings that can extend health instruction and provide needed resources for individuals (Joseph, Fernandes, Hyers & O’Brien, 2016).

Significance

Due to a lack of health literacy, many individuals face limitations associated with negative health outcomes, which often result in higher morbidity and mortality rates (Paasche-Orlow & Wolf, 2007). Although efforts exist to create a health literate population, researchers express that understanding the difficulties that individuals with low health literacy face is key to solving the problem. Both researchers and health professionals recognize that increasing levels of inadequate health literacy correlate to the rise in preventable health complications among the

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

population. This recognition leads to a call for an increase in health education and an improvement in the way health information is retained and applied (Vamos, Yeung, Schaal & Schlüter, 2016).

With increasing numbers of individuals unable to definitively state they are health literate, people question how to address the problem to ensure that health literacy improves among the population. Researchers have looked to colleges and universities to become part of the solution. Assessing and improving health literacy among undergraduates is not only important in order for the individual to make informed health decisions for themselves, but for others as future professionals and caretakers. There is a need for these institutions to provide students with a comprehensive health education that will extend past their time as students. Undergraduate students are in a “better position than the general population to improve their health literacy,” but without more information on their health literacy status, universities will be unable to improve students’ “navigation and utilization of health services” (Harper, 2014, p. 125). Although research exists on the health literacy of college populations, a deeper understanding of the various factors assisting or hindering health literacy levels among this population is needed. This study seeks to explore the health literacy knowledge and skills of undergraduate students at James Madison University. It intends to add to the general existing research on the health literacy levels among undergraduate students.

Statement of problem

The ability to obtain, process, and understand health information proves challenging for individuals with low health literacy levels. They are less likely to understand medical instructions and use preventative health services or the appropriate services for chronic conditions, which result in the use of services meant for critical cases (DeMarco & Nystrom, 2010). Previous research shows that there are high rates of hospitalization and the inappropriate

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

use of certain medical services by lower health literate individuals. Those with low health literacy are two times more likely to visit the hospital and have higher annual health care costs than those who are adequately health literate (Paasche-Orlow & Wolf, 2007; Williams, Davis, Parker & Weiss, 2002). These realities contribute to the U.S. population facing high morbidity and mortality rates, along with high overall health care costs (Basic & Erdelez, 2015; DeMarco & Nystrom, 2010).

Due to these harsh realities, researchers are acknowledging groups, like college students, that can improve their health literacy and contribute to overall improvements in health literacy rates among the population. Although undergraduates are one of the largest groups that receive traditional health information, research indicates that an increasing number of students are graduating without the health literacy skills needed to comprehend and properly use medical information and services (Harper, 2014; Vader, Walters, Roudsari & Nguyen, 2011). Typically, undergraduate students receive some type of health education, but research acknowledges that a single health course may be the only health information ever received by particular students (Basic & Erdelez, 2015; Polacek, Erwin & Rau, 2013). If students are receiving minimal health education, then their health knowledge and behaviors will be inadequate to maintain a healthy lifestyle and navigate particular health care situations successfully. Research suggests that university health programs take measures to ensure that undergraduates are receiving sufficient knowledge to develop their health literacy (Polacek, Erwin & Rau, 2013).

Research questions

1. What academic major had the highest overall health literacy score?
2. Are there differences among health literacy scores between students who took HTH 100 or KIN 100?
3. Do any differences exist between academic year and health literacy scores?

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

4. Do students who utilize services at The Well: The Office of Health Promotion and Well-being have higher health literacy scores than those who have not used any resources?
5. Where do students obtain most of their health information?
6. Do those with a chronic health condition have higher literacy scores?
7. Does having a parent/guardian in a health profession increase the likelihood of having a higher health literacy score?
8. Are there differences in student scores on the Short Assessment of Health Literacy and the Brief Health Literacy Screen?

Limitations

A major limitation of this study is that the researcher collected the surveys using a convenience sampling method. Although this was the simplest and most effective method to use, the results are not generalizable to a larger population because the research was not collected with true randomization. 110 students were surveyed out of around 20,000 students present at the institution. The participant pool was representative of James Madison University's campus, which is not necessarily representative of the larger population. Of those surveyed, 69% identified as women and 30.9% as men. JMU's student population is recorded as 58% female and 42% male, which is similar to the participant population of the study (Facts & Figures, 2019). 81.8% of participants identified as Caucasian and 18.2% identified as other races, including Hispanic, Asian, and Black. These findings were consistent with JMU's racial distribution as 78% Caucasian and 22% other races (Facts & Figures, 2019). The racial and gender distribution of this study, with most being white and women, may not give accurate insight into the health literacy knowledge and skill of undergraduate students in general. In order

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

to attain generalizability, a more diverse sample, representative of the U.S. population, would be needed.

Another limitation of our study involves participants potentially displaying the Hawthorne effect. The Hawthorne effect is displayed when participants are aware that they are being studied and answer in a certain way that they think the researcher wants them to answer (McCambridge, Witton & Elbourne, 2014). Participants may have withheld accurate data due to fear of judgement by the researcher, desire to seem more health literate, or conforming to the results they think the researcher is looking for. For example, participants may have stated they are aware of services offered by The Well, or they obtain most of their health information from professionals because they felt as if those were the “correct” answers.

Definition of terms

Health literacy: “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (DeMarco & Nystrom, 2010, p. 295).

Medical adherence: “the extent to which a person's behavior—taking medication, following a diet, and/or executing lifestyle changes- corresponds with agreed recommendations from a health care provider” (Brown & Bussell, 2011, p. 304).

Chapter Two

Health Literacy

A basis for health literacy research began in 2003 with the National Assessment on Adult Literacy, which included a section on health literacy, evaluating health literacy through clinical, preventative, and navigation of the health care system items (DeMarco & Nystrom, 2010). The results of this study were released in 2006 and demonstrated that around 35% of U.S. adults had

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

a basic or below basic health literacy level, while around 50% percent had an intermediate level, but still showed a need for improvement (DeMarco & Nystrom, 2010). This indicated that about 12% of adults in the U.S. had proficient health literacy, categorizing over 75 million adults with basic or below basic health literacy (America's Health Literacy, 2008). More specifically, a third of U.S. adults have difficulty with everyday health tasks, like adhering to scheduled immunizations, following prescription drug label directions, and choosing appropriate medical information sources (America's Health Literacy, 2008). This research prompted an increased awareness of health literacy levels in the nation and the need for improved health education in order to for individuals to have the necessary skills to be responsible for their health and create healthy lifestyles (Yang, Luo & Chiang, 2017). The push for improvements in health literacy continue today with health organizations, like the U.S. Department of Health and Human Services, creating nationwide objectives within the Healthy People initiative, to improve health literacy. These objectives specifically focus on health communication and the distribution of health information in order to reduce health disparities among the population (Ickes & Cottrell, 2010; Office of Disease Prevention and Health Promotion, 2019).

Health literacy risk factors and medical adherence

Millions of adults in the U.S. have inadequate health literacy, which increases the risk of negative clinical outcomes and the overutilization of emergency health services (Brown & Bussell, 2011). High rates of low health literacy in the U.S. have led researchers to seek to understand exactly which groups have more difficulty than others in their health literacy. There are numerous factors that contribute to low health literacy, most dealing with poverty, low education levels, disability, and race/ethnicity (Health Literacy, 2020). Research indicates that adults living below the poverty level, the uninsured or publicly insured, and those who did not

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

graduate high school are at higher risk for low health literacy (Health Literacy, 2020). Also, language plays a role in adequate health literacy, and those who do not speak English as their first language report difficulty in understanding health information and making appropriate health decisions (Health Literacy, 2020). These unavoidable risk factors make it difficult to navigate the healthcare system and puts stress not only the system itself, but each individual that needs to utilize its services. Research suggests that low health literacy has a substantial effect on health outcomes and results in “fewer preventive screenings, increased use of emergency departments, lack of understanding health messages, and decreased medical adherence” (Eisenberg, 2012, para. 7).

Medical adherence is a component of health literacy and is affected by individual factors like a patient’s health background, thoughts on effective means of treatment, and individual self-efficacy (Brown & Bussell, 2011). Medical adherence can be defined as “the extent to which a person's behavior—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health care provider” (Brown & Bussell, 2011, p. 304). Due to an emphasis on fast-paced diagnosis and treatment in the U.S., patient health literacy is rarely assessed, which leads to a lack of personal health interventions and an increase in poor care management (Knighton, Brunisholz & Savitz, 2017). In order to progress health literacy and address problems associated with medical adherence, improvements in patient education need to be made. Research suggests that to combat poor health literacy and its effect on medical adherence, an empowered health environment, emphasizing comfort, knowledge, and motivation, needs to be created (Brown & Bussell, 2011).

Those with “limited health literacy are likely to: exhibit impaired ability to recall health information, perceive low self-efficacy in understanding and using prescription medication,

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

reveal health exacerbation, show repeated and serious medication errors, and cause high medical expense,” which lead to a need for increased involvement on both the patient and healthcare provider (Palumbo, 2015, p. 418). “Limited health literacy produces a vicious cycle, which engenders professional dominance and patient disengagement,” and this cycle is continuous due to circumstances that constantly perpetuate disparity and challenges for individuals within a healthcare setting (Palumbo, 2015, p. 418). Patient participation is contingent upon comfortability, and limited health literacy leads to disinvolvement and inconsistency in patient-provider relationships. This reality leads many to call professionals to end the cycle by building relationships and working with patients in every aspect of care necessary (Palumbo, 2015). Adherence education must be applied in a personal and continuing manner, and should go beyond a single patient-professional interaction (Brown & Bussell, 2011). Research shows that patients do not always benefit from standard written instruction, so other means, like pictorial and audiovisual methods could be beneficial in addition to written instruction (Brown & Bussell, 2011). The combination of professional awareness and patient initiative is needed to end this vicious cycle and create a population in which the majority is health literate.

Impact on economy

Not only does low health literacy have a serious impact on the health outcomes of the population, but it also highly correlates to an increasing negative influence on the U.S. economy. Low health literacy is known to be a major burden not only in the U.S. healthcare system, but in the entirety of the U.S. economy as well (Vernon, Trujillo, Rosenbaum & DeBuono 2007). The negative influence of inadequate health literacy stems not only from the routine treatment of poor health outcomes, but also a mass over utilization of healthcare resources (Vernon, Trujillo, Rosenbaum & DeBuono, 2007). It is estimated that “healthcare spending will be 19.3% of the

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

gross domestic product by 2023” which shows about a 2% increase from 2012 (Joseph, Fernandes, Hyers & O’Brien, 2016, p. 28). Previous research approximation relays that the cost of low health literacy in the U.S. ranges from “\$106 billion to \$238 billion annually” and more research explains that “the out of pocket healthcare spending was about \$338 billion in 2013 and has continued to grow (Vernon, Trujillo, Rosenbaum & DeBuono, 2007, p. 2; Joseph, Fernandes, Hyers & O’Brien, 2016). Research estimates that the growth has equaled to a present-day cost ranging from \$1.6 trillion to \$3.6 trillion (Vernon, Trujillo, Rosenbaum & DeBuono, 2007). The rise in healthcare costs involves longer hospital stays, high readmission rates, and overall high healthcare utilization, most of which are avoidable costs within a low health literate population (Dolezel, Shanmugam & Morrison, 2018).

Strategies for improvement

The obstacles faced due to low health literacy do not go unnoticed and research seeks to understand the reality for individuals and the healthcare system itself. Although inadequate health literacy is a problem that will never cease to exist, many believe that improvements can be made with effective and efficient health information communication and greater structured health education opportunities (Nutbeam, McGill, Premkumar, 2017). The U.S. has strategized ways to improve health literacy in the nation through its National Action Plan to Improve Health Literacy. Awareness exists surrounding the current healthcare situation in the country, the realities that many individuals face due to low health literacy, and the ideal health practices in the country. The basis of the U.S. public health system focuses on prevention, and high levels of low health literacy in the country increase the difficulty in following this prevention-based model (Benjamin, 2010). Overall, individuals will not have the capability to practice preventive efforts if they do not understand what is communicated (Benjamin, 2010). With increased willingness to

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

address this reality, there is a call for consistency between the medical information provided to patients and the reality of its implementation to aid in improving health outcomes for all (Benjamin, 2010).

The National Action Plan to Improve Health Literacy relays that without its emphasis in a healthcare environment, limited health literacy often goes unnoticed by healthcare providers and health professionals (U.S. Department, 2010). The plan states that health professionals carry a lot of responsibility in combating low health literacy, but the issue should raise a multisector obligation, calling for policymakers and educators to play an important role as well (U.S. Department, 2010). Looking at ways to improve, calls for the need to understand the problems. Research notes that trouble in health literacy is continuously perpetuated by a rigid health system and professionals that are aware of the issues, but still use technical and medical terminology, unnecessary statistics, and unclear explanations of risks and recommendations with patients (U.S. Department, 2010). In order to combat the difficulty faced with health literacy, professionals explain a need for advocacy and education, especially for individuals in identified risk groups (Benjamin, 2010).

Strategies for improvement include restructure and innovation with prevention, treatment, and education. Researchers explain that low health literacy results in the avoidance of medical problems and looking to unreliable sources for information (U.S. Department, 2010). Restructure and innovation within the health system calls for “simplifying and improving written materials, using targeted approaches, and improving patient-provider communication” (Nutbeam, McGill, Premkumar, 2017; U.S. Department, 2010, p.10). Although it may not be simple, researchers conclude that making health information accurate, accessible, and actionable can combat low health literacy levels and produce widespread positive health outcomes (U.S.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Department, 2010). Besides improving patient-provider relationships and health information materials, education is another method to improve health literacy inadequacy. The National Action Plan states that the nation needs to ensure that individuals, especially young adults graduate with health literacy skills to ensure educated, positive health decisions throughout the lifespan (U.S. Department, 2010). A push for early health education will lead to higher health literacy rates and create future generations with health skills and better health outcomes.

Higher education

Due to the correlation between health literacy and education levels, schools have been identified as environments that have ease in health promotion and education to improve health related outcomes (Vamos, Yeung, Schaal & Schlüter, 2016). Colleges and universities, in particular, provide abundant opportunities for individuals to access health knowledge and resources to improve their health in all areas of wellness as well as their health literacy (Harper, 2014; Pearson, 2017). By requiring students to take health courses and offering health resources they may not find elsewhere, colleges support the creation of positive health behaviors and knowledge among their students (Polacek, Erwin & Rau, 2013). Due to the concern for their students' health and well-being, campuses across the U.S. provide numerous health supports, such as medical centers, exercise facilities, health education programs, health promoting policies, and health-related academic courses (Pearson, 2017; Polacek, Erwin & Rau, 2013).

Upon entering college, many students gain greater independence, leading to a greater responsibility for their health and well-being. A majority of students are placed in health care settings alone for the first time when entering college, which demonstrates a need for the frequent distribution of health information (Basic & Erdelez, 2015). The most common way in which students obtain direct health information is within a health-related class, most likely a

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

required course, that touches on numerous aspects of health, such as eating habits, sexual practices, alcohol and drug use, and physical activity (Basic & Erdelez, 2015; Harper, 2014; Vader, Walters, Roudsari & Nguyen, 2011). Institutions of higher education require students to take at least one health related course, like introductory health or ones centered around a specific physical activity. Most students will take a singular health course to fulfill requirements, and those who take multiple do so because of their major, professional goals, or interests. Studies show that students who enroll in one or more health classes acquire more health information than others, which proves helpful, especially because college students are likely to engage in risky health behaviors (Basic & Erdelez, 2015). Students who have been, or are, enrolled in health classes tend to gain more health information; however, that information might not be enough to create adequate health literacy levels necessary for proper health decisions.

Researchers note the importance of educating and preparing students during their time at the university due to the reality that it “may be the last setting where it is possible to comprehensively address health of a large proportion to the young adult population” (Kwan, Arbour-Nicitopoulos, Duku & Faulkner, 2016, p. 163). Understanding and accessing reliable health information is crucial for all individuals, but professionals’ reason that the impact of the challenge’s students face and their behavioral responses to these challenges serve as indicators for the necessity of health education in a college setting (Kwan, Arbour-Nicitopoulos, Duku & Faulkner, 2016). Risky health behaviors peak in emerging adulthood and research shows that it is a period of high tobacco, illicit drug, and alcohol use as well as a period of high stress, insufficient sleep, and risky sexual behaviors (College Health, 2016; Kwan, Arbour-Nicitopoulos, Duku & Faulkner, 2016). Acknowledging these risk factors and tailoring education to health consequences students face often will lead to safer practices and positive health

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

outcomes among this population. Prioritizing health education in institutions of higher learning would allow graduates to positively contribute to health literacy rates in the country and decrease the consequences faced by the healthcare system due to the perpetuated cycle of low health literacy levels (U.S. Department, 2010).

Although undergraduates are one of the largest groups that receive traditional health information, research indicates that an increasing number of students are graduating without the health literacy skills needed to comprehend and use medical information and services (Harper, 2014; Vader, Walters, Roudsari & Nguyen, 2011). Health literacy scores increase with “higher educational attainment, but 44 percent of high school graduates and 12 percent of college graduates had below basic or basic health literacy in 2003” (America’s Health Literacy, 2008, para. 6). Their below basic and basic health literacy skills indicate difficulty in completing common health tasks, which are imperative in following medical instructions and contributing to best health practices. Health literacy is multifaceted involving reading comprehension and quantitative numeracy, or mathematical knowledge and reasoning. In regard to their health literacy, studies show that college students tend to struggle the most with information comprehension and quantitative numeracy. A study conducted by the American Institutes of Research examined the comprehension and quantitative literacy skills among college students. Their research found that “20% of U.S. university students, who completed 4-year degrees, had the most basic quantitative literacy skills and 50% scored below a proficient level of literacy” (Harper, 2014, p. 125). In the context of health literacy, these findings demonstrate the reality that many of these students misunderstand health materials and risks, incorrectly use prescriptions, and underutilize preventative services. Teaching accurate health information, informing students about negative health behaviors, and advising future health care decisions

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

allows students to become more prepared to improve their health, but also give institutions of higher learning the ability to contribute to their educational purpose (Basic & Erdelez, 2015; Joseph, Fernandes, Hyers & O'Brien, 2016; Vader, Walters, Roudsari & Nguyen, 2011).

Acknowledging the health literacy of students and the role that numerous variables, such as academic major, previous health education, parental occupation, and academic year, play in attaining an adequate health literacy is key for institutions of higher education to understand. The acquisition of this information will allow colleges and universities to acknowledge health disparities and target specific populations of students who may be at risk for low health literacy. This information will give these institutions the ability to equip students with a strong foundation of health information and skills to tackle the complexities of the health care system (Joseph, Fernandes, Hyers & O'Brien, 2016).

Chapter Three: Methodology

In order to determine the health knowledge and skills of students at James Madison University a cross-sectional study was conducted through the administration of a questionnaire. The questionnaire used assessed both the health literacy knowledge and skills through a health word association test answering questions regarding general health skills. The study was IRB approved with the IRB #19-1024.

Sampling and Subjects

This research study surveyed 110 participants. The participants were current students at James Madison University regardless of their gender, academic year, race/ethnicity, and academic major. All participants were enrolled as students at JMU, but no other exclusionary criteria were used. Convenience sampling was used to recruit individuals willing to participate in this study. Over a four-month period, at various campus locations, 110 participants were

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

randomly requested to complete the health literacy questionnaire. Prior to completing the questionnaire, participants were made aware of their rights and ethical research practices were followed.

Instrumentation

The questionnaire included 33 items which consisted of 18 items from the Short Assessment of Health Literacy in Adults (Appendix A), five items from the Brief Health Literacy Screen (Appendix B), and 10 demographic questions (Appendix C). The Short Assessment of Health Literacy in Adults screens for low health literacy through a word association test. Participants were given a term and asked to identify the best related word from the key or distractor column. Participants also had the option to check the “don’t know” column if they were unsure of any association (Baker, Williams, Parker, Gazmararian & Nurss, 1999). Research notes that the Short Assessment of Health Literacy in adults is comparable to other health literacy instruments, such as the Rapid Estimate of Adult Literacy in Medicine (REALM) and the Test of Functional Health Literacy in Adults (TOFHLA) (Lee, Stucky, Rozier & Bender, 2010). Its validity and reliability were tested with Item Response Theory analysis with a score indicating that the instrument scoring was reliable for individuals with low health literacy (Lee, Stucky, Rozier & Bender, 2010).

The Brief Health Literacy Screen evaluates written and verbal health literacy. Participants were asked questions regarding their confidence in understanding and completing medical forms and their comfortability understanding medical information and direction (Sand-Jecklin & Coyle, 2014). The Brief Health Literacy Screen has been tested for its validity and reliability with research noting its accuracy in both research and clinical settings (Wallston, 2014). Also, research indicates the instrument accurately identifies inadequate health literacy skills (Haun, et

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

al., 2009). The combination of these validated and reliable health literacy assessments provided information on both the knowledge and the skills students possess regarding health literacy. The questionnaire took approximately five minutes for participants to complete.

Procedures

Prior to the start of the study, IRB approval was gained, IRB No. 19-1024. Using a cross-sectional study design, the research study included students completing a paper/pencil questionnaire, which took approximately five minutes to complete. The 33-item questionnaire included the Short Assessment of Health Literacy, the Brief Health Literacy Screen, and demographic questions. The questionnaire was distributed by the researcher to 110 undergraduate students at James Madison University. Students were asked to only take the survey once. Using common spaces on campus, such as, but not limited to, Carrier and Rose Libraries, the Student Success Center, classrooms throughout the campus, the Commons, and Madison Union, students were asked to voluntarily complete the survey. Data collection began in September 2019 and ended in December 2019.

Data analysis

The data was entered and analyzed using SPSS v. 21.0 software. Descriptive and inferential statistical tests were used to assess the demographic information of the sample population and look for relationships among the variables presented in the research questions. Initially each of the assessment tools used in the questionnaire were scored. The Short Assessment of Health Literacy was scored by each correct association getting one point. Once the test was completed, total points were calculated to generate the Short Assessment of Health Literacy score. A score between 0 and 14 out of 18 associations suggests the participant had low health literacy (Lee, Stucky, Rozier & Bender, 2010). The Brief Health Literacy Screen was

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

analyzed based on the level of confidence participants indicated in their answers to the survey questions. For the Brief Health Literacy Screen, numbers were added to allow for the calculation of a total health literacy score (range 5-25), with a higher score indicating a higher level of health literacy (Sand-Jecklin & Coyle, 2014). A summative score equaling 9 or below indicates low health literacy (Willens et al., 2013).

The scores of each of the health literacy assessments were compared to the demographic items asked. To determine what academic majors presented the highest health literacy scores, on both the Short Assessment of Health Literacy and Brief Health Literacy Screen, descriptive statistics were used comparing the means. To see if differences existed among the health literacy levels between students who took HTH 100 or KIN 100, an independent samples *t*-test was run with the *t*-values, *p*-values, means, and standard deviation reported for each assessment tool. To determine if differences existed between academic year and health literacy scores, a one-way ANOVA was performed with the degrees of freedom and significance level reported. Results were determined significance with a *p*-value less than or equal to 0.05. Further, differences in health literacy scores among those who utilize services at The Well were examined through an independent samples *t*-test to compare the *t*-values, *p*-values, means, and standard deviation for the assessment tools. To determine where students obtained most of their health information, descriptive statistics were assessed and the frequency and percent for each option were reported. Independent samples *t*-test were also performed to examine the relationship between chronic health conditions and health literacy scores on both of the assessment tools. To determine if having a parent/guardian in a health profession increased the chances of having a higher health literacy score, an independent samples *t*-test was used. Lastly, to compare overall differences in

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

student scores on the Short Assessment of Health Literacy and the Brief Health Literacy Screen a Pearson Correlation was completed.

Chapter Four: Results

Participants were undergraduate students from James Madison University. A total of 110 questionnaires were completed and all questionnaires were used in the data analysis. The final sample included 110 participants who identified as either female (69.1%, $n=76$) or male (30.9%, $n=34$). The majority of participants identified as white (81.8%, $n=90$), followed by Asian (6.4%, $n=7$), Hispanic/Latino (6.4%, $n=7$), African American (4.5%, $n=5$), and American Indian (0.9%, $n=1$). The majority of participants were upperclassmen, with seniors (33.6%, $n=37$), followed by juniors (32.7%, $n=36$), sophomores (20.9%, $n=23$), and freshman (11.8%, $n=13$). When asked about their academic majors, the majority of students studied Health Sciences (17.3%, $n=19$), followed by Geographic Science (8.2%, $n=9$), Business (6.4%, $n=7$), Nursing (6.4%, $n=7$), Communications (6.4%, $n=7$), and School of Media Arts & Design (SMAD) (5.5%, $n=6$).

A majority of participants stated that their parents were not in a healthcare profession (82.7%, $n=91$). When asked if they had a chronic health condition, most stated “no” (71.8%, $n=79$), and some answered “yes” (20.9%, $n=23$) and “I don’t know” (7.8%, $n=8$). Participants were asked about the health course they completed to fulfill their requirements. The majority of participants took Health 100 (65.5%, $n=72$), followed by Kinesiology 100 (19.1%, $n=21$), and not having taken a health course yet (15.5%, $n=17$). When asked if they were aware of the services offered at The Well, the majority of students stated “yes” (63.3%, $n=70$), but the majority stated they had not utilized services from The Well (82.2%, $n=91$). Of those who had utilized services (17.3%, $n=19$), the most popular services used were Healthy Sexuality (11.8%, $n=13$), followed by Alcohol and Other Drug Abuse Prevention (4.5%, $n=5$), Reality Educators Advocating

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Campus Health (REACH) (2.7%, $n=3$), Sexual Violence Advocacy and Prevention (1.8%, $n=2$), and Sexual Orientation, Gender Identity, and Expression (SOGIE) (1.8%, $n=2$).

The results from the descriptive statistics for the average score on the Short Assessment of Health Literacy among participants indicated ($M=16.69$, $SD=1.51$) and the range was 7. The average score on the Brief Health Literacy Screen among participants indicated ($M=18.65$, $SD=3.56$) and the range was 17. These results indicate that on average these participants do not have low health literacy levels.

Research Question One: What academic major had the highest overall health literacy score?

Participants completed both the Short Assessment of Health Literacy and the Brief Health Literacy Screen. The scores for each test were averaged and using descriptive statistics, the means for each test were compared by the most popular academic majors within the participant pool. For the Short Assessment of Health Literacy, the highest mean recorded was among students studying Communications ($M=17.43$, $SD=0.79$), followed by Health Sciences ($M=17.21$, $SD=1.27$), SMAD ($M=17.00$, $SD=0.63$), Geographic Science ($M=17.00$, $SD=1.12$), Business ($M=16.57$, $SD=1.39$), and Nursing ($M=16.43$, $SD=2.57$). For the Brief Health Literacy Screen, the highest mean was among students studying Nursing ($M=21.00$, $SD=2.38$), followed by Health Sciences ($M=20.63$, $SD=2.83$), Business ($M=18.43$, $SD=2.88$), Communications ($M=18.29$, $SD=3.90$), SMAD ($M=17.83$, $SD=3.19$), and Geographic Science ($M=17.33$, $SD=3.50$).

Research Question Two: Are there differences among health literacy scores between students who took HTH 100 or KIN 100?

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Participants were asked what health education course they had taken at JMU. They also completed both the Short Assessment of Health Literacy and the Brief Health Literacy Screen as part of the questionnaire. An independent samples *t*-test was run and the test showed that there was no significant difference between students who took HTH 100 or KIN 100 and health literacy scores. For the Short Assessment of Health Literacy, the results indicated that students who took HTH 100 averaged a higher score ($M=16.87$, $SD=1.36$) than those who took KIN 100 ($M=16.57$, $SD=1.75$). For the Brief Health Literacy Screen, the results indicated that students who took KIN 100 averaged a higher score ($M=19.05$, $SD=3.06$) than those who took HTH 100 ($M=18.63$, $SD=3.69$). In order to determine if there was significance between health course taken and health literacy scores, a Levene's Test was used to determine if equal variances were assumed. The independent samples *t*-test showed that there was no significant difference between scores on the Short Assessment of Health Literacy and health course taken $t(91)=0.733$, $p=0.462$. The independent samples *t*-test showed that there was no significant difference between scores on the Brief Health Literacy Screen and health course taken $t(91)= -0.531$, $p=0.370$). This indicates that the data presented was not normally distributed and equal variances were not assumed.

Research Question Three: Do any differences exist between academic year and health literacy scores?

Participants recorded their academic year and completed both the Short Assessment of Health Literacy and the Brief Health Literacy Screen. A one-way ANOVA was run and the results showed that there were no significant differences between the scores and academic year. The test indicated that the scores on the Short Assessment of Health Literacy were not statistically different among academic years $F(4,105)= 1.189$, $p=0.320$. The test indicated that

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

the scores on the Brief Health Literacy Screen were not statistically different among academic years $F(4,105)= 0.802, p=0.526$.

Research Question Four: Do students who utilize services at The Well have higher health literacy scores than those who have not used any resources?

Participants were asked if they had ever used services at The Well. They also completed both the Short Assessment of Health Literacy and the Brief Health Literacy Screen as part of the questionnaire. An independent samples *t*-test was run and the test showed that there was no significant difference between students who utilized services and health literacy scores. For the Short Assessment of Health Literacy, the results indicated that students who stated they had used services averaged a higher score ($M=17.12, SD=1.29$) than those who did not ($M=16.60, SD=1.54$). For the Brief Health Literacy Screen, the results indicated that students who stated they had not used services averaged a higher score ($M=18.97, SD=3.41$) than those who did ($M=17.15, SD=3.95$). In order to determine if there was significance between health course taken and health literacy scores, a Levene's Test was used to determine if equal variances were assumed. The independent samples *t*-test showed that there was no significant difference between scores on the Short Assessment of Health Literacy and utilizing The Well services $t(108)=1.489, p=0.394$. The independent samples *t*-test showed that there was no significant difference between scores on the Brief Health Literacy Screen and utilizing services $t(108)= -1.858, p=0.588$. This indicates that the data presented was not normally distributed and equal variances were not assumed.

Research Question Five: Where do students obtain most of their health information?

Participants were asked where they obtained most of their health information. Responses suggested that the majority of students found their health information online (36.4%, $n=40$)

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

followed by from medical professionals (24.5%, $n=27$), health classes (19.1%, $n=21$), and family (15.5%, $n=17$). Obtaining health information from friends (2.7%, $n=3$) and on social media (1.8%, $n=2$) were reported least.

Research Question Six: Do those with a chronic health condition have higher literacy scores?

Participants were asked if they had ever been diagnosed with a chronic health condition. They also completed both the Short Assessment of Health Literacy and the Brief Health Literacy Screen as part of the questionnaire. An independent samples t -test was run and the test showed that there was no significant difference between students who had a chronic health condition and health literacy scores. For the Short Assessment of Health Literacy, the results indicated that students stated they had a chronic health condition averaged a higher score ($M=19.78$, $SD=2.69$) than those who did not ($M=18.51$ $SD=3.72$). For the Brief Health Literacy Screen, the results indicated that students who stated they had a chronic health condition averaged a higher score ($M=16.74$, $SD=1.74$) than those who do not ($M=16.71$, $SD=1.43$). In order to determine if there was significance between having a chronic health condition and health literacy scores, a Levene's Test was used to determine if equal variances were assumed. The independent samples t -test showed that there was no significant difference between scores on the Short Assessment of Health Literacy and having a chronic health condition $t(100)=1.822$, $p=0.166$. The independent samples t -test showed that there was no significant difference between scores on the Brief Health Literacy Screen and having a chronic health condition $t(100)= 0.076$, $p=0.599$). This indicates that the data presented was not normally distributed and equal variances were not assumed.

Research Question Seven: Does having a parent/guardian in a health profession increase the likelihood of having a higher health literacy score?

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Participants were asked if one or both of their parents/guardians was in a health profession. They also completed both the Short Assessment of Health Literacy and the Brief Health Literacy Screen as part of the questionnaire. An independent samples *t*-test was run and the test showed that there was no significant difference between students who had a parent/guardian in a health profession and health literacy scores. For the Short Assessment of Health Literacy, the results indicated that students who stated they had a parent/guardian in a health profession averaged a higher score ($M=16.74$, $SD=1.24$) than those who did not ($M=16.68$, $SD=1.54$). For the Brief Health Literacy Screen, the results indicated that students who stated they did not have a parent/guardian in a health profession averaged a higher score ($M=18.70$, $SD=3.55$) than those who did ($M=18.42$, $SD=3.67$). In order to determine if there was significance between having a parent/guardian in a health profession and health literacy scores, a Levene's Test was used to determine if equal variances were assumed. The independent samples *t*-test showed that there was no significant difference between scores on the Short Assessment of Health Literacy $t(108)=0.169$, $p=0.359$. The independent samples *t*-test also showed that there was no significant difference between scores on the Brief Health Literacy Screen $t(108)= -0.306$, $p=0.803$). This indicates that the data presented was not normally distributed and equal variances were not assumed.

Research Question Eight: Are there differences in student scores on the Short Assessment of Health Literacy and the Brief Health Literacy Screen?

Participants were asked to complete both the Short Assessment of Health Literacy and the Brief Health Literacy Screen. To see if there were differences between each overall score of the two tests, a Pearson Correlation test was run between the average scores for each of the instruments. The results indicated that there was not a statistically significant difference between

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

the student scores on the Short Assessment of Health Literacy and the Brief Health Literacy Screen $r(110) = 0.060, p = 0.531$.

Chapter Five: Discussion and Conclusion

The purpose of this study was to assess the health literacy knowledge and skills among a sample undergraduate population at James Madison University. It sought to understand health literacy levels and the role of different predictors of health literacy among a university student population. The study assessed the health literacy levels of participants through the Short Assessment of Health Literacy and the Brief Health Literacy Screen. The results demonstrated that the participant scores on average were not within the low health literacy range. The present findings support research indicating that individuals with higher education levels tend to present with adequate health literacy (Harper, 2014; Health Literacy, 2020).

The first research question dealt with whether there was a relationship between academic major and health literacy scores. For the Short Assessment of Health Literacy, Communications was the major that had the highest average score, followed by Health Sciences. For the Brief Health Literacy Screen, Nursing and Health Sciences were the majors with the highest average scores. The Brief Health Literacy Screen assesses comfort and confidence in medical settings, which could be a reason why Nursing and Health Sciences students scored higher than others. Overall, results indicated that there were no significant differences found between majors in health literacy scores. Some studies support these findings, stating that no significant differences between major and health literacy scores have been found (Dolezel, Shanmugam & Morrison, 2018). Other research studies provide conflicting findings, stating that students in health-related majors have higher scores than non-health majors (Evans, Anthony & Gabriel, 2017; Fernandes, Hyers & O'Brien, 2016). This finding in the current study could be the result of many different

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

variables, such as prior health knowledge or health course completion. These variables could have been sufficient in preparing and aiding students in their health knowledge, allowing for adequate scores to be obtained, with or without study in a health-related major. The second research question assessed differences between taking Health 100 or Kinesiology 100 and health literacy scores. No significant differences were found between health literacy scores of students who took HTH 100 and those who took KIN 100. Similar material is taught in both courses, with the only significant difference being the addition of a physical component to the course in KIN 100. Due to the similarities between the courses, it would be anticipated that students should have similar scores. Further research is needed on potential differences between general health education courses and health literacy.

The third research question sought to determine if differences exist between academic year and health literacy scores. The results indicated that no statistically significant differences were found. These findings contradict other research studies that state with age health literacy increased. In a study conducted among university students, it was found that college classification year was a strong predictor of health literacy, with older students having the highest scores (Dolezel, Shanmugam & Morrison, 2018). Another study also found that among undergraduate students, those who were older and completed more credit hours than other students had higher health literacy scores (Fernandes, Hyters & O'Brien, 2016; Hansen, Shneyderman & Belcastro, 2014). The current study's findings could be explained by the ability for students to take a health education course throughout their time at the university. Students who take a health course early in their academic career could score similarly to those who are academically further along. A student's prior health knowledge or interests could be confounding variables in this research, as well.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

The fourth research question wanted to determine if there was a correlation between the utilization of on-campus health resources and health literacy scores. Significant differences were not identified between the health literacy scores of students who had utilized services and those who had not. On the Short Assessment of Health Literacy, participants who utilized The Well services had a higher average score than those who did not. A study conducted in 2015 relayed that those with basic or below basic health literacy have greater use of healthcare resources (Rasu, Bawa, Suminski, Snella & Warady, 2015). Unlike the 2015 study, the present findings could potentially differ due to the undergraduate sample and averages of adequate health literacy among participants. Also, results could be skewed due to participants not wanting to report that they have utilized services from The Well. Students that had not utilized services could also have done so because they did not need to, not because they are not educated or comfortable utilizing the services.

The fifth research question asked students where they obtain most of their health information. Results showed that most students found health information online, followed by medical professionals and in health classes. Similar to this study, other research showed that a majority of undergraduate students utilize the internet for health purposes (Asibey, Agyemang & Dankwah, 2017; Sbaffi & Zhao, 2019). Research supports the current findings and suggests that students start online for health information due to the ease of access (Asibey, Agyemang & Dankwah, 2017). Although seeking health information online is a popular resource, a study conducted in 2018 found that a majority of undergraduates' preferred health information resource was their family, while the internet was not as popular of an information source (Kim, Sinn & Syn, 2018). Differences between the current study and others suggesting the internet is not as popular could be due to how the research question is framed. In this study, students were

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

asked where they obtain most of their health information, not what their preferred health resource was, which could result in different answers.

The sixth research question sought to analyze differences between average health literacy scores among students who reported having a chronic health condition and those who did not. Students who reported having a chronic health condition averaged a higher score on both the Short Assessment of Health Literacy and the Brief Health Literacy Screen. This could be due to an increased familiarity with health information due to having a health condition. Also, higher scores could be due to the likelihood that they spend more time in a healthcare setting, leading to confidence and comfort with health knowledge. Although they averaged higher scores, there were no significant differences found between students who had a chronic health condition and those who did not. Contrary to this study, other research states that a chronic illness has been shown to be an indicator of low health literacy (Brown & Bussell, 2011; Ickes & Cottrell, 2010). Unlike this study, other studies analyzed chronic health conditions and health literacy among the broad population, not just among university students. Further research is needed to assess how chronic health conditions, specifically, affect university students and their health literacy levels.

The seventh research question looked to see if differences existed between average health literacy scores among those who reported having a parent/guardian in a health profession and those who did not. Those who had a parent/guardian in a health profession had an average score higher on the Short Assessment of Health Literacy. This result could be due to them being more familiar with health knowledge due to the profession of their parent/guardian. Overall, no significant differences were found between the scores of students with a parent/guardian in a health profession and students without a parent/guardian in a health profession. There is limited research on the effect of a parent's profession on health literacy scores among children. While

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

studies do not specify parental profession, they do suggest that parental education levels play a role in health literacy among their children. Research states that there is a positive correlation between parents' education and health literacy (Rababah, Al-Hammouri, Drew & Aldalaykeh, 2019; Evans, Anthony & Gabriel, 2019). Additional research, specific to parental professions and health literacy would strengthen current existing literature and could uncover a potential significant relationship.

The eighth research question sought to understand if differences in scores on the Short Assessment of Health Literacy and the Brief Health Literacy Screen existed. The averages on both of the tests were similar and each demonstrated that on average participants did not have low health literacy levels. Statically significant differences were not found between the scores on one instrument compared to the other. Although both instruments assess health literacy, they do so in different ways. The Short Assessment of Health Literacy assesses health literacy through an association test of general health knowledge where the Brief Health Literacy Screen assesses confidence in the application of health literacy skills. The tests are not associated and scores on one test do not necessarily predict the scores on the other. Overall, the participants within the current study averaged high scores on both of the tests, indicating that based on these instruments they do not have low health literacy knowledge and skills.

Suggestions for future research

Due to the lack of significant findings in this study, it is suggested that further research be conducted on the health literacy knowledge and skills of undergraduate students. The health literacy instruments used in this study are typically used to predict levels of low health literacy. Within a college population, it is assumed that most students would have adequate levels of health literacy, which was confirmed in this study. In order to gain more information on the

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

health literacy strengths and weaknesses of college students, a more specific health literacy instrument meant for a university population should be used. Also, future research studies among a university population should also include an appropriate number of participants to display an accurate representation of the specific student population studied.

Further research on the health literacy within the college population could dive deeper into the relationship between health literacy and age, gender, health interest, family relationships, perceived level of health knowledge, and utilization of healthcare resources. Regarding health education and health literacy levels, further research needs to investigate health curriculums in institutions of higher education and how health courses taken affect student health knowledge and skills. More research also needs to be done to understand if a single health education course is sufficient in preparing students for current and future healthcare situations. Also, future research could analyze diagnoses of health conditions and health literacy scores or perceived health literacy. The status of chronic health conditions within a family could also be analyzed to note if a correlation exists between family member diagnoses and health literacy levels. This analysis might give more insight into the role of health literacy in lifestyle choices and the probability of certain medical issues. Further research on health information acquisition might also be helpful in order to understand if people are obtaining information from the source they think is most accurate. Also, with the prevalence of technology, research should look at the relationship between health literacy and media literacy. Additional studies aimed at uncovering where individuals access their health information and the role of media in health could strengthen health information and resource access and utilization. Because health literacy is a broad topic that is affected by various variables, further research is needed to ensure the best possible health outcomes for individuals.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Conclusion

Health literacy plays an important role in successfully obtaining, understanding, and applying health information in everyday situations. Health literacy skills give individuals the ability to engage in preventive behaviors, communicate health issues, and avoid health consequences to ensure the best health outcomes possible. With improving low health literacy levels in the population, research notes the need for health education and calls on institutions of higher education to play a role in creating a more health literate population. Universities should take advantage of the academic setting and work to both educate and assess health literacy among their student population. The prioritization of health education within institutions of higher learning would allow students to graduate with the knowledge and skills needed to successfully navigate the current healthcare climate. Also, having a greater understanding for health literacy and its importance could lead universities to recognize health disparities among students and work to alter courses and resources to fit the needs of their students.

Improvements can always be made for students to obtain a stronger health foundation and greater confidence in health skills. College graduates should leave with the ability to contribute positively to health literacy rates in the country and to lessen the effects faced by the healthcare system due to low health literacy levels. Although the results in this study were not statistically significant, they add to the existing research on the topic. There is a need for more research on the topic, and for institutions of higher education to play a larger role in the understanding of the factors that contribute to both low and high health literacy scores among this specific population. With the continuation of research on this topic, more will be uncovered about health education and the effects of different variables impacting health literacy levels. Continued research will

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

lead to improvements not only in health knowledge and skills for students in institutions of higher learning, but also within the health literacy levels of the general population.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

References

- America's health literacy: Why we need accessible health information. (2008). Retrieved from U.S. Department of Health & Human Services website:
<https://health.gov/communication/literacy/issuebrief/>
- Asibey, B. O., Agyemang, S., & Dankwah, A. B. (2017). The internet use for health information seeking among Ghanaian university students: A cross-sectional study. *International Journal of Telemedicine and Applications*, 1-9. <https://doi.org/10.1155/2017/1756473>
- Baker, D. W., Williams, M. V., Parker, R. M., Gazmararian, J. A., & Nurss, J. (1999). Short Test of Functional Health Literacy in Adults. *PsycTESTS*. doi:10.1037/t27961-000
- Basic, J. & Erdelez, S. (2015). The role of risky behaviors and health education in college students' health information acquisition on the internet. *Association for Information Science and Technology*, 1-7. doi.org/10.1002/pa2.2015.145052010049
- Benjamin R. M. (2010). Improving health by improving health literacy. *Public Health Reports*, 125(6), 784–785. doi.org/10.1177/003335491012500602
- Bussell, J. K. & Brown, M. T. (2011). Medication adherence: WHO cares?. *Mayo Clinic Proceedings*, 86(4), 304–314. doi:10.4065/mcp.2010.0575
- College health and safety. (2016). Retrieved from Centers for Disease Control and Prevention website: <https://www.cdc.gov/family/college/index.htm>
- DeMarco, J. & Nystrom, M. (2010). The importance of health literacy in patient education, *Journal of Consumer Health on the Internet*, 14:3, 294-301.
doi.org/10.1080/15398285.2010.502021
- Dolezel, D., Shanmugam, R. & Morrison, E.M. (2018). Are college students health literate?, *Journal of American College Health*, 1-8. doi: 10.1080/07448481.2018.1539001

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Eisenberg, J.M. (2012). Mitigating the effects of low health literacy, *Comparative Effectiveness Review Summary Guides for Clinicians*. Retrieved from

<https://www.ncbi.nlm.nih.gov/books/NBK95340/>

Evans, A. Y., Anthony, E., & Gabriel, G. (2019). Comprehensive health literacy among undergraduates: A Ghanaian university-based cross-sectional Study. *Health Literacy Research and Practice*, 3(4), e227–e237. doi: 10.3928/24748307-20190903-01

Facts & figures. (2019). Retrieved from James Madison University website:

<https://www.jmu.edu/about/fact-and-figures.shtml>

Hansen, H., Shneyderman, Y. & Belcastro, P. (2015). Investigating the association of health literacy with health knowledge and health behavior outcomes in a sample of urban community college undergraduates, *American Journal of Health Education*, 46:5, 274-282. doi: 10.1080/19325037.2015.1055016

Harper, R. (2014). Development of a health literacy assessment for young adult college students: A pilot study, *Journal of American College Health*, 62:2, 125-134. doi:10.1080/07448481.2013.865625

Health literacy. (2020). Retrieved from Healthy People 2020 website:

<https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/health-literacy>

Ickes, M. & Cottrell, R. (2010). Health literacy in college students, *Journal of American College Health*, 58:5, 491-498. doi: 10.1080/07448481003599104

Haun, J., Nolan-Dodd, V., Varnes, J., Graham-Pole, J., Rienzo, B., & Donaldson, P. (2009). Testing the BRIEF health literacy screening tool. *Federal Practitioner*, 24-30.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Joseph, R., Fernandes, S., Hyers, L., & O'Brien, K. (2016). Health literacy: A cross-disciplinary study American undergraduate college students. *Journal of Information Literacy*.

doi.org/10.11645/10.2.2103

JMU statistical summary. (2018). Retrieved from James Madison University website:

<https://www.jmu.edu/oir/oir-research/statsum/2017-18/2017-18toc.shtml>

Kim, S., Sinn, D., & Syn, S. Y. (2018). Analysis of college students' personal health information activities: Online survey. *Journal of Medical Internet Research*, 20(4),

e132. doi:10.2196/jmir.9391

Knighton, A. J., Brunisholz, K. D., & Savitz, S. T. (2017). Detecting risk of low health literacy in disadvantaged populations using area-based measures. *Generating Evidence and Methods*, 5(3), 7. doi:10.5334/egems.191

Kwan, M. Y., Arbour-Nicitopoulos, K. P., & Faulkner, G. (2016). Patterns of multiple health risk-behaviours in university students and their association with mental health: Application of latent class analysis. *Health Promotion and Chronic Disease Prevention in Canada*, 36(8),163-170. doi:10.24095/hpcdp.36.8.03

Lee, S. Y., Stucky, B. D., Lee, J. Y., Rozier, R. G., & Bender, D. E. (2010). Short Assessment of Health Literacy-Spanish and English: a comparable test of health literacy for Spanish and English speakers. *Health Services Research*, 45(4), 1105–1120. doi:10.1111/j.1475-6773.2010.01119.x

Liu, H., Zeng, H., Shen, Y., Zhang, F., Sharma, M., Lai, W., Zhao, Y. (2018). Assessment tools for health literacy among the general population: A systematic review. *International Journal of Environmental Research and Public Health*. doi:10.3390/ijerph15081711

Journal of Environmental Research and Public Health. doi:10.3390/ijerph15081711

McCambridge, J., Witton, J., & Elbourne, D. (2014). Systematic review of the Hawthorne effect:

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

New concepts are needed to study research participation effects. *Elsevier*, 3, 267-277.

doi: 10.1016/j.jclinepi.2013.08.015

Nutbeam, D., McGill, B., & Premkumar, P. (2017). Improving health literacy in community populations: A review of progress. *Health Promotion International*, 33(5), 901-911.

doi: 10.1093/heapro/dax015

Office of Disease Prevention and Health Promotion. (2019). Health communication and health information technology. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/health-communication-and-health-information-technology>

Palumbo, R. (2015). Discussing the effects of poor health literacy on patients facing HIV: A narrative literature review. *International Journal of Health Policy and Management*, 4(7), 417-430. doi:10.15171/ijhpm.2015.95

Paasche-Orlow, M.K. & Wolf, M.S. (2007). The Causal Pathways Linking Health Literacy to Health Outcomes. *American Journal of Health Behavior*, 31(1). 19–26.

doi:10.5555/ajhb.2007.31.supp.S19

Pearson, R. (2018) Making use of the facts: A critical literacy approach to spark personal health action in college students, *American Journal of Health Education*, 49:1, 6-8. doi:10.1080/19325037.2017.1360811

Polacek, G. N., Erwin, T. D., and Rau, J. G. (2013). The longitudinal impact of an undergraduate general education wellness course in early adulthood. *Journal of Health Education Teaching*, 4(1), 15-23.

Rababah, J.A., Al-Hammouri, M.M., Drew, B.L., Aldalaykeh, M. (2019). Health literacy: exploring disparities among college students. *BMC Public Health* 19, 1401.

doi:10.1186/s12889-019-7781-2

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

- Rasu, R. S., Bawa, W. A., Suminski, R., Snella, K., & Warady, B. (2015). Health literacy impact on national healthcare utilization and expenditure. *International Journal of Health Policy and Management, 4*(11), 747–755. doi:10.15171/ijhpm.2015.151
- Sand-Jecklin, K. & Coyle, S. (2013). Efficiently assessing patient health literacy: The BHLS instrument. *Clinical Nursing Research, 23*(6), 581-600.
doi:10.1177/1054773813488417
- Sand-Jecklin, K., & Coyle, S. (2014). Brief Health Literacy Screen [Database record]. Retrieved from PsycTESTS. doi:10.1037/t37729-000
- Sbaffi, L., & Zhao, C. (2019). Modeling the online health information seeking process: Information channel selection among university students. *Journal of the Association for Information Science Technology, 71*(2), 196-207. doi:10.1002/asi.24230
- Sukys, S., Cesnaitiene, V. J., & Ossowsky, Z. M. (2017). Is health education at university associated with students' health literacy? Evidence from cross-sectional study applying HLS-EU-Q. *BioMed Research International, 85*16843. doi:10.1155/2017/8516843
- U.S. Department of Health and Human Resources: Office of Disease Prevention and Health Promotion. (2010). National action plan to improve health literacy. Retrieved from https://health.gov/sites/default/files/2019-09/Health_Literacy_Action_Plan.pdf
- Vader, A. M., Walters, S. T., Roudsari, B., & Nguyen, N. (2011). Where do college students get health information? Believability and use of health information sources. *Society for Public Health Education, 7*13-722. doi:10.1177/1524839910369995
- Vamos, S., Yeung, P., Schaal, S., & Schlüter, K. (2016). Developing an online health literacy

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

curriculum for two German universities: A key stakeholder approach. *Global Health Promotion*. doi:10.1177/1757975916676958

Vernon, J. A., Trujillo, A., Rosenbaum, S., & DeBuono, B. (2007). *Low health literacy: Implications for national health policy*. Retrieved from Public Health George Washington University website:
https://publichealth.gwu.edu/departments/healthpolicy/CHPR/downloads/LowHealthLiteracyReport10_4_07.pdf

Yang, S. C., Luo, Y. F., & Chiang, C. H. (2017). The Associations among individual factors, eHealth literacy, and health-promoting lifestyles among college students. *Journal of Medical Internet Research*, 19(1), e15. doi:10.2196/jmir.5964

Wallston, K. A., Cawthon, C., McNaughton, C. D., Rothman, R. L., Osborn, C. Y., & Kripalani, S. (2014). Psychometric properties of the brief health literacy screen in clinical practice. *Journal of General Internal Medicine*, 29(1), 119–126. doi:10.1007/s11606-013-2568-0

Willens, D. E., Kripalani, S., Schildcrout, J. S., Cawthon, C., Wallston, K., Mion, L. C., . . . Roumie, C. L. (2013). Association of brief health literacy screening and blood pressure in primary care. *Journal of Health Communication*, 18, 129-142.
doi:10.1080/10810730.2013.825663

Williams, M.V., Davis, T.C., Parker, R.M., Weiss, B.D. (2002). The role of health literacy in patient–physician communication. *Family Medicine*, 34, 383-389.

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

Appendix A

Short Assessment of Health Literacy

Instructions: For each number, mark the word in the key or distractor column that is more similar or has the closest meaning to the stem word provided. If you are unsure, mark the “don’t know” option.

Stem	Key or Distracter		Don't know
1. kidney	<input type="checkbox"/> urine	<input type="checkbox"/> fever	<input type="checkbox"/> don't know
2. occupation	<input type="checkbox"/> work	<input type="checkbox"/> education	<input type="checkbox"/> don't know
3. medication	<input type="checkbox"/> instrument	<input type="checkbox"/> treatment	<input type="checkbox"/> don't know
4. nutrition	<input type="checkbox"/> healthy	<input type="checkbox"/> soda	<input type="checkbox"/> don't know
5. miscarriage	<input type="checkbox"/> loss	<input type="checkbox"/> marriage	<input type="checkbox"/> don't know
6. infection	<input type="checkbox"/> plant	<input type="checkbox"/> virus	<input type="checkbox"/> don't know
7. alcoholism	<input type="checkbox"/> addiction	<input type="checkbox"/> recreation	<input type="checkbox"/> don't know
8. pregnancy	<input type="checkbox"/> birth	<input type="checkbox"/> childhood	<input type="checkbox"/> don't know
9. seizure	<input type="checkbox"/> dizzy	<input type="checkbox"/> calm	<input type="checkbox"/> don't know
10. dose	<input type="checkbox"/> sleep	<input type="checkbox"/> amount	<input type="checkbox"/> don't know
11. hormones	<input type="checkbox"/> growth	<input type="checkbox"/> harmony	<input type="checkbox"/> don't know
12. abnormal	<input type="checkbox"/> different	<input type="checkbox"/> similar	<input type="checkbox"/> don't know
13. directed	<input type="checkbox"/> instruction	<input type="checkbox"/> decision	<input type="checkbox"/> don't know
14. nerves	<input type="checkbox"/> bored	<input type="checkbox"/> anxiety	<input type="checkbox"/> don't know
15. constipation	<input type="checkbox"/> blocked	<input type="checkbox"/> loose	<input type="checkbox"/> don't know
16. diagnosis	<input type="checkbox"/> evaluation	<input type="checkbox"/> recovery	<input type="checkbox"/> don't know
17. hemorrhoids	<input type="checkbox"/> veins	<input type="checkbox"/> heart	<input type="checkbox"/> don't know
18. syphilis	<input type="checkbox"/> contraception	<input type="checkbox"/> condom	<input type="checkbox"/> don't know

Appendix B

Brief Health Literacy Screen

**Instructions: Please check the appropriate response to each question in the left column.
Only check the response in the left column.**

	<p align="center">Health Literacy Score (Do not write in this column)</p> <p align="center">-----</p>
<p>1. If you need to go to the doctor, clinic or hospital, how confident are you in filling out the medical forms by yourself?</p> <p>---- Not at all confident (1) ---- A little confident (2) ---- Somewhat confident (3) ---- Quite Confident (4) ---- Extremely confident (5)</p>	<p align="center">-----</p>
<p>2. How often do you have someone (family member of staff at the clinic or hospital) help you to read health or medical forms?</p> <p>---- Always (1) ---- Often (2) ---- Sometimes (3) ---- Occasionally (4) ---- Never (5)</p>	<p align="center">-----</p>
<p>3. How often do you have problems learning about your health because of trouble understanding written health information?</p> <p>---- Always (1) ---- Often (2) ---- Sometimes (3) ---- Occasionally (4) ---- Never (5)</p>	<p align="center">-----</p>
<p>4. How often do you have trouble understanding what your doctor, nurse, or pharmacist (druggist) tells you about your health or about treatments?</p> <p>---- Always (1) ---- Often (2)</p>	<p align="center">-----</p>

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

<p>---- Sometimes (3) ---- Occasionally (4) ---- Never (5)</p>	
<p>5. How often do you have trouble remembering instructions from the doctor, nurse or pharmacists (druggist) after you get home?</p> <p>---- Always (1) ---- Often (2) ---- Sometimes (3) ---- Occasionally (4) ---- Never (5)</p>	<p>-----</p> <p>Total: -----</p>

Appendix C

Demographic Questions

1. With which of the following do you identify?

- Woman
- Man
- Non-Binary
- Other _____

2. What is your academic year?

- Freshman
- Sophomore
- Junior
- Senior
- Other

3. Which of the following best describes your race or ethnicity?

- American Indian
- Hispanic or Latino
- Asian
- African American
- Caucasian/ White
- Other _____

4. Is one or both of your parents/guardians in a health profession?

(Ex: health aide, health educator, medical assistant, medical technician, nurse, physician)

- Yes
- No
- I don't know

5. Have you ever been diagnosed with a chronic health condition?

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

- Yes
- No
- I don't know
- Prefer not to answer

6. What general health education course did you take at James Madison University?

- Health 100
- Kinesiology 100
- I haven't taken one of these courses yet

7. Are you aware of the services that are provided by The Well: The Office of Health Promotion and Well-Being?

- Yes
- No
- I don't know

8. Have you ever utilized services from the following program areas through The Well?

(Select all that apply)

- Alcohol and other drug abuse prevention
- Peer Health Educators
- Sexual violence advocacy and prevention
- Healthy Sexuality
- Sexual Orientation, Gender identity, and Expression (SOGIE)
- Reality Educators Advocating Campus Health (REACH)
- I haven't utilized any services from The Well

9. What is your academic major?

HEALTH LITERACY KNOWLEDGE AND SKILLS AMONG UNDERGRADUATES

10. Where do you obtain most of your health information? (select one)

- Medical professionals
- Online
- Health classes
- Friends
- Family
- Social Media
- Other _____