The development and psychometric testing of the health literacy knowledge, application, and confidence scale (HLKACS)

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The Development and Psychometric Testing of the Health Literacy Knowledge, Application, and Confidence Scale (HLKACS)

by

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Dedication

I dedicate the finished product of my educational experience to my parents, Gail and Frank Fisher, who taught me that I could do anything if I put the work into it. I also dedicate it to my sons, Anthony, Daniel, Matthew, Christian, Nicholas, and Dominic, who sacrificed time with me and offered encouragement throughout this journey. May this journey not only allow me to further investigate and find solutions to low health literacy issues, but to serve as an example to my kids that with hard work, patience, and perseverance that you can do anything. I love you all.
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Abstract

Health literacy continues to be a pervasive issue faced by adults today within the healthcare environment. One in four adults cannot make informed decisions regarding their own care and do not understand basic healthcare information. Nursing provides the majority of healthcare teaching, yet little is known about the current knowledge level of such providers about health literacy knowledge and strategies. The purpose of this study was to determine the reliability and validity of the Health Literacy Knowledge, Application, and Confidence scale (HLKACS) with nursing students enrolled in baccalaureate and associate degree nursing programs in the state of Michigan. The study sample completed 344 surveys that consisted of demographic variables and the HLKACS, which was created to measure knowledge, application, and confidence in health literacy. The 29-item HLKACS instrument includes nine items measuring knowledge, 13 items measuring the application, and seven items measuring confidence. The results demonstrated satisfactory (or good) reliability for application and confidence subscale with internal consistencies of Cronbach’s alpha’s ranging from 0.91 to 0.92. The results from the exploratory factor analysis demonstrated construct validity with interpretable factors and 58.98% variance in knowledge and 66.36% variance in application and confidence explained by the factors. The correlation analyses also demonstrated significant relationships between knowledge and application as well as application and confidence was established. This reliable and valid HLKACS can be used in future research and education to determine knowledge levels, application of strategies, and confidence among nursing students.
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Chapter I: Introduction

Health literacy has been strongly linked to health outcomes over the last decade. It has been determined that educational interventions improve the long-term outcomes of health (Kars, 2008). Lower health literacy drives up the cost of healthcare by demonstrating poorer health outcomes leading to increased rates of hospitalization and decreased levels of preventive healthcare (Health Literacy, 2010). Research also suggests that health literacy is a stronger predictor of health status than socioeconomic status, age, or ethnic background (White, 2008). Although income, age, and ethnic background can negatively influence health literacy by placing barriers in the pathway of learning, health literacy ultimately is a stronger predictor of health status because it crosses all ages, income levels, and ethnic groups (Martin, Ryder, & Lurie, 2009).

Background

Nurse’s role in health literacy. Nursing is one of the primary sources for health education for the majority of adults. The American Nurses Association (ANA) has identified within the Scope and Standards of Practice that nurses are responsible for the health of the public and for helping them develop self-care skills (ANA, 2010). Traditionally, nursing has the most direct contact hours associated with care of the patient, often having 24/7 exposure in hospital situations and at least an hour in homecare settings. However, due to the nursing shortage and constraints due to healthcare reform, the amount of time previously spent teaching patients has been greatly decreased. Hendrich, Chow, Skierczynski, and Lu (2008) determined that although nursing faces many challenges, nurses still spend 77% of their time on nursing practice, with about 19.3%, or one fifth, of the time spent on direct patient-care activities. Medication
administration, which accounted for another 16.2% of patient care time, also gives the nurse access to the patient for instruction. In comparison to nurses, physicians are led to believe that three to five minutes of counseling for primary care issues such as smoking, alcohol use, and cancer screenings is sufficient time for education, based on system factors such as reimbursement and appointment length (Yarnell, Pollack, Ostbye, Krause, & Michener, 2003). However, it is not possible for physicians to meet the needs of the patient experiencing chronic illness in their allocated appointment times despite system factors that support the short encounters. Nurses have more face-to-face time with patients that can be used to promote the patient’s health literacy level.

Patient teaching and learning is impacted by the low level of health literacy and the lack of effective communication used to deliver needed health information. Nurses provide the majority of patient education, both in the inpatient and outpatient setting. Understanding that patient education is primarily addressed by nurses increases the need to integrate health literacy knowledge and communication strategies into nursing education. Nursing faculty can make a substantial impact on low health literacy and improve patient outcomes by integrating important health literacy knowledge into the nursing curriculum, which could subsequently decrease overall healthcare costs in the practice setting.

Nursing education is designed to educate future registered nurses as competent, compassionate caregivers. In order for future registered nurses to be competent in health literacy strategies, the recommendations of Institute of Medicine (IOM), Agency for Health Research and Quality (AHRQ), and Quality Safety and Education of Nurses (QSEN) need to be included in the nursing curriculum. One of the focus areas within the
IOM research recommendations is the role of health literacy and its impact on the patient and the care provided, which directly influences patient outcomes (IOM, 2013). Improving health and health literacy is important, not just to the patient but also for the researcher, practitioner, and academic. Health literacy remains a major research priority of the IOM, even with major healthcare reform changes (IOM, 2013). The focus of healthcare governmental agencies such as AHRQ, QSEN, and the IOM on low health literacy addresses the responsibility of all healthcare providers but directly addresses the importance of nurses in providing patient education and low health literacy issues.

Nurses need to improve health information communication with patients because it directly affects patient comprehension and results in informed decision-making by the patient. This effort should be taking place not only in the practice environment but also in the nursing education environment. The IOM Report, *The Future of Nursing: Leading Change, Advancing Health* (2011), addressed the need to adapt to the changing demands of the healthcare system and patient populations. There is an emphasis on competencies, such as health promotion and disease prevention, that focus beyond the provision of acute-care settings to ensure that nurses are ready for the changes in the evolving healthcare system (IOM, 2011). Between the research priorities identified by the IOM and the nursing workforce report reported by the IOM, the call for change in nursing education to reflect the current trends in healthcare delivery and research priorities is warranted. Accordingly, developing an instrument that measures the current level of knowledge, application, and confidence in health literacy among nursing students is important in helping to determine whether nursing education has made a sizeable shift toward incorporating health literacy into the curriculum.
Problem Statement

This study was designed to explore the health literacy knowledge, application, and self-confidence in nursing students through the development and psychometric testing of the Health Literacy Knowledge, Application, and Self Confidence Scale (HLKACS). The instrument developed for this study focused on the nursing student in order to determine if present nursing curriculum has effectively incorporated health literacy. This instrument may provide a method to assess nursing student knowledge, application, and confidence to determine whether the present nursing curriculum has been providing adequate information about health literacy to its students.

The World Health Organization (WHO) recognizes that health literacy issues are pervasive and impact health outcomes worldwide (WHO, 2013). Improving health literacy is imperative for improving quality of life for the individual as well as for the family, community, city, country, and world (Kickbusch, Pelikan, Tsouros, & Tsouros, 2013). Many variables impact health literacy; one assumption is that the health professional is one variable. During the 2013 Health Literacy Annual Research Conference, it was determined that health professionals need to do more research on interventions as well as what healthcare professionals actually know about health literacy and how they address it (Paasche-Orlow, 2013). It is important to note that little is known about the health literacy knowledge of nurses and nursing students. Quality of life improvements depend on having the appropriate information to make informed decisions that impact overall health. However, if the nursing student does not have the health literacy knowledge and strategies needed to address low literacy in the patient, attempts to improve overall patient knowledge maybe be futile. Health literacy strategies are the
learned actions needed to address health literacy. Therefore, it is important to assess and understand the current knowledge levels of nursing students.

**Significance**

**Health literacy as an important issue in healthcare.** Health literacy continues to be a pervasive issue faced by adults today within the healthcare environment. Nine out of ten adults cannot make informed decisions regarding their own care and do not understand basic healthcare information (Parnell, 2015). Nursing offers the majority of healthcare teaching, yet little is known about the current knowledge level of such health professionals in regard to health literacy issues and strategies. Low health literacy worldwide is increasing healthcare costs and causing poor health outcomes (Kickbusch et al., 2013). The World Health Organization (WHO) has determined that nearly half of all individuals in eight European countries have limited health literacy (Kickbusch et al., 2013). As a result, low health literacy is a pervasive issue across the world.

**Low health literacy in U.S. population.** Health literacy has clearly been identified as a strong predictor of patient outcomes and is pervasive among the adult patient population (AHRQ, 2011; Baker, 2006; Gazmararian, Curran, Parker, Bernhard, & DeBuono, 2005; IOM, 2004, 2013; Kickbusch et al., 2013; Mika, Kelly, Price, Franquiz, & Villarreal, 2005; National Research Council, 2011a; Nutbeam, 2000; Paasche-Orlow, 2013; Paasche-Orlow & Wolfe, 2007; Paasche-Orlow, Parker, Gazmararian, Nielson-Bohlman, & Rudd, 2005; U.S. Department of Health & Human Services, 2013; White, 2008). According to the National Center for Education Statistics (2006), 12% of adults have proficient health literacy. This translates to approximately nine out of ten adults lacking the necessary skills to manage their own health and prevent
disease. To further stress the importance of the health literacy crisis, 88% of adults, or more than 30 million, are below basic health literacy levels. A study by Paasche-Orlow, et al. (2005) reviewed U.S. research studies about health literacy to examine the prevalence of limited health literacy from 1963 through 2004. The data collected by Paasche-Orlow et al. (2005) identified the prevalence of low health literacy at 26% and marginal health literacy at 20%, which were consistent with the results of the National Center for Education Statistics. These rates have remained unchanged and appear to be increasing (AHRQ, 2013). In other words, one in four subjects had low health literacy, and nearly half had low or marginal health literacy. In addition, health literacy has been shown to be associated with self-rated health status, specifically from the study by Bennett, Chen, Soroui, and White (2009), where health was rated as poor by 42% of the individuals with low health literacy, and 28% of those individuals lacked health insurance. A recent study by Walker, Pepa, and Gerard (2010) determined that 30% of patients had less than an eighth-grade reading level for health literacy, and even 11% of those attending or completing graduate school were at basic or below basic levels of health literacy competency. The lack of health literacy at all education levels identifies the overall pervasive nature of low health literacy, which affects informed decision-making by the individual and reinforces the need to incorporate health literacy strategies into practice with all patient encounters. However, research has pointed to the fact that education cannot be the sole predictor of health literacy issues. Socioeconomic issues such as income, age, and gender are also factors that need to be considered.

**Health literacy and health outcomes.** Paasche-Orlow and Wolfe (2007) determined that although there is a strong link to health literacy being a predictor of poor
health outcomes, it is difficult to establish health literacy as an independent variable in the causal pathway due to other confounding factors such as gender, education, and social class. Part of the reason for the strong correlation between health disparity and health literacy is that many individuals who have low health literacy often have some connection to a socio-economic disparity, which often is linked to poor access and limited healthcare knowledge.

Individual differences affect health literacy in many different ways. For example, women often have higher health literacy than men (National Center for Education Statistics, 2006). This may be due to higher dropout rates among young men. Caucasians and Asian/Pacific Islanders have the highest health literacy, while Hispanics have the lowest (National Center for Education Statistics, 2006). Individuals over the age of 65 often had the lowest literacy of all age groups. Education also plays a role in the level of health literacy. Health literacy appears to increase with each level of education obtained (National Center for Education Statistics, 2006). Those living at or below the poverty level were also at risk of having low health literacy (National Center for Education Statistics, 2006). Receiving Medicaid or Medicare was also a significant indicator, which can be related to the elderly being on Medicare and those below the poverty level being on Medicaid (National Center for Education Statistics, 2006).

Socioeconomic issues influence overall health literacy and health outcomes. More important, the ever-changing healthcare system, with increasing complexity related to growing technology, shifts the potential for low health literacy onto all patients. Limited health literacy influenced by socioeconomic factors results in poor health outcomes. The reason for health literacy’s strong role as a predictor of health status is that
those with the lowest health literacy often have the poorest levels of health which are not
exclusively tied to socioeconomic issues (National Center for Education Statistics, 2006).
Individuals at all levels of socioeconomic status are at risk for low health literacy. In
addition, low health literacy is likely to have a greater impact on those with lower
socioeconomic status due to educational levels and resource access. However, those with
lower socioeconomic statuses but higher health literacy often have better outcomes due to
their ability to understand and act on their health issues.

Conceptual Framework

Health outcomes are driven by self-care behaviors of the individual but also are
dependent on the role nursing has in helping to meet self-care demands through
developing the individual’s health literacy abilities. Orem (2001, 1991) stated that self-
care is a learned behavior and also a deliberate action. These behaviors are learned from
interaction and communication within larger social groups. Self-care behaviors vary by
cultural and social experiences of the individual. Orem (2001, 1991) also stated that self-
care was performed in a deliberate way in response to needs created by self-care demand.
The response of the individual is not instinctive or reflexive but is performed with a
rationale based on the known need. The concepts of nursing agency and nursing systems
relate directly to the nurse’s role in providing the patient with needed information and
assistance in meeting self-care needs. Development of nursing agency in nursing students
is the key to meeting patient needs. The conceptual framework of Orem will be discussed
further in Chapter 2.
Assumptions

In this study, the following assumptions are made. Nursing students provide care during their clinical rotations. During their clinical rotations, nursing students communicate health information to their assigned patients who have varying levels of health literacy. Students receive knowledge during their theory classes and learn how to address varying degrees of health literacy. Students then apply this knowledge during their clinical experiences. As a result, students with higher academic progression will have higher levels of health literacy knowledge, application, and confidence. It is possible to measure the health literacy knowledge, application, and confidence using the HLKACS scale. Since the data being collected were self-reported, it was assumed that all students could read, write, and understand English. It was also assumed that all students were honest and truthful in their responses.

Summary

Low health literacy is associated with poorer health status and an increased risk of mortality. More important, nearly 90 million American adults have limited health literacy and face difficulties when navigating the healthcare system. Health literacy has many complex variables and is not determined by educational level. Therefore, even those with more education are at risk of being at a disadvantage in healthcare decision-making.

Nurses spend the majority of their time with patients and are in an excellent position to educate patients through the use of health literacy intervention. Therefore, understanding the present information about health literacy presented in nursing curriculum is a priority as we prepare future nurses. The evaluation of health literacy in the curriculum can be accomplished by measuring knowledge, application, and
confidence in nursing students. This study was designed to develop and test an instrument to measure the health literacy knowledge, application, and confidence of nursing students. Chapter I provided an introduction to health literacy and its significance. Chapter II will discuss the conceptual framework used to define the importance of the research on health literacy knowledge, application, and confidence in nursing students. Chapter III will present a review of the literature pertaining to health literacy, both from the patient and nursing student perspectives, and instrument development. Chapter IV will describe the methods used for this study. Chapter V presents the results of the study, and Chapter VI discusses the implications and recommendations based on the results.
Chapter II: Conceptual Framework

Healthcare providers speak a specialized language that complicates the understanding of the health information being provided. The effort of the healthcare provider to improve comprehension is often limited, leaving them as the authority and the patient in the dark relying on the knowledge of the physician to lead their decision without fully comprehending the meaning of the decision once made. Health literacy continues to be an important issue affecting the limited understanding and comprehension experienced by the patient. This is often complicated by the nurse not fully understanding what health literacy is.

Health has been identified as one of the principal social policy demands today. The scarcity of healthcare and the deterioration of health within the general public have become intolerable. The relevance of health as part of democracy has made it necessary to formulate an innovative societal response by those who are on the frontlines. Key to health as part of the democracy is health promotion and disease prevention. This can only be done through the use of health literacy strategies. As a result, health policy should take social inequality into account and give priority to high-risk social groups and address the many issues faced by individuals with poor health literacy. Groups that have been ignored, such as youth and the elderly, need to be supported through intervention while focusing on the quality of healthcare. Empowering and refining abilities of groups can lead to improved health and close the gaps in health within society.

Patients are taught to trust the knowledge of healthcare providers without the need to personally understand what is really being done. Educating patients about their health and empowering them to reflectively act to make changes in their lives liberates them
from the oppression of dependency. Empowering patients to act on their own health will reduce potential limitations experienced from the complications of disease. Educating patients also allows nurses to act as the agent to alleviate potential inequalities that exist for the patient in the healthcare system.

Teachers (nurses) along with learners (patients) need to enter into the dialectical process of exchange (Freire, 2010, 1998). The dialectical process requires one to enter into the debate or discussion on what education is and what it should be. It questions present methods and allows for active reflection on the possibilities. It is the labor or work of those engaged in the discourse that makes change possible. The teacher must open up a discussion with learners to persuade them that it is important to question their own reality and not accept the status quo. Teachers leave the role of the educator to become active in the learning process themselves in conjunction with the learner. This exchange transforms the world of education while engaging in reframing and reposing the question of understanding the relationship. This process and relationship is the same as that of the patient and the nurse.

Freire (2010, 2005) argues that human relationships exist in plural. The nurse and patient act together to identify and act on those issues that have caused a health inequality in the individual. This reflective action allows for the liberation of the patient and empowers both the nurse and patient in the health education process. Health literacy is a process of communication that empowers the patient to make informed decisions based on knowledge. Nursing acts as the agent of communication to ensure that information presented is clear and understandable.
Nursing and Health Communication

Healthcare is attempting to move away from the objectivism of acute care towards a community building and patient-centered view. Educational content must change from health as an object to health as a human experience. Nurses must first feel empowered before they are able to empower others and perform professionally at a higher level (Dowling, Murphy, Cooney, & Casey, 2011). Part of this empowerment can be accomplished by ensuring that nurses understand strategies that enable them to assist patients in comprehending complex health information.

Dialogue and dialectical thinking are integral to the nursing profession. The nurse must be an effective communicator as well as a critical thinker in order to empower the patient (Dowling et al., 2011). Effective communication requires the nurse to give up his or her power in order to establish a mutual relationship that empowers the patient (Dowling et al., 2011). Thus, it is important to define the nurse’s ability to communicate health information in a way that empowers the patient. Empowerment of patients will come through health communication that assists them with management of the obstacles and course of health-related challenges they face.

Nursing is the gatekeeper for communication and assists with the removal of obstacles due to health-related challenges and health literacy. In order for nursing to be effective as the gatekeeper, knowledge of health literacy is needed. If the nurse does not have the needed skills to address health communication and health literacy, the obstacles are not going to be removed and will result in poorer health outcomes. Identifying the health literacy knowledge, application, and confidence of nursing students can help us to identify whether nursing education programs are providing the needed skills to address
health literacy. The HLKACS instrument will assist with gathering the assessment information to determine whether the needed skills are being taught.

**Orem’s Self-Care and Nursing Agency**

Orem (2001, 1991) asserted that behavior learned from interaction and communication within society and a deliberate action results in self-care. Cultural and societal experiences of the individual determine self-care abilities. Orem (2001, 1991) also asserted that self-demand creates the need for self-care to be performed in a deliberate way that is not instinctive or reflexive but done based on rationale of the known need. Nursing agency and nursing systems provide for the patient by defining the nurse’s role of providing needed information and assistance in meeting self-care needs.

Nursing promotes the goal of patient self-care and is a service geared towards helping the self and others. Nursing is required when self-care demands exceed a patient’s self-care ability (agency) and helps to promote the patient as a self-care agent (Orem, 2001, 1991; Orem & Taylor, 2011). The development of nursing agency encompasses knowing who, when, and what kind of nursing care is needed and how to provide the needed care. Orem (2001) believed that acquired theoretical knowledge enables the nurse to seek answers to questions posed when entering another person’s life situation.

Nursing agency describes the complex and collective attributes of a person educated to be a nurse that are enabled when addressing a person’s self-care needs currently unmet by the patient. Nursing agency is enabled when helping others to know their own therapeutic self-care demands, helping in the development of self-care agency, or helping others to meet their therapeutic self-care demands (Orem, 2001, 1991).
Nursing agency is deliberate and complex, requiring experience and education to aid in its development.

It is through the supportive educative nursing system that issues of knowledge-related health disparity are addressed. The use of Orem’s theory is ideal for supporting health literacy interventions. Orem (2001) asserted that acquired theoretical knowledge enables the nurse to seek answers to questions posed when entering another person’s life situation. This acquired knowledge “is not memorized but rather understood, conceptualized, and made dynamic in practice situations” (Orem, 2001, p. 446). Health literacy and strategies to improve comprehension are acquired rather than memorized. It requires the nurse to be dynamic and operate within the patient’s life situation. Parnell (2015) determined that health literacy requires a “tapestry of skills” requiring a true partnership and is not dependent on the individual’s skills (p. 7). The responsibility then lies with both the healthcare professional and the patient. Assessing whether nurses have the necessary agency to intervene with health communication and health literacy issues is vital.

**Changing Nursing Education Curriculum**

Orem’s ideas of nurse agency can be used to develop a curricular structure that promotes a broadened awareness of the role of the nurse and create a more comprehensive perspective (Orem, 2001). Curriculum needs increase at an alarming rate when consideration is given to the growing amount of knowledge in the humanities, sciences, and technology. Ironside (2004) pointed out that as healthcare becomes more complex and nursing knowledge grows, more content is persistently added, while little is taken out. This results in stagnation of thinking and the decreased development of the
learner. Orem (2001) claimed that nursing education needs to advance understanding and merge research into practice. Nursing education presently lacks curriculum pertaining to health literacy knowledge and strategies, which limits the ability of future nurses to teach patients to establish control over their own health. Therefore, it is important for educators to get a sense of what is relevant through careful analysis and selection of content based on student needs (Ball, 2000). Health literacy, which is a new concept in healthcare, is often misunderstood and not addressed within nursing curriculum. Coleman (2011) determined that there is an overall absence of growth in health literacy curricula being reported in the nursing literature compared to other health professional groups.

**Teaching/Learning, Nursing, and Health Literacy**

Do educators teach how to facilitate learning, or do we teach how to give information to patients? How teaching is defined becomes another complex issue in the situations where learning must occur. Is it the delivery of information, or is it the process by which we facilitate learning? Benner, Sutphen, Leonard, and Day (2010) stated that nursing is at a significant moment in history, where changes in healthcare are profound and nursing needs to transform nursing education.

Nursing deals with adult learners within nursing education and in most settings of clinical practice. The core for adult learning includes the learner’s need to know, readiness and motivation to learn, self-concept, prior experience, and orientation to learning (Bastable, 2003; Knowles, Holton, & Swanson, 1998, 2011; Shulman, 1986). This applies well within healthcare and requires the nurse to think about what the person actually needs to learn and what is unique to their experience within the healthcare arena.
Can they do everything they need to do or are there core things that need to be taught that are necessary for the patient’s safety and welfare?

**Conclusion**

Orem (2001) determined that nursing programs need to ensure that nursing students have the distinct and unique knowledge to provide patients with the services that they need. Health literacy is a new concept within nursing. Nursing education needs to evaluate how well we have incorporated health literacy as an important concept of patient education into the nursing curriculum in order to strengthen nursing agency.

Freire (2005) discussed the need for teachers to use language and words to empower individuals. In the same way, Orem (2001) stressed the importance of nurses using nursing agency to empower patients. Both Freire and Orem aim to provide ways to empower individuals in self-care activities. Without understanding what types of the information were given to empower, it further disenfranchises individuals putting them at further risk of societal and health disparities.

Developing the skills needed to navigate low health literacy is a part of nursing agency that acts to empower patients to develop self-care agency. The HLKACS is designed to assess health literacy knowledge, application, and confidence of the nursing students. Determining whether nursing students have developed the necessary agency to assist patients in navigating through difficult healthcare decision-making can assist researchers and educators alike in developing strategies to overcome the barriers to success.

Parnell (2015) stated that today is the time to shift our focus from the patient to the healthcare provider to determine what skills are needed to improve health literacy.
Nurses compose the largest healthcare professional group charged with health education. Nursing has the opportunity to play a vital role in health literacy through intervention, awareness, and research. Health literacy should be a high priority content item in the educational preparation of nursing students. In order to identify the need for health literacy content in the curriculum, assessment of current health literacy knowledge, application, and confidence is needed to define the deficits within the present curriculum. The development and testing of the HLKACS instrument will assist in obtaining the needed information for curriculum revision.
Health Literacy and Patient Education

Patient education has changed from the delivery of information to that of a patient-centered focus on communication by including health literacy. Health literacy issues continue to be a major concern for patients and healthcare providers, which directly impacts patient outcomes while subsequently driving up healthcare costs (National Research Council, 2011a, 2011b, 2011c). The Institute of Medicine (IOM), the Agency for Healthcare Research and Quality (AHRQ), Quality and Safety Education for Nurses (QSEN), and Healthy People 2020 have all identified health literacy as a high priority due to the impact it has on individuals. Low health literacy further disenfranchises patients with health disparities by reducing their ability to make informed decisions regarding their care (AHRQ.gov, 2013; IOM, 2013; Parnell, 2015; Squellati, 2013; US Department of Health and Human Services, 2010). The lack of understanding or comprehension of healthcare information decreases the effectiveness of healthcare teaching. To adequately teach patients, patient limitations and methods to overcome those limitations must be used to adapt information to meet the needs of the patient (Dickens & Piano, 2013; Parnell, 2015; Sand-Jecklin, Murray, Summers, & Watson, 2010; Speros, 2009).

Patient health literacy interventions and outcomes. Paasche-Orlow (2013) stated at the Health Literacy Annual Conference that little interventional work has been done in the last decade. However, a study by Jacobson, Thompson, Morton, Offutt, Shevlin, and Ray (1999) showed that when patients receive materials on pneumococcal vaccines, materials that are written for low health literacy, they were more likely talk to
their physician and receive the vaccine. In addition, Wydra (2001) showed that patients who received interactive educational programs that were designed based on health literacy knowledge were able to better manage their cancer symptoms. Paasche-Orlow et al. (2005) and Curry, Hogstel, Davis, and Frable (2002) also identified increases in knowledge with community programs focusing on osteoporosis when including evaluation of health literacy. Dickens and Piano (2013) noted that strategies have been identified and research has summarized those strategies through many systematic reviews. Overall, the assumption can be made that using health literacy strategies to improve patient understanding may be instrumental in overcoming health literacy deficits.

Lower health literacy leads to poor health outcomes and costs the healthcare system between $106 and $238 billion annually related to increased rates of hospitalization and decreased levels of preventive healthcare (Health Literacy, 2010; Vernon, Trujillo, Rosenbaum, & DeBuono, 2007). Nursing is the primary source of health education for the majority of adults. It is critical to understand the current knowledge and practice of health literacy strategies among registered nurses and student nurses.

**Patient education materials.** Due to healthcare reform changes, patient education materials have often taken the place of face-to-face teaching due to time constraints and role responsibilities (Zanchetti et al., 2012). Nurses provide the majority of patient education in both the inpatient and outpatient setting. Zanchetti et al. (2012) acknowledged that health literacy has been made a low priority in the daily functions of the registered nurse due to time constraints. Due to deficits in health-related knowledge in
patients, nurses often resort to minimizing teaching by giving handouts and assigning videos or other media that are assumed to meet the standard of education required. Changing face-to-face contact with other information sources limits the opportunity to adapt teaching to meet the health literacy demands of the patient. Even patients who are considered functionally illiterate are able to enhance learning when appropriate learning strategies are utilized and information is commensurate with the patient’s ability (Zanchetti et al., 2012).

Health professionals develop the patient education materials most often used. However, a review of the literature suggests that health literacy and the readability of patient education materials continues to be an issue (Cotugna, Vickery, & Carpenter-Haefele, 2005; Hocevar & Yuksel, 2011; Hunter, Dignan, & Shalash, 2012; Kondilis, Akrivos, Soterlades, & Falagus, 2010; Pati, Karanagh, Bhatt, Wong, Noonan, & Cnaan, 2012; Vaughn, Oselschelegel, Heidel, Caldwell, & Wallace, 2011; Wilson, Mood, Risk & Kershaw, 2003). The research indicates the need to be proactive in the assessment of patient education materials. It also indicates a need to educate nurses regarding the readability of available educational materials and the high level of reading often needed. It cannot be assumed that other professional entities are writing materials at the recommended reading level of fifth grade for patients (Gazmaraarian et al., 2005). Dickens and Piano (2013) acknowledged that there are few patient education materials designed according to the recommendations to meet low health literacy.

Inadequate education of healthcare professionals about health literacy and the development of educational materials that are above the recommended reading level contribute to the problem of limited health literacy. Despite health literacy issues being
identified as a priority since Healthy People 2010, patients continue to have difficulty reading health education materials and, because of their embarrassment, do not report their difficulty (Parikh, Parker, Nurss, Baker, & Williams, 1996). This poor understanding contributes to noncompliance and poor healthcare outcomes, which directly affect quality of life.

Patient education is greatly impacted by the level of health literacy and the lack of effective communication used to deliver the needed health information. The possible outcomes of effective teaching are empowered patients who are satisfied and have increased quality of life, increased continuity of care, reduced anxiety, reduced negative health outcomes, improved independence, and the ability to adhere to treatment regimens while taking an active role in planning their care.

**Existing patient health literacy assessment instruments.** Based on the high priority need to assess health literacy and major healthcare agencies focusing on that need, evaluation of patient assessment instruments for health literacy is important. Huan, Valerio, McCormack, Sorenson, and Paasche-Orlow (2014) indicated that there are 51 instruments related to health literacy, with 26 addressing general health literacy, 15 for specific diseases, and 10 for specific populations. All these instruments are performance-based and require paper-and-pencil administration in person (Huan et al, 2014). Interestingly, many of the instruments did not include all of the basic concepts of health literacy (Huan et al., 2014). More important, most of these instruments lack the appropriate psychometric testing needed to ensure validity, and lack of sample sizes to strengthen the power of the effect contributes to the lack of consistent reliability (Huan et al., 2014).
Three existing instruments are most frequently used to assess health literacy of individuals: the Test of Functional Health Literacy in Adults (TOFHLA), the Rapid Estimate of Adult Literacy in Medicine (REALM), and the Newest Vital Sign (NVS). Huan et al. (2014) stated that often the new instruments use REALM and TOFHLA as the gold standard for comparison. At the Health Literacy Annual Conference, Paasche-Orlow (2013) indicated that these instruments do not measure total health literacy of the patient due to lack of scientific consensus and are limited to specific contexts of literacy. However, at the present time these are the most widely used instruments used to assess patient health literacy.

The TOFHLA was developed by researchers at Georgia State University and Emory University and has been validated in English and Spanish. The full version of the TOFHLA takes approximately 22 minutes to administer, while the shortened version (STOFHLA) takes approximately 7 minutes (Mika et al., 2005). The TOFHLA has three reading comprehension passages with words deleted from instructions for upper gastrointestinal procedure prep. The patient is expected to pick the best word to complete the sentences from a list. Passages were written in fourth- and tenth-grade reading levels. Numeracy is tested by using appointment slips and prescription bottles to read and interpret for the interviewer. Testing used terms that the patient would frequently encounter in the healthcare setting. The ability to read and interpret prescription labels, follow appointment slips, complete forms, and digest risk-benefit profiles is sometimes difficult even for those with adequate health literacy because the context is so unfamiliar (Baker, Williams, Parker, Gazmarrian, & Nurss, 1999). The TOFHLA identifies patients who have low functional health literacy based on the number of correct responses (Baker
et al., 1999; Mika et al., 2005). TOFHLA is limited because reading comprehension cannot fully be measured by the ability to identify correct terminology to insert into sentence completion questions.

The REALM assesses the patient’s ability to read and pronounce medical terminology. The patient’s health literacy is based on the number of words read and pronounced correctly. The REALM has several limitations: visual acuity, examiner’s administration abilities, pronunciation, and dialect. Additionally, the instrument can be administered only to those who speak English (Baker et al., 1999). Its aim is to provide a quick assessment of reading ability in the medical environment, taking approximately two to three minutes to administer. However, it does not assess one’s numeracy ability (Davis, Michielutt, Askov, Williams, & Weiss, 1993).

The Newest Vital Sign (NVS) is a bilingual (English and Spanish) screening tool that can be administered in about three minutes during patient visits (Pfizer, 2013). The NVS was supported by Pfizer, Inc., and developed by health literacy experts at the University of Arizona College of Medicine and the University of North Carolina (Pfizer, 2013). Patients are given a label fashioned after one on an ice cream carton and then asked to provide answers to six questions based on information provided on the label (Pfizer, 2013). Advantages of the NVS are its bilingual capability and its quick administration time. However, the ability to read and identify items on the label does not necessarily ensure that the patient can interpret complex medical instructions given with medical jargon. Critiques of the NVS show consistency with the S-TOFHLA results (Welch, VanGeest, & Caskey, 2001; Weiss, et al., 2005).
These instruments focus on patient indicators of health literacy. The instruments discussed are not designed to assess healthcare professionals and do not capture the information that is needed by nursing students to adequately assess and intervene with patients with varying degrees of health literacy. The ability to assess patient knowledge (the comprehension of health information) and nursing student ability (application of health literacy knowledge) is very distinct; thus, TOFHLA, REALM, and NVS are not suitable for assessing the knowledge level of nursing students.

**Nursing Knowledge of Health Literacy**

**Importance of nursing professional knowledge.** Increasing health literacy knowledge levels of nurses and nursing students and the development of patient education materials at recommended reading levels could impact patient outcomes by improving how nurses deliver information to the patient and how nurses evaluate materials needed to deliver health information. Assessing the ability of nursing students to assess patient education materials can also determine whether nurses are being prepared to critically analyze the patient education materials they use. The assessment of nursing students’ ability can also determine whether nursing education needs to add components related to analyzing patient education materials.

An additional concern is that as technology increases, those with the largest deficits in health literacy will have even more limited access due to limited use of digital resources such as computers. This is a concern not only with technology literacy of patients but also that of nurses. The average age of the nurse is 44.5, with 45% of nursing positions being filled by those over 50 (Burhaus, Staiger, & Auerbach, 2000; 2009). In addition, the National League of Nurses (2013) noted that 30% of students in associate
degree nursing programs and 16% of those in bachelor degree programs are over 30. Age may affect the comfort of nurses who are expected to use technology to assist with patient education. Many of the nurses and nursing students in these age groups may not be comfortable with technology. Nursing faculty themselves are rated at novice or beginner for teaching with technology (McNeil, et al., 2003). Use of technology may further complicate an already complex communication process within healthcare.

**Health literacy and nursing.** Many healthcare institutions require nurses to demonstrate effective teaching as part of their measure of excellence in practice on clinical ladders (Bastable, 2003, 2006). Joint Accreditation Commission Healthcare Organizations (JACHO) and the American Hospital Association (AHA) have made additional complex changes required for accreditation related to health literacy and patient education. The Department of Health and Human Services included health literacy in the Nation Action Plan to improve health and identified the importance of healthcare professions in the success of the initiative (U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion, 2010).

The Institute of Medicine (2004) recommended that health literacy become a core competency in nursing education. Nursing needs to improve how we communicate health information with patients because it directly affects comprehension and informed decision-making of the patient. Health literacy assessment should be taking place not only in the practice environment but in the nursing education environment as well. More important, providing healthcare information that is understandable is an ethical responsibility of nurses so that patients can make informed decisions about their health (Gazmararian, et al., 2005; Nutbeam, 2000). Nursing schools educate future nurses to be
both care providers and patient advocates, which helps to empower the patients. Health literacy skills empower individuals, families, and communities to improve health. Health literacy skills are necessary for the nurse today and should be considered not only an ethical responsibility but a core competency.

The goals of the AHRQ report on health literacy directly reflect the competencies identified by Quality and Safety Education for Nurses (QSEN). Competencies in safety, evidence-based practice, collaboration/teamwork, patient-centered care, informatics, and academic-clinical partnerships are important in making substantial changes in low health literacy and improving patient outcomes (QSEN Institute, 2013). Health teaching and determining the patient’s level of understanding healthcare information are important parts of each of the competencies.

The American Association of Colleges of Nursing (AACN) uses the National Patient Safety Goals, QSEN, and the research priorities of the AHRQ to guide recommendations for accreditation within nursing education (AACN, 2008). Each of the key priorities identified by QSEN can be linked to the Nursing Essentials for Baccalaureate Education by the AACN (AACN, 2008). This linkage indicates that nursing educators should look directly at their curriculum and evaluate key safety issues (AACN, 2008). One of the key safety issues identified by multiple governmental organizations and patient advocacy groups is health literacy. The National League of Nurses (NLN) also includes the recommendations of QSEN in their competencies expected among all levels of graduates (NLN, 2013).

An academic literature search identified that there is little literature about teaching health literacy in the curriculum. McCleary-Jones (2012) noted that there is inconsistent
and inadequate representation of health literacy in nursing education within nursing literature. As a result, health literacy should be a high priority in nursing curriculum to better prepare nursing students and the nursing workforce for patient education and health literacy considerations. There is need for change in the nursing curricula to reflect this. More important, there is a gap in the research assessing health literacy content in nursing education and the current knowledge, application, and confidence levels of both nursing students and registered nurses.

**Knowledge of health literacy in practice.** Despite health literacy issues being identified as a high level of need since Healthy People 2010, there is little information available on knowledge levels and awareness of health literacy among healthcare providers. Jukkala, Deupree, and Graham (2009) surveyed 230 participants from nursing, medicine, and dentistry, which also included students, attending a health literacy seminar. Less than 12% of participants knew that 30% of adults had health literacy issues. Of the three groups studied, the health profession with the lowest rate of health literacy knowledge was nurses. Dickens, Lambert, Cromwell, and Piano (2013) described in their study how nurses often overestimate their patient’s health literacy and how most practicing nurses have never had any education about health literacy. Nursing schools provide education to future nurses, and part of this education is teaching learning theory and opportunities to provide healthcare teaching to individuals in diverse settings. Speros (2009) noted that there is not substantial information about nursing knowledge of health literacy within the literature and that most health literacy literature is outside of the field of nursing. However, there are several studies since 2009 that identify nurses’ and nursing students’ knowledge.
Macabasco-O’Connell and Fry-Bowers (2011) stated that although 80% of nurses had heard of health literacy, less than half had formal health literacy training, and 56% viewed health literacy as a low priority. This is important for the patient with low literacy skills because if the nurse does not see health literacy as an issue, strategies needed to help the patient learn may not be used effectively, which could result in the patient not making informed decisions due to limited understanding. This is vital since one of the primary roles in nursing is educating patients on the self-care management of illness and health promotion.

Health literacy is not something that only the patient needs; the nurse needs to understand what health literacy is and have the skills needed to work within the confines of the patient’s health literacy skills. For a nurse to be literate about health communication, the nurse should have knowledge of health literacy (Scheckel, Emery & Nosek, 2010). The nurse is literate in healthcare and treatment regimens but often has a lower literacy level in health communication and teaching methodologies (Manacasbo-O’Connell & Fry-Bowers, 2011; Scheckel, Emery, & Nosek, 2010).

**Health literacy knowledge among nursing students.** A paucity of research investigating nursing student knowledge on health literacy is present. Cormier and Kotrlik (2009) assessed the health literacy knowledge and experiences of senior baccalaureate nursing students ($N = 361$). The study indicated that students scored only 50% on knowledge of health literacy. Cormier and Kotrlik (2009) questioned whether the score obtained in health literacy knowledge was high enough to indicate student proficiency. Areas in nursing education where gaps were identified included issues faced by vulnerable populations, accurate screening for health literacy, implementation
strategies for health literacy, and a lack of experience critiquing educational materials for appropriate use in teaching patients. It was also determined that students had little opportunity to evaluate educational media for suitability.

Scheckel, Emery, and Nosek (2010) interviewed undergraduate nursing students to determine their experience with learning and providing patient education. The study demonstrated a high level of proficiency with knowledge of disease and ability to provide patient education by the nursing students but acknowledged that this knowledge is ineffective without health literacy strategies, which include the use of both instruments designed to measure patient health literacy and psychosocial and economic assessments to measure barriers to learning. Students may have knowledge but also have limited confidence due to system-based responsibilities of the registered nurse (RN) that require them to limit their time with patient education (Zanchetta et al., 2012). The students believed that within the RN role, health literacy took a low priority. Nurses have gaps in health literacy knowledge that are not being addressed in nursing education (Cormier & Kotrlik, 2009). Studies in nursing education involving registered nurses and nursing students showed that there is limited knowledge and lack of understanding of the importance of health literacy. Therefore, there is a need to ensure that nursing education includes the high priority and importance of health literacy within the curriculum.

Squellati (2013) also interviewed 13 junior and senior undergraduate nursing students. Themes indicated that students believed they received health literacy information through their curriculum and that clinical practicum provided most of their experience. Students were taught good communication skills, but none used the screening tools.
Shieh, Belcher, and Habermann (2013) described three themes that emerged from a qualitative study with nursing students: identifying low health literacy from behavioral cues, using health literacy strategies to promote health, and the information loop. Students did not use standardized health literacy tools, evaluate patient education materials, or provide for patient empowerment through intervention. Sheih et al. (2013) stated that nursing education needs to enhance practice by integrating health literacy assessment tools and interventions designed to empower the patient into the nursing curriculum. Weekes and Phillips (2015) further supported the need for health literacy curriculum by stating that health literacy education should be implemented early in the curriculum and frequently revisited.

Sand-Jecklin et al. (2010) and McCleary-Jones (2012) assessed the impact of a brief education program on health literacy within the generic BSN population. The pre- and posttests were based on the information provided in the health literacy educational program as a quiz. The pre- and posttest design demonstrated a significant increase in knowledge on the test designed by the researchers. However, long-term use and retention of knowledge is not known and may be a concern. The lack of data on retention of health literacy knowledge supports the need for further research on whether health literacy is in the nursing curriculum and whether, across semesters, the knowledge is retained and used and whether self-efficacy in its use is present.

The instructor can relay the behaviors, strategies, and techniques, but the reason why we teach the information in the way that is chosen is often unclear (McLeod, Steinert, Meagher, & MacLeod, 2003). The nurse may know what to teach but be lack the skills and knowledge needed to present the information in a way that the patient
understands and can use. The result of prior knowledge in health literacy can greatly change the result of the teaching endeavor, even though the nurse has the same general knowledge skills. The lack of knowledge in health communication and health literacy also affects the application and self-confidence demonstrated by the nurse regarding health literacy. Studies on other topics have shown that knowledge often produces more action (application) and self-confidence, further demonstrating the importance of assessing knowledge (Shipman, et al., 2008; Ulrich, et al., 2010).

Nursing education. Students receive competency based information determined by what the instructor feels the student needs; however, this information may be lacking some key concepts needed to develop true nursing competency. More important, a bridge between academia and practice must occur in order to meet the challenges of the changing healthcare environment and changing student needs (Stanley & Dougherty, 2010). By changing the clinical focus to working together instead of the instructor observing the learning, thinking together and learning together becomes the priority (Paris & Gespass, 2001). Shulman (1986) points out that there is a missing paradigm in many disciplines where it is expected that content knowledge is sufficient for teaching (Carlsen, 1999; Knowles et al., 1998, 2011; Shulman, 1986).

In this particular case, the components of health literacy need to be considered to interpret and teach health-related information. Increased attention to health literacy has assisted in a better understanding of the factors associated with poor educational outcomes in patient teaching. By increasing attention in the classroom and clinical settings to the factors associated with content literacy and continued research into instructional strategies, a better understanding of teaching and learning will take place
within nursing. Additionally, use of professional development, graduate and undergraduate university courses, and conferences and workshops can also increase the content literacy related to health literacy among nurses. Nursing education also needs to address the need of nurses to more fully comprehend and understand instructional strategies to effectively teach their patients.

Understanding that patient education is primarily addressed by nurses emphasizes the need to integrate health literacy knowledge and strategies into nursing education. Integrating this important knowledge into nursing curricula would allow nurses to see the importance of health literacy. Nurses could then make a substantial impact on low health literacy and improve patient outcomes, which could subsequently decrease overall healthcare costs.

When examining the teaching/learning process, we must define what is within the pedagogy of teaching and considered content knowledge. Nursing programs often educate nurses on the content of disease but forget to educate them on how to teach. Twenty-eight nursing fundamental textbooks, which included chapters on patient education, published between 1996 and 2012 and written by twelve different authors, were reviewed to determine whether health literacy had been integrated since it was originally identified in the literature by Doak, Doak, and Root in 1985 (Doak & Doak, 1996). The textbooks included those written by the following authors: Brooker and Waugh, 2007; Craven and Hirle, 1996, 2000, 2003, 2007; Daniels, Grendell, and Wilkins, 2010; DeLlauhe and Ladner, 1998, 2002, 2006, 2011; Harkreader and Hogan 2004; Harkreader, Hogan, and Thobaben, 2007; Kozier, 2004, 2008; Leahy and Kizilay, 1998; Potter and Perry 2005, 2009, 2011; Ramont and Niedringhaus, 2008; Taylor, 1997, 2001;
Taylor, Lillis, Lemore, and Lynn, 2008, 2011; and White, Duncan, and Baumble, 2001, 2005, 2011. Each of the textbooks demonstrated that very little information was offered on teaching learning theory and the role of the educator. In all of the textbooks reviewed, fewer than two to five pages in each one included the process of teaching, most giving superficial information at best. Eleven of the textbooks defined and discussed pedagogy vs. andragogy, but this was usually a paragraph or less. The remainder discussed teaching learning principles through generalizations. Many texts approached teaching learning as a method of communication with motivation to learn, ability to learn, and the learning environment as additional key concepts.

Interestingly, for information specifically related to health literacy, only eight authors of textbooks directly discussed health literacy concerns. When it was discussed, the information consisted of one to four paragraphs of general information. An additional ten textbooks discussed illiteracy from the perspective of low reading levels but did not discuss the issues specific to health literacy. Health literacy strategies for educating patients identified in the textbooks were participation, lecture, reinforcement, one-on-one, demonstration, role play, and simulations as the predominant methods. In addition to the commonly used teaching strategies, eight textbooks identified the health literacy tools—WRAT, REALM, TOFHLA, Cloze, teach-back, Askme3, and SMOG readability test—as methods to assist with identifying patients with low health literacy and materials designed for low literacy. These strategies were identified but were not explained in full descriptions.

Doak and Doak (1996) first defined health literacy as the ability to read words and numbers and comprehend their meanings in a way that allows individuals to understand
their own health and make informed decisions. A review of commonly used nursing textbooks indicates that adequate information on health literacy still is not present in nursing education materials. The Joint Commission initially addressed the issue of every patient needing to be taught about their disease and treatment in a way that allows them to be able to make informed decisions over 15 years ago when Doak and Doak (1996) defined health literacy. Furthermore, nurses may not be receiving this important information, causing the nurse to lack health literacy content and teaching ability, which then transfers to their inability to adequately educate patients.

**Health Literacy Measurement Tools for Nursing Students**

Through a comprehensive literature review, several instruments that measure health literacy knowledge among nurses and nursing students were identified. Cormier (2006) developed Literacy Knowledge and Experience Survey (HL-KES) for nursing students that consists of 30 multiple-choice items related to knowledge, nine questions related to experiences in nursing school, and seven demographic variables. The study was administered to 336 students and evaluated psychometric properties of this instrument. Reliability was established using Cronbach’s alpha. The Cronbach’s alpha score for knowledge was .79 and for experience was .76, indicating acceptable reliability (George & Mallory, 2003). Item analysis for knowledge had item difficulty indices between .15 and .88. Two items scored below .3 and seven scored above .7, indicating moderate discrimination. Low discrimination items should be reviewed but not necessarily eliminated. The section representing experience reported a Cronbach’s alpha of .82, demonstrating good reliability. The overall instrument had a content validity index of
.98, which indicates that 98% of the content experts were in agreement of the validity of the items on the instrument.

Knight (2011) also used the HL-KES instrument to evaluate nursing knowledge and experience in Georgia. The survey was sent to 1,402 experienced nurses with at least three years of experience, with a final sample of 141 responding. Knight (2011) demonstrated internal consistency with PCA with a Cronbach’s alpha of .81 for health literacy experience. However, no other validity or reliability is reported.

Torres and Nichols (2014) also used the HL-KES to survey 391 associate degree nursing students. Participants had some knowledge about health literacy, but additional education was reported as needed. The Cronbach’s alpha for knowledge was reported as .82; however, Cronbach’s alpha scores for the subscales ranged between .71 and .78. No reliability scores were presented for the experience subscale.

Based on the review of these studies, the strengths of HL-KES include (a) ability to break knowledge into subgroups for identification of lack of knowledge topics, (b), consistent results between nursing student populations, and (c) ease of administration. The limitations were (a) lack of complete reliability and validity testing across students to ensure that the initial reported reliability and validity are consistent across groups and (b) limited to knowledge and experience with health literacy. The use of the HL-KES instrument has appeared in the literature three times to date. No revision of the instrument to improve item indices was seen. This leads to a question as to why the indices that scored low were not revised. The validity and reliability of this instrument have not fully been established. However, both admitted that there were knowledge deficits related to
health literacy and that knowledge of health literacy often correlates to experiences in addressing health literacy.

Knight (2011) did not do exploratory factor analysis but performed principal components extraction on only nine of the items in the instrument. Knight (2011) also examined only registered nurses with more than three years’ experience. The response to the survey was also low, with only 141 returned out of 1,402 that were sent out. Validity was reported by only the original study by Cormier (2006). It was not reported for the modification from nursing student focus to registered nurses. As a result, the information has not demonstrated repeated statistical significance with one population. The HL-KES also does not explore confidence.

**Rationale of the Current Study**

Limited research has been performed on how the nurse profession interacts or influences the phenomenon of health literacy through interventions and communication as well as the nursing professional’s understanding of health literacy (Macabasco-O’Connell, 2011). The lack of reporting of reliability and validity of the HL-KES and the lack of measurement of application and confidence identified the need for a tool to address these concerns. As a result, health literacy should be a high priority in nursing curriculum to better provide educational preparation for nursing students and the nursing workforce, and there is need for change in the nursing curricula to reflect this. More important, there is a gap in the research assessing health literacy content in nursing education and the current knowledge, application, and confidence levels of both nursing students and registered nurses. Therefore, exploration and development of health literacy
preparation, application, and confidence in using health literacy skills is beneficial to
determine the gaps present in nursing education regarding health literacy.

**Process of Developing and Validating Health Literacy Instrument**

In order to better understand what nursing students have learned and are
comfortable using in regard to health literacy, the three domains of professional learning
need to be incorporated in the instrument: affective, cognitive, and psychomotor
(Bastable, 2003). The existing HL-KES instrument reflected on only the cognitive
domain and the student's experience with health literacy. Currently, there is presently no
instrument that directly measures all three domains of learning within nursing and
assesses the health literacy knowledge (cognitive domain), practice (psychomotor
domain), and self-efficacy (affective domain) among nursing students. In order to change
practice in the clinical setting, it is vital that an instrument that directly collects data on
all three domains be developed. As identified above, nursing students may have the
knowledge of health literacy, but the amount of emphasis placed on health literacy
nursing education may vary greatly, which will directly influence efficacy of using health
literacy strategies. The more emphasis placed on health literacy in the nursing
curriculum, the more use and comfort in using health literacy strategies for nurses while
less emphasis decreases their comfort and use.

**Cognitive Domain of Health Literacy**

The cognitive domain of health literacy was measured by the nine-item health
literacy knowledge subscale and consisted of basic facts on health literacy, consequences
associated with low health literacy, health literacy screenings, guidelines for written
healthcare materials, and evaluation of health literacy interventions. The content areas
included in test construction were weighted and derived from the review of literature.
Bloom identified six cognitive levels used to categorize test items (Bastable, 2003). The cognitive levels of knowledge and comprehension were used for test construction based on the anticipated knowledge expected of a senior baccalaureate student in the area of health literacy.

**Health literacy basic facts.** The first content area within the health literacy knowledge subscale is health literacy basic facts and was measured by Items 1, 2, and 7. The items about basic health literacy facts include information about current reading levels of the average American, the depth of the health literacy issue, and the average reading level of current healthcare forms.

**Justification.** In a recent study, Walker, Pepa, and Gerard (2010) determined that 1/3 of patients had reading level below an eighth grade for health literacy, and only 11% of those attending or completing graduate school were at basic or below basic levels of health literacy competency. The lack of health literacy at all education levels shows the overall pervasive nature of low health literacy, which affects informed decision-making by the individual and the need to incorporate health literacy strategies into practice with all patient encounters.

Jukkala, Deupree, and Graham (2009) stated that less than 12% \( (N = 230) \) of healthcare professionals who participated at a health literacy conference knew that 30% of adults had health literacy issues; they identified nurses as the healthcare provider group reporting the highest rate of no prior health literacy knowledge. Macabasco-O’Connell and Fry-Bowers (2011) showed that although 80% of nurses had heard of health literacy, less than half had formal health literacy training, and 56% viewed health literacy as a low priority. Understanding that nurses have not identified health literacy as
important is paramount since one of the primary roles of nursing is educating patients on the self-care management of illness and health promotion.

The lack of comprehension of healthcare information further decreases the effectiveness of healthcare teaching. Many roundtable reports directed at health literacy were produced by the IOM, allowing the health literacy awareness agenda to be further enhanced by the 2010 National Action Plan to Improve Health Literacy instituted by AHRQ (U.S. Department of Health and Human Services, 2013). In addition, the Affordable Care Act requires and supports additional action on health literacy and effective communication, which is also seen within the National Action Plan and Healthy People 2020 (U.S. Department of Health and Human Services, 2013).

**Consequences of low health literacy.** The second content area within knowledge is consequences of low health literacy are measured by Item 5, which examined effects on patient outcomes. Consequences of poor health literacy are linked to poor patient outcomes and access. Lower health literacy drives up the cost of healthcare by demonstrating poorer health outcomes leading to increased rates of hospitalization and decreased levels of preventive healthcare (Health Literacy, 2010). Research also suggests that health literacy is a stronger predictor of health status than socioeconomic status, age, or ethnic background (White, 2008). Although income, age, and ethnic background can negatively influence health literacy by placing barriers in the pathway of learning, health literacy ultimately is a stronger predictor of health status because it crosses all ages, income levels, and ethnic groups (Martin, Ryder, & Lurie, 2009). Health is rated as poor by 42% of the individuals with low health literacy, and 28% of individuals with low
health literacy are more likely to lack health insurance (National Research Council, 2011b).

It is important for nurses and nursing students to be knowledgeable of health literacy basic facts, assessment and strategies, and consequences of low health literacy. Orem (2001) believed that acquired theoretical knowledge enables the nurse to seek answers to questions posed when entering another person’s life situation. This acquired knowledge “is not memorized but rather understood, conceptualized, and made dynamic in practice situations” (Orem, 2001, p. 446). Therapeutic self-care demand and maintaining self-care agency become the nurse’s priority. Therefore, assessing the health literacy knowledge of the nurse or nursing students increases the ability of the nurse to provide care that increases self-care agency.

**Health literacy assessment and strategies.** The third content area within the health literacy knowledge subscale is health literacy screening and was measured by Items 8 and 9, which address tools that can be used to assess and intervene with low health literacy. Use of plain language and teach-back methods are key in ensuring that patients understand the health information being provided. The use of health literacy tools assists the nurse in identifying patients who are at risk for health literacy issues. These tools can be found in the health literacy universal precautions tool kit and in multiple publications on health literacy by the National Research Council (AHRQ, 2011; National Research Council, 2011a, 2011b, 2011c).

**Health literacy evaluation of patient information.** The last area of content included in the knowledge subscale is evaluation of patient information. Items on the questionnaire that are included in this category are Items 3, 4, and 6. These items evaluate
the ability of the nursing student to screen information. Items 3, 4, and 6 are derived from the following information.

**Justification.** According to the National Center for Education Statistics (2006), 12% of adults have proficient health literacy. This translates into approximately 9 out of 10 adults lacking the necessary skills to manage their own health and prevent disease. To further stress the importance of the health literacy crisis, fourteen percent, or over 30 million adults, are below basic health literacy levels. Cotugna et al. (2005) determined that only two of ten patient education materials fell within the recommended fifth- to sixth-grade reading level. Reading levels were consistently found to be between two to four grade levels higher than recommended. Shieh and Hosei (2008) concluded that only 14% of reviewed materials were at the sixth-grade reading level.

**The Psychomotor Domain of Health Literacy**

The psychomotor domain of health literacy was measured by the 13-item Health Literacy Application Subscale and consisted of items that measure the nursing student’s experience with health literacy screening and presentation of health literacy screening to apply the knowledge and use health literacy strategies in professional practice.

**Justification.** Macabasco-O’Connell and Fry-Bowers (2011) stated that although 80% of nurses had heard of health literacy, less than half had had formal health literacy training, and 56% viewed health literacy as a low priority. This low level of priority further complicates the issue by decreasing the use of tools and other assessments to determine health literacy needs of the patient. In order to determine the priority of using health literacy knowledge in practice, application of health literacy skills must be addressed. No literature addressing the application of health literacy in students has been
identified. The application subscale is based on the knowledge scale and the components of assessment that are vital for assessment of potential low health literacy issues.

**The Affective Domain of Health Literacy**

The affective domain of health literacy consists of a 7-question confidence subscale that measures the confidence level of the student nurse’s ability to apply and comprehend health literacy strategies.

*Justification.* Unfortunately, many nurses are ill-prepared to use literacy techniques to assist patients in learning needed skills, particularly those with low literacy levels. The lack of preparation leaves the teacher (nurse) feeling ill-equipped to deal with low health literacy in patients (Greenleaf, Schoenbach, Cziko, & Mueller, 2001). The low level of self-efficacy is compounded by traditions that favor certain modes of content area delivery in nursing education (Bean, 2000; Bean, Readence, & Baldwin, 2011; O’Brien, Stewart, & Moje, 1995). As a result, the nurse feels high levels of self-efficacy when dealing with the content directly but lacks the self-efficacy to effectively teach the information to patients. In order to identify the confidence in using health literacy strategies, the instrument should assess the confidence level of nurses or nursing students using the health literacy strategies in practice settings.

Bandura (2006) stated that self-efficacy often influences the motivation, performance level, and consistency in using the skill to change the environment. Since health literacy continues to be an issue, one area needing to be explored is whether nursing students are acquiring the skills needed to feel that their self-efficacy in health literacy is high enough to elicit change in practice within the clinical setting.
Confidence Scaling

Scaling was based on Bandura’s recommendations when trying to measure self-efficacy or self-confidence (Bandura, 1971, 1982, 2006; Bandura & Schunk, 1981). Bandura (2006) suggested that the word “can” be used instead of “will” in scales measuring self-efficacy because it suggests a statement of capability instead of intention. For the scale on confidence, “can” was used. Perceived efficacy directly influences the outcome produced and the persistence in pursuing the action (Bandura, 2006). A sound efficacy scale requires conceptual analysis that fully identifies the domain of functioning (Bandura, 2006). Bandura (2006) suggested that using a 10-point scale, either 1 through 10 or to 100 by 10s, is the most reliable. Scales using 5 points or under do not provide good reliability. Bandura (2006) also claimed that using fewer than ten responses also limits the true identification of self-efficacy. This study used a 1-to-10 scale, with 1 being “can never perform” and 10 being “can perform all the time.” Using a 10-point scale with an extreme positive and extreme negative allows the subjects to give their opinions of their confidence level and not be confined to a specific numerical number of confidence. The scale is also a higher level of measure as interval using a 10-point scale.

Methodological Considerations

Sampling. Convenience sampling allows for willing participants from a defined group to participate (Fink, 1995; Wood & Ross-Kerr, 2011). A convenience sample allows the researcher to determine either the time frame and/or the number of subjects in advance (Wood & Ross-Kerr, 2011). It also allows every person who responds to participate, which makes the actual population unknown until the participants opt to participate. However, a limitation of the convenience sample is that the potential bias
cannot be estimated. Inclusion criteria are extremely important in determining eligibility because clearly defined criteria ensure that all eligible participants are identified to be recruited into the study. It also limits those who do not meet the criteria. Sample size can be based on that fact that there was a potential population of approximately 10,000 nursing students in Michigan (The Michigan Center for Nursing, 2013). Using the approximate number of nursing students suggested a sample between 322 and 370 for a 95% confidence level for exploratory factor analysis based on a chart in Mitchell and Jolley (2001). Rounding up to 400 allows for errors in absent data and incomplete surveys.

**Reliability.** Test-retest methods help to determine the reliability of the scale; however, this method may not be practical when measuring test items of knowledge. Using internal estimates of reliability allows for scores to be measured based on variance of the test, individual, and the consistency of performance of the test-taker from item to item (McDonald, 2002). This test is known as the reliability co-efficient and should be between 0.60 and 0.85 (McDaniel, 1994). Low reliability is often due to very easy or hard items, poorly written items that do not discriminate, and lack of representation of a unified body of content.

Quality of the test items, item difficulty, item discrimination, homogeneity of the test content and group, test length, sample size, and speed and design of administration are all factors that impact reliability measures (McDonald, 2002). The point biserial index (PBI) identifies the discrimination ability of the item that measures item quality. The PBI ranges from -1.0 to +1.0. The higher the + score, the better the discrimination. The mean \( p \)-value identifies the difficulty of the total test. A highly discriminating item has a PBI
about 0.20 and a p-value from 0.60 to 0.80 (McDonald, 2002). The standard error measurement (SEM) enables us to determine the difference between the obtained score and the true score. Looking at the margin of error in the test allows for translation of raw scores to test scores. In this dissertation, test retest and item analysis were performed to determine reliability.

Validity. Validity is the degree to which the instrument measures what it is supposed to measure and is supported by evidence and theory (Waltz, Strickland, & Lenz, 2010). Using validity to establish a nursing instrument measures the empirical properties of a nursing concept, in this case health literacy. The instrument is successfully developed if it measures the intended content. Five distinct types of evidence are needed to determine the validity in an instrument: test content, response processes, internal structure, relations with other variables, and the consequences of testing. The combination of the five elements determines the degree to which the evidence in total interprets the scores for the intended purpose. Evidence also indicates the degree to which theory supports the interpretation (Waltz, Strickland, & Lenz, 2010). Face validity is considered the acceptance of the instrument as sound based on the appearance (Lynn, 1986; Wood & Ross-Kerr, 2011). It is important to use expert sampling through content expert validity to evaluate the instrument in order to ensure that it measures the construct being tested (Haynes, Richard, & Kubany, 1995; Lynn, 1986; Wood & Ross-Kerr, 2011). For this study, the constructs are health literacy knowledge, application, and confidence of nursing students.

The tool’s validity is influenced by the systematic error introduced into the measurement procedure (Waltz, Strickland, & Lenz, 2010). The more systematic errors
introduced, the less validity the tool has. Factors that can produce systematic errors include characteristics of the respondents, measurement tool, method, or the measuring process. Characteristics of the instrument bias are the inclusion of items that measure knowledge, skills, or abilities irrelevant to the concept being measured. A significant threat to validity is proxy response, which is when a subject is unable to respond to a measure and guesses the correct answer or answers the question with what they feel is the desired answer (Waltz, Strickland, & Lenz, 2010). In this dissertation, expert content validity and factor analysis were performed to determine content and construct validity.

**Content Validity**

Content validity occurs when the emphasis is placed on the relationship between the instrument and the literature (Fraenkel & Wallen, 2009; Polit & Hungler, 1991; Wood & Ross-Kerr, 2011). Content validity is the degree to which the items are reflective of the construct of the instrument. Content validity also affects the latent factor structure of an assessment instrument (Haynes, Richard, & Kubany, 1995, p. 5). More important, content validity is directly linked to the target population and the particular construct domain.

Content validity also refers to how accurately a measurement tool assesses the various aspects of the specific construct in question—in other words, if the items/questions really assess the construct in question or are the responses influenced by other factors. The evaluation tool developed used the recommendations suggested by Waltz, Strickland and Lenz (2010) and Wynd, Schmidt, and Schaefer (2003).

**Content Expert Process**

Lynn (1986) stated that determining the number of experts is arbitrary and is often subject to the number of experts available. A minimum of three experts is needed when
experts are limited; however, five is considered a more sufficient level if there are enough experts available (Lynn, 1986). Judgments about the phenomena are strongly influenced by the validity of assessment instruments (Haynes, Richard, & Kubany, 1995; Lynn, 1986; Wood & Ross-Kerr, 2011). However, expert interpretation does not establish content validity but helps in developing the instrument validity (Lynn, 1986). This allows for “rigorous instrument development practice and quantifies the aspects that content validity requires” (Lynn, 1986, p. 385). However, such rigor is not always feasible.

**Construct Validity Using Factor Analysis**

Factor analysis assists in defining the validity of the instrument by determining whether the instrument items measured what was intended and can be implemented to define the dimensions of the instrument and also to identify relationships between variables and develop factors that can be used in subsequent analysis (Thompson, 2004). However, it also needs to be clarified that factor analysis does not result in easy-to-interpret factors. Factors can also be affected with small samples, resulting in inconsistent results (Waltz, Strickland & Lenz, 2010).

Exploratory factor analysis (EFA) allowed the researcher to determine the number of factors represented within the instrument. Within EFA, some considerations included the communality scores, loading of the factors, and eigenvalues. Factor structure coefficients for the factors should not be referred to as the loading due to ambiguous use of the term (Thompson, 2004). The communality coefficients reflect the amount of variance within the items of the factor and determine that the factors are a set (Thompson, 2004). The requirements of factor analysis include that the items be at the interval or ratio level and be linearly correlated (Polit, 2010). Raw data must first be transformed into a
correlation matrix. Any missing data and sample size issues must be resolved prior to proceeding to the next phase. Factor extraction determines the number of factors needed to capture the variance of the set of variables. Factor extraction maximizes the captured variance. The next phase in transforming the data is to produce results that are more interpretable. Finally, the data are analyzed, interpreted, and refined to decide how many factors to identify and rotate (Polit, 2010). The method of factor extraction was principal components analysis (PCA). PCA creates linear combinations of variables that are observable (Polit, 2010). The eigenvalues ultimately report the proportion of information that the factor produces (Thompson, 2004). Usually eigenvalues (loading values) over 1 are included in the factors; however, many researchers have questioned the accuracy of using 1 and instead use the scree test to further define the eigenvalue cut-off (Browne, 2001; Cattell, 1966; DiStefano, Zhu, & Mindrila, 2009; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Floyd & Widaman, 1995; Gorsuch, 1997; MacCullum, Widaman, Zhang, & Hong, 1999; Paatero, Hopke, Song, & Ramadan, 2002; Rummel, 1967). Waltz, Strickland, and Lenz (2010) recommend setting a minimum loading criterion of no less than .30, and ideally .50 or higher, before analysis. The intended outcome for this study was that the factors identified reflect the content of the instrument represented in the subscales of knowledge, application, and confidence. In this dissertation study, the intent was to identify all of the factors that reflect the content domains of the instrument represented in the subscales of knowledge, application, and confidence.

Prior to the dissertation study, two pilot studies (one quantitative and one qualitative) were conducted, and in the following content, results and implications for future studies were presented.
Quantitative I Pilot Study

This pilot study was performed using the Health Literacy Knowledge, Application, and Confidence Scale (HLKACS) as a survey administered to 29 registered nurses in a BSN completion program at a university in southeastern Michigan (DeBello, 2011). Health literacy facts were used in the form of multiple-choice questions to describe current health literacy knowledge. The purpose of this pilot was to determine whether there was a lack of knowledge among nurses. The survey consisted of 41 items (Appendix A).

Results of this pilot study indicated that the majority of nurses had no formal health literacy education. Even more alarming was that among nurses who stated they had formal health literacy education, there was a lack of accurate knowledge of health literacy. Twenty percent believed health literacy did not impact or only mildly impacted their care and did not believe those with higher general literacy levels could be at risk for health literacy issues. Less than 35% could identify the group most at risk for health literacy issues. To further complicate the health literacy issue, the majority of nurses identified that they infrequently or never assessed health literacy. The majority of nurses also believed that patient education resources were written or developed at or below a ninth-grade reading level when, in actuality, resources are often written at the tenth-grade level or higher. The nurses in this study also did not see health literacy as an important factor in health outcomes. Only half of the nurses could identify effective strategies in assessing and identifying health literacy issues. This information suggests that nurses lack the knowledge of not only the importance of assessing patients but the importance of
evaluating patient education materials and learning effective and correct techniques to evaluate both patient and materials.

Limitations of this study include lack of tool validation, lack of generalizability of the sample to the population, small sample size, and the use of nurses at one site. However, this pilot study supports the need for further research into the knowledge level, practice, and application of health literacy among nurses and nursing students based on the findings. Furthermore, it is unclear as to whether the lack of knowledge and application is a result of the loss of health literacy information over time, the lack of time to teach, or the belief that health literacy is not important, or whether knowledge was lacking at the time of graduation. The question itself poses the need for further research into the knowledge of nursing students about health literacy prior to graduation. This supports the need for the development of a health literacy instrument that is being examined within the proposed dissertation topic. Health literacy knowledge of nursing students cannot be explored without a reliable and valid instrument with which to collect research information. This study identified the lack of instruments and started the initial development of the proposed instrument.

**Qualitative Pilot Study**

A qualitative pilot study was performed, where five in-depth interviews were conducted among five nursing students. The goal of this qualitative study was to examine student perceptions and understanding of health literacy. The major themes revealed from this study were (a) not knowing, (b) needing more knowledge, and (c) needing more experience.
Students can often define patient education but have difficulty finding the words or expressing the definition of health literacy (DeBello, 2013a). When asked what the general definition of health literacy was, one of the students, Kim, stated “…the way I look at it is health literacy, umm, I need clarification, do you mean the patient end or as a nurse?” which demonstrates the theme of the lack of knowing identified within the study. Additionally, Todd stated that health literacy was “knowing what standard, just general and standard rules procedures et cetera.” Each of these quotes reinforces the lack of health literacy knowledge in nursing students or the confusion over what it really is.

The idea of needing more education about teaching was also expressed by Todd, who stated, “They teach us how to be nurses, but no one teaches us how to teach patients. It’s like they expect it to be just a part of who we are. But what if it isn’t?” Students desired more information about how to deal with low literacy but also see the patient education experience directly in clinical training. A senior nursing student ready to graduate expressed the idea of needing more in her education with teaching and learning strategies, which would also include health literacy. Stacy, a senior student, stated, “I guess more ideas than what I do … is it enough? Should I be giving them more? I just completed a teaching thing and that is one of the questions I put at the end, when the question asked what could you have done different? We need more education on this area.”

The third theme of needing practice was demonstrated by Jill, who stated, “We need more time to practice teaching patients and helping them understand….Often we just watch the nurse rush through….How we are supposed to learn from that?” Overall, students stressed that they did not get enough information or practice. This further
reinforces the idea that many students are not receiving the information or not understanding it.

Interestingly, a separate group of nursing students who had a health literacy assignment in their coursework were interviewed as a focus group \((N = 10)\) within the pilot. It is worthy to note that, in addition to findings similar to those in the previous pilot, the students were able to give a better health literacy definition than those who had not had a health literacy assignment in coursework. When asked the same questions about health literacy, the group was able to give an improved definition, although it was still very elementary. The group all gave similar definitions to Heather, who stated,

Health literacy is not so specific about what the actual reading level is. For most people, it is to pay attention to things… make sure that you know you’re not using a lot of medical terminology for people ‘cause they don’t understand it; that’s like the basic amount of health literacy.

The qualitative data also support the nursing students’ desire to have health literacy information and use it in practice. A larger comprehensive sample is needed in order to fully generalize the themes identified within this project to the entire student body, especially since the students self-selected to participate in the study. The results support the need for further research into the knowledge, application, and confidence students have when dealing with health literacy issues.

**Preliminary Pilot Testing of HLKACS Instrument**

Based on the findings from both qualitative and quantitative pilot study and comprehensive literature review, the Health Literacy Knowledge, Application, and Confidence Scale (HLKACS) was developed and pilot-tested in research internship to
establish and evaluate the measurement that includes three domains of health literacy (DeBello, 2013b). The initial HLKACS included 40 items and contained three subscales of knowledge (15 items), application (17 items), and confidence (9 items). The full instrument can be seen in Appendix B. The study measurement tool included five components: (a) informed consent; (b) demographic factors: six questions, such as gender, academic level, year born, and ethnicity; (c) health literacy knowledge subscale: 15 questions measuring the degree of understanding that health literacy is dependent on the capacity of the individual to obtain, process, and understand basic health information and services needed to make appropriate health decisions and that evaluation of health education materials is needed with each patient interaction, with eight questions using multiple choice and seven with true-false format; (d) health literacy application/evaluation subscale: 17 questions measuring the use of health literacy strategies and evaluation of health education practices; and (e) health literacy self-efficacy subscale: seven questions evaluating the confidence level in using health literacy strategies and evaluating patient for health literacy issues.

**Participant demographics.** Out of 330 nursing students recruited from Eastern Michigan University by an invitation via email, 238 completed the survey yielding a response rate of 72%. The mean age of the sample was 26.82 (SD = 8.25), with a range of 18 to 63. Eighty-four percent of the sample (N = 199) were females, and the racial distribution was 89.5% Caucasian, 2.5% African-American, 2.5% Hispanic, and 0.8% Asian. The sample was evenly distributed between sophomore (n = 81), junior (n = 78), and senior (n = 72) students.
**Results.** Reliability and validity were evaluated. Internal consistency using Cronbach’s alphas were used to evaluate reliability; two of the three subscales demonstrated excellent internal consistency with Cronbach’s of .93 for the application subscale and .91 for the confidence subscale. The knowledge subscale had a Cronbach’s of .41. The Cronbach’s alpha score was low due to the diversity of the questions and inconsistent answers among the students. The items were knowledge-based and were consistent with the format of a test item. Due to the format of test items, the knowledge subscale did not demonstrate good reliability because of lack of the variance within the items. Therefore, item analysis and item discrimination analysis would have been better evaluation strategies to determine the reliability of the knowledge subscale; these strategies were used in full psychometric testing of the revised HLKAC instrument later in this dissertation.

Validity was addressed as face validity and the ease of taking the survey online. Validity was established using factor analysis. Principal component analysis was performed examining the associations among the knowledge, application, and confidence items, and the Varimax algorithm was used for factor rotation. This analysis generated nine factors with eigenvalues greater than one, with six factors (1, 2, 3, 4, 5 and 6) representing the knowledge domain, two factors (7 and 8) representing application, and one factor (9) representing the confidence domain (see Table 1). With all items loaded into the nine factors, this solution accounted for 62.06% of the variance. The factor analysis demonstrated that all factors load over the .3 level. Communalities were above .3 for the application and confidence scales; however, the communalities for the knowledge scales ranged from .03 to .37. The application and confidence scale demonstrated good
reliability with Cronbach alpha scores for the two factors in application at .80 and .94 respectively, while confidence demonstrates a score of .92. Cronbach alpha scores ranged from .11 to .83 for the six factors representing knowledge, which demonstrated poor reliability for the knowledge subscale (DeBello, 2013b). This was most likely due to the diverse nature of the knowledge questions and the data being categorical. In this dissertation, categorical PCA was done for the knowledge subscale, which addresses the inconsistency seen within the pilot’s factor analysis results.

In terms of levels of health literacy knowledge, application, and self-efficacy, sophomore students had higher scores on both application and self-efficacy domain and higher scores in the knowledge domain. This may due to the factor that sophomore students have received additional health literacy training in a nursing course prior to survey administration. Nevertheless, the majority of the students had little confidence ($M=14.44$, $SD=5.03$) in their ability to address health literacy strategies. The mean reflects the overall sum of the confidence scale with a score range from 8 to 80 and the higher number being a higher level of confidence. Overall the pilot studies performed demonstrated that health literacy knowledge is limited, and the need for further education in nursing curriculum on health literacy content was identified by both qualitative and quantitative pilot studies.

The lack of empirical evidence for nursing professionals and students in three domains—knowledge, application and confidence—also supports the need for additional work in this area. The HLKACS instrument has shown promising initial psychometric results and warrants further work in refining the health literacy measurement and evaluating psychometric properties. The results of the pilot studies also indicate that
nursing educators may not provide the needed tools, skills, and information about health literacy to baccalaureate nursing students. The need for accurate information regarding health literacy is also paramount, as accreditation standards are incorporating the need for health literacy knowledge into nursing curriculum. The findings from pilot studies informed the directions for future dissertation study, which includes exploring different strategies to evaluate reliability and using a larger heterogeneous population to assist in establishing reliability and validity.

**Summary**

Nursing is the primary source of health education for the majority of adults and children as well. Current literature in health literacy has focused on the patient. There are over 90,000 articles that look at health provider interaction with health literacy. The majority of the research manuscripts focused on health literacy interventions and/or address the healthcare provider on clinical practices but do not measure health professional knowledge of health literacy. More important, there is lack of evidence identifying the health literacy knowledge level of nurses, nursing students, and other healthcare professionals. Few articles have been identified that address nursing knowledge. None of these have a well-developed instrument that has been used consistently to develop strong validity and reliability. The need for an instrument that measures not only knowledge but application of the knowledge and confidence in using health literacy strategies is needed. Information found from this study offers a foundation to begin integration of health literacy as a concept into nursing curriculum and as a competency in practice.
The study examined the development of the HLKACS instrument using nursing students as the sample. The study also examined the relationship between knowledge, application, and confidence in health literacy knowledge and strategies used to intervene with low health literacy. The study also compared the differences between associate degree and baccalaureate degree nurses. The following research questions were examined:

Research Question One: What is the validity of the Health Literacy Knowledge, Application, and Confidence Scale (HLKACS)?

Research Question Two: What are the reliability properties of Health Literacy Knowledge, Application, and Confidence Scale (HLKACS)?

Research Question Three: Is there a relationship between health literacy knowledge, application, and level of confidence?

Research Question Four: Is there a difference in health literacy knowledge of nursing students based on academic standing?

Research Question Five: Is there a difference in health literacy knowledge of nursing students based on the program attending?

Research Question Six: Is there a difference in health literacy application of nursing students based on academic standing?

Research Question Seven: Is there a difference in health literacy application of nursing students based on program attending?

Research Question Eight: Is there a difference in health literacy confidence of nursing students based on program attending?
Research Question Nine: Is there a difference in health literacy confidence of nursing students based on academic standing?

**Definition of Concepts**

The main variables under investigation in this study are defined both conceptually and operationally in this section.

**Health Literacy**

**Health literacy definitions.** For this study, health literacy was examined as the ability of the nurse to define health literacy (knowledge), identify individuals with low health literacy skills (knowledge), use interventions to increase patient understanding of their health in those with low health literacy (application), and feel confident in using interventions to increase patient understanding of their health in those with low health literacy (confidence).

The American Medical Association (AMA) and the National Library of Medicine (NLM) defined health literacy as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (IOM, 2004, p. 32). Health literacy has also been defined 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” (WHO, 2013, p. 10).

**Operationalization.** Health literacy knowledge, application, and confidence were operationalized as the total mean score of knowledge, application, and confidence subscales of the HLKACS instrument being developed.
**Health literacy knowledge.** Health literacy knowledge consists of basic facts on health literacy, consequences associated with low health literacy, health literacy screenings, guidelines for written healthcare materials, and evaluation of health literacy interventions.

**Operationalization.** Health literacy knowledge was operationalized by the use of the sum score of the number correct out of the nine items on the health literacy knowledge portion of the HLKACS scale.

**Health literacy application.** Health literacy application is the ability to apply knowledge in experiences requiring use of the health literacy strategies. Application is the implementation and use of knowledge in professional practice. Application can also be defined as the psychomotor function of knowledge.

**Operationalization.** The operationalized definition was the total sum of the 13 items on the application portion of the HLKACS scale.

**Health literacy confidence.** Health literacy confidence is defined as the level of comfort in use of health literacy knowledge and the nurse’s ability to apply the information to practice. Confidence is the faith or belief that one will act in a right, proper, or effective manner when having the correct knowledge to offer success.

**Operationalization.** Confidence was operationalized by the total sum of the seven items on the HLKACS confidence subscale.

**Program attending.** Program attending is identified as either associate degree or baccalaureate degree. An associate degree nursing program is a two-year undergraduate academic degree program usually offered by community colleges, junior colleges, technical colleges, and bachelor’s degree-granting colleges and universities. A
A baccalaureate nursing program is a four-year academic degree in the science and principles of nursing, granted by a tertiary education university or similarly accredited school.

**Operationalization.** An associate degree nursing program was operationalized as identification of being in an associate degree in nursing program using an ordinal response set. A baccalaureate degree nursing program was operationalized as being in a baccalaureate degree in nursing program using an ordinal response set.

**Academic progression.** Academic progression is a measure of the student's academic achievement relative to his/her degree requirements. Associate degree nursing students can be in the first or second year. Baccalaureate nursing students can be identified as either freshman, sophomore, junior, or senior level, first or second semester.

**Operationalization.** Academic progression was operationalized as reporting of year in nursing school according to program attending.

**Age.** Age is defined as the length of time in years that a person has lived.

**Operationalization.** Age was operationalized as reporting of month and year born and calculated based on time of the survey.

**Gender.** Gender is the state of being male or female, as defined by the person.

**Operationalization.** Gender was operationalized as identification as either male or female in the demographic section of the survey by the subject.
Chapter IV: Methods

Study Design

The study was a descriptive survey to assist in the development and psychometric analysis of a newly developed instrument. Data were collected using a commercial survey application, Survey Monkey. Survey Monkey ensured confidentiality and security of the data with encryption. The sample size was 400 nursing students in the state of Michigan, which was justified in the sampling section. The goal of the study was to determine the validity and reliability of the Health Literacy Knowledge, Application, and Confidence Scale (HLKACS) instrument. In addition, data analysis using correlations and tests for differences between associate and bachelor degree nursing students in regard to the health literacy knowledge, application, and confidence in using health literacy strategies were examined. Data were analyzed using SPSS 23 software.

Sampling

The study participants included nursing students in nursing programs in the state of Michigan. In this study, a convenience sample was identified through faculty and deans at Michigan universities and colleges (Appendix C). The inclusion criteria were individuals over 18 currently enrolled in either an associate degree or bachelor degree nursing program. The reason for inclusion of both programs was that the current workforce in Michigan is 42% associate degree and 44% bachelor degree in 2012 (Michigan Center for Nursing, 2013). The remaining percentage represents diploma nurses. Diploma nurses are not included in the sample because there are no longer any diploma schools open in the state of Michigan. An email reminder was sent out to
increase possible participation in the study on a weekly basis until the sample size was obtained. A time frame of 30 days was used for test-retest analysis.

Sample size was based on that fact that there was a potential population of approximately 10,000 nursing students in Michigan (The Michigan Center for Nursing, 2013). The approximate number of nursing students suggested a sample between 322 and 370 for a 95% confidence level for exploratory factor analysis based on a chart in Mitchell and Jolley (2001). Rounding up to 400 allows for errors in absent data and incomplete surveys.

Measures

The research tool used for this study was a revised version of the HLKACS instrument that was modified and informed by earlier pilot studies conducted by the researcher and after content expert review (see Appendix D). The current version of the 38-item HLKACS after content expert review and revision consisted of four sections as follows:

**Demographic information:** Seven questions (e.g., gender, academic level, year born, ethnicity) were included in this section, and demographic data were analyzed with descriptive statistics. Means and standard deviations were used as central tendency for age, while frequencies were used for gender, ethnicity, academic standing, and type of patient education materials used. Demographic data allowed the researcher to show the characteristics of the participants in the study.

**Health Literacy Knowledge subscale:** Nine questions were asked, measuring the degree of understanding that health literacy is dependent on the capacity of the individual to obtain, process, and understand basic patient health information and services needed to
make appropriate health decisions and that evaluation of health education materials is needed with each patient interaction; all questions used multiple choice format with the correct answer being scored as 1 and the incorrect answers being scored as zero with a possible total knowledge score of 9.

Health Literacy Application subscale: Thirteen questions measured the use of health literacy strategies and evaluation of health education practices and used a 5-point Likert scale. The Likert scale rates responses are scored as follows: 1 = Never, 2 = about 25% of the time, 3 = about 50% of the time, 4 = about 75% of the time, and 5 = about 100% of the time. The application subscale was scored by the sum of the items with a range of 13–65. Reliability reported from the pilot study was a Cronbach alpha of .9. The pilot study found a significant correlation found between the test and retest results for application (r (36) = .68, p<.001) demonstrating adequate test-retest reliability for the scale prior to revision.

Health Literacy Confidence subscale: Seven questions evaluating the confidence level in using health literacy strategies and evaluating patient for health literacy issues were measured by a 10-point Likert scale. The subjects were asked to rank their confidence based on a 1-to-10 scale. The Likert scale responses were scored as follows: 1 = can never perform, 5 = can perform part of the time, and 10 = can perform all the time. The confidence subscale was scored by the sum of the items with a range of 7–70. There was significant correlation found between the test and retest results for confidence, r (36) = .64, p<.001 demonstrating adequate test-re-test reliability for the scale.
Procedures

Survey administration. After the evaluation and approval by the dissertation committee, the survey was sent to deans, directors, and faculty at schools of nursing in Michigan to disseminate to students. A small sample of 40 nursing students from the 400 subjects was used to test the document for the precision. Each student in the sample of 400 was asked to make a five-character passcode. Due to many schools of nursing requiring IRB approval at their own school, enrolling subjects proved to be more difficult than anticipated. The all students were asked to do the survey a second time due to slow initial subject enrollment. For students retaking the survey for test-retest administration, the passcode linked the surveys without breaching confidentiality. The instrument was administered once and then students were asked to repeat it within a one-month span using an electronic survey process. Originally the plan was for two weeks but due to slow subject enrollment, it was changed to one month. The process of administering the survey once and asking the students to repeat within a one-month span should have helped any potential situation where there is substantial knowledge growth that could have influenced the results.

Human Subject Protection

Voluntary participation and informed consent principles were followed. Confidentiality of information from and about human subjects was maintained. Possible risks to the subjects were addressed. Permission was obtained from the Human Subjects Review Committee at Eastern Michigan University (see Appendix E). CITI training was also completed by the primary investigator (see Appendix F). Permission was sought
from the deans and faculty of nursing schools at universities and colleges in the state of Michigan. No identifying data were attached to the survey other than a subject number and birth year. Data were kept in a locked cabinet in a locked office and on a password-protected computer. A statement was included in the consent form that the risk was that of ordinary daily use of the Internet (see Appendix G). Data collection and security were compliant with the Eastern Michigan University Office of Research Development statement of online surveys (Eastern Michigan University, 2013).

Data Management

Upon achieving the desired number of participants, the data were analyzed using SPSS. The information was coded into SPSS 23. Missing data were addressed using list-wise omission. After all data were entered, item analysis was done.

Data Analysis

Demographics. Demographic data were analyzed by using descriptive statistics. Variables included age, gender, ethnicity, program attending, academic progression, tools used in patient education, and health literacy tools seen in clinical rotations. The ordinal variables of age and academic progression were summarized using mean, standard deviation, frequencies, percentages, and range. Nominal variables which included, ethnicity, program attending, tools used in patient education, and health literacy tools seen in clinical were summarized using frequencies and percentages.

Correlational data analysis. To test for bivariate relationships between the HLKACS scales in this sample, Pearson’s correlations were analyzed to determine overall relationships between variables. Variables for this question included total knowledge, total application, and total confidence.
**Parametric testing.** To test for differences between the HLKACS scales in this sample, t-tests were used to determine whether there was a difference between scales based on academic program attending. ANOVA testing allowed for differences between the scales in this sample based on academic progression. Variables used for t-tests and ANOVA testing were knowledge, application, and confidence. Chi-square was used if the data did not show equal variance and normal distribution.

**Reliability.** Reliability was tested and established using test-retest and item analysis with Cronbach’s alpha. After content expert validity was established, reliability within the instrument was explored. Test–retest was used to determine the precision and stability of the instrument. Prior to sending the electronic survey to students, it was tested by the dissertation committee to ensure that user difficulty was not encountered.

**Validity.** Prior to data collection, validity was tested and established using content validity and expert content validity. In order to provide for expert content validity, a tool was needed and was developed to allow the content experts to review the proposed HLKACS instrument. Using the evaluation tool, the experts were asked to assess the relevancy of the items to the content addressed and judge whether the items adequately represent the content or behaviors of the domain of interest, in this case health literacy (Waltz, Strickland, & Lenz, 2010). Questions on the tool for evaluation of the HLKACS instrument addressed the health literacy content needed by nursing students and whether the instrument was clear and concise; the third area was for comments or suggestions. The evaluation tool for the content experts can be seen in Appendix H. Questions used on the tool include the following:

1. Do the following items measure health literacy content needed by a nurse?
2. Are the items included in the survey clear and concise as written?

3. Comments and suggestions?

The evaluation package for content expert review was reviewed and approved by the dissertation committee prior to collecting data. All revisions were made prior to contacting experts for review of the instrument. Experts were asked to score each item in the instrument with the first question proposed using a 4-point Likert scale, with 1 = does not address the content; 2 = vaguely addresses the content; 3 = partially addresses the content; and 4 = comprehensively addresses the content (Wynd, Schmidt, & Schaefer, 2003). Question Two was answered with a yes = 2 or no = 1. The scoring tool also had an area for comments and suggestions. Each question examined and determined whether the item needed revision, removal, or retention by the researcher.

After the approval of the content expert package, a list of content experts was chosen and submitted to the dissertation committee for approval. Content experts were chosen from published researchers associated with the Alliance of International Nurses for Improved Health Literacy or known for measurement expertise. A committee of three content experts was formed to evaluate the HLKACS instrument. The individuals chosen were three nursing professionals: a professor of nursing at the University of Alabama at Birmingham School of Nursing known for her expertise in health literacy knowledge of health professionals; an associate professor at Johns Hopkins University and co-director of cardiovascular and chronic care who is known for her research in health literacy; and a retired professor of nursing from Eastern Michigan University known for her public health, nursing education, and measurement.
Experts were asked to independently review the items and evaluate for their relevance to the domains identified for the content in the instrument. Content experts were given two weeks for review. An email reminder regarding the deadline was sent one week after the package was sent to the experts. If feedback was not received, an email reminder was sent, allowing an additional week. This was repeated until feedback was received or it was determined that the individual could not perform the review. If the individual could not perform the review, an alternative reviewer was identified, approved by the committee, and contacted.

A synthesis of the data and comments received from the three content experts was compiled and sent to the dissertation committee one week after receiving the third review. The document created addressed any macro tool issues raised (e.g., comments that affect more than individual item content), and issues linked to specific individual tool items. Suggestions for the management of reviewer comments were made for the committee to consider. The dissertation committee provided input on item content revisions. The tool was then revised, circulated to, and approved by the committee (Appendix D).

Construct validity through exploratory factor analysis (EFA) was performed to determine the number of factors within the instrument and within the subscales of knowledge, application, and confidence. The requirements of factor analysis include that the items be at the interval or ratio level and be linearly correlated (Polit, 2010). Raw data must first be transformed into a correlation matrix. Factor extraction determines the number of factors needed to capture the variance of the set of variables and maximizes the captured variance. The next phase in transforming the data is to produce results that
are more interpretable. This is called factor rotation. Finally, the data are analyzed, interpreted, and refined to decide how many factors to identify and rotate (Polit, 2010). The method used for factor extraction was principal components analysis (PCA). PCA creates linear combinations of variables that are observable (Polit, 2010). The eigenvalues ultimately report the proportion of information that the factor produces (Thompson, 2004). Usually eigenvalues over 1 are included in the factors; however, many researchers question the accuracy of using 1 and use the Scree test to further define the eigenvalue cut-off (Rummel, 1967; Fabrigar et al., 1999; Floyd & Widaman, 1995; Paatero, Hopke, Song, & Ramadan, 2002; DiStefano, Zhu, & Mindrila, 2009; Browne, 2010; Cattell, 1966; Gorusch, 1997). The intended outcome was that the factors identified will reflect the content domains of the instrument represented in the subscales of knowledge, application, and confidence.
Chapter V: Results

This chapter discusses the results of this study. Reliability and validity testing of the instrument are described. The research question results follow. The significant results for the research questions are summarized at the conclusion of the chapter.

Participants Demographics

The survey was sent to over 350 faculty and deans at schools of nursing in the state of Michigan to help find students to enroll in the study. The survey link was sent via email to the faculty and deans of schools of nursing to forward to students. As a result, 406 consent forms were signed, which resulted in 344 valid surveys. Of the 406 consents signed, 62 participants did not go on and complete the survey. The sample consisted of 32 men and 312 women. There were 9 African Americans, 22 Asians, 288 Caucasians, 3 Hispanics, 5 Native Americans, and 16 who identified as other due to mixed racial backgrounds. The mean age was 25.26 (7.88). The mode for age was 20 years of age (n = 61). The median age was 21 (n = 56). The range was from 18 to 54 years old. Associate degree nursing students accounted for 17.30% of the sample (n = 59), while bachelor degree nursing students accounted for 82.70% (n = 283). Current ranks for bachelor degree nursing students consisted of 7.60% freshman (n = 26), 13.4% sophomore (n = 46), 33.50% junior (n = 115), and 30.30% senior (n = 104). Current ranks for associate degree nursing students include 8.70% first-year associate (n = 30) and 6.40% second-year associate (n = 22). Full sample characteristics can be seen in Table 2.

Reliability of HLKACS

Reliability was tested using Cronbach’s alpha, item analysis and test-retest. The two subscales of application and confidence demonstrated excellent internal consistency,
while the knowledge subscale did not demonstrate good internal consistency. The Cronbach’s alpha results for the subscales were .34 for the knowledge scale, .91 for the application scale, and .92 for the confidence scale. Reliability analysis was also done for the HLKACS instrument to determine individual item consistency. See Table 3 for reliability analysis and internal consistency.

Item analysis was done by determining the item difficulty index and biserial correlations. Item difficulty was calculated by dividing the total number of correct responses by the total number of subjects. Biserial correlations were performed to determine item discrimination. McDaniel (1994) recommends an item difficulty between .30 and .70. Item analysis reported biserial \( r \) ranging from .03 to .54 for knowledge, .47 to .80 for application, and .80 to .87 for confidence. Two items fell below the .30 recommended limit on the knowledge subscale. Any item outside of the recommended parameters were further evaluated and will be further discussed in Chapter VI.

Test-retest reliability was conducted on responses from 39 participants who completed the survey twice within a one-month period. The results from Pearson’s \( r \) coefficients ranged from .51 to .66 and demonstrated acceptable test-retest reliability with significant correlations of pre- and posttest scores for all subscales (Table 4). Table 4 also shows the T-score and significance levels. Test-retest was also used for reliability, with significant correlation found in pre- and posttest knowledge, \( r (36) = .28, p > .05. \)

Validity of HLKACS

Based on the feedback given by the three nursing experts after content validity analysis, the knowledge subscale now consisted of 9 questions after a deletion of 11 questions. The experts reviewing the document identified questions that were consistent
with expectations for a nursing student or those that seemed repetitive, unnecessary, or unclear and could be deleted. The experts also had concerns about the number of questions within the scale and suggested deleting questions. Based on the concerns of the expert and evaluation of the comments, the determination was made to delete seven questions from the application subscale, resulting in a revised application subscale of 13 questions. The confidence subscale had one question deleted, resulting in seven instead of eight questions. Remaining questions within the subscales were revised to improve readability and reduce potential bias. See Appendix D for the current version of the instrument.

**Factor Analysis**

An exploratory factor analysis (EFA) was conducted on the 13-item health literacy application and the 9-item health literacy confidence scales to determine the presence of any sub-constructs within the scales. The factor analysis was conducted using the principal component analysis method of factor extraction and Varimax rotation method. This orthogonal rotation method was chosen to simplify interpretation of results (Munro, 2005). The principal component analysis was conducted with eigenvalues set at greater than 1.0 as the criterion for factor extraction. As a result of data needing to be continuous and either interval or ratio for EFA, the knowledge scale could not be accurately reduced into dimensions. However, using categorical principal components analysis allowed for a form of factor analysis to be used for the knowledge subscale since responses for the knowledge items were scored as multiple-choice.

Four dimensions within knowledge were identified with categorical principal components analysis (PCA). Categorical PCA is factor analysis done with categorical data. Factors were considered to have patterned relationships and to be suitable for factor
analysis by looking at the Kaiser-Meyer-Olkin Measure of Sample Adequacy, which was .55, and Bartlett’s test of Sphericity, which was <.001. The results from categorical PCA on the knowledge subscale yielded four factors. Factor I (reading levels) had an eigenvalue of 1.69 consisting of three questions (Q3, Q4, and Q7); See Table 5. Factor II (risks and strategies) had an eigenvalue of 1.40 consisting of three questions (Q6, Q8, and Q9). Factor III (risk factors) had an eigenvalue of 1.17 consisting of one question (Q1). Factor IV (basic fact) had an eigenvalue of 1.05 consisting of two questions (Q2 and Q5). The four factors accounted for 58.98 of the total variance within the knowledge subscale.

Four dimensions within application and confidence were identified with PCA. Factors were considered to have patterned relationships and to be suitable for factor analysis by looking at the Kaiser-Meyer-Olkin Measure of Sample Adequacy, which was .92, and Bartlett’s test of Sphericity, which was <.001. Factor I (assessment of reading level), loaded with an eigenvalue of 8.5, consisted of eight application questions (Q1, Q2, Q4, Q5, Q6, Q7, Q9, and Q10. Factor II (confidence), loaded with an eigenvalue of 2.41, consisted of all nine confidence questions. Factor III (language), loaded with an eigenvalue of 1.32, consisted of two application questions (Q3 and Q8). Factor IV (health literacy strategies), loaded with an eigenvalue of 1.03, consisted of three application questions (Q11, Q12, and Q13). With all items loaded into the four factors, this solution accounted for 66.36% of the variance (See Table 6).

Correlations Between Study Constructs

Pearson’s coefficient correlations were analyzed to determine the relationships between knowledge, application, and confidence. The Bonferroni approach was used to control for Type I errors. There was a significant correlation between knowledge and
application, \( r (315) = .164, p = .004 \). In addition, there was a significant correlation between application and confidence, \( r (312) = .534, p < .001 \).

**Differences Between Study Constructs**

ANOVA and \( t \)-testing were performed to determine whether there was a difference between the academic programs and academic standing within the programs. The \( t \)-test results showed that associate degree nursing students had higher overall scores on all three subscales of knowledge, application, and confidence than baccalaureate degree nursing students (See Table 7). A Chi-square test was also done to account for unequal sample sizes between associate degree and bachelor degree nursing students. Chi-square results indicated that there was still a significant difference between the two groups, with chi-square scores for knowledge being \( X^2 = (2, n = 306) = 227.52, p < .001 \), application being \( X^2 = (2, n = 306) = 116.00, p < .001 \), and confidence at \( X^2 = (2, n = 306) = 186.90, p < .001 \).

ANOVA testing was performed to examine whether there was a difference on three domains of health literacy based on academic standing within the prospective programs. Split file analysis was performed, to separately test academic progression in the subsample groups of ADNs and BSNs. Split file analysis demonstrated no statistically significant differences in the four baccalaureate groups in knowledge, application or confidence. However, there was a statistically significant difference in knowledge between two groups from the associate degree program, \( F (2, 306) = 2.54, p = .05 \). With second year associate degree students having more knowledge. However, there was no statistical differences in application or confidence.
Summary

The results of the psychometric testing generally demonstrated good reliability and adequate construct validity. The data also demonstrated that there were differences in knowledge, application, and confidence between associate degree and bachelor degree nursing students. There were significant relationships between knowledge and application and between application and confidence.
Chapter VI: Discussion and Conclusion

This study focused on the development and psychometric testing of Health Literacy: Knowledge, Application, and Confidence Scale (HLKACS). The HLKACS instrument tested in the dissertation study measured three domains of health literacy: knowledge, application, and confidence levels of nursing. The final 29-item HLKACS measurement included 29 items in these three subscales: knowledge (9 items), application (13 items), and confidence (7 items).

The three domains of knowledge, application, and confidence were used to examine the phenomena of health literacy in nursing students. Knowledge was chosen to measure the content the student knew regarding health literacy. Application was chosen to see if the nursing students used the knowledge they had obtained, and confidence was used to measure whether they were comfortable in using the information to measure and assist with health literacy issues in patients.

During the developmental phase, a comprehensive literature review and pilot studies were performed among RN (registered nurse) to BSN (bachelor in science of nursing) and traditional bachelor degree nursing students. After refinement of the instrument, it was sent out to three nursing experts to rate its content validity. Items were deleted or revised accordingly. The instrument was then reviewed, discussed, debated, revised, and approved by the dissertation committee prior to dissemination.

The study sample consisted primarily of bachelor degree students (82.7%), with 90.4% of the sample identified as female. According to the 2014 biennial survey of nursing schools done by NLN (National League of Nursing, 2016), women represent 85% of students enrolled, which demonstrates that the sample used was representative of
the general population. However, the sample was not representative of the distribution of students across programs. Associate degree nursing programs account for 58%, while BSN programs account for 48% (NLN, 2016). Most of the participants were either junior (33.5%) or senior (30.3%) baccalaureate level students. This is consistent with the times when nursing classes are offered within the universities and colleges. Although there were representatives of all races in the sample, Caucasians made up 84% of the group. The sample for this study was higher than indicated in the NLN survey, which was 72%. This may be related to which students chose to complete the survey.

Educational materials identified as being used by students were pamphlets (47.8%), videos (43.4%), one-on-one discussion (68.4%), demonstration (66.9%), and the Internet (48.4%). The results indicate that there is not one consistent form of patient education materials being used to increase health knowledge in the clinical setting. In addition, health literacy tools identified as being used in clinical settings included TOFHLA (7.4%), REALM (4.4%), NVS (11.3%), DLA (5.9%), SAHL (8.3%), REALM-SF (2%), and PEMAT (14.7%). The results indicated that health literacy tools are still limited within the clinical setting. Since the use of health education materials is variable and there is the lack of tools being used to assess health literacy, it does raise a concern as to whether the needs of patients for health teaching are being met. In particular, it is worrisome that patients who have low health literacy may not receive health information that empowers them to provide self-care and improve health outcomes.

**Reliability of HLKACS**

The results of the study demonstrated that the HLKACS instrument has good reliability, as the internal consistency indicator of Cronbach’s alpha was greater than .79.
in overall HL scale, and Cronbach’s alpha for the application and confidence subscales were .91 and .92, respectively. However, the knowledge subscale had a low Cronbach’s alpha of .34, which was most likely due to the diverse knowledge examined and the lack of knowledge of the topic. A low value of alpha also could be due to a low number of questions (Tavakol & Dennick, 2011). In the current study, the four factors under the knowledge domain contain only 2–3 items each. However, due to the low Cronbach’s alpha and the nature of assessing health literacy knowledge, this may indicate a lack of knowledge among the participants in the study rather than a problem with the items within the knowledge subscale.

**Item analysis.** Item analysis reported biserial \( r \) ranging from .03 to .54 for knowledge, .47 to .80 for application, and .80 to .87 for confidence (Table 4). Two items fell below the .30 recommended limit on the knowledge subscale (See Table 4). When analyzing items of knowledge, most test writers desire items with indices of difficulty no lower than .20 nor higher than .80, with an average index of difficulty from .30 or .40 to a maximum of .60. Item analysis helps to determine how the question contributes to reliability (MacGahee & Ball, 2009). Both the application and confidence subscales had item difficulty indices within the desired range. Two items on knowledge were not within the recommended range. The items that scored poorly were most likely due to students lacking knowledge about the information requested. Biserial \( r \) discriminates item quality. It also compares item score with total score. The correlation also addresses the interaction of item difficulty and discrimination. The higher the point biserial \( r \), the better the item is at discriminating how well the material is really known: “A positive biserial indicates that those scoring higher on the test were more likely to answer that question correctly. If the
students in the lower third answer an item correctly more frequently than the upper third of the students, the point biserial will have a negative value” (MacGahee & Ball, 2009, 167). A low value usually means that the question was too easy. There are no universal guidelines to determine what biserial \( r \) value is the most desirable. As a general rule, anything below .20 is considered poor and needing revision; items with a value between .20 and .30 are considered fair, and items between .30 and .70 are considered good (MacGahee & Ball, 2009). However, each question should always be evaluated in terms of the purpose of the test and of the individual question. For example, there may be a question that is so critical to the knowledge that it is expected that 100% of the participants answer it correctly. In that case, a point biserial \( r \) of 0 may be the goal. Item discrimination was very low; this was most likely due to lack of knowledge overall within the group of students surveyed rather a problem with the item.

**Test-retest.** A small sample of 39 nursing students was used to test the document for precision. The instrument was administered once and then repeated within a month. Originally, the desire was to have students chosen for retest all do so within the first month. However, due to difficulty obtaining subjects, all subjects were asked to complete the survey within one month after taking the first survey to ensure that an adequate sample was obtained for the test-retest. This should have helped to prevent the students from encountering situations where substantial knowledge growth occurred that could have influenced the results. Test-retest was used to determine the precision and stability of the instrument. The \( t \)-test scores demonstrated that there was no significant difference between pre- and posttest results for the knowledge, application, and confidence subscales of the students who took the survey a second time. The results also
demonstrated satisfactory test-retest reliability with significant correlations of pre- and posttest scores for all subscales of the HLKACS instrument between Test 1 and Test 2. Test-retest estimates the measurement error by using the same subjects under the same conditions to retest the measurement instrument (Fraenkel & Wallen, 2009; Lavrakas, 2012; Polit & Hungler, 1991, 1999; Wood & Ross-Kerr, 2011). Reliability is affected by the length of time between the two administrations. The longer the interval, the more likely there will be changes in the individuals. The time between test and retest should reflect the ability of the individual to retain a relatively consistent position (Fraenkel & Wallen, 2009). The instrument showed that there was no significant difference in results between the two times that the subjects took the survey. This demonstrates that the instrument was reliable from one administration to another and provides consistent data.

Validity of HLKACS

Validity was established by performing content expert validity. Having experts in the field of health literacy examine the proposed instrument helped to ensure that the content needed was present and unneeded content could be removed. Several concerns existed in regard to content expert validity. First, there are few nursing experts in the field. Second, there are limited data about health literacy in nursing available. As a result, in-depth discussion was needed within the dissertation committee to evaluate the feedback received from the experts and to decide whether to delete, revise, or retain items. Throughout the process, the existing literature was used to ensure that the content as revised or retained maintained the correct information. There is a lot of debate over what content is necessary for a nurse to have and be able to adequately assess for low health literacy. The development and testing of the HLKACS instrument will assist in
further research and development of nursing knowledge pertaining to what is adequate knowledge for nursing students and what demonstrates use of this information in practice.

**Factor Analysis**

The treatment of ordinal variables needs to be addressed because we cannot assume that distances between the categories are equal. In analyzing, ordinal data has a fixed order within the variable that does not imply differences between the labels in the categories. PCA is frequently used to analyze scales, often consisting of subscales, for multidimensionality of the variables studied. Unfortunately, PCA is based on some assumptions that all of the variables are at interval or ratio measurement levels and the relationship is linear. Because in the social sciences many variables are nominal or ordinal and relationships between variables are frequently nonlinear, standard PCA is not the appropriate analysis to use. Nonlinear PCA, or categorical principal component, is an optimal scaling method. It is the nonlinear equivalent of PCA for variables of mixed measurement levels that may not be linearly related to each other with the goal of traditional PCA (Linting, Meulman, Groenen, & Van, 2007).

According to Yong and Pearce (2013), a loading factor above .32 is needed for a sample over 300 to be statistically significant. Loading scores for knowledge ranged from .44 to .84, which could be related to the diversity present among the questions (see Tables 5 and 6). Communalities are used to determine where the eigenvalue cutoffs for factors are located. Factor analysis is difficult when questions measure knowledge and may not be truly representative of the dimensions within the knowledge subscale. Based on the suggested loading values, knowledge items within the knowledge subscale were statistically significant and measured health literacy knowledge. The range of loading
values is mostly likely due to the inconsistency within students’ knowledge of health literacy. However, for the purpose of this study, the knowledge subscale accurately measures health literacy knowledge in nursing students. Therefore, it can be stated that the knowledge subscale is valid and reliable.

Confidence items loaded into one factor and was labeled accordingly. The factors that loaded with knowledge questions are diverse due to the questions’ subjects and the limited number of questions. The questions measuring confidence were also diverse, which would contribute to the lower communality scores. Based on the criteria discussed by Yong and Pearce (2013), confidence questions met the criteria for factor analysis, and the factors met the criteria of significance.

Correlations Between Study Constructs

There was a strong correlation between knowledge and application, $r (315) = .164 \quad p = .004$. In addition, there was a strong correlation between application and confidence, $r (312) = .534 \quad p < .001$. Without knowledge, students do not know when or how to apply health literacy strategies. Knowledge, however, did not directly increase confidence. Application of health literacy strategies and assessment did increase confidence. Therefore, it can be assumed that when students have knowledge of health literacy and apply strategies for assessment and intervention in practice, confidence does increase. When an individual has the knowledge needed, it will lead to that person using the knowledge in practice through application of the learned materials. When a person has the level of knowledge needed and has applied it in practice, it leads to confidence. It is important for student nurses to obtain the needed health literacy knowledge and apply it in practice, so when the student begins to practice independently they will have the confidence to use the knowledge and apply it correctly.
Differences Between Study Constructs

The t-test results indicated that the associate degree nursing students had higher overall scores on all three subscales of knowledge, application, and confidence than baccalaureate degree nursing students. There was a significant difference in knowledge, but none related to application and confidence. Second year associate degree students scored significantly higher in knowledge than the other group. However, when Chi-square was done due to unequal sample sizes, all three were statistically significant.

Associate degree nursing students may have scored higher due to having more exposure to the information than baccalaureate students. This leads to another question of whether associate degree nursing programs are offering more content about health literacy than baccalaureate nursing programs. However, it should also be noted that even though associate degree nursing students scored higher than baccalaureate nursing students, the score was still low. This should raise concerns within both baccalaureate and associate degree nursing programs that should lead to evaluation of health literacy content within the curriculum at these institutions. Health literacy knowledge within the curriculum is vital in today’s healthcare arena where understanding what a patient is capable of learning, and how to accomplish it, can improve patient outcomes and decrease healthcare costs. Understanding that the nurse is the person who can help the patient be successful at making informed decisions and following through with healthcare recommendations increases the demand for health literacy content to incorporated into the nursing curriculum.
Threats to Validity

Limitations of the study include use of an instrument that has not been previously used and the possibility of participant desire to learn more about the topic being explored. Since health literacy is a new topic and may not have been covered in the curriculum, items on the survey may lead the student to research to learn more about the subject. This could result in elevated scores on test-retests. Part of the survey included knowledge questions, which may have influenced higher or lower scores due to guessing. The one-month interval between surveys may have had an effect on recall and learning (Lavrakas, 2013). Initially, it was proposed to do the second administration of the survey within one week. This was not accomplished due to the slow return of initial surveys, which resulted in the need to expand the second administration to one month. The duration between the two surveys may have resulted in independent learning. Shortening of the duration between surveys may help with the consistency between the two measurements and should be explored. Another issue was that some participants did not complete the whole survey, and only 38 fully completed the survey a second time.

Generalization is limited to use of a convenience sample because the participants were motivated to complete the survey. Selection bias is possible due to the survey nature of the research project. The study was dependent on deans, directors, and faculty to distribute the survey, which led to a larger sample of baccalaureate nursing students than associate nursing students taking and completing the surveys. It was also difficult due to many needing additional human subject approval from their institution before sending out the survey.
In addition, threats to the study included constant and random errors. Random errors are unpredictable and transient (Polit & Hungler, 1991; Wood & Ross-Kerr, 2011). Examples of a random error can be subjective personal factors such as mood, attention span, and health. The researcher can also pose as a threat if administering the instrument when fatigued or impatient, or if the participants perceive a bad attitude. The e-survey eliminated the risk of the researcher being a random threat because the students self-administered the survey. Another possible random error or threat is mortality. Participants did decide to quit during the administration of instrument, which resulted in incomplete data sets. Location threats were also possible since the survey was self-administered over the Internet.

Constant errors included social desirability and acquiescent responses. Social desirability occurs when the participant responds in a way that is socially accepted or that the researcher expects (Fraenkel & Wallen, 2009; Wood & Ross-Kerr, 2011). This was likely a potential problem in a previous pilot study because the students knew the researcher. In the design of this study, the students will not know the researcher, which should help with the social desirability responses.

Acquiescent responses are when the participant consistently answers positively or negatively to the questions (Fraenkel & Wallen, 2009; Polit & Hungler, 1991; Wood & Ross-Kerr, 2011). This is difficult to control for but can be done by asking questions in two different forms: one positive and one negative. The Hawthorne effect of being a participant may also influence the participant (Fraenkel & Wallen, 2009; Polit & Hungler, 1991; Wood & Ross-Kerr, 2011).
Implications

This study reported the psychometric properties of a new instrument to explore the knowledge, application, and confidence levels of nursing students and nursing professionals about health literacy information and strategies. Reliability and validity were established for the application and confidence subscales and identified the need to further evaluate the knowledge subscale. Instruments measuring healthcare professional knowledge, application, and confidence levels are in the developmental stage, and further research is needed. The current HLKACS not only measures health literacy knowledge but also measures application and confidence and, as such, adds additional depth to the research about health literacy in the healthcare professional. In order to address health literacy issues of our patients, nurses must have both sufficient knowledge of health literacy strategies and adequate confidence to impart that knowledge. The results of this study indicate that nursing educators may not be providing the needed tools, skills, and information about health literacy to baccalaureate nursing students.

Teaching patients about their health is an expected function of the practicing nurse and needs to be taught in nursing school. The American Association of Colleges of Nursing (AACN) uses the National Patient Safety Goals, QSEN, and the research priorities of the AHRQ to guide recommendations for accreditation within nursing education (AACN, 2008). The goals of the AHRQ report on health literacy directly reflect the competencies identified by Quality and Safety Education for Nurses (QSEN). Competencies in safety, evidence-based practice, collaboration/teamwork, patient-centered care, informatics, and academic-clinical partnerships are important in making
Knowledge is linked to practice even when it does not directly translate into action. Facts that show the effects of health literacy on patient outcomes or the health system can encourage the nursing student to place value on the content which will later translate into practice. Nursing education is based on facts that do not necessarily translate into direct practice however these facts are important in ensuring the future nurse understands the long term effects if action is not taken. The assumption is that knowledge of facts will lead to understanding the importance of action when in practice.

The instrument developed in this study can be used as a tool to identify knowledge, application, and confidence levels of nursing students and registered nurses in order to further expand the research exploring healthcare provider use of health literacy strategies. Instruments measuring healthcare professional knowledge, application, and confidence levels are in the developmental stage, and further research is needed. Not only does current lack of research evidence of nursing professional and student knowledge, application, and confidence support the development of the instrument, but accreditation standards are also requiring health literacy knowledge to be included in the nursing curriculum. In order to address health literacy issues of our patients, nurses must have sufficient knowledge of health literacy strategies and adequate confidence to apply them. The results of this study indicate that nursing educators may not be providing the needed tools, skills, and information about health literacy to baccalaureate nursing students. Teaching patients about their health is an expected function of the practicing nurse and needs to be taught in nursing school.
The American Association of Colleges of Nursing (AACN) uses the National Patient Safety Goals, QSEN, and the research priorities of the AHRQ to guide recommendations for accreditation within nursing education (AACN, 2008). The goals of the AHRQ report on health literacy directly reflect the competencies identified by Quality and Safety Education for Nurses (QSEN). Competencies in safety, evidence-based practice, collaboration/teamwork, patient-centered care, informatics, and academic-clinical partnerships are important in making substantial changes in low health literacy and improving patient outcomes (QSEN Institute, 2013). It is important to note that policy is needed to drive changes in nursing curriculum to ensure that health literacy is part of the curricular requirements. This may be done by inserting health literacy as a priority in accreditation requirements by the NLN and AACN.

Based on the findings of this dissertation, the HLKACS instrument can be used to further explore and define what nursing education is providing in regard to health literacy in the nursing curriculum. The tool may also be useful in exploring the knowledge of nurses in the practice setting. This study also indicated that health literacy knowledge, application, and confidence are still low. It reinforces the idea that we don’t know what we don’t know.

Nursing educators assume the task of educating nursing students who will later educate patients about their healthcare needs. Orem and Freire both believe that education when used to empower can improve overall outcomes for individuals. Oppressed individuals are often scolded and thought to be noncompliant without thought given to the social injustices that have prevented the individual to follow the recommended treatment regimen. However, can patients be held accountable if nurses
lack the skills to communicate needed information in an understandable way? The results of this study demonstrated that nursing student health literacy knowledge, application and confidence is low, which points to a gap in the development of nursing agency. The gap in nursing agency due to low health literacy skills in nurses can contribute to the poorer outcomes in patients.

Nursing systems consists of three types, wholly compensatory, partially compensatory, and supportive educative (Orem 1991, 2001). Often more than one compensatory system is used when caring for the patient and/or family. There are five basic methods used to assist or help others which consists of acting for another, guiding another, supporting another physically or psychologically, providing a developmentally appropriate environment, and teaching another. Each of these methods helps to clarify the type of nursing system needed. It is through the supportive educative nursing system that issues of knowledge related health disparity is addressed. The use of Orem’s theory is ideal for supporting health literacy interventions.

All of this points to the development of nursing agency, which encompasses knowing whom needs nursing care, when and what kind of nursing care is needed and how to provide the needed care. Orem (2001) believed that acquired theoretical knowledge enables the nurse to seek answers to questions posed when entering another person’s life situation. This acquired knowledge “is not memorized but rather understood, conceptualized, and made dynamic in practice situations” (Orem, 2001, p. 446). It is through understanding a theoretical framework that nurses develop their own personal style of nursing, provide individualized care, nursing diagnoses are developed and valid within a frame of reference and nursing care systems are designed.
Education allows the individual to assume self-care instead of relying on others to provide necessary activities that can either be social or health related. Empowering individuals to act for themselves is a major focus of nursing care. Therefore, it is critical that nursing students have knowledge of health literacy and strategies to improve their patients’ health literacy skills. The results of this study suggest that both associate degree and baccalaureate degree students are entering the workforce with knowledge gaps related to health literacy. Many students have limited exposure to patient-teaching aids and to health literacy screening tools. Since many of the major accreditation organizations have adopted health literacy as a priority, it is critical that nursing educators fulfill the obligation of preparing nursing students to address health literacy in a variety of healthcare settings. Delineating priority content in the nursing curriculum has been a constant struggle as technology increases and new advances in health emerge. Nursing programs are designed to produce a graduate who is prepared as a generalist and can learn additional practice knowledge in the workforce. However, due to the constraints of staff and the increased acuity of patients, this may not always be possible. However, one area that nursing has strong commitment to is patient education, thus demonstrating the importance of health literacy in practice.

Nurses need to be able to identify individuals with low health literacy skills and teaching strategies that will help individuals to interpret health information and make informed decisions. Sorrell (2006) points out that, “… unless students understand the widespread problem of low health literacy and its implications, they will not know how to facilitate understanding for patients with low health literacy skills” (p. 19). Nursing school graduates need to be aware of the needs of individuals with low literacy skills in
order to plan and implement effective health teaching. Information about health literacy needs to be more comprehensive in the nursing curriculum. Nursing faculty needs to update their own knowledge of health literacy in order to make substantive changes to nursing curriculum. Increasing awareness of faculty will help to facilitate integration into both cognitive and clinical courses. It can be assumed that if students have a knowledge gap pertaining to health literacy, then it is most likely that this gap also exists within practicing nurses. The integration of health literacy knowledge and skills into nursing curriculum should be a focus along with further research to ensure that health literacy is being integrated and practiced after graduation. Increasing health literacy knowledge and skills of students should, over time, increase the presence of health literacy intervention in the clinical setting. Every effort to improve health literacy awareness among nursing students should also be applied to practicing nurses. Every patient has the right to receive health information in a way that is understandable. This can be accomplished by ensuring that nurses receive the appropriate information in nursing school.

Experiences with various health literacy levels should be provided to nursing students. Students need to not only understand the readability and appropriateness of health materials but also be able to determine if it is appropriate for the individual or group it is intended for. In addition, further research and development is needed in developing a health literacy screening tool that can be used to evaluate reading ability (Baker et al., 1999). In addition, if faculty members are not familiar with the current tools available to assess health literacy or have not used them in their own practice, they may not be incorporated into priority content within nursing curriculum.
Conclusion

Educating nursing students requires examining theoretical beliefs and helping nursing students to establish their foundation both theoretically and personally, so that they have a framework to practice within. Engaging students in critical thinking and inquiry helps them to develop into more autonomous, accountable, and ethical practitioners. Nurses need to question and understand their position in order to act and think for themselves and their patients. In order to do so, we must examine our own beliefs about teaching and learning and about content versus pedagogical knowledge so that the student becomes a competent, caring practitioner with multiple levels of content literacy. It is imperative that nursing embraces the need for health literacy as a level of content literacy. Health disparities in the United States are consistently being identified within healthcare systems. Declining literacy, increasing diversity, and a large expectation for knowledge-intensive work environments are contributing to what can be called a “perfect storm” for quality improvement in health literacy. The Educational Testing Services predicts a five percent decline in health literacy (Institute of Medicine, 2009). The crucial need for nursing to address the current lack of health literacy information incorporated into curriculum and, more important, the potential lack of faculty knowledge is overwhelmingly present.

Nursing faculty also need to re-evaluate clinical experiences to ensure that students get needed practice in using health literacy strategies during patient teaching. This experience should include not only patient interaction but also the time to evaluate patient education materials to ensure that they meet the needs of the patients requiring educational interventions. Although there is some debate over the practicality of health
literacy tools, it does help the nurse to understand the level of health literacy knowledge a patient has. However, if nursing faculty are not familiar with these tools, it is unlikely that students will be exposed to them during their educational experience.

The research presented in this dissertation demonstrates the need for nursing faculty to evaluate their curriculum to determine whether health literacy has a strong presence and whether there are deficits requiring adjustments to the curriculum to ensure that future nurses have the needed content. Knowing that health literacy gaps appear in both baccalaureate and associate degree nursing programs, it is a realistic possibility that the gap also exists among practicing nurses in Michigan. Health literacy knowledge and skills among practicing nurses should also be explored to ensure that health information is being presented in a way that empowers patients to act on their own behalf.
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Undergraduate nursing students integrating health literacy in clinical settings.

*Nursing Education Today,* [http://dx.doi.org/10.1016/j.nedt.2012.008](http://dx.doi.org/10.1016/j.nedt.2012.008)
Table 1

*Items with Principal Components Varimax Factor Loadings*

<table>
<thead>
<tr>
<th>Knowledge Subscale:</th>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1–Interpretation of knowledge</td>
<td>K1: The reading level of the drug label shown above is:</td>
<td>.71</td>
</tr>
<tr>
<td>Eigenvalue = 1.52 Cronbach’s alpha = .46+</td>
<td>K2: The percentage of adults who understand the drug label shown above is:</td>
<td>.70</td>
</tr>
<tr>
<td>Factor 2–Potential impact</td>
<td>K3: Health literacy has an impact on patient care.</td>
<td>.56</td>
</tr>
<tr>
<td>Eigenvalue = 1.27 Cronbach’s alpha = .11++</td>
<td>K5: Limited health literacy can cause minor health issues to become major issues</td>
<td>.80</td>
</tr>
<tr>
<td>Factor 3–Determining understanding</td>
<td>K8: The average consent form is written at a 10th grade level.</td>
<td>.73</td>
</tr>
<tr>
<td>Eigenvalue = 1.41 Cronbach’s alpha = .39++</td>
<td>K4: Individuals with high levels of education may have limited health literacy.</td>
<td>.77</td>
</tr>
<tr>
<td>Factor 4–Individuals with low literacy</td>
<td>K11: The best way to determine the patient’s understanding of healthcare instruction</td>
<td>.80</td>
</tr>
<tr>
<td>Eigenvalue = 1.20 Cronbach’s alpha = .84</td>
<td>K6: The average reading level for the Americans</td>
<td>.55</td>
</tr>
<tr>
<td>Factor 5–Impact</td>
<td>K7: Thirty percent of the US population has difficulty understanding healthcare information and instructions.</td>
<td>.72</td>
</tr>
<tr>
<td>Eigenvalue = 1.55 Cronbach’s alpha = .11++</td>
<td>K9: Limited health literacy cost between $30 and $75 billion dollars a year.</td>
<td>.72</td>
</tr>
<tr>
<td>Factor 6–Reading level</td>
<td>K12: What question would you ask your patient to get the best estimate of the patient’s reading ability?</td>
<td>.75</td>
</tr>
<tr>
<td>Eigenvalue = 2.04 Cronbach’s alpha = .53</td>
<td>K13: The reading level of written materials</td>
<td>.66</td>
</tr>
<tr>
<td>K14: The language level for reading level equivalent of Videos</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>K15: The reading level of websites used for patient education</td>
<td>.74</td>
<td></td>
</tr>
</tbody>
</table>

++ affected by the bivariate true and false questions
Table 1. Continued.

<table>
<thead>
<tr>
<th>Factor 7–Applying knowledge</th>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1: I evaluate the reading level of healthcare materials before using them for patient teaching:</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td>A2: I assess patients of all educational levels for health literacy issues:</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>A3: I use a health literacy screening tool to assess health literacy skills of an individual</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td>A4: I evaluate the cultural appropriateness of the healthcare materials, including videos, handouts, videos, and audiotapes before using them for teaching</td>
<td>.69</td>
</tr>
<tr>
<td>Eigenvalue = 2.21</td>
<td>Cronbach’s alpha = .80</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 8–Individual Evaluation and Application</th>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigenvalue = 9.87</td>
<td>A5: Use plain language</td>
<td>.78</td>
</tr>
<tr>
<td>Cronbach's alpha = .94</td>
<td>A6: Focus on action</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>A7: Assess life experience</td>
<td>.65</td>
</tr>
<tr>
<td></td>
<td>A8: Assess economic contexts of teaching</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>A9: Assess access to services</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>A10: Assess social issues</td>
<td>.81</td>
</tr>
<tr>
<td></td>
<td>A11: Assess cultural issues</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>A12: Assess language and understanding</td>
<td>.77</td>
</tr>
<tr>
<td></td>
<td>A13: Limit amount of information</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>A14: Supplement instructions with pictures</td>
<td>.55</td>
</tr>
<tr>
<td></td>
<td>A 15: Assess usability of internet sources</td>
<td>.64</td>
</tr>
<tr>
<td></td>
<td>A16: Use open-ended questions while teaching</td>
<td>.73</td>
</tr>
<tr>
<td></td>
<td>A17: Use the teach back method</td>
<td>.71</td>
</tr>
</tbody>
</table>
Table 1 continued.

<table>
<thead>
<tr>
<th>Factor 9–Confidence</th>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigenvalue = 2.77</td>
<td>C1: I can manage health literacy assessment effectively.</td>
<td>.72</td>
</tr>
<tr>
<td>Cronbach’s alpha = .92</td>
<td>C2: I can identify strategies to overcome a health literacy barrier.</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>C3: I can accomplish goals with my patient concerning patient education because of my health literacy knowledge.</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>C4: I can invest the appropriate amount of time and can overcome health literacy obstacles in patient education.</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>C5: I can be resourceful, when educating patients with poor health literacy issues.</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>C6: I can think of ways to adjust my method if I sense my patient is having a hard time understanding the content.</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>C7: I can handle any patient teaching issues that come my way.</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>C8: I can find alternative solutions when I am confronted with difficult situations in patient education.</td>
<td>.77</td>
</tr>
</tbody>
</table>
Table 2

_Distribution of Sample Characteristics_

<table>
<thead>
<tr>
<th>Characteristic</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>(%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>312</td>
<td>90.40</td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>9.30</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>9</td>
<td>2.60</td>
</tr>
<tr>
<td>Asian</td>
<td>22</td>
<td>6.40</td>
</tr>
<tr>
<td>Caucasian</td>
<td>288</td>
<td>84.00</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3</td>
<td>0.90</td>
</tr>
<tr>
<td>Native American</td>
<td>5</td>
<td>1.50</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>4.70</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>(M = 25.26, SD = 7.88)</td>
<td></td>
</tr>
<tr>
<td><strong>Program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>59</td>
<td>17.30</td>
</tr>
<tr>
<td>Bachelor</td>
<td>283</td>
<td>82.70</td>
</tr>
<tr>
<td><strong>Rank in Program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baccalaureate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>26</td>
<td>8.90</td>
</tr>
<tr>
<td>Sophomore</td>
<td>46</td>
<td>15.90</td>
</tr>
<tr>
<td>Junior</td>
<td>115</td>
<td>39.50</td>
</tr>
<tr>
<td>Senior</td>
<td>104</td>
<td>35.70</td>
</tr>
<tr>
<td>Associate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st year</td>
<td>30</td>
<td>57.7</td>
</tr>
<tr>
<td>2nd year</td>
<td>22</td>
<td>42.3</td>
</tr>
</tbody>
</table>
Table 3

Item Analysis and Internal Consistency of HLKACS (n = 306)

<table>
<thead>
<tr>
<th>Knowledge subscale:</th>
<th>M</th>
<th>SD</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>K 1) Individuals with limited health literacy</td>
<td>.39</td>
<td>.69</td>
<td>.53</td>
</tr>
<tr>
<td>K (2) Health literacy includes all of the following except:</td>
<td>.42</td>
<td>.49</td>
<td>.47</td>
</tr>
<tr>
<td>K (3) The average American adult reads health related information at the:</td>
<td>.00</td>
<td>.06</td>
<td>.14</td>
</tr>
<tr>
<td>K (4) A average health related consent form is written at the:</td>
<td>.21</td>
<td>.41</td>
<td>.54</td>
</tr>
<tr>
<td>K (5) With limited health literacy, the number of hospital readmissions:</td>
<td>.00</td>
<td>.08</td>
<td>.03</td>
</tr>
<tr>
<td>K (6) Individuals who are at the greatest risk for low health literacy knowledge are:</td>
<td>.67</td>
<td>.47</td>
<td>.38</td>
</tr>
<tr>
<td>K (7) The current reading level of written health materials recommended by the Joint Commission on accreditation of healthcare organizations (JACHO) is:</td>
<td>.10</td>
<td>.31</td>
<td>.36</td>
</tr>
<tr>
<td>K (8) Key indicator(s) of low health literacy can be seen in:</td>
<td>.73</td>
<td>.44</td>
<td>.49</td>
</tr>
<tr>
<td>K (9) Improving patient understanding of health information requires using:</td>
<td>.83</td>
<td>.38</td>
<td>.45</td>
</tr>
<tr>
<td>Application subscale:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A (1) I evaluate the reading level of healthcare materials before using them for patient teaching: literacy:</td>
<td>3.07</td>
<td>1.32</td>
<td>.73</td>
</tr>
<tr>
<td>A (2) I assess patients of all education levels for health literacy issues:</td>
<td>3.20</td>
<td>1.36</td>
<td>.71</td>
</tr>
<tr>
<td>A (3) I use plain language while teaching my patients</td>
<td>4.48</td>
<td>0.89</td>
<td>.47</td>
</tr>
<tr>
<td>A (4) I assess my patient’s current experience and knowledge related to their health concerns</td>
<td>3.97</td>
<td>1.10</td>
<td>.73</td>
</tr>
<tr>
<td>A (5) I assess the patient’s access to healthcare services</td>
<td>5.34</td>
<td>1.24</td>
<td>.79</td>
</tr>
<tr>
<td>A (6) I assess for socioeconomic issues that may affect the patient’s ability to learn</td>
<td>3.55</td>
<td>1.24</td>
<td>.80</td>
</tr>
<tr>
<td>A (7) I assess for cultural issues that may affect my patient’s learning</td>
<td>3.74</td>
<td>1.23</td>
<td>.70</td>
</tr>
<tr>
<td>A (8) I assess the patient’s native language and understanding of English</td>
<td>4.18</td>
<td>1.11</td>
<td>.59</td>
</tr>
</tbody>
</table>

Table 3. continued

Table 3 cont.
A (9) I supplement verbal and written health communication with pictures to increase understanding  3.43  1.29  .71
A (10) I assess patient’s ability to use health related internet sources  3.05  1.39  .72
A (11) I use open ended questions to assess patient understanding.  4.13  1.01  .59
A (12) I use the teach back method to assess patient understanding  3.87  1.14  .63
A (13) I review home medications to assess patient literacy  3.36  1.39  .67

Confidence subscale:
C (1) I am confident I can effectively assess a patient’s health literacy  3.08  1.31  .84
C (2) I am confident I can identify a strategy to help with health literacy barriers  3.20  1.36  .81
C (3) I am confident that I can identify health education resources for patients with limited health literacy to read.  4.48  .91  .85
C (4) I am confident I can think of ways to adjust my method if I sense my patient is having a hard time understanding the content.  3.99  1.09  .80
C (5) I am confident that I have incorporated the best practices of health literacy into my practice.  3.55  1.23  .82
C (6) I am confident that I use health literacy strategies that improve the patient's ability to understand and manage their own health.  3.56  1.23  .87
C (7) I am confident that I can find additional resources to help me when I am having a difficult time teaching with low literacy issues.  3.72  1.13  .81
Table 4

*Test-retest Reliability Coefficients (n=39)*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Before</th>
<th>After</th>
<th>t</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Subscale-Knowledge</td>
<td>3.13±4.18</td>
<td>3.10±1.43</td>
<td>.11</td>
<td>.91</td>
<td>.51</td>
</tr>
<tr>
<td>Total Subscale-Application</td>
<td>47.23±8.79</td>
<td>46.67±8.86</td>
<td>.43</td>
<td>.67</td>
<td>.57</td>
</tr>
<tr>
<td>Total Subscale-Confidence</td>
<td>50.46±4.19</td>
<td>48.54±10.61</td>
<td>1.31</td>
<td>.27</td>
<td>.59</td>
</tr>
</tbody>
</table>

*significant at <.001*
### Table 5

*Categorical Principal Components Analysis Rotated Factor Matrix for Descriptive Solution (9 Descriptors) in Health Literacy Knowledge*

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge Subscale:</strong> Factor 1–Reading levels (Eigenvalue = 1.78, Cronbach’s alpha = .51++)</td>
<td></td>
</tr>
<tr>
<td>K (3) The average American adult reads health related information at the:</td>
<td>.73</td>
</tr>
<tr>
<td>K (4) A average health related consent form is written at the:</td>
<td>.75</td>
</tr>
<tr>
<td>K (7) The current reading level of written health materials recommended by the Joint Commission on accreditation of healthcare organizations (JACHO) is:</td>
<td>.80</td>
</tr>
<tr>
<td><strong>Factor 2–Risks and Strategies (Eigenvalue = 1.34, Cronbach’s alpha = .33)</strong></td>
<td></td>
</tr>
<tr>
<td>K (8) Key indicator(s) of low health literacy can be seen in:</td>
<td>.77</td>
</tr>
<tr>
<td>K (9) Improving patient understanding of health information requires using:</td>
<td>.84</td>
</tr>
<tr>
<td><strong>Factor 3–Risk Factors (Eigenvalue = 1.27, Cronbach’s alpha = .25)</strong></td>
<td></td>
</tr>
<tr>
<td>K (1) Individuals with limited health literacy</td>
<td>.68</td>
</tr>
<tr>
<td>K (2) Health literacy includes all of the following except:</td>
<td>.79</td>
</tr>
<tr>
<td><strong>Factor 4–Basic facts (Eigenvalue = 1.21, Cronbach’s alpha = .22)</strong></td>
<td></td>
</tr>
<tr>
<td>K (5) With limited health literacy, the number of hospital readmissions ________________</td>
<td>.84</td>
</tr>
<tr>
<td>K (6) Individuals who are at the greatest risk for low health literacy knowledge are:</td>
<td>.50</td>
</tr>
</tbody>
</table>
### Table 6

*Principal Components Analysis with Rotated Factor Matrix for Descriptive Solution (20 Descriptors) in Health Literacy Application and Confidence*

<table>
<thead>
<tr>
<th>Factor 1–Application - Assessing reading level</th>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigenvalue 8.5</td>
<td>A (1) I evaluate the reading level of healthcare materials before using them for patient teaching: literacy:</td>
<td>.69</td>
</tr>
<tr>
<td></td>
<td>A (2) I assess patients of all education levels for health literacy issues:</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>A (4) I assess my patient’s current experience and knowledge related to their health concerns</td>
<td>.53</td>
</tr>
<tr>
<td></td>
<td>A (5) I assess the patient’s access to healthcare services</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>A (6) I assess for socioeconomic issues that may affect the patient’s ability to learn</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>A (7) I assess for cultural issues that may affect my patient’s learning</td>
<td>.62</td>
</tr>
<tr>
<td></td>
<td>A (9) I supplement verbal and written health communication with pictures to increase understanding</td>
<td>.55</td>
</tr>
<tr>
<td></td>
<td>A (10) I assess patient’s ability to use health related internet sources</td>
<td>.73</td>
</tr>
<tr>
<td>Factor 2–Confidence</td>
<td>C (1) I am confident I can effectively assess a patient’s health literacy</td>
<td>.76</td>
</tr>
<tr>
<td>Eigenvalue 2.41</td>
<td>C (2) I am confident I can identify a strategy to help with health literacy barriers</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>C (3) I am confident that I can identify health education resources for patients with limited health literacy to read.</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>C (4) I am confident I can think of ways to adjust my method if I sense my patient is having a hard time understanding the content.</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>C (5) I am confident that I have incorporated the best practices of health literacy into my practice.</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>C (6) I am confident that I use health literacy strategies that improve the patient's ability to understand and manage their own health.</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>C (7) I am confident that I can find additional resources to help me when I am having a difficult time teaching with low literacy issues.</td>
<td>.80</td>
</tr>
<tr>
<td>Factor 3–Application-Language</td>
<td>A (3) I use plain language while teaching my patients</td>
<td>.77</td>
</tr>
<tr>
<td>Eigenvalue = 1.32</td>
<td>A (8) I assess the patient’s native language and understanding of English</td>
<td>.56</td>
</tr>
<tr>
<td>Factor 4–Application-Health literacy strategies</td>
<td>A (11) I use open ended questions to assess patient understanding.</td>
<td>.55</td>
</tr>
<tr>
<td>Eigenvalue 1.03</td>
<td>A (12) I use the teach back method to assess patient understanding.</td>
<td>.77</td>
</tr>
<tr>
<td></td>
<td>A (13) I review home medications to assess patient literacy</td>
<td>.61</td>
</tr>
</tbody>
</table>
Table 7

*T-test results*

<table>
<thead>
<tr>
<th></th>
<th>Baccalaureate</th>
<th>Associate</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>$M=3.28, SD=1.41$</td>
<td>$M=3.84, SD=1.26$</td>
<td>88.19</td>
<td>307</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Application</td>
<td>$M=46.61, SD=10.74$</td>
<td>$M=52.14, SD=9.54$</td>
<td>42.23</td>
<td>307</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Confidence</td>
<td>$M=47.40, SD=10.92$</td>
<td>$M=50.00, 1SD=11.01$</td>
<td>78.81</td>
<td>307</td>
<td>&lt;.001*</td>
</tr>
</tbody>
</table>

*significant level at <.001*
Table 8

ANOVA Results

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Knowledge</th>
<th>Application</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Associate Degree</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st year associate (n=24)</td>
<td>$M=3.58$, SD=1.38</td>
<td>$M=51.52$, SD=9.22</td>
<td>$M=48.52$, SD=11.89</td>
</tr>
<tr>
<td>Second year associate (n=21)</td>
<td>$M=4.33$, SD=1.07</td>
<td>$M=50.00$, SD=11.74</td>
<td>$M=50.40$, SD=9.63</td>
</tr>
<tr>
<td></td>
<td>$F=2.54$, $p&lt;.05^*$</td>
<td>$F=.45$, $p&gt;.05$</td>
<td>$F=.65$, $p&gt;.05$</td>
</tr>
<tr>
<td><strong>Baccalaureate Degree</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman baccalaureate (n=22)</td>
<td>$M=3.00$, SD=1.23</td>
<td>$M=46.24$, SD=16.03</td>
<td>$M=44.10$, SD=13.05</td>
</tr>
<tr>
<td>Sophomore baccalaureate (n=45)</td>
<td>$M=3.24$, SD=1.38</td>
<td>$M=45.77$, SD=11.80</td>
<td>$M=46.43$, SD=11.78</td>
</tr>
<tr>
<td>Junior baccalaureate (n=111)</td>
<td>$M=3.22$, SD=1.45</td>
<td>$M=45.94$, SD=49.75</td>
<td>$M=47.18$, SD=10.56</td>
</tr>
<tr>
<td>Senior baccalaureate (n=100)</td>
<td>$M=3.40$, SD=1.38</td>
<td>$M=48.27$, SD=9.96</td>
<td>$M=49.32$, SD=10.39</td>
</tr>
<tr>
<td></td>
<td>$F=.47$, $p&gt;.05$</td>
<td>$F=.214$, $p&gt;.05$</td>
<td>$F=1.74$, $p&gt;.05$</td>
</tr>
</tbody>
</table>

*Significant at <.05
Appendix A: Original Questionnaire

Sex _______ Birth date: __________________

Education: Circle at that apply


Look at the following label:

What grade level is this written at?

<table>
<thead>
<tr>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
</table>

What percentage of people understand this label?

Under 25%  25%  50%  75%  100%

How would you rate the impact of health literacy on patient care?

Greatly impacted  moderately impacted  mildly impacted  not impacted

Answer the following questions:

Individuals with high levels of education may or may not have limited health literacy.
Strongly agree  somewhat agree  somewhat disagree  strongly disagree  don’t know

Limited health literacy can cause minor health issues to become major issues. True False

The average American reads at a 7th grade level. True False

Thirty percent of the US population has difficulty understanding healthcare information and instructions. True False.

The average consent form is written at a 10th grade level. True False.

Limited health literacy cost between $30 and $75 billion dollars a year. True False.

The age group with the highest number of individuals who have low health literacy skills is:

1. 18-25
2. 26-35
3. 36-45
4. 46-55
5. 56-65
6. 65 and older

What is the best way to determine the patient’s understanding of healthcare instructions?

1. Ask the question, do you understand?
2. Ask the patient questions about what you taught.
3. Ask the patient to teach back the information.
4. Ask the patient what they know about the instructions.
<table>
<thead>
<tr>
<th>Question</th>
<th>Each time</th>
<th>Only when you think there is a problem</th>
<th>Seldom because the materials are written by professionals and are easily understood</th>
<th>Never, it takes too much time</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often should you evaluate the reading level of healthcare materials before using them for patient teaching:</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I should assess patients of all educational levels for health literacy issues:</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I should use a health literacy screening tool to assess health literacy skills of an individual</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

| What is the average reading level of written materials?                   | 5  6  7  8  9  10  11  12 |
| What is the average language level (reading level equivalent of videos)? | 5  6  7  8  9  10  11  12 |
| What is the average reading level of websites used for patient education? | 5  6  7  8  9  10  11  12 |

What question would you ask your patient to get the best estimate of the patient’s reading ability?

1. What was the last grade you completed?
2. Do you have difficulty reading?
3. Would you read this label on this medicine bottle for me?
4. How often do you read the newspaper?
What type of patient education materials have you used?

1. Pamphlets provided by drug companies, medical suppliers, health organizations
2. Videos
3. One on one discussion
4. Demonstration
5. Internet sites
6. Other Specify: ____________________________

<table>
<thead>
<tr>
<th>Question</th>
<th>Each time</th>
<th>Only when you think there is a problem</th>
<th>Seldom because the materials are written by professionals</th>
<th>Never, it takes too much time</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often should you evaluate the reading level of healthcare materials before using them for patient teaching?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>How often should you evaluate the cultural appropriateness of the healthcare materials, including videos, handouts, videos, and audiotapes before using them for teaching?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you use the following while teaching your patients:</th>
<th>Always</th>
<th>Frequently</th>
<th>Sometimes</th>
<th>Almost Never</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use plain language</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Focus on action</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess life experience</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess economic contexts of teaching</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess access to services</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess social issues</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess cultural issues</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess language and understanding</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Question</td>
<td>Always</td>
<td>Frequently</td>
<td>Sometimes</td>
<td>Almost Never</td>
<td>Never</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>--------</td>
<td>------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-------</td>
</tr>
<tr>
<td>Limit amount of information</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Supplement instructions with pictures</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Assess usability of internet sources</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Use open ended questions while teaching</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Use the teach back method</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I feel that I can manage health literacy assessment effectively.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>If a patient has difficulty learning, I know strategies to overcome the barrier.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Because, I am knowledgeable I can accomplish goals with my patient concerning patient education.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I feel if I invest the appropriate amount of time, I can overcome obstacles with patient education.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am very resourceful, when educating patients with poor health literacy issues.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I am confident in my ability to effectively manage health literacy issues.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix B: Revised Instrument

Please identify a five-character passcode to use if you are asked to take the survey a second time:

____  ____  ____  ____  ____

1) I am:
   a. Male
   b. Female

2) What month and year were you born?   ____/_______ (example 11/1964)

3) I am: (pick one)
   a. African American
   b. Asian
   c. Caucasian
   d. Hispanic
   e. Native American
   f. Other ___________________

4) I attend a: (pick one)
   a. Associate degree nursing school
   b. Bachelor degree nursing school
   c. ____________

5) What is your current rank in nursing school: (pick one)?
   a. Freshman- Baccalaureate
   b. Sophomore- Baccalaureate
   c. Junior- Baccalaureate
   d. Senior- Baccalaureate
   e. 1st year Associate
   f. 2nd year Associate

6) What type of patient education materials have you used? (Pick all that apply)
   a. Pamphlets
   b. Videos
   c. One on one discussion
   d. Demonstration
   e. Internet sites or materials
   f. Other __________________________ -
Knowledge subscale

**Drug Facts**

**Active ingredient (in each tablet)**
- Chlorpheniramine maleate 5 mg

**Purpose**
- Antihistamine

**Uses**
- temporarily relieves those symptoms due to hay fever or other upper respiratory allergies:
- sneezing
- runny nose
- itchy, watery eyes
- itchy throat

**Warnings**
- Ask a doctor before use if you have
- glaucoma
- a breathing problem such as emphysema or chronic bronchitis
- trouble urinating due to an enlarged prostate gland

**Ask a doctor or pharmacist before use if you are taking tranquilizers or sedatives**

**When using this product**
- avoid alcoholic drinks
- alcohol, sedatives, and tranquilizers may increase drowsiness
- be careful when driving a motor vehicle or operating machinery
- excitement may occur, especially in children

**If pregnant or breast-feeding, ask a health professional before use.**
**Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away.**

**Directions**
- adults and children 12 years and over: take 2 tablets every 4 to 6 hours; not more than 12 tablets in 24 hours
- children 6 years to under 12 years: take 1 tablet every 4 to 6 hours; not more than 6 tablets in 24 hours
- children under 6 years: ask a doctor

**Other information**
- store at 20-25°C (68-77°F); protect from excessive moisture

**Inactive ingredients**
- D&C yellow no. 10, lactose, magnesium stearate, microcrystalline cellulose, pregelatinized starch

---

Answer the following questions based on the drug label above:

1. The reading level of the drug label shown above is:
   - a. 5th to 7th grade level
   - b. 8th to 9th grade level
   - c. 10th-11th grade level
   - d. 12th grade and higher

2. The percentage of adults who understand the drug label shown above is:
   - a. Under 25%
   - b. 25-50%
   - c. 50-75%
   - d. 75-100%

3. Individuals with limited health literacy:
   - a. Read at an elementary level
   - b. Read at a high school level
   - c. Read at the college level
   - d. Read at all levels
4. Health literacy includes
   a. Fundamental literacy
   b. Scientific and computer literacy
   c. Civic literacy
   d. All of the above

5. The average American reads at the 5th grade level. True False

6. Sixty percent of the US population has difficulty understanding healthcare information and instructions. True False

7. The average consent form is written at the:
   a. 5th grade level
   b. 7th grade level
   c. 9th grade level
   d. 11th grade or higher level.

8. Limited health literacy costs the U.S. an additional 58 million dollars a year in healthcare cost. True False

9. The age group with the highest number of individuals who have low health literacy skills is:
   a. Young adults
   b. Middle age adults
   c. Older adults
   d. Elderly adults

10. Key elements of plain language include:
    a. Organizing information so that the most important points come first
    b. Giving complex information into understandable chunks
    c. Using and defining technical terms
    d. Using the passive voice

11. What is the best way to determine the patient’s understanding of healthcare instructions?
    a. Ask the patient questions about what you taught.
    b. Ask the patient to teach back the information.
    c. Ask the patient what they know about the instructions.
    d. Ask the patient if they understand.

12. What question would you ask your patient to get the best estimate of the patient’s reading ability?
    a. What was the last grade you completed?
    b. Do you have difficulty reading small or large print?
c. Would you tell me what the name of your medication, why you are taking and how it’s taken?

d. Do you know how to read the newspapers, books and magazines?

13. The reading level of written health materials is:
   a. at the grade school level
   b. at the middle school level
   c. at the high school level
   d. at the college level

14. The language level (reading level equivalent of videos) is:
   a. at the grade school level
   b. at the middle school level
   c. at the high school level
   d. at the college level

15. The reading level of websites used for patient education is:
   a. at the grade school level
   b. at the middle school level
   c. at the high school level
   d. at the college level

16. Key indicators of low health literacy can be seen in behaviors, responses to written communication and responses to questions about medication regimens.
   True or False

17. Using the brown bag medication review encourages patients to
   a. Ask questions about their treatment.
   b. Just follow the recommended directions
   c. Have someone else manage the directions
   d. Learn medical terminology

18. Improving patient understanding of health information requires using plain language, pictures, limited information, a shame free environments and addressing disabilities. True False

19. Individuals with low health literacy
   a. Use more services to prevent complications
   b. Use more services to treat complications
   c. Report more office visits to control complications
   d. Report their health is fine

20. Assessing health literacy using the REALM or TOFHLA scores have more practicality and usefulness issues in clinical than research settings. True False
Application subscale:

1. I evaluate the reading level of healthcare materials before using them for patient teaching: literacy
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

2. I assess patients of all educational levels for health literacy issues:
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

3. I use a health literacy screening tool to assess health literacy skills of an individual
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

4. I evaluate the cultural appropriateness of the healthcare materials, including videos, handouts, videos, and audiotapes before using them for teaching
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

5. I use plain language while teaching my patients
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

6. I assess lived experience with health concerns
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time
7. I assess economic issues of the patient that may affect teaching
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

8. I assess the patient’s ability to access to services
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

9. I assess social issues that may affect the patient’s ability to learn
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

10. I assess for cultural issues that may affect health and learning
    a) Never
    b) About 25% of the time
    c) About 50% of the time
    d) About 75% of the time
    e) About 100% of the time

11. I assess the patient’s native language and understanding of English
    a) Never
    b) About 25% of the time
    c) About 50% of the time
    d) About 75% of the time
    e) About 100% of the time

12. I limit amount of Information given at one time
    a) Never
    b) About 25% of the time
    c) About 50% of the time
    d) About 75% of the time
    e) About 100% of the time
13. I supplement health communication with pictures to increase understanding
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

14. I assess usability of internet sources
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

15. I use open ended questions to assess patient understanding
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

16. I use the teach back method to evaluate patient understanding
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

17. I use the brown bag medication review to assess patient literacy
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

18. I use the TOFHLA scale to assess health literacy
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time
19. I use the REALM scale to assess health literacy
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

20. I revise information obtained from the internet and other sources to improve usability
   a) Never
   b) About 25% of the time
   c) About 50% of the time
   d) About 75% of the time
   e) About 100% of the time

Confidence Subscale:

Respond to the following sentences based on the following scale. Choose an answer of how confident you feel from 1 to 10.

<table>
<thead>
<tr>
<th>Can never perform</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Perform All the time</th>
</tr>
</thead>
</table>

I am confident: level

1. I can manage health literacy assessment effectively. ______

2. I can identify strategies to overcome a health literacy barrier. ______

3. I can accomplish goals with my patient concerning patient education because of my health literacy knowledge. ______

4. I can invest the appropriate amount of time to overcome health literacy obstacles in patient education. ______

5. 75-100% of the time I can identify resources needed to educate patients with poor health literacy issues. _____

6. I can think of ways to adjust my method if I sense my patient is having a hard time understanding the content. ______

7. I can handle any patient teaching issues that I experience. _____

8. I can find alternative solutions when I am confronted with difficult situations in patient education and communication. ______
Appendix C: Michigan Board of Nursing Approved Education Programs

**REGISTERED NURSE PROGRAMS-BACCALAUREATE DEGREE**

Andrews University, Department of Nursing Berrien Springs 49104
Calvin College, Department of Nursing 3201 Burton Street, SE, Grand Rapids 49546
Davenport University, Mable Engle School of Nursing 415 East Fulton, Grand Rapids 49503
Davenport University, School of Nursing 3555 East Patrick Road, Midland 48642
Davenport University, School of Nursing 27650 Dequindre Road, Warren 48092
Eastern Michigan University, School of Nursing 311 Marshall, Ypsilanti 48197
Ferris State University, Department of Nursing 200 Ferris Drive, Big Rapids 49307
Finlandia University, Department of Nursing 601 Quincy Street, Hancock, 49930
Grand Valley State University, Kirkhof School of Nursing 1 Campus Drive, Allendale 49401
Hope College, Department of Nursing 35 E. 12th Street, Holland 49423
Lake Superior State University, Department of Nursing 650 Easterday Avenue, Sault Ste. Marie 49783
Madonna University, Department of Nursing 36600 Schoolcraft Road, Livonia 48150
Michigan State University, School of Nursing A230 Life Sciences Bldg., East Lansing 48824
Northern Michigan University, School of Nursing New Science Facility, Room 2301, Marquette 49855
Oakland University, School of Nursing 428 O’Dowd Hall, Rochester 48063
Rochester College, School of Nursing 800 West Avon Road, Rochester Hills 48307
Saginaw Valley State University, Crystal M. Lange College of Nursing and Health Ser. 7400 Bay Road, University Center 48710
Siena Heights University, School of Nursing 1247 E. Siena Heights Drive, Adrian 49221
South University, School of Nursing 41555 Twelve Mile Road, Novi, 48377
University of Detroit-Mercy, McAuley School of Nursing 4100 West McNichols Road, Detroit 48221
University of Michigan-Flint, School of Nursing 303 E. Kearsley, Rm 516 CROB, Flint 48502
University of Michigan, School of Nursing 400 N. Ingalls, #1320, Ann Arbor 48103
Wayne State University, College of Nursing 5557 Cass Avenue, Detroit 48202
Western Michigan University, Bronson School of Nursing Kalamazoo 49008

**ASSOCIATE DEGREE**

Alpena Community College, Department of Nursing 665 Johnson Street, Alpena 49707
Baker College Allen Park, Nursing Department 4500 Enterprise Drive, Allen Park 48101
Baker College Auburn Hills, Nursing Department 1500 University Drive, Auburn Hills 48326
Baker College Cadillac, Nursing Department 9600 13th Street, Cadillac 49601
Baker College Clinton Township, Nursing Department 34950 Little Mack Avenue, Clinton Township 48035
Baker College Muskegon, Nursing Department 1903 Marquette Avenue, Muskegon 49442-1490
Baker College Owosso, Nursing Department 1020 South Washington, Owosso 48867-4400
Baker College Flint, Nursing Department 1050 West Bristol Road, Flint 48507-5508
Bay de Noc Community College, ADN Program 2001 N. Lincoln Road, Escanaba 49829
Delta College, Division of Nursing University Center 48710
Glen Oaks Community College, Division of Nursing Education 62249 Shimmel Road, Centreville 49032
Gogebic Community College, Department of Nursing E4946 Jackson Road, Ironwood 49938
Grand Rapids Community College, Department of Nursing 143 Bostwick Avenue, NE, Grand Rapids 49503
Henry Ford Community College, Department of Nursing 5101 Evergreen Road, Dearborn 48128
ITT – Canton, Nursing Department 1905 South Haggerty Road, Canton 48188
Jackson Community College, Nursing Department 2111 Emmons Road, Jackson 49201
Kalamazoo Valley Community College, Division of Health Sciences 6767 West O Avenue, Kalamazoo 49009
Kellogg Community College, Nursing Education 450 North Avenue, Battle Creek 49017
Kirtland Community College, Department of Nursing 10775 N. St. Helen Road, Roscommon 48653
Lake Michigan College, Division of Health Sciences 2755 E. Napier Avenue, Benton Harbor 49022
Lansing Community College, Department of Nursing & Healthcareers 422 N. Washington Square, Lansing 48933
Macomb County Community College, Nursing Program 44575 Garfield Road, Mt. Clemens 48044
Mid Michigan Community College, Department of Nursing 1375 South Clare Avenue, Harrison 48625
Monroe County Community College, Division of Health Sciences 1555 Raisinville Road, Monroe 48161
Montcalm Community College, Department of Nursing 2800 College Drive, Sidney 48885
Mott Community College, Division of Nursing 1401 East Court Street, Flint 48503
Muskegon Community College, Nursing Program 221 South Quarterline Road, Muskegon 49442
North Central Michigan College, Department of Nursing 1515 Howard Street, Petoskey 49770
Northwestern Michigan College, Health Occupations Division 1701 East Front Street, Traverse City 49686
Oakland Community College, Nursing Department 7350 Cooley Lake Road, Waterford 48327
St. Clair County Community College, Department of Nursing 323 Erie Street, Port Huron 48061
Schoolcraft College, Nursing Education 18600 Haggerty Road, Livonia 48152
Southwestern Michigan College, Department of Healthcareers 58900 Cherry Grove Road, Dowagiac 49047
Washtenaw Community College, Department of Nursing 4800 E. Huron River Drive, Ann Arbor 48105
Wayne County Community College, Nursing Education 8200 W. Outer Drive, Detroit 48219
West Shore Community College, Nursing Education 3000 N. Stiles Road, Scottville 49454
Appendix D: Health Literacy Knowledge, Application, and Confidence Scale (HLKACS)

1) I am:
   a. Male
   b. Female

2) What month and year were you born?   ___/_______ (example 11/1964)

3) I am: (pick one)
   a. African American
   b. Asian
   c. Caucasian
   d. Hispanic
   e. Native American
   f. Other ___________________

4) I attend a: (pick one)
   a. Associate degree nursing school
   b. Bachelor degree nursing school

5) What is your current rank in nursing school: (pick one)?
   a. Freshman- Baccalaureate
   b. Sophomore- Baccalaureate
   c. Junior- Baccalaureate
   d. Senior- Baccalaureate
   e. 1st year Associate
   f. 2nd year Associate

6) What type of patient education materials have you used? (Pick all that apply)
   a. Pamphlets
   b. Videos
   c. One on one discussion
   d. Demonstration
   e. Internet sites or materials
   f. Other__________________-

7) Health literacy tools I have seen in clinical include: (select all that apply)
   a. TOFHLA (Test of functional health literacy in adults)
   b. REALM (Rapid estimation of adult literacy in medicine)
   c. NVS (Newest Vital Sign)
   d. DLA (Digital literacy assessment)
   e. The Patient Education Materials Assessment Tool (PEMAT)
   f. SAHL (Short Assessment of health literacy)
   g. REALM-SF (Rapid estimation of adult literacy short form)
Knowledge subscale- Answer the following questions based on the drug label above:

1. Individuals with limited health literacy:
   a. Read at an Elementary level
   b. Read at a High school level
   c. Read at the College level
   d. Read at all levels

2. Health literacy includes all of the following except
   a. Calculating a dose of medication by height and weight
   b. Reading a Medicare pamphlet
   c. Understanding health insurance limitations
   d. Using a map to navigate a healthcare facility.

3. The average American adult reads health related information at the:
   a. Elementary grade level.
   b. Middle school grade level
   c. High school grade level
   d. College grade level

4. An average health related consent form is written at the:
   a. Elementary grade level
   b. Middle school grade level
   c. High school grade level
   d. College grade level.

5. With limited health literacy, the number of hospital readmissions ________________.
   a. Remains the same.
   b. Decreases by 50%.
   c. Doubles.
   d. Is not important.

6. Individuals who are at the greatest risk for low health literacy knowledge are:
   a. Teenagers
   b. Young adults
   c. Middle age adults
   d. Elderly adults

7. The current reading level of written health materials recommended by the Joint Commission on accreditation of healthcare organizations (JACHO) is:
   a. At the Grade school level
   b. At the Middle school level
   c. At the High school level
   d. At the College level
8. Key indicator(s) of low health literacy can be seen in:
   a. Responses to questions about medication regimen
   b. Responses to written materials
   c. Asking few or no questions
   d. All of the above

9. Improving patient understanding of health information requires using:
   a. Plain language and pictures
   b. Chunking information
   c. Trusting environment that addresses their disabilities
   d. All of the above

Application subscale:

1. I evaluate the reading level of healthcare materials before using them for patient teaching:
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

2. I assess patients of all education levels for health literacy issues:
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

3. I use plain language while teaching my patients
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

4. I assess my patient’s current experience and knowledge related to their health concerns
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time
5. I assess the patient’s access to healthcare services
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

6. I assess for socioeconomic issues that may affect the patient’s ability to learn
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

7. I assess for cultural issues that may affect my patient’s learning
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

8. I assess the patient’s native language and understanding of English
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

9. I supplement verbal and written health communication with pictures to increase understanding
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

10. I assess patient’s ability to use health related internet sources
    a) Never
    b) Under 25% of the time
    c) 26-50% of the time
    d) 51-75% of the time
    e) 76-100% of the time
11. I use open ended questions to assess patient understanding.
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

12. I use the teach back method to assess patient understanding
   a) Never
   b) Under 25% of the time
   c) 26-50% of the time
   d) 51-75% of the time
   e) 76-100% of the time

13. I review home medications to assess patient literacy
   a. Never
   b. Under 25% of the time
   c. 26-50% of the time
   d. 51-75% of the time
   e. 76-100% of the time

Confidence Subscale:

Respond to the following sentences based on the following scale. Choose an answer of how confident you feel from 1 to 10. Use this scale for all the questions.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can never</td>
<td>Can perform some of the time</td>
<td>Perform all the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. I am confident I can effectively assess a patient’s health literacy. ______

2. I am confident I can identify a strategy to help with health literacy barriers. ______

3. I am confident that I can identify health education resources for patients with limited health literacy to read. ______

4. I am confident I can think of ways to adjust my method if I sense my patient is having a hard time understanding the content. ______

5. I am confident that I have incorporated the best practices of health literacy into my practice. __________
6. I am confident that I use health literacy strategies that improve the patient’s ability to understand and manage their own health. ______

7. I am confident that I can find additional resources to help me when I am having a difficult time teaching with low literacy issues. _________
Appendix E

RESEARCH @ EMU

UH SRC Determination: EXEMPT

DATE: December 9, 2015

TO: Marguerite DeBello, RN MSN
    Eastern Michigan University

Re: UHSRC: # 819809-2
    Category: Exempt category 2
    Approval Date: December 9, 2015

Title: The development and psychometric testing of the Health Literacy Knowledge, Application and Confidence Scale (HLKACS)

Your amended research project, entitled The development and psychometric testing of the Health Literacy Knowledge, Application and Confidence Scale (HLKACS), has been determined to maintain an Exempt status in accordance with federal regulation 45 CFR 46.102. UHSRC policy states that you, as the Principal Investigator, are responsible for protecting the rights and welfare of your research subjects and conducting your research as described in your protocol.

Renewals: Exempt protocols do not need to be renewed. When the project is completed, please submit the Human Subjects Study Completion Form (access through IRBNet on the UHSRC website).

Modifications: You may make minor changes (e.g., study staff changes, sample size changes, contact information changes, etc.) without submitting for review. However, if you plan to make changes that alter study design or any study instruments, you must submit a Human Subjects Approval Request Form and obtain approval prior to implementation. The form is available through IRBNet on the UHSRC website.

Problems: All major deviations from the reviewed protocol, unanticipated problems, adverse events, subject complaints, or other problems that may increase the risk to human subjects or change the category of review must be reported to the UHSRC via an Event Report form, available through IRBNet on the UHSRC website.

Follow-up: If your Exempt project is not completed and closed after three years, the UHSRC office will contact you regarding the status of the project.

Please use the UHSRC number listed above on any forms submitted that relate to this project, or on any correspondence with the UHSRC office.

Good luck in your research. If we can be of further assistance, please contact us at 734-487-3090 or via e-mail at human.subjects@emich.edu. Thank you for your cooperation.

Sincerely,

April Nelson, MS
Research Compliance Administrator
University Human Subjects Review Committee
Appendix F

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)
CITI HEALTH INFORMATION PRIVACY AND SECURITY (HIPAA) CURRICULUM COMPLETION REPORT
Printed on 09/17/2013

Marguerite DeBello (ID: 2006922)
206B Marshall
Ypsilanti
Michigan 48197
USA

DEPARTMENT: nursing
PHONE: 7344972416
EMAIL: mdebello@emich.edu
INSTITUTION: Eastern Michigan University

HEALTH INFORMATION PRIVACY AND SECURITY (HIPAA) COURSE - INFORMATION FOR INVESTIGATORS: This course for Clinical Investigators will satisfy the mandate for basic training in the HIPAA. In addition other modules on keeping your computers, passwords and electronic media safe and secure are included.

COURSE/STAGE: Basic Course/1
PASSED ON: 11/18/2010
REFERENCE ID: 5256965

<table>
<thead>
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<th>REQUIRED MODULES</th>
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<th>SCORE</th>
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<tr>
<td>About the Course</td>
<td>11/18/10</td>
<td>1/1 (100%)</td>
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<tr>
<td>Basics of Health Privacy</td>
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<td>Health Privacy Issues for Researchers</td>
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<td>8/10 (80%)</td>
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<table>
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<th>SCORE</th>
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<td>4/4 (100%)</td>
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<td>Health Privacy Issues for Fundraisers</td>
<td>11/18/10</td>
<td>4/5 (80%)</td>
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<tr>
<td>Health Privacy Issues for Marketers</td>
<td>11/18/10</td>
<td>5/5 (100%)</td>
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<tr>
<td>Protecting Your Computer</td>
<td>11/18/10</td>
<td>7/8 (88%)</td>
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<tr>
<td>Picking and Protecting Passwords</td>
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<td>7/8 (88%)</td>
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<tr>
<td>Protecting Your Portable Devices</td>
<td>11/18/10</td>
<td>7/7 (100%)</td>
</tr>
<tr>
<td>Protecting Your Identity</td>
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<td>5/7 (71%)</td>
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<tr>
<td>Safer Emailing and Messaging, Part 1</td>
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<td>No Quiz</td>
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<tr>
<td>Safer Emailing and Messaging, Part 2</td>
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<td>14/16 (88%)</td>
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<tr>
<td>Safer Web Surfing</td>
<td>11/18/10</td>
<td>6/8 (75%)</td>
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<td>Security Rules: Introduction to Federal and State Requirements*</td>
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<td>5/6 (83%)</td>
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<tr>
<td>Security for Work/Workers Off-Site</td>
<td>11/18/10</td>
<td>4/4 (100%)</td>
</tr>
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</table>

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. False information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunshweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator
Appendix G: Informed Consent Form

Project Title: The Development and Psychometric testing of the Health Literacy Knowledge, Application, and Confidence Scale (HLKACS)

Investigator: Marguerite DeBello RN MSN, ACNS, BC, CNE Eastern Michigan University

Purpose of the Study: The purpose of this research is to test a new instrument called the Health Literacy Knowledge, Application and Confidence Scale (HLKACS).

Funding: This research is not funded.

Study Procedures: Participation in this study involves completing an online survey. It should take between 20 and 35 minutes to complete the survey. You may be asked to complete the survey a second time.

Risks: The primary risk of participation in this study is a potential loss of confidentiality. You do not have to answer any questions that make you uncomfortable or that you do not want to answer.

Expected Benefits: There will be no direct personal benefit to you, but your participation will contribute to our understanding of health literacy knowledge of healthcare professionals.

Confidentiality: We will keep your information confidential by using a code to identify your information. The code will be linked to your name using a separate key. Your information will be stored in a password-protected computer file. We may share your information with other researchers outside of Eastern Michigan University. If we share your information, we will remove any and all identifiable information so that you cannot reasonably be identified. The results of this research may be published or used for teaching. Identifiable information will not be used for these purposes.

Compensation: You will be entered in a raffle for a $100 Amazon gift card for participating in this research study. If you are asked to take the survey twice, your name will be entered two times.

Contact Information:
If you have any questions about the research, you can contact the Principal Investigator, Marguerite DeBello at mdebello@emich.edu or by phone at 734-487-3273. You can also contact Marguerite’s Chair Dr. Tsu Yin Wu at twu@emich.edu or by phone at 734-487-2310.
For questions about your rights as a research subject, you can contact the Eastern Michigan University Office of Research Compliance at human.subjects@emich.edu or by phone at 734-487-3090.
Voluntary participation: Participation in this research study is your choice. You may refuse to participate at any time, even after signing this form, with no penalty or loss of benefits to which you are otherwise entitled. You may choose to leave the study at any time without loss of benefits to which you are otherwise entitled. If you leave the study, the information you provided will be kept confidential. You may request, in writing, that your identifiable information be destroyed. However, we cannot destroy any information that has already been published.

Statement of Consent
I have read this form. I have had an opportunity to ask questions and am satisfied with the answers I received. I click “continue” below to indicate my consent to Participate in this research.
Appendix H
Directions: While the actual assessment tool will be distributed in an online format, each of the question items to be included are listed below. Use this evaluation sheet to provide feedback on each of the 48 items in the Health Literacy Knowledge, Application and Confidence Scale (HLKACS). There are three subscales within the total scale, knowledge, application and confidence. Your evaluation should include reflection on the item stem content, and the available response set. For each item circle the appropriate number for appropriateness and clarity. In addition, if you have specific feedback on the item, please provide your comments in the space provided. If more space is needed, identify the comments for the item by placing the item number before the comment (ex. Knowledge 1). When you are finished please return the evaluation sheet in the envelope provided. An electronic copy of this document has also been sent so that if you desire you can type your comments into the evaluation tool and return via email. Thank you for your willingness to provide input.
**Drug Facts**

**Active ingredient (in each tablet)**
Chlorpheniramine maleate 2 mg

**Uses**
temporarily relieves these symptoms due to hay fever or other upper respiratory allergies:
- sneezing
- runny nose
- itchy, watery eyes
- itchy throat

**Warnings**
- Ask a doctor before use if you have
- glaucoma
- a breathing problem such as emphysema or chronic bronchitis
- trouble urinating due to an enlarged prostate gland

Ask a doctor or pharmacist before use if you are taking tranquilizers or sedatives

When using this product:
- You may get drowsy
- avoid alcoholic drinks
- alcohol, sedatives, and tranquilizers may increase drowsiness
- be careful when driving a motor vehicle or operating machinery
- excitement may occur, especially in children

If pregnant or breast-feeding, ask a health professional before use.

Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away.

**Directions**
- Take 2 tablets every 4 to 6 hours; not more than 12 tablets in 24 hours.
- Take 1 tablet every 4 to 6 hours; not more than 6 tablets in 24 hours.
- Ask a doctor.

**Other information**
- Store at 20-25°C (68-77°F).
- Protect from excessive moisture.

**Inactive ingredients**
- D&C yellow no. 10, lactose, magnesium stearate, microcrystalline cellulose, pregelatinized starch
## Knowledge Items

<table>
<thead>
<tr>
<th>Individual items are listed below.</th>
<th>1. Appropriateness of Item</th>
<th>2. Item Clarity</th>
<th>Additional Comments (e.g., Item stem or response scaling)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge 1 (see label)</strong> The reading level of the drug label shown above is: (see attached tool for label)</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td>a. 5&lt;sup&gt;th&lt;/sup&gt; to 7&lt;sup&gt;th&lt;/sup&gt; grade level</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>b. 8&lt;sup&gt;th&lt;/sup&gt; to 9&lt;sup&gt;th&lt;/sup&gt; grade level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. 10&lt;sup&gt;th&lt;/sup&gt;-11&lt;sup&gt;th&lt;/sup&gt; grade level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. 12&lt;sup&gt;th&lt;/sup&gt; grade and higher</td>
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<tr>
<td><strong>Knowledge 2 (see label)</strong> The percentage of adults who understand the drug label shown above is:</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td>e. Under 25%</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
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<tr>
<td>f. 25-50%</td>
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<tr>
<td>g. 50-75%</td>
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<tr>
<td>h. 75-100%</td>
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<tr>
<td><strong>Knowledge 3</strong> Individuals with limited health literacy:</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td>a. Read at an elementary level</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>b. Read at a high school level</td>
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<tr>
<td>c. Read at the college level</td>
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<tr>
<td>d. Read at all levels</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Knowledge 4</strong> Health literacy includes</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td>a. Literacy</td>
<td>1 = Critical/important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>b. Scientific and computer literacy</td>
<td></td>
<td></td>
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<tr>
<td>c. Civic literacy</td>
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<tr>
<td>d. All of the above</td>
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<tr>
<td>Knowledge 5</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
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<tr>
<td></td>
<td>Item is clear and concise: (Circle One)</td>
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<tr>
<td></td>
<td>1 = Yes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2 = No</td>
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<tr>
<td>Knowledge 6</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
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<td></td>
<td>Item is clear and concise: (Circle One)</td>
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<tr>
<td></td>
<td>1 = Yes</td>
<td></td>
<td></td>
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<td></td>
<td>2 = No</td>
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<tr>
<td>Knowledge 7</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
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<td></td>
<td>Item is clear and concise: (Circle One)</td>
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<tr>
<td></td>
<td>1 = Yes</td>
<td></td>
<td></td>
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<td></td>
<td>2 = No</td>
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<tr>
<td>Knowledge 8</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
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<td></td>
<td>Item is clear and concise: (Circle One)</td>
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<tr>
<td></td>
<td>1 = Yes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2 = No</td>
<td></td>
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<tr>
<td>Knowledge 9</td>
<td>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
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<tr>
<td>------------</td>
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</tr>
<tr>
<td>The age group with the highest number of individuals who have low health literacy skills is:</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>e. Young adults</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Middle age adults</td>
<td></td>
<td></td>
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<tr>
<td>g. Older adults</td>
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<td></td>
<td></td>
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<tr>
<td>h. Elderly adults</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge 10</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key elements of plain language include:</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>a. Organizing information so that the most important points come first</td>
<td></td>
<td></td>
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<tr>
<td>b. Giving complex information into understandable chunks</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>c. Using and defining technical terms</td>
<td></td>
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<tr>
<td>d. Using the passive voice</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge 11</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the best way to determine the patient’s understanding of healthcare instructions?</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>a. Ask the patient questions about what you taught.</td>
<td></td>
<td></td>
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<tr>
<td>b. Ask the patient to teach back the information.</td>
<td></td>
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<tr>
<td>c. Ask the patient what they know about the instructions.</td>
<td></td>
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<tr>
<td>d. Ask the patient if they understand.</td>
<td></td>
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<tr>
<td>Knowledge 12</td>
<td>Knowledge 13</td>
<td></td>
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</tr>
<tr>
<td><strong>What question would you ask your patient to get the best estimate of the patient's health literacy reading ability?</strong></td>
<td><strong>The current reading level of most written health materials is:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. What was the last grade you completed?</td>
<td>a. at the grade school level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Do you have difficulty reading small or large print?</td>
<td>b. at the middle school level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Can you tell me the name of your medication, and why you are taking and how it's taken?</td>
<td>c. at the high school level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Do you know how to read the newspapers, books and magazines?</td>
<td>d. at the college level</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This item measures important health literacy knowledge content needed by a student nurse. (Circle One)

1 = Critical/Important Content
2 = Somewhat important
3 = Not critical content

Item is clear and concise: (Circle One)

1 = Yes
2 = No

Comments:
<table>
<thead>
<tr>
<th>Knowledge 14</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| a. at the grade school level | $1 = \text{Critical/Important Content}$  
$2 = \text{Somewhat important}$  
$3 = \text{Not critical content}$ | $1 = \text{Yes}$  
$2 = \text{No}$ | | |
| b. at the middle school level | | | | |
| c. at the high school level | | | | |
| d. at the college level | | | | |

<table>
<thead>
<tr>
<th>Knowledge 15</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| a. at the grade school level | $1 = \text{Critical/Important Content}$  
$2 = \text{Somewhat important}$  
$3 = \text{Not critical content}$ | $1 = \text{Yes}$  
$2 = \text{No}$ | | |
| b. at the middle school level | | | | |
| c. at the high school level | | | | |
| d. at the college level | | | | |

<table>
<thead>
<tr>
<th>Knowledge 16</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| True or False | $1 = \text{Critical/Important Content}$  
$2 = \text{Somewhat important}$  
$3 = \text{Not critical content}$ | $1 = \text{Yes}$  
$2 = \text{No}$ | | |
<table>
<thead>
<tr>
<th>Knowledge 17</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| Using the “brown bag” medication review encourages patients to:  
  a. Ask questions about their treatment.  
  b. Just follow the recommended directions.  
  c. Have someone else manage the directions.  
  d. Learn medical terminology. |  
  1 = Critical/Important Content  
  2 = Somewhat important  
  3 = Not critical content | 1 = Yes  
  2 = No | |

<table>
<thead>
<tr>
<th>Knowledge 18</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving patient understanding of health information requires using plain language, pictures, limited information, a shame free environment and addressing disabilities. True False</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
  1 = Critical/Important Content  
  2 = Somewhat important  
  3 = Not critical content | 1 = Yes  
  2 = No | |

<table>
<thead>
<tr>
<th>Knowledge 19</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| Individuals with low health literacy:  
  a. Use more services to prevent complications.  
  b. Use more services to treat complications.  
  c. Report more office visits to control complications.  
  d. Report their health is fine. |  
  1 = Critical/Important Content  
  2 = Somewhat important  
  3 = Not critical content | 1 = Yes  
  2 = No | |
<table>
<thead>
<tr>
<th>Knowledge 20</th>
<th>This item measures important health literacy knowledge content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the Rapid Estimate of Adult Literacy in Medicine (REALM) or Test of Functional Health Literacy in Adults (TOFHLA) scores to assess health literacy can be more practical and useful in clinical than research settings. True False</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td>Overall Sub-Scale Comments: (e.g. Are there other knowledge content areas that should be included above?)</td>
</tr>
</tbody>
</table>
# Application Items

<table>
<thead>
<tr>
<th>Individual items are listed below.</th>
<th>1. Appropriateness of Item Clarity</th>
<th>Additional Comments (e.g., Item stem or response scaling)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application 1</strong>&lt;br&gt;I evaluate the reading level of healthcare materials before using them for patient teaching: literacy&lt;br&gt;a. Never&lt;br&gt;b. Under 25% of the time&lt;br&gt;c. 25-50% of the time&lt;br&gt;d. 50-75% of the time&lt;br&gt;e. 75-100% of the time</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)&lt;br&gt;1 = Critical/Important Content&lt;br&gt;2 = Somewhat important&lt;br&gt;3 = Not critical content</td>
<td>Item is clear and concise: (Circle One)&lt;br&gt;1 = Yes&lt;br&gt;2 = No</td>
</tr>
<tr>
<td><strong>Application 2</strong>&lt;br&gt;I assess patients of all educational levels for health literacy issues:&lt;br&gt;a. Never&lt;br&gt;b. Under 25% of the time&lt;br&gt;c. 25-50% of the time&lt;br&gt;d. 50-75% of the time&lt;br&gt;e. 75-100% of the time</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)&lt;br&gt;1 = Critical/Important Content&lt;br&gt;2 = Somewhat important&lt;br&gt;3 = Not critical content</td>
<td>Item is clear and concise: (Circle One)&lt;br&gt;1 = Yes&lt;br&gt;2 = No</td>
</tr>
<tr>
<td><strong>Application 3</strong>&lt;br&gt;I use a health literacy screening tool to assess health literacy skills of an individual&lt;br&gt;a. Never&lt;br&gt;b. Under 25% of the time&lt;br&gt;c. 25-50% of the time&lt;br&gt;d. 50-75% of the time&lt;br&gt;e. 75-100% of the time</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)&lt;br&gt;1 = Critical/Important Content&lt;br&gt;2 = Somewhat important&lt;br&gt;3 = Not critical content</td>
<td>Item is clear and concise: (Circle One)&lt;br&gt;1 = Yes&lt;br&gt;2 = No</td>
</tr>
<tr>
<td>Application 4</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
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<tr>
<td>Application 5</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
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<td></td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
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<tr>
<td>Application 6</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
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<td></td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
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<tr>
<td><strong>Application 7</strong></td>
<td><strong>Application 8</strong></td>
<td><strong>Application 9</strong></td>
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<tr>
<td><strong>I assess economic issues of the patient that may affect learning</strong>&lt;br&gt;a. Never&lt;br&gt;b. Under 25% of the time&lt;br&gt;c. 25-50% of the time&lt;br&gt;d. 50-75% of the time&lt;br&gt;e. 75-100% of the time</td>
<td><strong>I assess the patient’s ability to access to healthcare services</strong>&lt;br&gt;a. Never&lt;br&gt;b. Under 25% of the time&lt;br&gt;c. 25-50% of the time&lt;br&gt;d. 50-75% of the time&lt;br&gt;e. 75-100% of the time</td>
<td><strong>I assess social issues that may affect the patient’s ability to learn healthcare information</strong>&lt;br&gt;a. Never&lt;br&gt;b. Under 25% of the time&lt;br&gt;c. 25-50% of the time&lt;br&gt;d. 50-75% of the time&lt;br&gt;e. 75-100% of the time</td>
</tr>
<tr>
<td><strong>This item measures important health literacy application content needed by a student nurse. (Circle One)</strong>&lt;br&gt;1 = Critical/Important Content&lt;br&gt;2 = Somewhat important&lt;br&gt;3 = Not critical content</td>
<td><strong>This item measures important health literacy application content needed by a student nurse. (Circle One)</strong>&lt;br&gt;1 = Critical/Important Content&lt;br&gt;2 = Somewhat important&lt;br&gt;3 = Not critical content</td>
<td><strong>This item measures important health literacy application content needed by a student nurse. (Circle One)</strong>&lt;br&gt;1 = Critical/Important Content&lt;br&gt;2 = Somewhat important&lt;br&gt;3 = Not critical content</td>
</tr>
<tr>
<td><strong>Item is clear and concise: (Circle One)</strong>&lt;br&gt;1 = Yes&lt;br&gt;2 = No</td>
<td><strong>Item is clear and concise: (Circle One)</strong>&lt;br&gt;1 = Yes&lt;br&gt;2 = No</td>
<td><strong>Item is clear and concise: (Circle One)</strong>&lt;br&gt;1 = Yes&lt;br&gt;2 = No</td>
</tr>
<tr>
<td>Application 10</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
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</tr>
<tr>
<td>I assess for cultural issues that may affect health teaching</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
</tr>
<tr>
<td>a. Never</td>
<td></td>
<td></td>
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<tr>
<td>b. Under 25% of the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. 25-50% of the time</td>
<td></td>
<td></td>
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<tr>
<td>d. 50-75% of the time</td>
<td></td>
<td></td>
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<tr>
<td>e. 75-100% of the time</td>
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</table>

<table>
<thead>
<tr>
<th>Application 11</th>
<th>This item measures important health literacy application content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I assess the patient's native language and understanding of English</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>a. Never</td>
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<td></td>
<td></td>
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<tr>
<td>b. Under 25% of the time</td>
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<td></td>
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<tr>
<td>c. 25-50% of the time</td>
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<tr>
<td>d. 50-75% of the time</td>
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<tr>
<td>e. 75-100% of the time</td>
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</table>

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<thead>
<tr>
<th>Application 12</th>
<th>This item measures important health literacy application content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I limit amount of Information given at one time</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td>a. Never</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Under 25% of the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. 25-50% of the time</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>d. 50-75% of the time</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>e. 75-100% of the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application 13</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| I supplement health communication with pictures to increase understanding | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No |  |
| a. Never  
b. Under 25% of the time  
c. 25-50% of the time  
d. 50-75% of the time  
e. 75-100% of the time |  |

<table>
<thead>
<tr>
<th>Application 14</th>
<th>This item measures important health literacy application content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I assess patient’s ability to use internet health sources | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No |  |
| a. Never  
b. Under 25% of the time  
c. 25-50% of the time  
d. 50-75% of the time  
e. 75-100% of the time |  |

<table>
<thead>
<tr>
<th>Application 15</th>
<th>This item measures important health literacy application content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I use open-ended questions to assess patient understanding | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No |  |
| a. Never  
b. Under 25% of the time  
c. 25-50% of the time  
d. 50-75% of the time  
e. 75-100% of the time |  |

<table>
<thead>
<tr>
<th>Application 16</th>
<th>This item measures important health literacy application content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I use the teach-back method to evaluate patient understanding | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No |  |
| a. Never  
b. Under 25% of the time  
c. 25-50% of the time  
d. 50-75% of the time  
e. 75-100% of the time |  |
<table>
<thead>
<tr>
<th>Application 17</th>
<th>This item measures important health literacy application content needed by a student nurse. (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application 18</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application 19</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
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</tr>
<tr>
<td>Application 20</td>
<td>This item measures important health literacy application content needed by a student nurse. (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
Overall Sub-Scale Comments: (e.g. Are there other application behaviors that should be included above?)

Confidence Items

Note to reviewer: the following response scale is paired with the following items to capture the subject’s response for these items.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can</td>
<td>Perform</td>
<td>never</td>
<td>all the time</td>
<td>perform</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Respond to the following sentences based on the following scale. Choose an answer of how confident you feel from 1 to 10.

<table>
<thead>
<tr>
<th>Individual items are listed below.</th>
<th>1. Appropriateness of Item</th>
<th>2. Item Clarity</th>
<th>Additional Comments (e.g., Item stem or response scaling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence 1</td>
<td>This item measures important health literacy activities needed by a student nurse: (Circle One)</td>
<td>Item is clear and concise: (Circle One)</td>
<td>Comments:</td>
</tr>
<tr>
<td>I am confident I can assess a patient’s health literacy effectively.</td>
<td>1 = Critical/Important Content 2 = Somewhat important 3 = Not critical content</td>
<td>1 = Yes 2 = No</td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Confidence 2</th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident I can identify strategies to overcome a health literacy barrier. | 1 = Critical/Important Content
2 = Somewhat important
3 = Not critical content | 1 = Yes
2 = No | |

<table>
<thead>
<tr>
<th>Confidence 3</th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident I can accomplish the health education goals of my patient. | 1 = Critical/Important Content
2 = Somewhat important
3 = Not critical content | 1 = Yes
2 = No | |

<table>
<thead>
<tr>
<th>Confidence 4</th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident I can invest the appropriate amount of time to overcome health literacy obstacles in patient education. | 1 = Critical/Important Content
2 = Somewhat important
3 = Not critical content | 1 = Yes
2 = No | |

<table>
<thead>
<tr>
<th>Confidence 5</th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident that 75–100% of the time I can identify resources needed to educate patients with limited health literacy. | 1 = Critical/Important Content
2 = Somewhat important
3 = Not critical content | 1 = Yes
2 = No | |
<table>
<thead>
<tr>
<th><strong>Confidence 6</strong></th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident I can think of ways to adjust my teaching method if I sense my patient is having a hard time understanding the content. | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No | |

<table>
<thead>
<tr>
<th><strong>Confidence 7</strong></th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident I can handle any patient teaching issues that I experience. | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No | |

<table>
<thead>
<tr>
<th><strong>Confidence 8</strong></th>
<th>This item measures important health literacy activities needed by a student nurse: (Circle One)</th>
<th>Item is clear and concise: (Circle One)</th>
<th>Comments:</th>
</tr>
</thead>
</table>
| I am confident I can find alternative solutions when I am confronted with difficult situations in patient education and communication. | 1 = Critical/Important Content  
2 = Somewhat important  
3 = Not critical content | 1 = Yes  
2 = No | |

**Overall Sub-Scale Comments:** (e.g. Are there other behavioral confidence items that should be included above?)
Other Comments and Suggestions:

Reviewer:  

Date: