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Health Literacy of Nursing Students and Their Awareness of Patient Literacy Needs

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Jennifer Potter

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Walden University
2017

Abstract

Health Literacy of Nursing Students and Their Awareness of Patient Literacy Needs

by

Jennifer Potter

MS, Globe University, 2011

BS, Minnesota School of Business, 2010

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Services, Health Care Administration

Walden University

November 2017

Abstract

Research has suggested that providers of health services must be aware of health literacy tools as elements of communication with patients. Poor health literacy is an epidemic that affects quality of care. The purpose of this study was to examine the functional health literacy of associate-degree nursing (ADN) students and their awareness of patients' health literacy needs. This correlational study was designed to examine the relationship between the functional health literacy of ADN students and their awareness of their patients' health literacy needs using the asset model and the health literate care model. A convenience sample of 131 ADN students in their last 2 semesters of nursing school completed the Test of Functional Health Literacy in Adults (TOFHLA) and the Knowledge and Skills Survey. Pearson correlation, linear regression, multivariate analysis of variance, and Spearman correlation were used to analyze the demographics of students, TOFHLA, and Knowledge and Skills Survey scores. The Pearson correlation indicated that the functional health literacy of ADN students and their awareness of the need to identify patients with low health literacy were statistically significant ($p = .017$). The results supported the need for improved training and support for students on the topic of health literacy along with opportunities for further research. The implication of social change directly relates the area of nursing education by further identifying associations between education and the application of health literacy, which leads to further discussion on organizational policy and curriculum changes. These types of analysis will lead to more patient-centered care and improved patient outcomes.

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Dedication

This dissertation is dedicated to my grandmother, Myrlene Angell (Paulson). It was through our interactions that I came across the topic of health literacy and I quickly understood the importance of having proficient health literacy. You are the reason I advocate for the patient who lacks it and I advocate for further training and awareness for the health care workers who provide care.

Acknowledgments

Thank you to Dr. Robert Hoye, my dissertation chair. Your guidance throughout this journey has been pivotal in helping me to reach my goals and to get through the moments when I feel stuck. I am grateful that you are my chair. Thank you, Dr. Cynthia Newell, for your time and expertise. It is greatly appreciated.

I would like to thank my family for their support throughout trials and tribulations: my mom, my dad, and my sister, Sheila. I also need to thank my better half, Neil. Thank you for supporting my life and educational goals and reminding me that I can do this. Lastly, to my band of little ones: Brendan, Faith, Lillian, Nikolai, and Allen. Thank you for your patience, flexibility, and, at times, perspective.

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Chapter 1: Introduction to the Study

Introduction

Over the past several decades, U.S. policymakers and industry professionals have focused on health care outcomes and quality, which can be affected by literacy, culture, language, education, and disabilities (McKee & Paasche-Orlow, 2012). The National Literacy Act of 1991 (as cited in Diehl, 2011) defined literacy in this country as the ability of a person to read, write, and speak in English and compute and solve problems in a proficient manner to function within society and to meet his or her goals. The U.S. Department of Health and Human Services, Office of Disease Protection and Health Promotion (2010) described *health literacy* as "the degree to which individuals have the capacity to obtain, process and understand basic health information needed to make appropriate health decisions" (para. 1). A health professional or patient must be able to read, write, and understand oral health information and verbalize his or her own health needs and perform calculations. Once the health information is gathered, then it must be applied. The application of health literacy skills is where miscommunication can happen. Health professionals must understand this information to ensure that they utilize the proper methods to communicate with the patient and meet their needs.

According to a 2003 survey and follow-up 10 years later, almost half of the U.S. population had limited English literacy skills, and one-quarter of the population was severely deficient in literacy (Kutner, Greenberg, Jin, & Paulsen, 2006). Providers of health care—doctors, nurses, dentists, pharmacists—often overestimate a patient's literacy level (Macabasco-O'Connell & Fry-Bowers, 2011). The aforementioned literacy

numbers might alarm health care organizations striving to communicate with patients and educators who are training those entering the field of health care.

A widespread misunderstanding in the medical community is that students who are entering the health care fields have sufficient health literacy abilities and awareness to provide quality care to patients. The skills required of students to identify patients' needs differ from health education skills that students need to ensure that patients understand their diagnosis and treatment plans. Nursing students who confidently have these skills can give patients the quality of care they are expecting when they obtain health services. In this research, I examined a sample of nursing students in associate-degree programs to assess their health literacy abilities and their awareness of patients' health literacy needs.

The study was intended to make a positive social contribution by highlighting a major American epidemic—the lack of health literacy application and awareness. Second, the research focused on a little-studied area: nursing students' abilities as they transition from being in school to being practicing nurses. Nurses' literacy needs must be assessed, refined, and supported because of the long-term ramifications for the quality of care.

In Chapter 1, the problem of health literacy among associate-degree nursing (ADN) students is addressed. The purpose of this cross-sectional quantitative study and the theoretical framework upon which it was based are also discussed. Additionally, I explain the assumptions, scope, delimitations, limitations, and threats to the validity of the study, as well as how this information supports the significance of the study and implications for further research and social change.

Background

Ensuring health literacy and proper health communication requires educators to teach a complex set of skills and knowledge to new health care professionals (U.S. Department of Health and Human Services, Office of Disease Protection and Health Promotion, 2010). The Department of Health and Human Services noted that basic health literacy is fundamental in each patient-provider interaction. Gaining proficient health literacy skills to ensure understanding of medical material and deploying proper communication techniques can be difficult for all health professionals, as there are multiple demands on their time and energy.

Although the Liaisons Committee on Medical Education (LCME) mandated that health literacy be incorporated into the medical curriculum in 2002 (Ross, Lukela, Agbakwuru, & Lypson, 2013), this recommendation lacked specific minimum time requirements or plans showing how educational institutions should specify, assess, and train staff on health literacy. Ross et al. (2013) reported that 36% of 2nd-year medical students failed to identify health literacy as a barrier to treatment compliance and preventative screening. In another survey of 456 nurse practitioners about their knowledge, experience, and intentions to use health literacy strategies, Cafiero (2013) found that the majority of nurse practitioners had some knowledge of health literacy. A vast majority, however, could not identify health literacy screening tools, and there was a gap in their ability to engage patients in learning.

Because of increased awareness of how poor health literacy can be a barrier to patient care, some schools of nursing have over the past decade added health literacy

education to their curricula; however, 80% of registered nurses have been in practice for 10 years or more (AMN Healthcare, 2013). As such, educators must teach nursing and other health students essential and applied lessons related to health literacy and patient education to meet health care organizations' quality of care outcomes and patient expectations.

The application of health literacy skills is even more pertinent in teaching hospitals that reach diverse populations with a wide variety of health needs (Livaudais-Toman, Burke, Napoles, & Kaplan, 2014). These teaching institutions can reduce the factors that hinder patients' health literacy proficiency, including lack of educational opportunity, learning disabilities, cognitive decline in older adults, and the premise of continuous use of the skills (Ickes & Cottrell, 2010). For the same reason, if curricula were adjusted to ensure that students struggling with health literacy could be identified early in their programs, then students would be better prepared to meet the health literacy needs of patients. Although many of the current teaching methods are evidence-based and have been used effectively in teaching nursing education, many have fallen short in addressing the extent to which students can apply the training in practice (Scheckel, Emery, & Nosek, 2010).

According to the National Assessment of Adult Literacy (NAAL; Kutner et al., 2006), among all primary fields of study, only 15% of adults with associate's degrees graduate with proficient levels of health literacy. Furthermore, only 27% of adults graduating with a 4-year degree have proficient health literacy, and 33% of adults who have taken some graduate courses or completed a graduate degree have proficient health

literacy. Educators within colleges that offer health programs and expect students to deliver health education to patients should be concerned. What is also troubling is that 4% of adults who graduate with an associate's degree have below-basic health literacy (Kutner et al., 2006).

Nursing students are expected to receive a comprehensive curriculum in either 2 or 4 years. Patients and health care employers expect nursing students to be trained and prepared to work with up-to-date knowledge; however, many nursing students lack the skills needed in various specialties (McCann, Lu, & Berryman, 2009). In particular, McCann et al. (2009) found that, until there was an intervention, the mental health literacy of students was inadequate. One of a nurse's primary duties is to provide patient education, a challenging endeavor if a nurse lacks proper health literacy skills (Sand-Jecklin, Murray, Summers, & Watson, 2010). Nursing graduates must be able to identify patients who are unable to analyze health information and use it to make proper health decisions. Nursing students must be proficient in health literacy screening tools; if they are not, the result can be patient frustration, increased health care costs, and poor clinical outcomes (Sand-Jecklin et al., 2010).

Proliferation of Inadequate Health Literacy

Health literacy correlates with education level (Kutner et al., 2006). A complex set of factors influences individuals' health literacy. In a survey of 240 health care providers and students about health literacy, Jukkala, Dupree, and Graham (2009) found that fewer than 12% were able to estimate the prevalence of health literacy. Nurses

believed that health literacy could be determined by a patient's demographics, which is not the case, according to research (Jukkala et al., 2009).

Lindquist, Jain, Tam, Martin, and Baker (2011) studied nonfamily paid caregivers of seniors, who included those with experience as registered nurses, certified nursing assistants, and professionals in other health-related occupations. Lindquist et al. found that 35.7% of those surveyed had inadequate health literacy, even though 85.7% of the staff completed health-related tasks up to half of the time or all of the time. Torres and Nichols (2014), in a study of health literacy knowledge and experience of associate's degree nursing students, found that only 41% knew basic facts about health literacy; moreover, only 46% knew the guidelines for written materials. The researchers attributed the low scores in the testing to a lack of health literacy teaching within the curriculum. To continue to meet the quality of care needs of patients and the needs of students who are lacking health literacy knowledge, the requirements in for identifying health literacy tools and utilizing them in certain situations must be identified and addressed prior to students graduating and seeking employment.

When these needs are not addressed, research has shown that poor health literacy can have adverse effects on patient outcomes. Nurses are the primary caregivers and conduits of health information, but in one study, 81% of nurses failed to check to make sure that patients understood the diabetes education given to them (Al Sayah, Williams, Pederson, Majumdar, & Johnson, 2014). In another study, nurses incorrectly identified patients with low health literacy, which affected the patients' understanding regarding

follow-up appointments, new medications, dietary restrictions, and activity level after they were discharged (Dickens, Lambert, Cromwell, & Piano, 2013).

Overview of This Study

When health information is not presented correctly due to a nurse's lack of health literacy, the interaction between the patient and the provider can suffer, affecting health promotion. In this research, I used a cross-sectional correlation quantitative method to assess the functional health literacy of 2-year-degree nursing students and evaluate their awareness of health promotion and literacy. The study was designed to expand on the limited research on ADN students' ability to apply their health literacy knowledge to understand and identify patients with health literacy needs. Furthermore, because one variable is previous health literacy training, this study will help to indicate whether the health literacy of a student, prior health literacy training, or both aid in a student's awareness or lack of knowledge of health promotion and literacy.

Problem Statement

Those who provide health services are expected to have some degree of competency and proficiency in health literacy to provide appropriate communications to and for the patient. Providers may be unable to identify the health literacy needs of a patient if they lack full literacy themselves (U.S. Department of Health and Human Services, 2015). Inequalities in health literacy are not limited to the patient population, even though much of the research on the subject has been centered on patient health literacy and its effect on clinical outcomes or the tools that providers use (Squiers, Peinado, Berkman, Boudewyns, & McCormack, 2012). Only limited research is

available on the health literacy of ADN students and how it correlates with their awareness of the health literacy needs of patients.

The health care worker is an essential member of a team assisting patients in locating and communicating health information and identifying suitable ways to communicate with them (Centers for Disease Control and Prevention [CDC], 2015). Torres and Nichols (2014) studied associate-degree nurses at one college and found that students had knowledge of health literacy but were unaware that health literacy is a predictor of health status, particularly in patients 55 years of age and older. In an assessment of 2nd-year medical students, 66.8% could not identify that health literacy was a social determinant of health, a finding Ross et al. (2013) linked to a lack of health literacy education.

Sand-Jecklin et al. (2010) found that although educating patients is a core part of nurses' duties, nurses were inadequately trained on the health literacy needs of patients. Nurses who are not properly trained will have low health literacy abilities, which can lead to difficulty in the process of communicating with patients and the public; the result can be poor clinical outcomes (Johnson, 2014). In this study, I strove to identify the current state of health literacy of associate-degree nurses and their level of awareness of patients' health literacy needs.

Purpose of the Study

Lack of proficiency in health literacy costs Americans an additional $73 billion in health care due to chronic conditions, poor coordination of health services, and increased hospitalizations (Macabasco-O'Connell & Fry-Browers, 2011). At the center of this lack

of proficiency are the nurses and other health care support staff who provide and

coordinate services and are expected to be experts in navigating the complex health

system. As identified in the literature review, several academic institutions have begun to

assess students to determine where there are shortcomings within their programs in

evaluating patients' health literacy needs (Ross et al., 2013).

Few researchers have examined the literacy requirements of the providers of

health services themselves and ensured that their needs are met. Providers' health

literacy can affect the quality of care that patients receive and the outcomes of services

rendered. The purpose of this study was to identify if there is a correlation between the

functional health literacy of associate's-degree nursing students and their ability to be

aware of patients' health literacy needs.

<div align="center">**Research Questions and Hypotheses**</div>

RQ[1]   How is the functional health literacy of associate-degree nursing students

related to their awareness of the need to identify patients with low health

literacy?

Ho1:   There is no statistically significant relationship between the

functional health literacy of nursing students and their awareness

of the need to identify patients with low health literacy.

Ha1:   There is a statistically significant relationship between the

functional health literacy of nursing students and their awareness

of the need to identify patients with low health literacy.

RQ[2] How will the demographics of students have an impact on their functional health literacy and their awareness of the need to identify patients with low health literacy?

  Ho2: The demographic characteristics of students will not have an effect on their health literacy as assessed by the TOFHLA and their awareness of the need to identify patients with low health literacy.

  Ha2: The demographic characteristics of students will have an effect on their health literacy as assessed by the TOFHLA and their awareness of the need to identify patients with low health literacy.

RQ[3] What are the differences in health literacy and awareness of the need for health literacy between nursing students who have had health literacy training and nursing students who have not had exposure to health literacy training?

  Ho3: There is no difference in health literacy and awareness of the need for health literacy between nursing students who have had health literacy training and nursing students who have not had exposure to health literacy training.

  Ha3: There is a difference in the health literacy and awareness of the need for health literacy between nursing students who have had health literacy training and nursing students who have not had exposure to health literacy training.

The secondary independent variables for this study were age, gender, number of years of previous education, race, and exposure to prior health literacy training; the primary independent variable was the health literacy of the nursing student. A nursing student's score on the TOFHLA served as the measure of the health literacy of the student. Information on the coding of the variables for analysis is presented in Chapter 3.

The TOFHLA is a functional health literacy assessment that takes about 22 minutes to complete. The 50-item reading comprehension section uses cloze procedure and a 17-item numeracy section (Wolf et al., 2012). More information regarding this assessment and these variables appears in Chapter 3. The dependent variable for this research was how aware the ADN student was of health literacy information, facts, and other ways to identify patients with low health literacy needs. The dependent variable was measured with the Knowledge and Skills Survey score (Appendix B). The Knowledge and Skills Survey is quantified by the score the student receives on each question (1 point per question), and students' ability can also be assessed based on how comfortable they are in certain situations via a Likert-type scale that is part of this survey.

Theoretical Framework

The intention of this study was to examine whether a nurse's health literacy capabilities affect her or his ability to identify proper health literacy tools. The asset model (Nutbeam, 2013) describes how health literacy can both be supported and enabled or be a hazard that needs to be identified and controlled. Nutbeam (2013) described literacy in three tiers:

1. *Functional literacy*, involving reading and writing skills

2. *Communicative* or *interactive literacy*, involving more cognitive function to gain insight into information and obtain relevant information

3. *Critical literacy*, or literacy that requires one to be able to analyze information in order to adapt or respond to a given situation.

Past studies have shown that lack of these literacy abilities can have a major effect on health outcomes. Lack of health literacy communication results in misunderstanding between patients and communicators (CDC, 2015). If nursing students' health literacy needs are not identified and supported throughout their programs, they will have trouble using their health literacy skills to become aware of the patients' health literacy requirements. Livaudais-Toman et al. (2014) found that clinical environment outreach efforts and the provision of materials in a variety of languages had a positive effect on the health literacy of patients and resulted in recruiting a diverse patient population. Providing an environment conducive to increasing nurses' functional health literacy can enable them to enhance their confidence and awareness of their patients' needs.

Furthermore, nursing students are expected to meet the demands of a changing health landscape, and within this landscape is the health literate care model (U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, 2015). This model sets expectations for providers of care to treat all patients as though they lack proficiency in health literacy and to be aware of the available health literacy tools that can meet patients' health literacy needs (U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, 2015). Nursing students must be

expected to meet the requirements of the health care organization as well as those of patients, with a resulting increase in the quality of care.

Thus, education environments need to lay groundwork to identify those who lack proficiency in health literacy skills. Those who need extra training may not recognize their patients' health literacy needs. Nutbeam's (2013) simple, linear model of functional health literacy suggests that developing knowledge and capability may increase the health literacy of an individual and can have an effect on the individual's behaviors and practices; the result can be improved health outcomes, choices, and opportunities. Doing the opposite, or disregarding the problem, can have adverse effects and increase the risks that poor health literacy proficiency presents in relation to clinical outcomes.

Nature of the Study

The research design was a quantitative cross-sectional correlation study. The purpose was to examine the relationship between the health literacy of the associate-degree nursing students and their level of awareness of patients' health literacy needs. The primary independent variable was the health literacy of the associate's-degree nursing students. The secondary independent variables included age, gender, number of years of previous education, race, previous exposure to health literacy training, and health literacy score. The dependent variable was the score on the Knowledge and Skills Survey, which was used to assess the students' awareness of health literacy information pertaining to identifying a patient with low health literacy and the students' comfort level with assisting a patient with low health literacy with various tasks. Conducting the study

within the natural environment or college setting may have affected the awareness the

nurses had of their patients' health literacy (Campbell & Stanley, 1963).

One significant weakness in this design was the lack of control over the

independent variables (Key, 1997). As stated previously, the independent variables that

were chosen for this study were age, gender, and number of years of previous education.

Accounting for additional independent variables helps in identifying other correlations,

which may strengthen the credibility of the hypothesis (Campbell & Stanley, 1963); still,

the increase or lack of correlation cannot prove or disprove causation (Campbell &

Stanley, 1963).

Similar Studies and Methods

Using interpretive phenomenological methodology, Scheckel et al. (2010)

sampled eight undergraduate nursing students in their final semester of a baccalaureate

nursing program. In a longitudinal study of baccalaureate nursing students, McCann et

al. (2009) used a nonprobability sample (convenience sample) with a sample size of 90

students, then 46, and then 96 students who had completed their sixth semester.

Researchers who completed a study on 98 paid nonfamily caregivers chose a purposive

sampling method (Lindquist et al., 2011). In one study of junior and senior baccalaureate

students' health literacy, the researchers selected random sampling after ensuring that

disciplines of study from all colleges at the university were represented. The sampling

happened twice because the sample size of 366 was not reached during the first quarter in

the randomly selected classes (Ickes & Cottrell, 2010).

A convenience sample of students from accredited associate-degree nursing programs in Minnesota participated in this study. This type of nonprobability sample design allowed sampling of the nursing programs that agreed to take part in the study. The Minnesota Board of Nursing has accredited 27 associate-degree nursing programs (State of Minnesota, 2012). One of the original concerns was that it would be difficult to reach the appropriate effect size using a purposive sample or a quota sample design, which requires a sample that is representative of the population (Frankfort-Nachmias & Nachmias, 2008). Emails were out to nursing deans across the state to ask if they would allow their final-semester nursing students to participate in the study.

Definition of Terms

For this research, the following definitions are used.

Associate-degree nurse (ADN): A nurse who has completed or is pursuing his or her associate-degree in nursing; in this study, an ADN is a nursing student in the last semester of an associate-degree program in nursing who is planning to take the National Council Licensure Examination (N-CLEX) to obtain registered nurse (RN) licensure.

Health literacy: "The cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" (World Health Organization, 2015, para. 1).

Liaisons Committee on Medical Education (LCME): An accrediting body for allopathic medical schools (National Academies of Sciences, Engineering, and Medicine, 2015).

National Assessment of Adult Literacy (NAAL): An assessment published by

Kutner et al. (2006) completed in 2003 on 19,000 Americans 16 years of age and older to

assess their health literacy.

Assumptions

All of the students who took part in this study were willing participants. Neither

instructor, the college they were attending, the organization where they were completing

their clinical orientations, the Minnesota Board of Nursing, nor the researcher coerced

them to take part in the study. Furthermore, the participants were allowed to withdraw

from the study at any time without any ramifications. I have preserved their anonymity

when displaying results, and all data collected will remain confidential.

I assumed that each participant strove to do his or her best on all portions of the

evaluation, had completed high school, and had completed each previous part of the

nursing school curriculum. I assumed that all participants were on track to graduate in

the term when they were completing the study, as required by the participant

qualifications. Participants received written directions regarding the significance of this

study and the importance of being willing participants who performed at their best. The

participants were reminded that they could withdraw for any reason if they so desired.

Scope of Delimitations

The aim of this study was to examine the current functional health literacy of

ADN students and to identify whether there was any correlation between this literacy and

the ADNs' ability to be aware of the health literacy needs of patients. Once these nursing

students graduate and pass the NCLEX, they are identified as registered nurses. The

scope of practice differs little between registered nurses who have had 4 years of education and registered nurses who have had 2 years of schooling. On the NAAL, on average, there was a 16-point difference in scores between those who had a received a bachelor's degree and those who had received an associate's degree (Kutner et al., 2006).

Although there is another category of nursing students who receive associate's degrees (licensed practical nurse), this credential does not have a bachelor's degree option, and therefore, this study did not focus on this group of nursing students. A threat to the internal validity of a cross-sectional correlational study is that it can be difficult to control any other external influences on the independent variable. Because the independent variable cannot be manipulated, the study cannot prove causation (Frankfort-Nachmias & Nachmias, 2008).

Limitations

A limitation of this study was using the Test of Functional Health Literacy in Adults (TOFHLA). This assessment took an average of 22 minutes to complete (Baker, Williams, Parker, Gasmararian, & Nurss, 1999). This length of time to complete one of three portions may cause some fatigue and anxiety among respondents. The amount of time was a concern, given that the participants had sat through the reading of the implied consent prior to completing the TOFHLA and had completed the demographic form.

After completing the TOFHLA, participants also needed to fill out a Knowledge and Skills Survey. The respondents were able to take a brief break between the assessments to avoid testing fatigue, but even with a break, fatigue and anxiety may still have caused the score to diminish. The students were in their final terms of the program,

and many seemed tired due to prior coursework or had other commitments that appeared

to be pressing; this seemed to cause some students to rush through their assessments. The

TOFHLA assesses functional health literacy, which does not cover all aspects of health

literacy that can aid in identifying and communicating with and educating a patient.

Experimenter bias happens when a researcher unintentionally communicates an

expected response (Frankfort-Nachmias & Nachmias, 2008). A script was followed to

avoid experimenter bias. Instructors did not have access to the TOFHLA and Knowledge

and Skills Survey beforehand. On the demographic form, participants were asked if they

had any health literacy training because prior training was expected to increase their

score.

The use of multiple campuses aided in gaining a larger sample population ($N =$

131), but the sample design chosen due to the timing of the campuses was a convenience

sample. Therefore, this study cannot be generalized to the overall ADN student

population due to the inability to estimate the population's parameters from the values of

the characteristics obtained from the sample (Frankfort-Nachmias & Nachmias, 2008).

Another limitation is that due to the correlational method applied, causation

cannot be proven with the variables used in this research (Key, 1997; Field, 2013). The

research outcomes are described in associations or correlations, as they exist together.

The relationships can be defined as positive, as negative, as no correlation, or as a

strength of an association (Reynolds, 2007).

There are limitations to the theoretical frameworks used within this study. Both

theoretical models are large models. The portions of this study are focused on two of the

axioms: the asset model as part of a larger literacy model, and the health care worker, in the context of the health literate care model, and how this model supports him or her. In that these models have interrelated definitions and concepts, it is important to understand that not all can be measured, and this is a limitation and a benefit to axiomatic models (Reynolds, 2007).

Due to the interrelatedness of pieces within the asset model, one area cannot increase until the other (i.e., reading or numeracy fluency) increases (Nutbeam, 2000, 2003, 2008). If a student's understanding is not assessed, and the training is not customized to their learning needs to meet the learning gap to increase their capacity to provide better patient care, the health literate care model will not exist, or at least it does not exist in its most efficient form. Therefore, the nursing student's ability to have health literacy and be able to identify the patient's with low health literacy is part of the health literate care model. The health literate care model is an outcome to proficient health literacy application and education (Koh, Brach, Harris, & Parchman, 2013).

Significance and Implications

This research addresses a unique and unmet need in health literacy research. The NAAL (Kutner et al., 2006) survey suggested that proficient health literacy is significantly lacking among those who have attained associate's degrees. Researchers have shown that patients who have a positive experience and understand what they need to do and need to know are more likely to adhere to their treatment plan (Ramaswamy, Williams, Clark, & Kelley, 2014). Better health literacy skills can help providers quickly identify beneficial health information, which can enhance the quality of services and

quality of care outcomes (U.S. Department of Health and Human Services, 2015).

Ensuring that health professionals have proficient health literacy skills will enable them

to communicate more effectively with patients and identify their health literacy needs.

This research required current ADN programs and facilities that offer clinical

rotations that hire students to consider the health literacy of the students who participate

in the programs. Moreover, based on the results, administrators may take into account

whether academic programs are having a positive effect on the quality of care delivered

to the health organization.

Summary

Poor health literacy affects a significant portion of the U.S. population. Studies

have shown that with increased health experience and health encounters, health literacy

can increase with education; however, as learned from the NAAL, a significant number

of adults still lack proficient health literacy, even after having attained associate's

degrees. This study focused on the functional health literacy of associate-degree nursing

students in Minnesota and how their functional health literacy affected their ability to be

aware of their patients' health literacy needs.

The TOFHLA and the Knowledge and Skills Survey were used to correlate a

student nurse's functional health literacy and his or her ability to identify the health

literacy needs of a patient. Offering the TOFHLA in an educational setting reflects a

health literacy exam comparable to the NAAL survey. The Knowledge and Skills Survey

ties real-life patient facts and situations to useable data to drive future policies,

procedures, and recommendations to better train and hire ADN students.

The next chapter is a review of the current research on health literacy and the current state of nursing education and health literacy training. The theoretical frameworks supporting the study and the rationale for variables and concepts are discussed. In Chapter 3, the research design and methodology, along with threats to validity, are described. Data collection and results are reviewed in Chapter 4; in Chapter 5, the findings, limitations of the study, recommendations, and implications are discussed.

Chapter 2: Literature Review

Introduction

The purpose of this research was to identify correlations between the health literacy of associate's-degree nursing students and their awareness of the health literacy needs of patients. In this chapter, I review the literature on the state of health literacy in the United States and its impact on patients and organizations. Further review of the literature on health care workers and nurses and how their health literacy abilities and training affect patient education is also provided in this chapter.

Nursing students are influenced by the teaching methods of faculty, which can affect their ability to provide patient education effectively (Scheckel et al., 2010). Nurses' lack of ability to educate patients properly has been linked to nursing students' inadequate training in assessing and identifying patients with health literacy needs and nursing students lacking capacity to apply tools to properly educate patients on treatment plans, procedures, and other wellness messages (Scheckel et al., 2010). Nursing students' lack of skill in conveying the proper message can result from a lack of health literacy abilities as well. In identifying this possible correlation between a student's limited proficiency in communicating a message and the student's capability to meet patient needs, the asset model and the health literate care model are two theoretical frameworks that support the research for this study.

The Search Process

The search of electronic and print sources included the following library databases and search engines: EBSCOhost, Cumulative Index to Nursing and Allied

Health Literature (CINAHL) Plus, eBook academic collection, HealthSource, and Google Scholar. In addition to search engines and databases, government websites were reviewed for updated policies and practices that affect the current state and the future of health literacy.

The search included the following terms: *nursing*, *education, clinical outcomes, tools*, and *frameworks*. Further literature searches were done on *development of health literacy*, *mental health literacy*, and *health literacy education*. Filters were checked for peer-reviewed, full-text literature published within the last 5 years for the majority of the research. The search combinations yielded hundreds of sources. I studied sources that laid a foundation for what health literacy is, those that examined the effect that health literacy has on the health organization, theoretical frameworks and tools that have been researched and developed, and health literacy related to the training of health care workers and nursing students. The theoretical framework can extend beyond the original timeframe as well as any literature that describes the development of the original tools used in health literacy research (Creswell, 2013). Furthermore, the data originally gathered through the National Assessment of Adult Literacy (NAAL) played a pivotal role in the development of health literacy research, awareness, and tools; there has not been a similar undertaking since this assessment was conducted in 2003.

The Lack of Proficient Health Literacy

Health literacy continues to be an evolving concept. The World Health Organization (2015) defined health literacy "as the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use

information in ways which promote and maintain good health" (para. 1). This complex definition of health literacy encompasses the ability of the individual not only to understand health information, but also to comprehend the effects that external factors have on his or her ability to navigate and interact with others in the health care environment. The Patient Protection and Affordable Care Act (2010) defined health literacy as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services in order to make appropriate health decisions." The CDC and Department of Health and Human Services (HHS) have adopted this definition, which served as the operational definition in this study.

The 2003 NAAL assessed the current state of health literacy in more than 19,000 individuals age 16 and older. Kutner et al. (2006), who published the results, found that, for several reasons, the majority of the U.S. population (98%) lacked proficient-level health literacy skills. The United States is known as a melting pot, and as the population becomes more diverse, so will health literacy statistics. Race appears to have a direct correlation with health literacy (Lee, Carter-Pokras, Braun, & Coleman, 2012). Among the 98% who lacked proficiency, rates of poor proficiency were higher among older adults, minority populations, those with low socioeconomic status, and the medically underserved (U.S. Department of Health and Human Services, 2015). Participants who completed the NAAL study and who had an ethnicity of White or Asian/Pacific Islander had higher health literacy abilities compared to other ethnicities (Kutner et al., 2006). Participants who spoke only English before starting school had higher literacy

proficiency than those who spoke only other languages, as well as those who were able to speak English and another language (Kutner et al., 2006).

Furthermore, researchers have found that the average adult reads at a level five grades lower than the last year of schooling he or she has completed (Osborne, 2011; Torres & Nichols, 2014). Thus, if the majority of Americans have educational credentials consisting only of a high school diploma and they do not advance their schooling, the average reading level is eighth grade. As such, it is difficult for Americans to interpret health information to make educated decisions and navigate the complex health system. Furthermore, if health care workers are unaware that the average American reads at or below an eighth-grade reading level, they likely are not speaking or relaying written and numeric health information at a level that can meet patients' needs.

The road toward limiting the effect that poor health literacy has on the majority of the U.S. population will be long unless the health care system restricts the use of medical jargon, finds solutions to overcome cultural barriers, and assists those with limited English proficiency (LEP; U.S. Department of Health and Human Services, 2015). In a cross-sectional survey of Korean Americans' language proficiency and health literacy, Lee and Choi (2012) found that as Korean Americans progress through levels of education, their English skills tend to become more proficient (Lee & Choi, 2012). This research further suggests that education and training impact the communication ability and skills of a person if there are no other barriers; conversely, limited English proficiency and inadequate access to quality education and training adversely affect a student's ability to develop health literacy skills. In response to this situation, the

National Action Plan to Improve Health Literacy (as cited in Diehl, 2011) identified the need to not only teach English in adult basic education, but also put a focus on health literacy.

Consequences of Inadequate Health Literacy

Lack of proficient-level health literacy costs more the $100 billion annually in the United States (National Academies of Sciences, Engineering, and Medicine, 2015). This price tag is 4 times greater than the cost for the population with proficient health literacy abilities (Ickes & Cottrell, 2010) and has been attributed to chronic conditions and the inability to coordinate health services and increased hospitalization (Heinrich, 2010; Macabasco-O'Connell & Fry-Bowers, 2011). Rasu, Bawa, Suminski, Snella, and Warady (2015) studied a sample of 22,599 participants from the Medical Expenditure Panel and the NAAL and found that none of the sample population had proficient health literacy. The authors discovered that the participants had significantly higher use of the emergency room, office visits, and prescription expenditures. Those lacking basic health literacy are more than likely to make errors with medications and are sicker when they seek medical care, which can lead to longer hospital stays, death, and higher rates of hospitalizations (Berkman et al., 2011).

Limited proficient health literacy is higher among minority populations, those with low socioeconomic status, and older adults. These populations may have more difficulty completing forms, sharing and understanding their medical history, identifying the relationship between risky behavior and health outcomes, managing health

conditions, and understanding treatment options and directions (Heinrich, 2010; U.S. Department of Health and Human Services, 2015).

In a study of 92,749 patients who received care from the Veterans Administration health system over a period of 3 years, researchers found that those with inadequate or marginal health literacy had significantly higher outpatient and pharmacy costs when compared to those with adequate health literacy (Haun, Patel, French, Campbell, Bradham, & Lapcevic, 2015). The 3-year estimated cost associated for patients receiving care within this system with marginal or inadequate health literacy was $143 million more than for those who were found to have adequate health literacy. This study population was not minorities, but predominately older white males.

Health Literacy and the Health Profession

Health literacy rests not only on the individual, but also on the medical ecosystem, consisting of clinics, hospitals, accrediting boards, government, and organizations in academia. Health literacy has taken such a prominent role in health care outcomes that it is considered the sixth vital sign, as it has been linked to health disparities and adverse clinical outcomes (Heinrich, 2010). Although there has been affirmative action in limiting human error in administering medication, Lindquist et al. (2011) found that paid caregivers lack proficient-level health literacy skills and do not fare well when given complex medication directions. Paid caregivers are often unable to follow the instructions on pill bottles and place medications accurately into pillboxes (Lindquist et al., 2011).

Health professionals are expected to assist patients in navigating the complex health care system, aid in identifying which health information is best suited for a given situation, and communicate the various types of health information via the different methods by which health information can be given (CDC, 2015). A review of the research suggested that such assistance is not provided in many situations across the health care landscape. According to the NAAL, only 15% of adults in the United States who have obtained an associate's degree have proficient health literacy levels (Kutner et al., 2006). The numbers increase to 27% for those who graduated with a bachelor's degree and 33% for those who have taken some graduate courses or have obtained a graduate degree (Kutner et al., 2006). The NAAL study also found that 4% of those who received an associate's degree were below basic health literacy proficiency.

Demonstrating health literacy does not mean being literate in English, but being able to identify information in short prose texts, detect and follow instructions in simple documents, and locate numbers and use them in simple quantitative operations. Fifteen percent of NAAL (2003) participants had basic health literacy proficiency, which means that they were able to orally read at a certain level of fluency and proficiency. This also meant that if they could not only locate information, but also read and understand information to get through tasks.

The 66% of associate-degree participants who demonstrated intermediate proficiency on the NAAL (2003) were reading and understanding information in dense and less commonplace prose texts, summarizing and making simple inferences, determining causes and effects, identifying information in multiple documents, and using

quantitative data to solve problems when the arithmetic operation was not specified. Those with proficient-level literacy abilities can read prose that is lengthy, complex, and abstract, and they can synthesize the information and make complex inferences. The participants in the study could locate, synthesize, and analyze multiple pieces of information that could be found in various documents. Furthermore, those with proficient literacy skills can use general quantitative data to solve multistep problems involving complex arithmetic operations (Kutner et al., 2006).

Nursing and Health Literacy

The roles that individuals assume in providing health care require reading and numeracy abilities, health-related knowledge, speed and efficiency of thought, critical thinking, and capacity to multitask and recall memories and other information. In a survey of perceptions of health literacy among registered nurses, advanced nurse practitioners, clinical nurse specialists, and clinical nurse managers, Macabasco-O'Connell and Fry-Bowers (2011) found that 80% of nurses had not heard the term *health literacy*, 59% did not have formal education or training in health literacy, and 80% never or rarely assessed patients for health literacy with a valid health literacy tool.

This lack of awareness and education is troubling. The majority of those surveyed by O'Connell and Fry-Bowers (2011) had an associate's degree and were in positions in which patients relied on them to be able to communicate health information and ensure patients' understanding of the information through evidence-based practices. Thirty percent of the nurses asked patients if they had a difficult time reading health information. Fifty-six percent viewed health literacy as having lower priority than other

health concerns, despite its direct effect on health outcomes (Macabasco-O'Connell & Fry-Bowers, 2011). Lack of proficient-level health literacy has been tied to health disparities, poor clinical outcomes, and hospital readmissions (Dickens et al., 2013).

In another study, Sand-Jecklin et al. (2010) found that nurses were not adequately educated on identifying health literacy needs of patients within their programs. Researchers who studied nurses who worked in a long-term care setting found that they lacked adequate knowledge and skills to manage pain and other palliative-care symptoms effectively (Brazil, Brink, Kaasalainen, Lou Kelly, & McAiney, 2012). Although nursing students and seasoned nurses must be able to identify patients who are lacking literacy skills and those who are compensating for this skill deficit, which requires proper training and education, the long-term care environment has not had the means to provide effective continuing education and training on health literacy. Constraints include budgeting and staff coverage (Brazil et al., 2012). Without the right instructions and practice, the result can be frustration, impoverished and adverse health outcomes, and increased health problems (Sand-Jecklin et al., 2010).

Authors of a pedagogical assessment on the health literacy knowledge and experiences of associate-degree nursing students used the Health Literacy Knowledge and Skills Survey to measure the health literacy knowledge and skills of nurses at the various levels of a program (Torres & Nichols, 2014). This survey yielded a low Cronbach's alpha score, suggesting that the survey may have needed adjustments. No other tools were used to validate the nurses' actual health literacy levels to identify any functional health literacy needs based on tested, evidence-based tools such as the Test of

Health Literacy Assessment in Adults (TOFHLA), Rapid Estimate of Adult Learning in Medicine (REALM), or Newest Vital Sign (NVS) at this level.

Torres and Nichols (2014) found that 27% of nursing students failed to identify "teach-back" as the most efficient way to ensure understanding of health information. Twenty-four percent of nursing students did not understand that a nurse should be aware of the fact that patients with low health literacy proficiency can have difficulty applying health information to various health situations. Forty percent were unaware that patients likely to pretend to read the information given to them, and 49% of ADN students were not aware that a lack of participation in discussion of their care is another patient behavior linked to low health literacy (Torres & Nichols, 2014).

Health Literacy and Higher Education

Health literacy refers to a person's ability to use cognitive and social skills to gain access to, understand, and use health information in ways to promote and maintain his or her health (Chen, Hsu, Tung, & Pan, 2012). As mentioned previously, researchers have correlated patients' health literacy level and the outcome of their ongoing care. Therefore, health organizations must find ways to gauge patients' health literacy levels and to deliver information appropriately to ensure that patients can understand and use the information that is given to them. Those relaying the information must be adequately trained to recognize health consumers' health literacy abilities and to deploy the proper health literacy tools to ensure effective communication.

Education is one of the leading factors determining a person's health literacy (Chen et al., 2012). Those who have obtained a bachelor's degree have almost twice the

amount of proficiency (27%) compared to those who have received an associate's degree (15%; Kutner et al., 2006). This is important, given the limited differences in the scope of practice of an associate's-degree registered nurse giving care and a bachelor's-degree nurse providing care (Minnesota Board of Nursing, 2016). Ivanitskaya, Hanisko, Garrison, Janson, and Vibbert (2012) studied preprofessional health students in Year 1 and Year 2 schools. The more education individuals had, the better the health literacy scores they received. Education also affected motivation and students' ability to identify reliable resources and gain more information regarding various health topics.

Nursing students are expected to receive a comprehensive curriculum in either 2 or 4 years. Therefore, patients and health care employers expect the staff will come ready to work with the up-to-date knowledge needed to perform their duties successfully. Health literacy is not currently a licensing requirement, and adopting the course curriculum into higher education is a challenge (National Academies of Sciences, Engineering, and Medicine, 2015). Among nurse practitioners who participated in a study on health literacy, 75% had "never" or only "sometimes" had health literacy emphasized in their curriculum; even though they have contact with patients with complex needs and must educate and inform patients (Cafiero, 2013).

In a review of nursing textbooks and literature used in nursing programs, DeBello (2012) found that the literature on these programs failed to address health literacy or health literacy strategies adequately. This lack of education is a lost opportunity; as this is a time when students are malleable and can learn new processes. In addition to teaching students, universities and teaching hospitals are more likely than solo or group

practices to engage in outreach to the diverse population and may be better equipped to meet the needs of those lacking health literacy skills (Livaudais-Toman et al., 2014).

National Action Plan to Improve Health Literacy

A set of goals has been formulated by more than 700 public and private entities to reconstruct the way health information is created and disseminated and to develop seven goals. The overall objective is to "ensure that children graduate with literacy skills that will help them live healthier throughout their lifespan," (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010, p. ii). The authors of the report were not referring to only K-12 education. Goal 3 stresses "incorporat[ing] accurate, standards-based, and developmentally appropriate health and science information and curricula in child care and education through the university level" (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010, p. 32). The goal most relevant to higher education under this action plan is the requirement to have health literacy and health education for all postsecondary schools and to build partnerships across a variety of sectors. This plan includes health care providers, libraries, and adult education centers, to build a connection with the health literacy activities between these community partners (U.S. Department of Health and Human Services, Office of Disease Prevention, and Health Promotion, 2010).

Higher education is also addressed in Goal 4. Goal 4 focuses on the effort to "support and expand local efforts to provide adult education, English language instruction, and culturally and linguistically appropriate health information services in the

community" (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010, p. 35). College students are expected to use their health literacy skills to bridge the cultural and generational divides (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010). While this action plan does not specifically speak to nursing, it does identify the need for health care workers to be trained in health literacy and plain language and to be the medium for dissemination of information between referenced complex health information and the community.

Licensing Boards and Accrediting Bodies

Although licensing boards do not require health literacy education and training, the LCME, the accrediting body for allopathic medical schools, calls for medical curricula to include instruction on communication skills related to patients, their families, colleagues, and other health professional. The Accreditation Council for Graduate Medical Education (ACGME), which oversees allopathic residencies, requires students to "actually" communicate information and team with patients, families, and other health professionals across a broad range of socioeconomic and cultural backgrounds (National Academics of Sciences of Engineering, and Medicine, 2015). Despite these strides, problems remain with teaching health literacy, using health literacy tools, and other barriers, including undefined measurements to ensure that goals are being met.

A stigma surrounds a lack of literacy, and having an open and honest discussion with the patient can be difficult if the nurse does not know how to set the tone. Caregivers who can communicate in a nonjudgmental environment can ease patients'

fears about discussing their health literacy difficulties. Using open ended questions to understand a patient's learning style can be helpful; for example, asking whether the patient prefers reading to nonreading options can give insight into a person's literacy abilities. Nurses can look for other clues, such as noticing if patients or caregivers do not fill out forms or if they misspell words, or if they identify medications by color and shape rather than by the prescription label (Osborne, 2011).

Taking the time to assess a patient's health literacy requires sensitivity throughout the interaction. Proper communication can be taught only early on when students are attending nursing school and observing faculty members (Sand-Jecklin et al., 2010). Many of the current teaching methods are evidence-based and have been effective in teaching nursing education. Other research has not addressed the extent to which students can apply the learning in practice. Nursing students lack the knowledge to provide proper patient education (Scheckel et al., 2010). In a study of associate-degree nursing students, 41% knew basic facts about health literacy, and only 46% knew the guidelines for written materials, which Torres and Nichols (2014) argued is a lack of health literacy education within the nursing curriculum.

Healthy People 2020

A change in the college nursing curriculum could aid in meeting patient needs and community goals listed in Healthy People 2020 initiatives. Several of the goals of Healthy People 2020 follow:

- The health care provider gives the patient easy-to-understand instructions
  (U.S. Department of Health and Human Services, Office of Disease, and

Health Promotion, 2014). In a cross-sectional survey, Cantor Coa, Crystal-

Mansour, Davis, Dipko, and Sigman (2009) found that 64.1% of adults aged

18 and older thought their doctor gave them easy-to-understand instructions.

- The providers of health care ask patients how they will follow instructions to

    ensure understanding (U.S. Department of Health and Human Services, Office

    of Disease and Health Promotion, 2014). This goal has room for vast

    improvement. In the same cross-sectional survey, only 24.4% of adults were

    asked how they plan to follow the instructions given by their provider to make

    sure that they understood the information (Cantor et al., 2009).

- The health care provider clarifies health information in a way that the patient

    can understand it (U.S. Department of Health and Human Services, Office of

    Disease and Health Promotion, 2014). When adults were surveyed on

    whether they were offered assistance in filling out forms, only 14.8% of adults

    aged 18 years and older said yes (Cantor et al., 2009).

The baselines for these goals reflect the cross-sectional information found in the

2011 data from the Health Information National Trends Survey (HINTS). The majority

of the objectives for Healthy People 2020 have a measurement goal to increase

improvement on the measure by 10% (U.S. Department of Health and Human Services,

Office of Disease and Health Promotion, 2014). These objectives align well with the

goals and strategic plans of government agencies, including one of the theoretical

frameworks in this study, the health literate care model.

Theoretical Framework: Asset Model

Health literacy is a complex phenomenon dependent on the interrelations of social and cultural contexts. The asset model suggests that health literacy consists of three levels: functional health literacy, communicative literacy, and critical literacy. Functional literacy is a person's ability to read and write to function effectively in a given situation. Communicative literacy requires one to extract information to gather meaning from varying forms of communication to apply it to the changing situation. Critical literacy is the most advanced level of literacy. At this level, the person needs to be able to analyze the information critically to make decisions that will affect the outcomes of events Nutbeam, 2008, 2013).

The asset model, suggests that health literacy can be supported and enabled, or it can be identified as a hazard and be controlled and adapted. For the outcome of health literacy to happen, prior reading fluency and numeracy must be supported with clear communication and education. These pieces will support skills self-advocacy and self-management, and it will build knowledge and capacity (Nutbeam, 2000, 2013). The asset model refers to not only reading comprehension and understanding figures. Comprehension is also a determinant of a person's personal, social, and cultural development (Martensson & Hensing, 2011; Nutbeam, 2000, 2008, 2013). Health literacy is not a skill that is naturally accomplished and completed. It is a continuum of competencies that can be affected by life events and processes (Martensson et al., 2011). Functional, communicative, and critical skills can progressively increase when treated as

an asset, through formal and informal education and experiences, which can have an effect on behaviors and practices. The result can be improved health outcomes, choices, and opportunities (Nutbeam, 2000, 2013).

Unaccommodating clinical and community settings, absences of role models, and inadequate theoretical preparation are three primary factors that influence a nursing student's performance and ability to communicate effectively and decrease their ability to increase their health literacy skills: (Sykes, Wills, Rowlands, & Popple, 2013). Chin et al. (2011) examined two of three fundamental components of health literacy among older adults: processing capacity and general knowledge. The process-knowledge model focuses on whether health education tends either to remain unchanged or to increase with age. It parallels the asset model and can be measured with the Shortened Test of Health Literacy Assessment in Adults (S-TOHLA) and Rapid Estimate of Adult Learning in Medicine (REALM) to compare health literacy abilities. Health literacy depends on a variety of general skills that are necessary for understanding and reasoning about health information (Chin et al., 2011).

Theoretical Framework: Health Literate Care Model

For adequate health literacy and proper health communication to take place, a complex phenomenon must happen that requires not only skills and knowledge. Health professionals must also have the public's understanding that health information is essential. Thus, basic health literacy is fundamental to each patient-provider interaction (U.S. Department of Health and Human Services, 2010). Adverse clinical outcomes occur when health professionals' communication skills do not align with the patient's

ability to understand. Therefore, health professionals should use universal precautions as outlined by the U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality (2015), part of the health literate care model.

Health literacy is a compilation of experiences and interactions with others. A person's capacity can be affected by the demands and complexities of the health care system (Brach et al., 2012). The health literate care model supports the notion that if the infrastructure, policies, process, materials, and relationship become easier or more difficult, the patient fluctuates between the levels of health literacy ability. If the levels are not adapted to one level, the system will be too complicated, and the effectiveness in any given situation, such as treatment or a diagnosis, will diminish (Brach et al., 2012). Providers of health services must assume every patient has limited proficiency in understanding health information and navigating the health environment. Health literacy requires a multitude of skills for a person to interpret health information, to read and write prose, use digital information, and to adequately verbalize their information (CDC, 2015).

With only 12% of U.S. adults having the health literacy skills required to navigate the complex health system (Kutner et al., 2006), health care workers must be able to use universal precautions, which means to assume all will lack proficient health literacy, and to employ proper health literacy strategies. Central to this model is the need for leaders to drive the strategic and comprehensive changes to identify challenges and aid in designing and promoting the health literate care model (Koh, et al., 2013). Furthermore, nursing students are expected to meet the needs of the changing health landscape. The

health literate care model has been developed by the U.S. Department of Health and

Human Services, Agency for Healthcare Research and Quality to assist in these changes.

This model set the expectations for providers of care to treat everyone as if they lack

proficiency in health literacy and to be aware of the proper health literacy tools available

to meet the needs of patients to ensure appropriate relay and understanding of

communications.

The Frameworks Together

The asset model and the health literate care model suggest the need for policy

makers and health care workers to identify health literacy as a risk or an asset. Once this

is decided, then administrators and health care workers can deploy the proper methods

utilized within the health literate care model, a universal approach to the patient and their

literacy abilities. Identifying health literacy as an asset, such in the cases of having a

prepared and active care team that is aware of the proper health literacy tools and

practices, can aid in identifying patient needs, raising awareness, and assist in patient

self-management (Koh et al., 2013). A knowledgeable team can reduce health care costs

and assist in implementing proficiencies contained within the health literate care model.

While many of these measures can be identified and deployed by the health care

administration, the staff at the medical facility working with the patient has the greatest

impact on the measures.

These models will help nursing faculty identify if the student's current functional

health literacy is adequate to meet program needs or if there are additional requirements

that need to be met to enhance their progression through the program. Beyond the

education setting, nursing students' awareness can affect their ability to carry effectively

out the health literate care model; if not, additional training may be required to ensure

new nursing graduates are an effective member of the health care team.

Summary

The purpose of this study is to identify if there is a correlation between the

functional health literacy of associate's degree nursing students and their awareness of

the health literacy needs of patients. There has been an increase in programs and

initiatives to increase health literacy awareness. The research has shown that students

leave their programs unaware of the tools available to identify patients who have poor

literacy abilities and how to educate and translate health information.

The asset model and health literate care model complement one another. The

impact of a person's functional health literacy could affect his or her ability to carry out

the health literate care model. This model requires a health care worker to be aware of a

patient's health literacy needs and to use the proper health literacy tools. Ensuring

awareness can be difficult if the nurse does not have proficient health literacy abilities or

has not been trained in their curriculum on these universal health literacy precautions.

In this study, I assessed the student's functional health literacy using TOFHLA.

After students had completed the TOFHLA, they completed Knowledge and Skills

Survey; which is designed to test their awareness of patient needs. The research design

and rationale, methodology, and sampling population will be discussed in Chapter 3.

Ethical procedures along with instrumentation and operationalization of constructs will

also be covered in this chapter.

Chapter 3: Research Method

Introduction

The purpose of this study was to examine the functional health literacy of ADN students and to identify correlations between their functional health literacy and their awareness of the health literacy needs of patients. Although knowledge of the effects of proficient health literacy has increased, research is limited on the outcomes of the health literacy levels of health professionals entering the health environment. Lack of proficient-level health literacy can cause a breakdown in communication and have an effect on patient outcomes and the quality of care (Sand-Jecklin et al., 2010).

In this chapter, the research design and rationale are presented. The methodology is discussed, including a description of the population, sampling, recruitment, participation and data collection, instrumentation, threats to validity, and ethical procedures.

Research Design and Rationale

The research design that was used was a quantitative cross-sectional correlation study. Multiple external factors need to be considered, as they can alter the score a person receives on the TOFHLA and the Knowledge and Skills Survey. Therefore, it is best to identify participants in a natural setting and to note the variables that have an impact on their health literacy abilities: age, race, gender, length of education, and whether they have had previous health literacy training. Due to the quantitative outputs of the TOFHLA and Knowledge and Skills Survey and the supporting literature to assess health literacy, a quantitative study was chosen. The research questions and hypotheses

supported this research design. Furthermore, because the group was identified and was not randomly assigned to separate groups where the independent variable would be manipulated (Campbell & Stanley, 1963), this research design and approach were most appropriate for this study. All participants underwent the same procedure and process.

Researchers who have examined health literacy within the health profession—whether with a focus on providers of health services or with a focus on the patient's health literacy—have conducted correlational studies. Torres and Nichols (2014) used a Health Literacy Knowledge and Skills Survey to draw correlations between data collected regarding all associate-degree nursing students enrolled at the Borough of Manhattan Community College. As stated previously, this study showed that students were lacking in some areas of their health literacy knowledge and needed additional education on the subject.

Dickens et al. (2013) used a descriptive, cross-sectional approach to research nursing professionals' overestimation of patients' health literacy. In addition to the descriptive statistics, correlations were completed to compare patient educational attainment stratified by the newest vital sign categories, an assessment that indicates a person's health literacy ability. Findings from Dickens et al. and other studies suggest that schools of nursing and health sciences should educate health professionals on health literacy and focus future research on diminishing the adverse outcomes associated with low health literacy.

The asset model is based on the theory that health literacy is the result of education, life events, and communication (Nutbeam, 2008, 2013). These results are

tested by assessments such as the TOFHLA, the REALM, and other similar evaluations,

which are then compared to the variables chosen. The health literate care model is based

on the identification of correlations between demographic variables, studies that included

assessments, and the growing body of knowledge that supports the understanding that

poor health literacy is an epidemic and that better provider-patient communication is

needed (U.S. Department of Health and Human Services, 2010). Examining the

functional health literacy of ADN students and surveying their awareness of health

literacy tools and concepts provides insight into their ability to provide quality

communication to patients, which can affect outcomes of care.

Research Questions and Hypotheses

The research questions were designed to identify patterns in the relationship

between the variables, which included the demographics of the participants, the score on

the TOFHLA, and the health literacy awareness survey. The variables that have been

identified align well with previous variables that have been used in the NAAL and other

similar studies and assessments, such as age, number of years of education, and ethnic

background. The NAAL included language spoken before starting school and poverty

threshold as two additional demographic characteristics (Kutner et al., 2006); I focused

only on participants who had English as their primary language because the research

tools used for this research had not been adequately translated into other languages. In

addition to the demographic variables selected for this study, I have also taken into

consideration whether participants had health literacy training, and if so, the length of the

training. Because exposure to health literacy training and the duration of such training can have an impact on the outcome, correlations were drawn for these variables as well.

RQ[1]   How is the functional health literacy of associate-degree nursing students related to their awareness of the need to identify patients with low health literacy?

    Ho1:   There is no statistically significant relationship between the functional health literacy of nursing students and their awareness of the need to identify patients with low health literacy.

    Ha1:   There is a statistically significant relationship between the functional health literacy of nursing students and their awareness of the need to identify patients with low health literacy.

RQ[2]   How will the demographics of students have an impact on their functional health literacy and their awareness of the need to identify patients with low health literacy?

    Ho2:   The demographic characteristics of students will not have an effect on their health literacy as assessed by the TOFHLA and their awareness of the need to identify patients with low health literacy.

    Ha2:   The demographic characteristics of students will have an effect on their health literacy as assessed by the TOFHLA and their awareness of the need to identify patients with low health literacy.

RQ[3]   What are the differences in health literacy and awareness of the need for health literacy between nursing students who have had health literacy

training and nursing students who have not had exposure to health literacy

training?

Ho3:   There is no difference in health literacy and awareness of the need

for health literacy between nursing students who have had health

literacy training and nursing students who have not had exposure

to health literacy training.

Ha3:   There is a difference in the health literacy and awareness of the

need for health literacy between nursing students who have had

health literacy training and nursing students who have not had

exposure to health literacy training.

Methodology

Population

Nursing is the largest of the health professions. As of 2013, there were 2.6

million RNs; this figure included ADNs and those with a diploma RN (AMN Healthcare,

2013). Fewer than half of the RNs who hold associate-degrees will go on for further

schooling (AMN Healthcare, 2013). In Minnesota, 101,852 RNs are currently licensed;

their average age is 46.24 years (Minnesota Board of Nursing, 2016). The average age

decreases among students enrolled in an associate-degree nursing program. The average

enrollment per year in these programs is 50 students (State of Minnesota, 2012), for about

1,350 ADN students in the state.

Sampling and Sampling Procedures

A convenience sample of students from accredited associate-degree nursing programs in Minnesota participated in this study. This type of nonprobability sample design allowed for a sampling of the nursing programs after completion of an Institutional Review Board (IRB) process at each location. The Minnesota Board of Nursing has approved 27 associate-degree nursing programs (State of Minnesota, 2012).

I did not select a purposive or quota sampling method. Each of these methods requires the researcher to determine when the sample appears to be representative of the population, and due to the timeframe during which the study was to be conducted, it would have been difficult to reach the appropriate effect size (Frankfort-Nachmias & Nachmias, 2008). Because the design was cross-sectional correlational with one dependent variable, correlational tests such as Pearson correlation were used to examine the association of effect size between variables (Field, 2013).

There were three participant criteria: Each participant needed to (a) be a current ADN student in the last two semesters at one of the colleges selected, (b) speak English as his or her primary language, and (c) be of age to provide implied consent. A G*Power 3.1 calculation was completed to determine the effect size (Figure 1). The correlation: bivariate normal model with a sample size for two-tailed, 80% power, and alpha set at .05 was selected. The test was set at a priori because the power analysis was conducted before the collection of data; it was used to determine sample size (Faul, Buchner, & Lang, 2009). This resulted in a minimum sample size of 84 student nurses. This calculation was based on the primary research examining the correlation between the

functional health literacy of ADN students (independent variable) and their awareness of the patient's health literacy needs (dependent variable). A minimum sample size of 84 falls in line with previous studies on health.
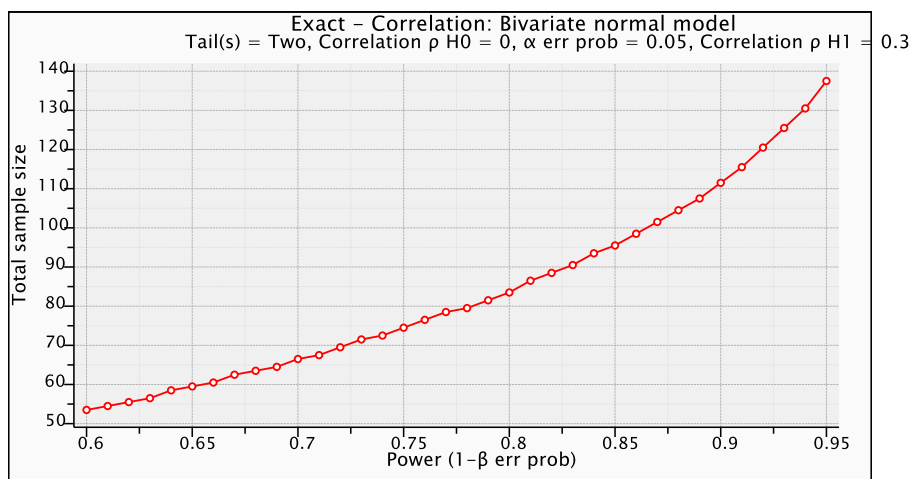
Figure 1. Power plot graph.

The majority of sample designs in research on health literacy fall within the nonprobability sampling design category. Scheckel, Emery, and Nosek (2010) used a purposive sampling of eight undergraduate nursing students in their final semester of a baccalaureate nursing program; this design was an interpretive phenomenology. In another study of baccalaureate nursing students, the researchers chose to complete a longitudinal survey using a nonprobability sample (convenience sample) with a sample size of first 90, then 46, and then 96 students who had completed their sixth semester (McCann et al., 2009). Researchers who completed a study on 98 paid nonfamily caregivers chose a purposive sampling method (Lindquist et al., 2011). In one study of

junior and senior baccalaureate students' health literacy, the researchers selected random

sampling after ensuring that disciplines of study from all colleges at the university were

represented. The sampling happened twice because the sample size of 366 was not

reached for the first quarter in the classes that were randomly selected (Ickes & Cottrell,

2010).

Procedures for Recruitment, Participation, and Data Collection

Recruitment. Emails were sent out to nursing and health sciences deans at each

of the colleges to explain the study and inform the college that individuals' participation

was voluntary. A copy of the implied consent was also included. The implied consent

included background information on the study, the procedure of the research, any risks

involved, the confidentiality of the data, and an explanation that the study was voluntary.

Implied consent was used for this study because there was no reason to use identifiers

that would link the information back to the participant such as name or date of birth.

After the colleges that are willing to be part of the study had been identified, the IRB

processes at each location were completed, and dates and timeframes were selected.

Participation. The dean, program director, or faculty contacted students

concerning when and where on campus the study would take place. The students who

chose to participate in the study received another implied consent. The implied consent

was read out loud to the participants while they followed along with their copy. They

were asked if they had any questions. They implied consent by moving forward with the

demographic form and assessments. Numbers identified the participants, rather than

names, so that neither the college nor I could distinguish which student completed the

TOFHLA and the Knowledge and Skills Survey.

Data collection. Each participant completed a demographic questionnaire that

inquired about the participant's age, gender, number of years of previous education, race,

and previous exposure to health literacy training (Appendix A). Once the questionnaire

had been completed, the participant then began the TOFHLA, followed by the

Knowledge and Skills Survey. Because data were collected only once, the Knowledge

and Skills Survey was the last step. After completing this final step, participants were

told that they could put their documents in the provided envelope and close it. This

action signaled that they had completed the study. Results will be distributed to the point

of contact at each campus.

Instrumentation and Operationalization of Constructs

The demographic questionnaire addressed the majority of the independent

variables identified for this study: age, gender, number of years of previous education,

race, and prior health literacy training. The remaining primary independent variable was

based on the TOFHLA score. The independent variables (IVs) were the following:

- Age (Range: 18–21; 22–25; 26–29; 30+).

- Gender (SPSS Coded Value: 1—male; 2—female).

- Number of years of previous education (Numeric—denotes years;
  postsecondary students could complete in 12–13 years): 12; 13; 14; 15; 16;
  17; 18; 19; 20+.

- Race (SPSS coded value: 1—White; 2—Black; 3—Asian, 4—Pacific Islander; 5—Hispanic/Latino; 6—Other).

- Prior health literacy training (SPSS coded value: 1—Yes; 2—No).

- Health literacy of nursing student (TOFHLA score).

Dependent variable (DV): Awareness of patient health literacy needs (Knowledge and Skills Survey score).

The Test of Functional Health Literacy for Adults (TOFHLA). The TOFHLA was constructed in 1995 and tests a person's ability to read passages and phrases containing words and numbers. The information was based on materials from health care settings. The researchers who developed the test reviewed more than 30 samples of hospital texts that were widely used. The reading comprehension portion is a modified 50 cloze procedures, which means every fifth to seventh word is omitted, and the reader is given four-word options in which he or she must select which one is grammatically or contextually correct (Parker et al., 1995; Wolf et al., 2012).

The full TOFHLA includes instructions for preparing an upper gastrointestinal series, a patient's rights and responsibilities section of a Medicaid application form, and a standard hospital informed consent form. The numeracy section for this assessment consists of 17 items using actual hospital forms and labeled prescription vials (Parker et al., 1995). Once participants are given these sections, they are asked a series of questions to test their ability to comprehend directions regarding taking medication, monitoring blood glucose, keeping appointments, and obtaining financial assistance. The numeracy section is multiplied by 2.941 to gain a score between 0 and 50. The numeracy score and

the reading comprehension score, also scored 0 to 50, are then added to get a total

TOFHLA score from 0 to 100 (Parker et al., 1995).

It takes the average participant 22 minutes to complete the TOFLHA; Baker et al.

(1999) created an abbreviated version called the Shortened Test of Functional Health

Literacy (S-TOFHLA). The overall Cronbach's alpha, which is an internal test of

consistency (Cronbach, 1951), was .68, with the reading comprehension section receiving

a Cronbach's alpha of .97 and the numeracy section receiving Cronbach's alpha of .60

(Baker et al., 1999). Therefore, most of those who use the S-TOFHLA offer only the

reading comprehension portion (Collins et al., 2012). Since the goal of this research is to

examine the nurses' functional health literacy ability in both reading and numeracy, the

S-TOFHLA was not be utilized for this study due to the lower Cronbach's alpha score in

the numeracy section.

Due to its validity, the TOFHLA has been used in several studies to identify

health literacy proficiencies and to assist in testing the validity of new instruments. The

TOFHLA was also the assessment used to test the participants who took part in the

NAAL. This screening tool adequately assesses the outcome of functional health literacy

based on reading, writing, and numeracy (Parker et al., 1995) and supports the theoretical

frameworks for this study when these scores are correlated with the demographics and

the Knowledge and Skills Survey. The contact for the TOFHLA is Dr. Parker at the

Department of Medicine at Emory University School of Medicine, in Atlanta, GA.

Knowledge and Skills Survey. The Knowledge and Skills Survey was developed

in 2005 to identify first-year pharmacy students' knowledge and comfort level regarding

health literacy (Sicat & Hill, 2005). The survey consists of 20 questions:

- Questions 1–8 are true-or-false.

- Questions 9–14 are multiple-choice.

- Questions 15–18 ask about respondents' comfort level when completing tasks

  for patients with low literacy

- Question 19 assesses the respondents' reading level in response to a passage

  about diabetic neuropathy.

- Question 20 is open-ended and asks participants to consider strategies on how

  to revise the text to improve readability (Sicat & Hill, 2005).

For this study, there was a pretest and a posttest of the pharmacy students. The

Knowledge and Skills Survey was given prior to the health literacy training intervention

and then after. The pretest Cronbach's alpha = .34, and the posttest Cronbach's alpha =

.61, and the difference in the scores was statistically significant ($p < 0.001$) (Sicat & Hill,

2005). These are low scores, but scores did increase between the pretest and the posttest

to show that the intervention did have some effect, as the changes in the Cronbach's

alpha scores were significant.

Another group of researchers (Devraj, Butler, Gupchup, & Poirier, 2010) adjusted

the statements on the questionnaire that they attributed to the low Cronbach score. The

authors found that students scored significantly higher between the posttest and the

pretest when compared to the Sicat study ($p < 0.01$). Devrag et al. (2010) attributed the

improvement to the students being in year 3 rather than year 1. The scoring was based on a point per question conversion. A Cronbach's alpha score was not provided for the revised statement; instead, Devrag et al. used face validity. Face validity means that the items on the survey appeared to successfully measure what the researchers intended to measure (Creswell, 2013).

Cronbach's alpha is utilized to assess the reliability of a scale, the higher the number, the more reliable the scale (Field, 2013). In some early stages of research, as in this case, a Cronbach's alpha as little as .5 has been sufficient to meet reliability based on the diversity of the constructs (Field, 2013). The contact for the utilization of the Knowledge and Skills Survey is B. L. Sicat, from the School of Pharmacy, Virginia Commonwealth University in Richmond.

Threats to Validity

Analysis. Once the assessments and surveys were completed, they were hand-scored. After hand scoring the assessments, the assessments were reviewed a day later to ensure the scoring was correct prior to entering the data into the Statistical Package for Social Sciences (SPSS) for data analysis. MANOVA was conducted to examine the effect of the secondary independent variables on the TOFHLA and the Knowledge and Skills Survey. The relationship between the TOFHLA scores and the Knowledge and Skills Survey was determined with a Bivariate Pearson correlation coefficient. Spearman correlation was used to identify the association between those who have had literacy training and those who have not had literacy training and their Knowledge and Skills Survey results.

Testing reliability. Pearson's correlation coefficient was used to examine the correlation between variables. Variables without a numeric value were numerically coded. Field (2013) stated that $r = .10$ is a small effect size, $r = .30$ is a medium effect size and $r = .50$ is a large effect size or relationship between two variables. For variables that do not meet the assumptions of Pearson's correlation, Spearman's correlation was utilized.

Construct validity. As stated previously, the Knowledge and Skills Survey along with the TOFHLA and demographic questionnaire assisted in drawing relationships between the variables. The instruments were utilized to determine if the functional health literacy of the nursing students is supported by their education and move them toward having proficient health literacy. The Knowledge and Skills Survey will identify if students have the background and skills needed to understand how health literacy affects patients and their ability to identify and perform various health literacy related activities.

Ethical Procedures

The implied consent was read and given to every participant. The implied consent reminded participants that any information provided would be kept confidential and that careful consideration has been given to any risk, such as fatigue, stress, anxiety, or frustration. Participants were informed they may withdraw from the voluntary study at any point. The student rather than collecting signatures gave implied consent, to protect their privacy. Their completion of the survey would indicate their consent.

I confirmed that I would not use the participants' information for any purposes outside of this research project. Data is kept secure by password protection and will be

destroyed after at least five years. Participants may obtain the reports from the contact person at the college.

In addition to IRB approval, institutional permission was received from each college granting me access to their students. I agreed to keep the sites anonymous in the study and the study report. Due to my role within a certain college, I also disclosed this, had to ensure students that my role had no bearing on how they progressed through their program. Lastly, I gained the permission that was needed to reproduce and conduct the TOFHLA and the Knowledge and Skills Survey.

Summary

The focus of this research was to identify if there was a gap between the ADN students' functional health literacy and their awareness of the need to identify patients with low health literacy. Using a cross-sectional correlational study, I identified the relationships between functional health literacy, past education, and other demographic factors, and an associate-degree nursing students' knowledge and abilities the need to identify patients with low health literacy. Previous research focused primarily on patients, the health literacy screening tool itself, or whether the provider of health services had health literacy understanding. There was not a previous study that screened ADN students using the TOFHLA to ensure that they were not limited in their functional health literacy abilities with a resulting emphasis on the importance of identifying patients with low health literacy.

In Chapter 4 details of the data collection, tests and scales, and the results will be included. The details of data collection including period, the end number of participants,

and the demographics of the participants will be discussed. The tests and scales will include descriptive statistics, statistical analysis, and research question and hypothesis results.

Chapter 4: Results

Introduction

The purpose of the study was to identify whether there is a correlation between the functional health literacy of associate-degree nursing students and their awareness of identifying patients' with low health literacy. This study was completed using the TOFHLA to assess the functional health literacy of nursing students and using the Knowledge and Skills Survey to assess their awareness of patient health literacy needs. Three research questions were derived from a review of the literature. The research questions are addressed in this chapter along with demographic data that were secondary independent variables for this research. In this chapter, I describe the data collection effort, the demographics of the sample, and the variables used in the statistical analyses, and I examine the findings as they pertain to the research questions and hypotheses.

Data Collection

Data collection began in February 2017 and concluded in April 2017. Throughout this period, the three identified college sites provided information on their IRB processes and deadlines. Each IRB process was completed. After the IRB process was completed at each location, a change in procedure form was submitted to the Walden IRB so that approval could be granted at that site for data collection. Once approval was granted, I worked with the dean or lead faculty designated for the site to arrange the time, dates, and space for data collection.

Demographics of Participants

The research design was a cross-sectional correlational study. The primary research was dependent on one variable, the Knowledge and Skills Survey, to determine the participants' awareness of the need to identify patients with low health literacy. Correlational test such as Pearson and Spearman correlation were pertinent to this study. A G*Power calculation was completed—correlation: bivariate normal model. This analysis was used to determine the sample size for two-tail, 80% power, and alpha set at .05; the minimum number of students needed for this research was 84.

The total number of students who responded to the request between the three associate-degree nursing programs was 138. All of those who presented to take part in the research were given the implied consent, which was read verbatim to them. They were given an opportunity to ask questions before moving on with the study, and then they were informed that moving on with the research forms implied their consent. The students were reminded that they could discontinue the study at any time by discontinuing completion of the assessment or survey instruments, putting the information into the envelope provided, and sealing it shut.

Of the 138 students who presented to take part in the research, one did not qualify for the study, and six did not complete the research assessments beyond either the demographic form (Appendix A) or the first or second page of the assessment. These partial pieces of information were not included in the data, as the participants' discontinuation of moving forward was a signal that they declined further participation in the research, leaving the total number of participants at 131. As shown in Figure 2, 131

participants brought the power above the 90% interval, power = 94%, significance level

set at .05.
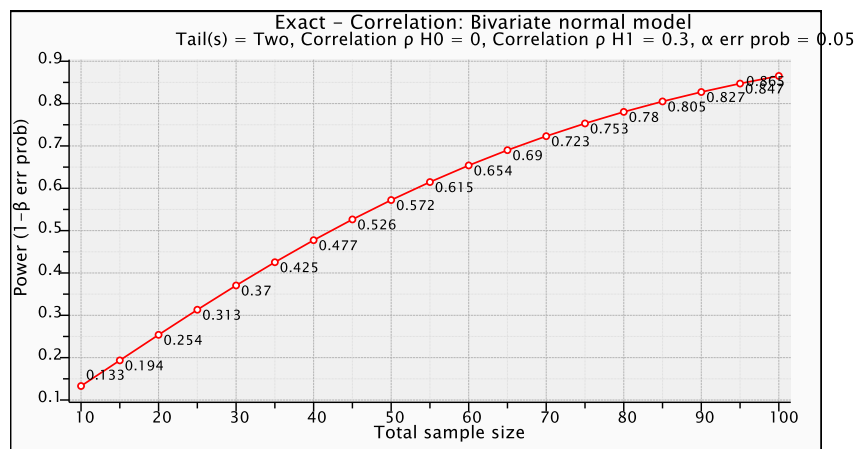
Figure 2. Sample power plot graph.

It took students an average of 34 minutes to complete the demographic form, the

TOFHLA, and the Knowledge and Skills Survey. Age was coded in SPSS as follows:

18-21 years was coded as 1, 22-25 years was coded as 2, 26-29 years was coded as 3, and

30+ years was coded as 4. As displayed in Table 1, 35.9% of the participants were over

the age of 30 ($n = 47$, $M = 2.92$, $SD = .945$, $SE = .083$). The median age of the

participants was 26-29. Of the 131 participants who completed the study, 110 reported

being female (84%). Gender was coded as follows: 1 was the code for male, and 2 was

the code for female. The distribution of the age groups is displayed in Figure 3. There is

minimal skewness $<\pm2.0$, but the distribution for gender, which is shown in Figure 4,

shows negative skewness due to the majority of the population being female, with

skewness of -1.873 (*SE* = .212) and kurtosis of 1.532 (*SE* = .420). Normal values for

kurtosis are between -3.0 and +3.0, and normal vales for skewness are between -2.0 and

+2.0 (Frankfort-Nachmias & Nachmias, 2008).

Table 1

Age of ADN Students

Age in yrs.	*n*	%
18-21	6	4.6
22-25	46	35.1
26-29	32	24.4
30+	47	35.9

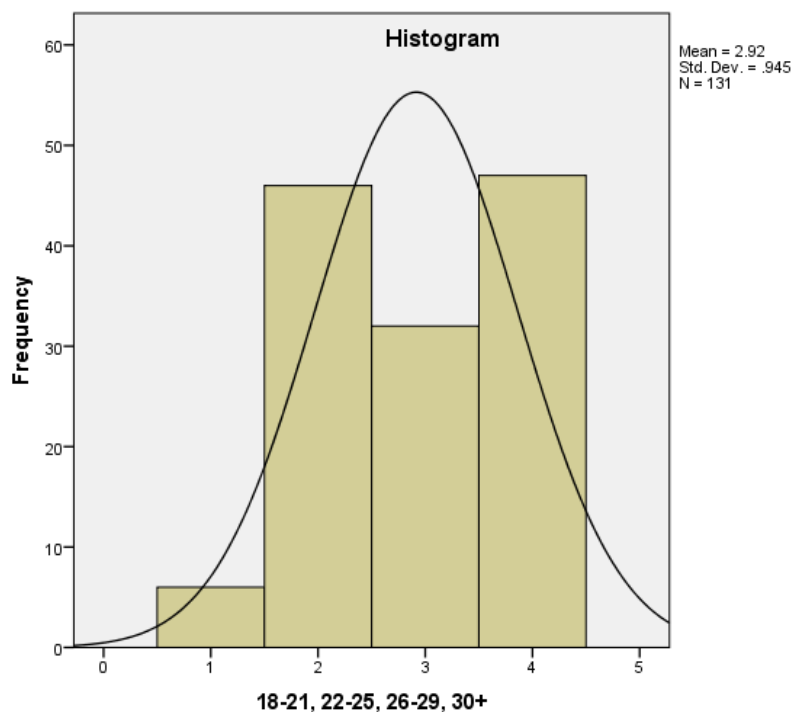*Note. N* = 131, *M* = 2.92 (22-25 years of age), *SE* = .083.
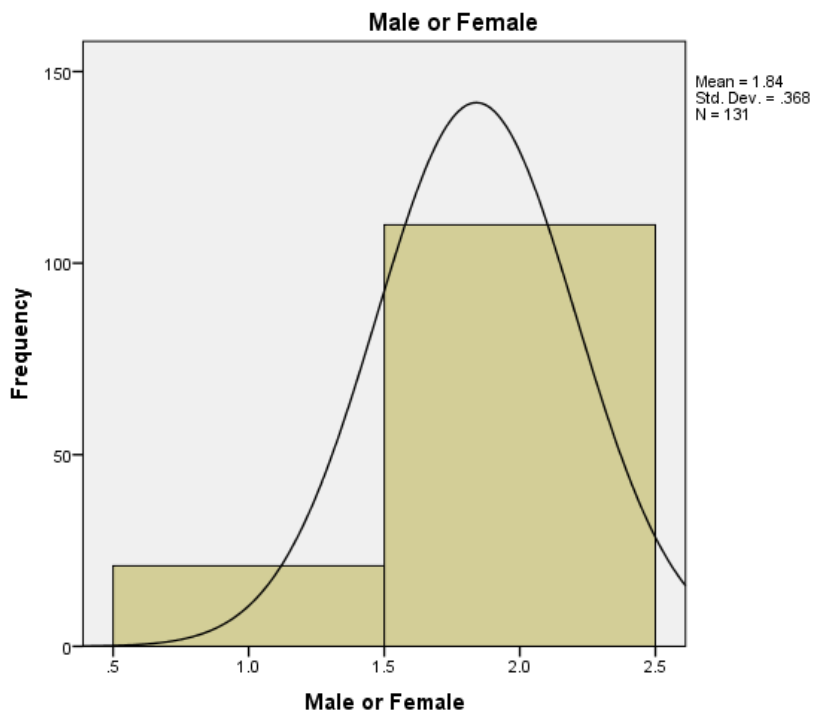

Figure 3. Histogram of age groups.

Figure 4. Histogram of gender.
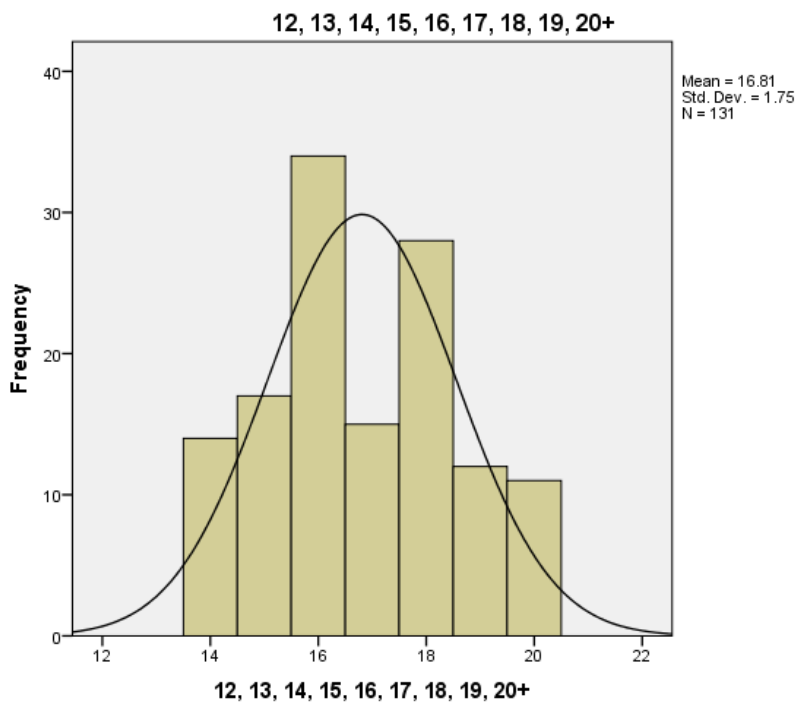
Figure 5. Histogram of years of education.

As shown in Table 2, 26% of participants reported having 16 years of education

total ($n = 34$, $M = 16.81$, $SD = 1.75$, $SE = .153$). A selection of 16 years of schooling

meant that a student had 13 years of K-12 education and an additional 3 years of higher

education at the time of the survey. Although participants had the option to pick as few

as 12 years of education to account for postsecondary students, the observed range for

this category was 14-20+ years of education. In addition to the question regarding years

of schooling, participants were asked if they had any formal health literacy training. Of

the participants who completed the demographic form, 104 participants (79.4%) indicated

that they had not had any health literacy training.

Table 2

Number of Years of Education

Yrs. of education	n	%
14	14	10.7
15	17	13.0
16	34	26.0
17	15	11.5
18	28	21.4
19	12	9.2
20	11	8.4

Note. N = 131, *SE* = .153, *M* = 16.81 years of education.

The majority of the participants were White ($n = 104$). The demographic

frequencies are displayed in Table 3, and the positive skewness can be seen in Figure 6,

the skewness of 2.400 ($SE = .212$) and kurtosis of 4.586 ($SE = .450$). It is important to

note that no one who participated in this study selected the "other" or "Pacific Islander"

options, although these were offered. The overall demographics of the participants

aligned closely with the current demographics of the nursing workforce. According to

the Minnesota Board of Nursing (2016), the largest age group among registered nurses (RNs) in the workforce is 55-64 years of age, followed by 34 years of age and younger; 92% of RNs are women, and 85% of the RN workforce is White/Caucasian.

There were six options for participant race on the demographic form: White, Black, Asian, Hispanic/Latino, Pacific Islander, and other. Race was numerically coded in SPSS as follows: White = 1, Black = 2, Asian = 3, Pacific Islander = 4, Hispanic/Latino = 5, and other = 6. As discussed previously, the sample was representative of the RN workforce in terms of the race that primarily encompasses the profession (79.4% White). The workforce in 2013-2014 was 3% African American or African, 2% Asian, 1% Hispanic/Latino, 1% American Indian/Alaskan Native, 0.2% Native Hawaiian/other Pacific Islander, and 1% other (Minnesota Board of Nursing, 2016).

Table 3

Ethnicity of ADN Students

Ethnicity	n	%
White	104	79.4
Black	10	7.6
Asian	7	5.3
Hispanic/Latino	10	7.6

Note. $N = 131$, $M = 1.499$, $SE = .099$.
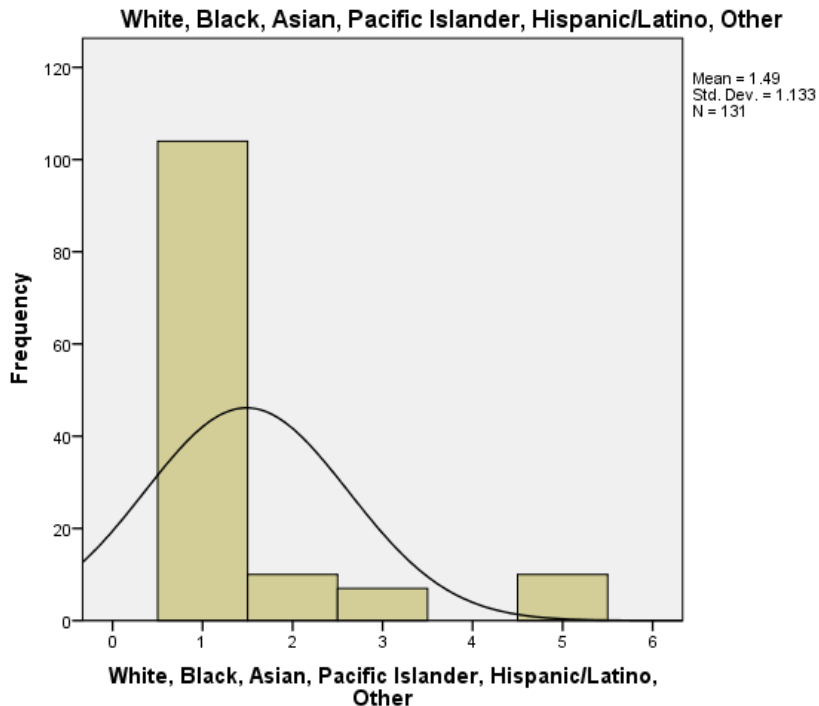
Figure 6. Histogram of race.

Tests and Scales

TOFHLA

After the completion of the demographic form, participants were asked to complete the TOFHLA. As stated previously, this assessment consists of a numeracy section and reading comprehension section. The numeracy section contains 17 questions. The 17 questions were weighted using a constant of 2.941 to give the numeracy section equal weight as the reading comprehension section, which has 50 questions (Parker et al., 1995).

After the participants had completed the assessment, scores were hand tabulated and rechecked a day later to ensure correct tabulation of scores. The two scores were added together using the weighted scores from the numeracy section and the raw score

from the reading comprehension section. The scores of the two parts were combined to give an overall score for each participant out of 100. The participants' scores are displayed in Table 4. The weighted numeracy scores ranged from 33-50 points ($M = 45.39$, $SD = 3.858$), and the raw reading scores ranged from 39-50 points ($M = 48.21$, $SD = 1.868$).

Table 4

TOFHLA Reading Comprehension & Numeracy Combined Scores

Score	*n*	%
80-85	8	6.1
86-90	23	17.6
91-95	43	32.7
95-100	57	43.6

Note. $M = 93.6$, $SE = .399$, $SD = 4.565$.

Validity. The total scores for the numeracy section, reading comprehension section, and the two scores together were used to calculate the reliability of the test. The reliability of the assessment was calculated using Cronbach's alpha (Cronbach's alpha = .794). Because this was over .70, the instrument is a reliable assessment of the student's functional health literacy (Field, 2013). This score is a bit higher than the Cronbach's alpha on the overall test discussed earlier, which was .68 (Baker et al., 1999).

Knowledge and Skills Survey

The last item that the participants needed to complete was the Knowledge and Skills Survey. This survey served as the dependent variable and measured the

participants' knowledge of health literacy tools and information needed to proficiently identify and communicate with a patient with low literacy needs. This survey consisted of 20 items. The first eight items were true-or-false questions. These statements were followed by six multiple-choice questions.

Four questions asked respondents to indicate their comfort level when completing tasks for patients with low literacy. These four questions were based on a Likert-type scale of *very comfortable*, *comfortable*, *somewhat comfortable*, and *not comfortable* (Likert, 1932). Item 19 assessed the respondents' reading level in response to a passage about diabetic neuropathy, and Item 20 was an open-ended question that asked participants to consider strategies for revising the text to improve readability.

Validity. To tabulate scores, Items 1-14 and Item 19 were given 1 point. The total score was divided by 15 to get a percentage score out of 100. From this number, a whole number was given, and any decimals were rounded to the nearest whole number. Items 15-18 were kept as a Likert-type scale for data comparisons and were not part of the total score. Item 20 was not evaluated at this point because it was an open-ended question with a variety of qualitative answers.

Based on total scores and the Likert-type scale, the internal validity was checked using SPSS. For the four total scores and the Likert-type scale, Cronbach's alpha = .101; on just the standardized items, Cronbach's alpha =.757. When Sicat and Hill (2005) completed their study, the pretest Cronbach's alpha was .34, and the posttest Cronbach's alpha was .61. Although all the scores shown on the interitem correlation matrix (Table 5) display a positive relationship, the scores were low on the Knowledge and Skills

Survey; therefore, if the other portions of this survey outside of the Likert-type scale were eliminated, Cronbach's alpha would increase significantly ($N = 5$, $M = 65.28$, $SD = 12.30$).

Table 5

Knowledge & Skills Survey Interitem Correlation Matrix

	Comfortable identify patients	Comfortable help patients take meds	Comfortable review patient education	Comfortable ability be with patients	Survey score
Comfortable identify patients	1.000	.537	.525	.482	.236
Comfortable help patients take meds	.537	1.000	.588	.497	.166
Comfortable review patient education	.525	.588	1.000	.682	.109
Comfortable ability be with patients	.482	.497	.682	1.000	.011
Survey score	.236	.166	.109	.011	1.000

Note. $M = 13.056$, Min. $= 2.069$, Max. $= 56.122$, Range $= 54.053$, Variance 579.616.

As stated previously, the Knowledge and Skills Survey offers an opportunity to examine the comfort level of ADN students in assisting patients who have difficulties with low literacy. Although this portion of the Knowledge and Skills Survey was not part of the research questions, it is pertinent for it not to be overlooked regarding the student's awareness and ability to provide care for patients with low health literacy. As their

capacity to feel comfortable identifying and assisting patients with low health literacy enables students to provide the needed care and drive the quality of care health care organizations are striving for (Nutbeam, 2000 & 2013). There were four questions on the Knowledge and Skills Survey where students needed to select their comfort level on certain tasks as it pertains to patients with low health literacy. The questions were:

1. How comfortable do you feel with being able to identify patients who have low health literacy?

2. How comfortable do you feel with being able to help patients with low health literacy take their medications correctly?

3. How comfortable do you feel with being able to review a patient education brochure or medication leaflet to determine how suitable it is for a patient you know has low literacy?

4. How comfortable do you feel about your ability to be with your patients with low health literacy?

A Likert -type scale for each question was given for answers to the four questions. The scale options were: *very comfortable* (coded in SPSS as 1), *comfortable* (coded in SPSS as 2), *somewhat comfortable* (coded in SPSS as 3), and *not comfortable* (coded in SPSS as 4) (Likert, 1932). In Table 6, the frequencies for each question and the Likert-type answer is displayed. Many of the answers fell within the "*comfortable*" and "*somewhat comfortable*" range. The average answer was "*comfortable*" for many of the answers. As with the demographic data, histograms were reviewed to check for

skewness and kurtosis of the data. Figures 7-10 show the histograms for the four

questions.

Table 6

ADN Students' Comfort Levels in Assisting Patients With Low Literacy

	Comfortable identify patients		Comfortable help patients take meds		Comfortable review patient education		Comfortable ability be with patients	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Very comfort	11	8.4	19	14.5	17	13	25	19.1
Comfort	40	30.5	67	51.1	64	48.9	72	55
Some comfort	70	53.4	42	32.1	48	36.6	34	26
Not comfort	10	7.6	3	2.3	2	1.5	0	0
Mean	2.6		2.22		2.27		2.07	
SD	.751		.716		.700		.670	
SE	.066		.063		.061		.059	

Note. $N = 131$.

Figure 7. Histogram: Identify patients with low health literacy.
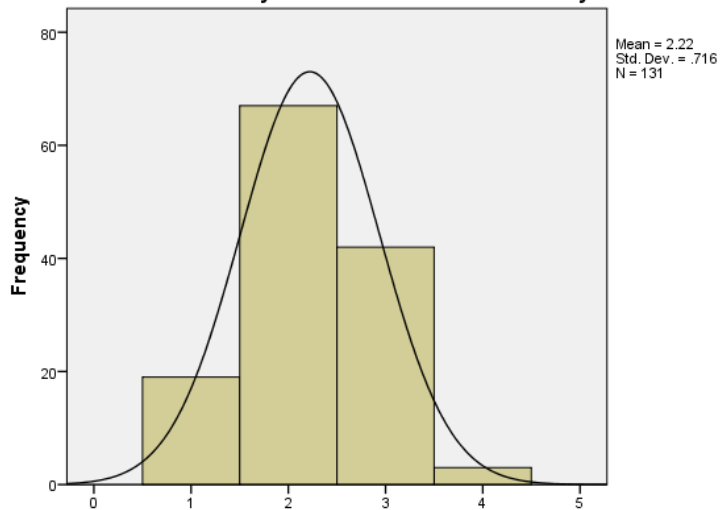
Figure 8. Histogram: Help patient with medication.
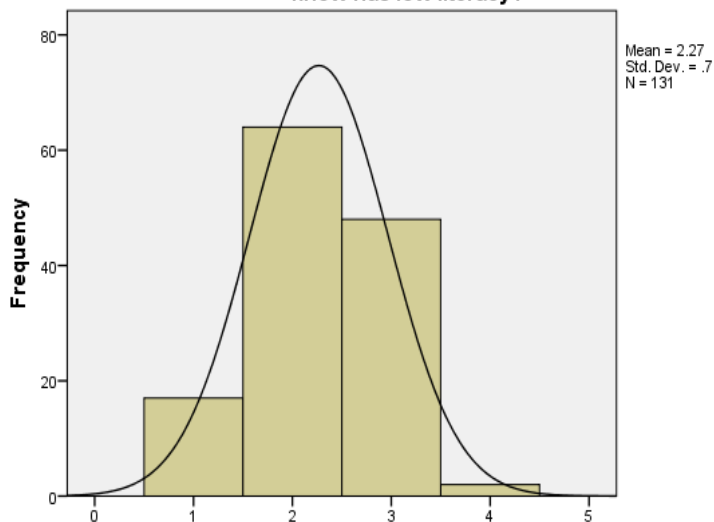
Figure 9. Histogram: Review patient education.

Figure 10. Histogram: Communicate with patient.

Results

As stated previously SPSS was utilized for data analysis. There were three research questions and three hypotheses that needed to be answered. The statistical tests that were used to identify correlations and associations were Bivariate Pearson's correlation coefficient, linear regression, MANOVA, and Spearman's correlation.

Research Question 1

RQ^1 How is the functional health literacy of associate-degree nursing students related to their awareness of the need to identify patients with low health literacy?

Ho1:   There is no statistically significant relationship between the functional health literacy of nursing students and their awareness of the need to identify patients with health literacy.

Ha1:   There is a statistically significant relationship between the functional health literacy of nursing students and their awareness of the need to identify patients with health literacy.

Variables. Independent Variables (IV): TOFHLA Scores; Dependent Variables (DV): Knowledge and Skills Survey Scores
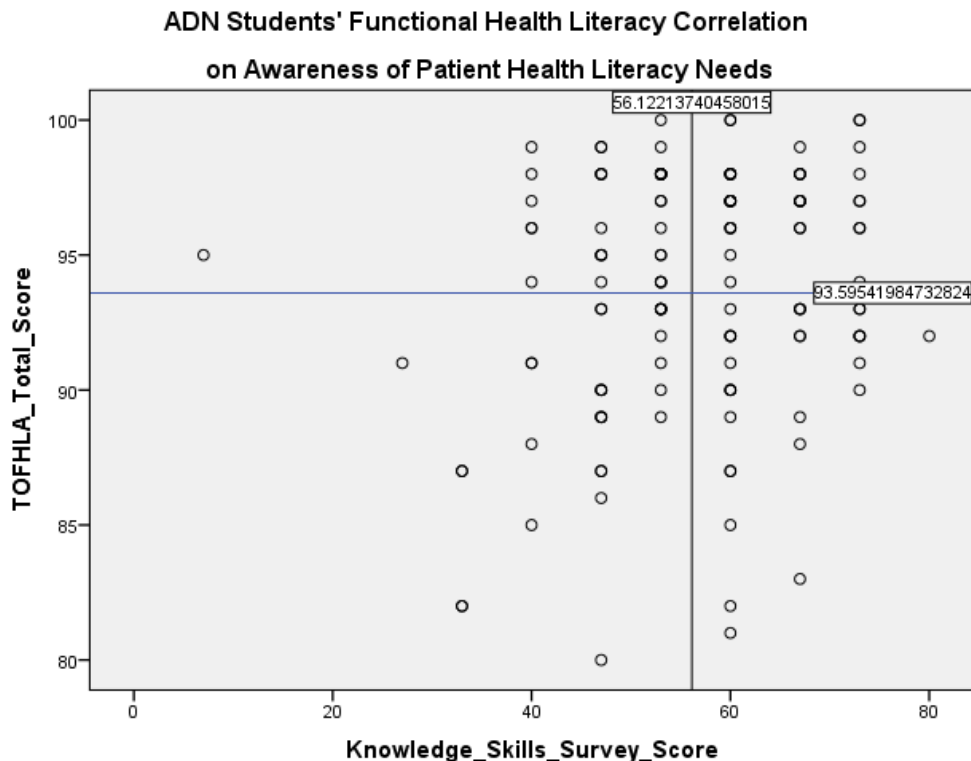
Figure 11. Scatter plot Pearson correlation.

Bivariate Pearson's correlation coefficient. Pearson correlation was utilized to examine the relationship between the TOFHLA scores and the Knowledge and Skills Survey since both variables were assessment scores and not categorical.

Assumptions. For Bivariate Pearson correlation coefficient, there are four assumptions that were met. The first assumption were that the two variables, TOFHLA scores and Knowledge and Skills Survey scores, have a linearity and homoscedasticity. Homoscedasticity was checked utilizing a scatter plot as shown in Figure 11.

Furthermore, there were no significant outliers, and the variables were normally

distributed; which are the last two assumptions (Field, 2013).

Results. There was a positive correlation between the functional health literacy of

nursing students, and their awareness to identify patients with health literacy needs with

small effect size ($r = .208$, $p = .017$, $n = 131$). This correlation was statistically

significant ($p < .05$). Therefore, the null hypothesis is rejected. There is a statistically

significant relationship between the functional health literacy of nursing students and

their awareness of the need to identify patients with low health literacy.

Additional test. Since the Knowledge and Skills Survey included a section with a

Likert-type scale on the student's comfort level to identify, communicate, and provide

education to patients with low health literacy, it is pertinent to add research question to

this section as this pertains to the ADN student's overall ability. According to the asset

model and health literate care model, skills and capability are pertinent in the individual

being able to be aware of health literacy needs of patients (Brach et al., 2012; Martensson

& Hensing, 2011; Nutbeam, 2000, 2008, 2013). If a student cannot meet a patient's

need, it may be he or she was not aware or comfortable to act due to unmet needs of their

own; whether that is their functional health literacy or their knowledge of health literacy

tools.

Subquestion 1.

SQ1: How does the functional health literacy of ADN students relate to their

perceived comfort level in identifying, reviewing education, assisting with

medication and communicating with a patient with low health literacy?

Ho4: There is no statistically significant relationship between the

functional health literacy of nursing students and their perceived

comfort level in identifying, reviewing education, and

communicating with a patient with low health literacy.

Ha4: There is a statistically significant relationship between the

functional health literacy of nursing students and their perceived

comfort level in identifying, reviewing education, and

communicating with a patient with low health literacy.

Variables. Independent Variables (IV): TOFHLA Scores; Dependent Variables

(DV): Knowledge and Skills Survey Likert-type Answers

Linear regression. Linear regression was conducted to examine the association

between the TOFHLA and each of the four comfort level questions from the Knowledge

and Skills Survey. This analysis was selected due to the dependent variables being

categorical.

Assumptions. Four assumptions must be met to run a linear regression analysis of

the data; these are similar of the bivariate test. There must be a linear relationship

between the independent variables and dependent variables. The variables must normally

be distributed, and the variables must be equally distributed (Field, 2013). The last

assumption is there must not be multicollinearity.

Results. A linear regression was conducted to identify associations between

TOFHLA scores and how comfortable ADN students feel identifying patients with low

health literacy needs. A nonsignificant regression was found ($F (1, 129) = .439, p =$

.509), with an $R2$ of .003. For TOFHLA scores and the participant's ability to help patients with low health literacy with their medications, a nonsignificant regression was found (F (1, 129), = .155, p = .694), with an $R2$ of .001. Nonsignificant regression was found with TOFHLA scores and the participant's comfort level to review patient education for patients with low literacy (F (1, 129) = .438, p = .509), with an $R2$ of .003 and TOFHLA scores and the participant's comfort level to communicate with patients (F (1, 129) = .015, p = .901), with an $R2$ of .000.

Since there were no significant p values, we can accept the null hypothesis. There is no statistically significant relationship between the functional health literacy of nursing students and their perceived comfort level in identifying, reviewing education, and communicating with a patient with low health literacy. Based on the R squared values of the analysis, the answer for SQ1 is that functional health literacy of ADN students has a minimal, if any, association with their perceived comfort level identifying, giving education, assisting with medication and communicating with a patient with low health literacy.

Table 7

Linear Regression Analysis of TOFHLA and Comfort Level

		B	SE	β	p
Identify patients	Constant	1.706 (9.975, 4.388)	1.355		.210
	TOFHLA score	.010 (-.019, .038)	.014	.058	.509
Help patients with meds	Constant	1.712 (-.845, 4.270)	1.293		.188
	TOFHLA score	.005 (-.022, .033)	.014	.035	.694
Review patient education	Constant	1.433 (-1.065, 3.930)	1.262		.259
	TOFHLA score	.009 (-.018, .036)	.013	.058	.509
Communicate with patients	Constant	2.219 (-.177, 4.615)	1.211		.069
	TOFHLA score	-.002 (-.027, .024)	.013	-.011	.901

Note. $N = 131$.
*$p < .05$.

Research Question 2

RQ^2 How will the demographics of students have an impact on their functional

health literacy and their awareness of the need to identify patients with

low health literacy?

Ho2:   The demographic characteristics of students will not have an effect

on their health literacy as assessed by the TOFHLA and their

awareness of the need to identify patients with low health literacy.

Ha2:   The demographic characteristics of students will have an effect on

their health literacy as assessed by the TOFHLA and their

awareness of the need to identify patients with low health literacy.

Variables. Independent Variables (IV): age, gender, number of years of previous

education, race, and if they have had prior health literacy training**;** Dependent Variable (DV): TOFHLA scores and Knowledge and Skills Survey scores

MANOVA. MANOVA was conducted to examine the relationship between the independent variables and the two dependent variables. This analysis was selected because there were multiple independent variables and two continuous dependent variables. ANOVA was not utilized due to the number of dependent variables.

Assumptions. The assumptions for MANOVA were checked. The variables were independent of each other. The dependent variables were continuous as they were assessment scores. There were two or more categorical independent variables, and there was homogeneity of variance (Field, 2013).

Results. After reviewing the information in Table 8 it was identified that there was not a statistical significance between demographics and the TOFHLA and Knowledge and Skills Survey: age F (6, 120) = .257, p = .956, *Wilks Λ* = .975, *partial η^2* = .013; gender, F (2, 60) = .719, p = .491, *Wilks Λ* = .977, *partial η^2* = .023; years of previous education, F (12-120) = 1.265, p = .248, *Wilks Λ* = .788, *partial η^2* = .112; race, F (6, 120) = 1.353, p = .239, *Wilks Λ* = .877, *partial η^2* = .063; whether or not the participant has had health literacy training, F (2, 60) = 5.532, p = .006, *Wilks Λ* = .844, *partial η^2* = .156. With this data, the null hypothesis HO[2] is accepted. The demographic characteristics of students will not have an effect on their health literacy as assessed by the TOFHLA and their awareness of the need to identify patients with low health literacy needs. Further analysis was examined in the test of between-subject effects; which examines the separate association of each dependent variable on the independent

variable, Table 9. It is found that whether or not the participant had prior health literacy

training is statistically significant, $(F\ (1,\ 61) = 11.014,\ p = .002,\ partial\ \eta2 = .153)$.

Therefore, to answer RQ2, while the demographics will not have an effect on the

assessments together, independently they have some degree of association with

assessments independently. The variable with the significance is whether the participant

had health literacy training before taking the assessments.

Table 8

Multivariate: Demographics, TOFHLA, and Knowledge and Skills Survey

Effect		Value	*F*	Hypothesis *df*	Error *df*	Sig.	Partial eta squared
Intercept	Wilks's lambda	.004	7069.991	2.000	60.000	.000	.996
Age	Wilks's lambda	.975	.257	6.000	120.000	.956	.013
Gender	Wilks's lambda	.977	.719	2.000	60.000	.491	.023
Yrs. of edu.	Wilks's lambda	.788	1.265	12.00	120.000	.248	.112
Race	Wilks's lambda	.877	1.353	6.000	120.000	.239	.063
Health lit train	Wilks's lambda	.844	5.532	2.000	60.000	.006	.156

Note. $N = 131$.
*$p < .005$.

Table 9

Between-Subject Effects: Demographics, TOFHLA, and Knowledge & Skills Survey

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared
Corrected model	Knowledge Skill Survey	9473.815	69	137.302	1.003	.497	.532
	TOFHLA score	1522.118	69	22.060	1.133	.310	.562
Intercept	Knowledge Skill Survey	93259.008	1	93259.008	681.438	.000	.918
	TOFHLA score	278239.318	1	278239.318	14293.450	.000	.996
Age	Knowledge Skill Survey	44.593	3	14.864	.109	.955	.005
	TOFHLA Score	22.832	3	7.611	.391	.760	.019
Gender	Knowledge Skill Survey	187.031	1	187.031	1.367	.247	.022
	TOFHLA score	.368	1	.368	.019	.891	.000
Number of years of previous education	Knowledge Skill Survey	1461.376	6	243.563	1.780	.118	.149
	TOFHLA score	134.020	6	22.337	1.147	.346	.101
Race	Knowledge Skill Survey	279.444	3	93.148	.681	.567	.032
	TOFHLA score	140.619	3	46.873	2.408	.076	.106
Health literacy training	Knowledge Skill Survey	.002	1	.002	.000	.997	.000
	TOFHLA score	214.401	1	214.401	11.014	.002	.153

Note. $p < .005$.

Research Question 3

RQ[3]   What are the differences in health literacy and awareness of the need for

health literacy between nursing students who have had health literacy

training and nursing students who have not had exposure to health literacy

training?

Ho3:   There is no difference in health literacy and awareness of the need for health literacy between nursing students who have had health literacy training and nursing students who have not had exposure to health literacy training.

Ha3:   There is a difference in the health literacy and awareness of the need for health literacy between nursing students who have had health literacy training and nursing students who have not had exposure to health literacy training.

Variables. Independent Variables (IV): If they have had health literacy training; Dependent Variables (DV): Knowledge and Skills Survey Scores

Spearman correlation. A cross tabulation and Spearman correlation were conducted to examine the Knowledge and Skills Surveys scores against those who have or have not had health literacy training. Spearman correlation was selected instead of Pearson correlation since one of the variables was a categorical variable.

Assumptions. Spearman correlation does not have assumptions on distribution (Field, 2013).

Results. The range of scores for the Knowledge and Skills Survey is 7-80, ($N = 131$, $M = 56.12$, and $SD = 11.709$). For the question of whether the participant has had health literacy training, yes was coded as 1 and no was coded as 2. The descriptive statistics for this variable were ($N = 131$, $n = 27$ for yes and $n = 104$ for no, $M = 1.79$, $SD = .406$). Table 10 shows the cross tabulations of scores with whether or not the participant has had health literacy training.

Table 10

Knowledge and Skills Survey Score and Health Literacy Cross-Tabulation

		Had health literacy training		Total
		Yes	No	
	Score of 7	0	1	1
	% within KSS score	0.0%	100.0%	100.0%
	% within Yes/No	0.0%	1.0%	0.8%
	% Total	0.0%	0.8%	0.8%
	Score of 27	1	0	1
	% within KSS score	100.0%	0.0%	100.0%
	% within Yes/No	3.7%	0.0%	0.8%
	% Total	0.8%	0.0%	0.8%
	Score of 33	1	3	4
	% within KSS score	25.0%	75.0%	100.0%
	% within Yes/No	3.7%	2.9%	3.1%
	% Total	0.8%	2.3%	3.1%
	Score of 40	3	7	10
	% within KSS score	30.0%	70.0%	100.0%
	% within Yes/No	11.1%	6.7%	7.6%
	% Total	2.3%	5.3%	7.6%
	Score of 47	6	16	22
	% within KSS score	27.3%	72.7%	100.0%
	% within Yes/No	22.2%	15.4%	16.8%
Knowledge	% Total	4.6%	12.2%	16.8%
Survey scores	Score of 53	7	19	26
	% within KSS score	26.9%	73.1%	100.0%
	% within Yes/No	25.9%	18.3%	19.8%
	% Total	5.3%	14.5%	19.8%
	Score of 60	5	27	32
	% within KSS score	15.6%	84.4%	100.0%
	% within Yes/No	18.5%	26.0%	24.4%
	% Total	3.8%	20.6%	24.4%
	Score of 67	3	15	18
	% within KSS score	16.7%	83.3%	100.0%
	% within Yes/No	11.1%	14.4%	13.7%
	% Total	2.3%	11.5%	13.7%
	Score of 73	1	15	16
	% within KSS score	6.3%	93.8%	100.0%
	% within Yes/No	3.7%	14.4%	12.2%
	% Total	0.8%	11.5%	12.2%
	Score of 80	0	1	1
	% within KSS score	0%	100.0%	100.0%
	% within Yes/No	0%	1.0%	1.0%
	% Total	0%	0.8%	0.8%
Total	Count	27	104	131
	% within KSS score	20.60%	79.4%	100.0%
	% within Yes/No	100.0%	100.0%	100.0%

| | % Total | 20.6% | 79.4% | 100.0% |

Note. $N = 131$.

The Knowledge and Skills Survey percentage is determined by taking the count value under yes or no in a score and dividing it by the total combined count of yes or no. The percentage within yes or no is determined by taking the yes or no value divided by the total number of yes answers ($n = 27$) or no answers ($n = 104$). The overall percentage is determined by taking the number of yes or no answers for the score and dividing the value by the total number ($N = 131$) of respondents. Of the 131 participants who completed the Knowledge and Skills Survey, 17 scored above a 70%. Of the 17, only 1 had previous health literacy training. To answer RQ3, regardless of whether or not participants had health literacy training before taking the survey, the Knowledge of Skills Survey scores could still be at a proficient level (above 70%) as only 1 of the 17 who had a proficient score had health literacy training.

When analyzing the Knowledge and Skills Survey as a whole, the Spearman's rho correlation was significant $p < .05$ ($rho = .190, p = .030$). This analysis confirms alternative hypothesis Ha3. There is a difference in the health literacy and awareness of the need for health literacy between nursing students who have had health literacy training and nursing students who have not had exposure to health literacy training.

Summary

The purpose of this study was to examine the correlation between functional health literacy of associate-degree nursing students and their awareness of the need to identify patients with low health literacy. Further analysis was also done to identify if there were associations between demographics and the TOFHLA scores and the

Knowledge and Survey scores. There was additional examination into those who have and have not had exposure to health literacy training to determine differences in the correlations. After data collection, it was determined that there was a need for an additional research question to examine if the functional health literacy scores had any correlations with the comfort level of associate-degree nursing students to complete specific tasks for patients with low health literacy needs.

Three campuses participated in the study; 138 students presented to participate. One student did not qualify for the study, and six students did not complete the study. The removal of the six partial data sets left 131 participants who were evaluated. Using SPSS, Pearson correlation, linear regression, MANOVA, and Spearman correlation were conducted to assess the four research questions. The results for RQ1 was there was a significance with small effect size in the functional health literacy of ADN student and the awareness need to identify patients with low health literacy ($r = .208$, $p = .017$).

For RQ2, when looking at the preliminary MANOVA there was not a statistical significance between demographics and the TOFHLA and Knowledge and Skills Survey: age ($p = .956$), gender ($p = .491$), years of previous education ($p = .248$), race ($p = .239$), whether or not the participant has had health literacy training ($p = .006$). It was found that whether or not the participant had prior health literacy training is statistically significant ($p = .002$) when looking further at the between-subject effects. Independently whether the participant had health literacy training does have a significant association with the student's functional health literacy and their awareness of the need to identify patients with low health literacy. This correlation was further confirmed by RQ3

Spearman correlation analysis on the differences between nursing students who have or have not had health literacy training. Spearman's rho correlation was significant $p < .05$ ($rho = .190$, $p = .030$). Linear regression was utilized for SQ1. Nonsignificant values were found for the associations between the TOFHLA and the comfort level of ADN students identify ($p = .509$), review education ($p = .694$), assist with medication ($p = .509$), and communicate ($p = .901$) with patients with low health literacy.

Chapter 5 will provide an overview of the study and the significance of the research. Key findings and interpretations will be discussed along with the limitation of the study. Recommendations for future research will be suggested, and the implications for positive social change will be discussed.

Chapter 5: Summary, Conclusions, and Recommendations

Introduction

The purpose of this study was to determine whether there is a correlation between the functional health literacy of ADN students and their awareness of the health literacy needs of patients. Proficient health literacy is important in obtaining and processing health information to ensure that the correct services are rendered (U.S. Department of Health and Human Services, 2015). To provide needed services, health care professionals must be sensitive to patients' needs throughout their interactions with them; basic health literacy is fundamental to the success of these interactions (Scheckel et al., 2010).

The correlation between the functional health literacy of ADN students and their awareness of the need to identify patients' with low health literacy needs, as measured by the Knowledge and Skills Survey, was statistically significant. There were also significant findings in the correlation between participants who had health literacy training and those who did not have exposure to health literacy training. No significant correlations were found between the functional health literacy of ADN students and their comfort level in completing tasks for patients with low health literacy and the participants' demographics and their TOFHLA scores and Knowledge and Skills Survey scores.

Interpretation of the Findings

The findings extend knowledge in the field of health education regarding the importance of health literacy and awareness of patients' needs. Being able to provide

patient education and communicate treatment plans effectively is important for members of the nursing profession; however, it was found in one study that for every one patient, nurses overestimate the health literacy of six patients (Dickens et al., 2013). Nurses' overestimation of patients' health literacy is detrimental to patient safety and affects quality care outcomes for health care organizations. It is highly recommended that health literacy training be provided to nursing staff within their college curriculum (Dickens et al., 2013; Torres & Nichols, 2014).

There have been interventions in support of increasing the health-literacy awareness of nursing students. A group of 16 undergraduate nursing students took part in a clinical study to assess their sensitivity to health literacy. Sensitivity was documented via interviews. It was discovered through the interviews that the health care setting, a lack of role models, and the fact that the students felt underprepared for health teaching were all determinants of an inability to promote health (Zanchetta et al., 2013). In another study, the researchers examined the baseline level of health literacy of students for the future development of workshops (Torres & Nichols, 2014).

For the current study, Pearson correlation was used to run the analysis for the first research question examining how the functional health literacy of associate-degree nursing students related to their ability to identify patients with health literacy needs. It was determined that increases in functional health literacy are associated with increases in a student's awareness of the need to identify patients with low health literacy. Although the participants were proficient in their functional health literacy, only 17 scored above 70% on the Knowledge and Skills Survey. This lack of application is

similar to the findings of other studies indicating that the development of knowledge and skills needed to identify patients with low health literacy and meet patient needs requires formal training (McCann et al., 2009; Sand-Jecklin et al., 2010; Scheckel et al., 2010).

An additional test was added to Question 1 after it was determined that it was pertinent to examine the Likert-type scale portion of the Knowledge and Skills Survey, which measures comfort level in identifying patients with low health literacy, reviewing patient education, assisting a patient with medication, and communicating with a patient with low health literacy. The ability of participants to be comfortable with their skills and knowledge demonstrates their perception of that particular skill as an asset, and therefore part of the theoretical framework that supports this research (Nutbeam, 2000, 2008, 2013). Linear regression analysis was conducted for Subquestion 1. There is no statistically significant relationship between the functional health literacy of nursing students and their perceived ability in identifying and communicating with the patient with low health literacy.

For Question 2, MANOVA was completed due to the number of independent variables and the two dependent variables. This question examined how the demographics of students have an impact on their functional health literacy and their ability to identify patients with low health literacy needs. Students' demographic characteristics do not have an effect on their health literacy as assessed by the TOFHLA and their ability to identify patients with low health literacy needs. Based on the NAAL, demographics including educational level, gender, and racial background had some effect on literacy level (Kutner et al., 2006). All of the participants received proficient-level

total health literacy scores; this could be one reason that the demographics did not have as much of a correlation with the TOFHLA or Knowledge and Skills Survey scores.

For Question 3, differences in health literacy and health-literacy awareness between nursing students who had had health literacy training and nursing students who had not had exposure to health education training. Spearman correlation was used to run the analysis. There was a difference between the health literacy of nursing students who had had health literacy training and those who had not. As stated previously, formal training is needed to increase students' proficiency in identifying patients with low health literacy and to make students more aware of the tools that can be used in meeting such patients' needs. Research supports increased understanding if an individual has had some training in health literacy (Ickes & Cottrell, 2010; Scheckel et al., 2010; Torres & Nichols, 2014).

Limitations of the Study

There are limitations to the theoretical frameworks used within this study. The asset model indicates that if reading and numeracy fluency are supported, further education will lead to increased capacity and knowledge (Nutbeam, 2000, 2003, 2008), but this does not take into account the countereffect. There is a separate model that applies when health literacy is not treated as an asset or when the determinants at the moment of measurement produce an adverse effect on the individual. Therefore, this model does not fit every person or environment. Furthermore, the health literate care model provides a universal precaution approach wherein all health care professionals treat patients as though they lack health literacy proficiency (Koh et al., 2013). It does

highlight a team approach to deliver the care model, but it does not determine how frequently health literacy training should be given and how it should be measured to ensure the competency of health care professionals. These are items that were not measured by the TOFHLA or the Knowledge and Skills Survey. The participants were asked if they had health literacy training; however, this was a yes-or-no question. There were no follow-up questions concerning when such training occurred, how long it took, or what topics were covered.

I administered the research instruments in person. The implied consent was read verbatim to avoid experimenter bias, which can unintentionally communicate a researcher's expected response (Frankfort-Nachmias & Nachmias, 2008). The campuses did not have access to the TOFHLA or the Knowledge and Skills Survey, but a limitation of the research was the length of time it took participants to complete the demographic form, TOFHLA, and Knowledge and Skills Survey. The completion of the form and assessments seemed to take a bit longer than the participants had wanted, although the average time was 34 minutes. This length of time may have caused some participants to rush through portions of their assessments and survey due to another class or appointment. There were also students who showed fatigue as they progressed through the process. Although participants took a short break between assessments, it was observed through their nonverbal cues that the process seemed quite long for a handful of students. This perception may have caused a decrease in some of the students' scores.

Although the population of research participants was representative of the associate-degree nursing population, this study cannot be generalized to the associate-

degree nursing population in general or associate-degree nursing student population due to the convenience sampling (Frankfort-Nachmias & Nachmias, 2008). The study reached 138 participants with 131 completing the study, but completing a random sample with ADN students across the state in the small time frame allowed by this study was prohibitive with the resources available. Another limitation was that due to the correlational method applied, causation could not be proven with the variables used in this research (Field, 2013; Key, 1997).

Recommendations

With the completion of this study, there are opportunities for further studies. The health literate care model requires the health care worker to apply skills such as self-management and shared decision making. (Koh et al., 2013). These are skills that do not develop until after the foundational health literacy skills for an individual have been securely established (Nutbeam, 2000, 2003, 2008). There will continue to be gaps in successfully carrying out the health literate care model in an efficient manner without proper identification of which skills have been secured and which avenues are areas of growth.

Health literacy is the outcome of the education received by the individual. The health literate care model involves a person's ability to apply health literacy knowledge to changing circumstances in order to critically analyze and interact with greater confidence with the situation at hand (Nutbeam, 2015). Further studies that measure the health care worker's ability to self-manage or successfully participate in shared decision

making to ensure desired patient outcomes would offer opportunities for cause-and-effect analysis.

With ADN students being in their last terms and going through their clinical rotations, there are opportunities for further evaluation of the environment that they are provided and how this supports their understanding and ability to provide needed patient care to patients with low health literacy. This study measured students' functional health literacy, which is the most basic level of health literacy needed to understand and apply knowledge to limited health-related activities (Nutbeam, 2015). Further studies measuring nursing student or other health care professionals within a health care team are needed to ensure that advanced health literacy levels are being met so that organizational models such as the health literate care model can be successfully applied.

As stated previously, 80% of nurses had not heard the term *health literacy*, and 59% did not have formal education or training in health literacy (Macabasco-O'Connell & Fry-Bowers, 2011). The relationship between whether a participant had prior health literacy training and the participant's score on the Knowledge and Skills Survey was statistically significant. Further research into type of training, length of training, and other specifics would be beneficial to understanding the effects of training on a nurse's comfort level in applying training when completing nursing tasks and identifying and assisting patients with low health literacy.

Data analysis indicated a lack of significance in demographics of nursing students and functional health literacy results and Knowledge and Skills Survey scores. There was also no significance in the functional health literacy of students and their comfort

levels in completing certain health literacy tasks. Due to demographics having some significance in TOFHLA scores in other studies with larger populations, I recommend that this study be expanded to a large group of nursing students or to members of the associate-degree nursing population who have not completed the NCLEX exam.

Implications

Positive Social Change

Health literacy is a major determinant in health outcomes. As discussed throughout this research, although health care students and workers may be proficient in their studies and job duties, many lack the ability to identify patients with low health literacy or to identify and apply the proper tools to aid a patient navigating the complex health care system (Cafiero, 2013; Jukkala et al., 2009; Macabasco-O'Connell & Fry-Bowers, 2011). While there are initiatives to aid in ensuring a systemic approach to patient engagement as part of the health care team, it still requires training of medical staff; both current and those onboarding.

Campus Level

Out of the 131 students who completed the Knowledge and Skills Survey, only 17 were able to achieve a score above 70%, and only one had previous health literacy training. Despite these scores, the majority of the students were *comfortable* to *somewhat comfortable* completing tasks related to health literacy. The question is this: Would correct patients be identified, and would patient needs be met? These items should be considered when updating curriculum at the campus level to meet the demands of today's health care environment.

Health Care Organizations

For a health care organization that is a teaching organization, policies and procedures should be reviewed to ensure a supportive environment for incoming medical workers and students. As discussed in the asset model, a supportive environment is supportive of health promotion and provides the tools needed to ensure education, application, and ongoing mentorship for the individual. Conditions, as mentioned above, build on the health care worker's capacity to build on their knowledge and abilities, so that they are more efficient and effective at the tasks they are given. The overall outcome includes being able to be patient centered, which is the premise of the health literate care model.

Conclusions

A significant portion of health literacy research and instrumentation has been patient centered, as health literacy has been tied to patient outcomes. Increased awareness has been linked to the need to train health care workers on health literacy tools, but limited research has been conducted to measure the health literacy proficiency of health care workers. The study population of ADN students in their last semesters of their program was used to measure the functional health literacy of associate-degree nursing students and their awareness of patients' health literacy needs.

IBM SPSS version 21.0 was used to complete Pearson correlation coefficient, linear regression, MANOVA, and Spearman correlation. After the completion of the first analysis, the null hypothesis was rejected. The functional health literacy of ADN students and their awareness of patients' health literacy needs were statistically significant.

Further investigation indicated that the functional health literacy of ADN students did not have significant associations with the student's comfort level in being able to assist patients with medications, review patient education, and communicate with patients with low health literacy. The demographics can have an external association with both the TOFHLA and the Knowledge and Skills Survey; MANOVA was used to examine the associations. The null hypothesis was accepted, as there were no statistical correlations between the demographics of the ADN students and the functional health literacy score or the Knowledge and Skills Survey. Further analysis showed a significant correlation between students having prior health literacy training and their Knowledge and Skills Survey score.

This research contributed to filling the gap identified in the literature by measuring the functional health literacy of associate-degree nursing students and determining whether there were associations with the students' awareness of the health literacy needs of patients. Further analysis could offer opportunities to develop a curriculum that meets the demands of the quickly changing health care environment. Additionally, health care organizations should consider opportunities to provide support to incoming staff and students striving to adopt a patient-centered approach.

Future research may provide opportunities to identify the impact that specific training has on nurses' understanding of health literacy topics or tools and their ability to apply these lessons. Furthermore, there is a need to develop tools that measure proficiency at higher levels of health literacy that are pertinent for medical workers. This

study indicates that there is a need not just to offer education, but also to ensure that

learning is measurable as it leads to practice in the health care organization.

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Appendix A: Demographic Form

Please answer the questions below.

1.   What range does your age fall in?

        18-21   22-25   26-29   30+

2.   What is your gender? Male   Female

3.   Circle the number of years of previous education (13= high school + 1 year of

        college, 14=high school + 2 years of college, and so forth).

        12   13   14   15   16   17   18   19   20+.

4. What is your race?

        White   Black   Asian   Pacific Islander

        Hispanic/Latino   Other

5. Have you had prior health literacy training?   Yes   No

Appendix B: Knowledge and Skills Survey

Health Literacy Knowledge and Skills Survey

Jennifer Potter is completing a study on the health literacy of associate degree nursing students. This the last part of the process. Please do not write your name on this test. All individual scores will be anonymous and kept confidential, and only aggregate data will be reported. Your participation in completing this survey is voluntary.

Please indicate if the following statements are true or false:

1. ___ Years of schooling are a good indicator of literacy level.

2. ___ Patients will tell you if they can't read.

3. ___ People who are illiterate are slow learners.

4. ___ Health care costs for people with low literacy are higher than for others.

5. ___ People with low literacy have poor coping skills.

6. ___ Health literacy has been found to predict whether a patient will take their medications correctly.

7. ___ Low literacy patients recognize their inadequate literacy.

8. ___ Low literacy patients are more likely to suffer from chronic diseases than others.

9. What percentage of the U.S. adult population has deficiencies in reading or computation skills?
   a. 10%
   b. 30%
   c. 50%
   d. 70%

10. Who suffers from poor health literacy?
   a. People of lower socioeconomic class.
   b. People of middle socioeconomic class.
   c. People of higher socioeconomic class.
   d. People of all socioeconomic classes.

11.   What is the reading level of the average U.S. adult?

    a. 6th grade
    b. 8th grade
    c. 10th grade
    d. 12th grade

12. What reading level is required to read most patient education materials?

    a. 6th grade
    b. 8th grade
    c. 10th grade
    d. 12th grade

13. A patients' ability to read is best judged by his/her:

    a. Physical appearance.
    b. Verbal skills.
    c. Socioeconomic status.
    d. None of the above.

14. What would be the best approach when counseling a patient with low health literacy about a prescribed medication regimen?

    a. Reducing the content to what the patient truly needs to know to follow the essential instructions of the prescribed regimen.
    b. Providing the patient with a sufficient amount of background information so that the patient can understand the essentials of the reasoning behind the prescribed regimen.

15. How comfortable do you feel with being able to identify patients who have low health literacy? Please check one.

☐ Very comfortable

☐ Comfortable

☐ Somewhat comfortable

☐ Not comfortable

16. How comfortable do you feel with being able to help patients with low health literacy take their medications correctly? Please check one.

☐ Very comfortable

☐ Comfortable

☐ Somewhat comfortable

☐ Not comfortable

17. How comfortable do you feel with being able to review a patient education brochure or medication leaflet to determine how suitable it is for a patient you know has low literacy. Please check one.

☐ Very comfortable

☐ Comfortable

☐ Somewhat comfortable

☐ Not comfortable

18. How comfortable do you feel about your ability to communicate with patients with low health literacy? Please check one.

☐ Very comfortable

☐ Comfortable

☐ Somewhat comfortable

☐ Not comfortable

19. What grade level is required to read the following passage taken from a patient education brochure regarding diabetes?

> Diabetic neuropathies are a family of nerve disorders caused by diabetes. People with diabetes can, over time, have damage to nerves throughout the body. Neuropathies lead to numbness and sometimes pain and weakness in the hands, arms, feet, and legs. Problems may also occur in every organ system, including the digestive tract, heart, and sex organs. People with diabetes can develop nerve problems at any time, but the longer a person has diabetes, the greater the risk. An estimated 50 percent of those with diabetes have some form of neuropathy, but not all with neuropathy have symptoms. Diabetic neuropathy also appears to be more common in people who have had problems controlling their blood glucose levels, in those with high levels of blood fat and blood pressure, in overweight people, and in people over the age of 40.

   Grade Level _____

20. Imagine you have the responsibility to revise complex patient education materials so that they can be understood by a patient population in which low health literacy is prevalent.

   What strategies would you employ to revise the text?

Appendix C: Knowledge and Skills Survey Permission

Jennifer, I had to look for the document since it has been some years since Dr. Sicat and I did this research. Fortunately, I was successful and the document is attached. You have my permission to use it and to adapt it for your purposes.

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That is what learn

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