Health literacy: the knowledge and experiences of senior level baccalaureate nursing students

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ABSTRACT

The purpose of this study was to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students enrolled at state universities in Louisiana. Three hundred and sixty-one students from eight baccalaureate nursing programs agreed to participate in the study.

The Health Literacy Knowledge and Experience Survey (HL-KES) was utilized to measure the health literacy knowledge and experiences of participants. Participants were able to identify low socioeconomic groups as high risk for low health literacy skills and were strongly aware of the consequences associated with low health literacy skills. Knowledge gaps were evident in the following areas: identifying the older adult as a high risk group, health literacy screening, and guidelines for written healthcare information.

A nine-item likert-type scale was utilized to measure health literacy experiences. Responses suggest that participants’ health literacy experiences are somewhat limited particularly with regards to assessing the reading level, appropriate use of illustrations, and cultural relevance of healthcare materials. A factor analysis revealed two factors labeled, “Core” and “Technology” that explained 57.15% of the variance in health literacy experiences.

A negatively weak statistically significant relationship existed between health literacy experiences and health literacy knowledge. In addition, multiple regression analysis revealed that Technology Health Literacy Experiences, certification in an area of healthcare, grade point average, age, and ethnicity explained 11.6% of the variance in health literacy scores.
CHAPTER I

INTRODUCTION

Rationale

Health literacy is fast becoming recognized as a major healthcare problem in the United States. Although the ability of an individual to read and understand healthcare information is evident in the term, health literacy encompasses much more than just basic reading skills. The concept of health literacy also includes the ability of an individual to function within the health care system and make informed decisions regarding health care. Weiss (2003) defines health literacy as, “…the ability to read, understand, and use health information to make appropriate healthcare decisions and follow instructions for treatment” (p. 6). Nurses play a key role in providing health care information to individuals in a variety of settings; therefore, it is imperative that nurses be prepared to face the challenges presented by individuals with poor health literacy skills.

Although the concept of health literacy is not new, the prevalence of low health literacy skills in the United States came to the forefront in the aftermath of the 1992 National Adult Literacy Survey (NALS) (Parker, Baker, Williams, & Nurss, 1995). Low literacy skills of adults in the United States, once thought to be a problem with consequences primarily affecting the individual, is now viewed as a social problem which threatens the health and well being of the entire nation (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). In 1992, the Department of Education conducted the NALS, the first attempt to construct a complete profile of adult literacy that included prose, document, and quantitative literacy. Over 40 million American adults scored within the lowest literacy categories (Kirsch et al., 1993). In terms of healthcare, these results suggest that adults with low literacy scores do not possess basic skills required to function within the healthcare system. This includes completing basic tasks such as reading prescription drug
labels, reading appointment cards for follow-up appointments with healthcare providers, and interpreting instructions on childcare (National Work Group on Literacy and Health, 1998).

The Louisiana State Adult Literacy Survey was conducted as a component of the 1992 National Adult Literacy Survey. Jenkins and Kirsch (1994) presented a summary of these results and reported that 24-26% of participants scored at the lowest literacy level. These results have strong implications for not only healthcare providers, but also community and state leaders.

Recognizing a need for action the Louisiana legislature passed Louisiana House Bill No. 2019 during the 2003 Regular Session. This bill created a statewide task force to address health literacy issues. Members of the task force included representation from a variety of healthcare fields including nursing, pharmacy, and medicine as well the Developmental Disabilities Council, the Minority Health Commission, and the health insurance industry. The charge of this task force was to improve access to health care, reduce unnecessary spending, and improve health care outcomes of the citizens of Louisiana (Timm, 2005).

The significance of the NALS report prompted a follow-up assessment of adult literacy in America which was conducted in 2003, the National Assessment of Adult Literacy (NAAL). A thorough analysis of the 2003 NAAL is still underway. Initial reports indicate that there has been an eight point increase in average quantitative literacy scores from the 1992 NAL; however, there have been no significant changes in the average prose and document literacy scores (Kutner, Greenberg, & Baer, 2006).

The NALS provided valuable information on the state of adult literacy in America and piqued the concern of many health care providers. As a result, health literacy has also become an integral part of the national health platform outlined in Healthy People 2010 (DHHS Office of Disease Prevention and Health Promotion, 2000) and efforts are being made by many
professional organizations and government agencies to increase the awareness of health literacy among healthcare professionals.

Despite the facts on adult literacy in the United States today, most consent forms and health educational materials are written at a tenth grade to graduate school level (Weiss, 2003). Patients who have difficulty reading healthcare instructions often fail to report this to their healthcare provider because of the shame and embarrassment associated with poor reading skills (Parikh, Parker, Nurss, Baker, & Williams, 1996). Consequently healthcare information provided to many patients is often misunderstood, a factor that may contribute to noncompliance with the plan of care and poor healthcare outcomes (Gazmararian et al., 1999; Williams, Baker, Honig, Lee & Nowlan, 1998; Williams, Baker, Parker & Nurss, 1998). In dollars and cents, poor health outcomes contribute to escalating healthcare costs. Weiss (2003) estimates that low literacy skills cost the United States $50 to $73 billion annually.

The health literacy skills of an individual directly impact that individual’s healthcare status and quality of life. Providing healthcare information that is understandable enables an individual to make informed decisions regarding healthcare and is considered by many to be an ethical responsibility of healthcare providers (Gazmararian, Curran, Parker, Bernhardt, & DeBuono, 2005; Nutbeam, 2000). Schools of nursing lay the foundation for future nurses not only to be providers of care, but patient advocates. Empowering individuals and communities with health literacy skills should then be considered an ethical responsibility and core competency for all registered nurses.

Schools of nursing have a longstanding history of preparing nurses for the teaching role. Concepts related to teaching learning theory are threaded throughout most nursing curricula, and baccalaureate nursing students are provided with opportunities to provide healthcare information to individuals in diverse healthcare settings. However, there is no evidence to support that
schools of nursing are preparing baccalaureate nursing students with the knowledge and experiences required to assist individuals with low health literacy skills. Dreger and Tremback (2002) report that, “Experts suggest that nurses need to improve their efforts at literacy screening and enhance their methods of providing health education to better serve patients” (p. 283). Parker, Ratzan and Lurie (2003) support this statement and advocate for improving efforts, “…to make health literacy a component of training for health professionals” (p. 152).

**Problem Statement**

The purpose of this study was to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students currently enrolled in baccalaureate nursing programs at state universities in Louisiana. In addition, this study sought to determine what factors may be related to the health literacy knowledge of senior level baccalaureate nursing students currently enrolled in baccalaureate nursing programs at state universities in Louisiana.

**Research Questions**

The following research questions were addressed in this study:

1. What are the selected characteristics of senior level baccalaureate nursing students enrolled in state universities in Louisiana, namely, age, gender, ethnicity, prior educational experiences, certifications, grade point average (GPA), and frequency of interaction with healthcare providers for their own personal healthcare needs and or the healthcare needs of a significant other?

2. What is the health literacy knowledge of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the Health Literacy Knowledge and Experience Survey (HL-KES)?

3. What are the health literacy experiences of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES?
4. Does a relationship exist between the health literacy experiences and the health literacy knowledge of senior level baccalaureate nursing students enrolled in schools of nursing at state universities in Louisiana as measured by the HL-KES?

5. Does a model exist that explains the variance in health literacy of senior level baccalaureate nursing students as measured by the HL-KES? The potential exploratory variables that were used in this analysis were age, gender, ethnicity, prior educational experiences, certifications, GPA, the frequency of interaction with healthcare providers for their own personal healthcare needs or the healthcare needs of a significant other, and health literacy experiences.

**Significance of the Study**

The nursing shortage has provided nursing graduates with direct entry into the healthcare system. They are expected to provide safe and efficient patient care to individuals with diverse cultural and socioeconomic backgrounds in a cost effective manner. Although advances in medical technology have contributed greatly to improving healthcare outcomes, they have also increased the complexity of managing healthcare (Parker, Ratzan, & Lurie, 2003). Increasingly, patients are expected to manage more complex healthcare needs independently at home without the assistance of a nurse. Now, more that ever, nurses must be proficient in the delivery of healthcare information to ensure that patients are equipped with both the cognitive and psychomotor skills required to maintain an optimal level of health.

Nursing educators must take a hard look at established nursing curricula to determine if they are providing nursing students with the knowledge and experiences required to provide healthcare to individuals with low health literacy skills. Future employers will expect that nursing graduates can effectively provide healthcare information to patients in compliance with patient education standards established by the Joint Commission on Accreditation of Healthcare
Organizations (JCAHO), one of the major regulatory organizations ensuring health care quality and safety (JCAHO, 2005). In addition, nursing curricula should embrace the national health agenda on health literacy established within the context of Healthy People 2010. The health literacy goals of Healthy People 2010 cannot be met until nurses, one of the largest groups of healthcare providers, acquire the knowledge and skills needed to address the needs of those with low health literacy skills.

There is overwhelming support for increasing the awareness of health literacy among healthcare providers (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). The Committee on Health Literacy of the Institute of Medicine reports that, “Increasing knowledge, awareness, and responsiveness to health literacy among health service providers as well as the community would reduce problems of limited health literacy.” (2004, p.2). The American Medical Association (AMA) (Nelson, Schwartzberg, & Vergara, 2005) view health literacy as a pressing problem that all healthcare providers must confront and strongly advocate for a concerted effort to, “… require health literacy training in medical and all healthcare professional education…” (p. 325).

Communication between patient and nurse is the key to overcoming the barriers to healthcare created by low health literacy skills. The likelihood of a new nursing graduate interacting with patients possessing low health literacy skills is strong; therefore, nursing educators should be committed to preparing these new nurses with the skills needed to conduct health literacy screenings and provide healthcare information to individuals in a format that is understandable.

According to French and Larrabee (1999), there is a plethora of research that indicates health literacy is a major problem and they advocate further research to investigate “…why literacy issues are minimized or ignored in healthcare settings…” (p. 78). It is imperative that
schools of nursing in Louisiana follow the lead of the Louisiana legislature in addressing the issues of health literacy. This assessment of the health literacy knowledge and experiences of senior level baccalaureate nursing students will provide nursing educators with baseline data to determine how well they are preparing baccalaureate nursing students to meet the needs of individuals with low health literacy skills.

**Definition of Terms**

For the purposes of this study, the following terms were defined:

- **Culture**: “the thought, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups” (Office of Minority Health, 2001, p.131).
- **Grade Level or Reading Level**: “A term used to describe the average reading skills expected after each year of school in the U.S. public school system.” (Irvine, 1999, p. 4).
- **Grade Point Average** – The grade point average on all required nursing courses at the beginning of the last semester of required senior level nursing courses.
- **Healthcare Information** – Information provided to an individual by a health care provider for the purposes of health promotion, health prevention, and health maintenance.
- **Health Literacy** – “the ability to read, understand, and use health information to make appropriate healthcare decisions and follow instructions for treatment” (Weiss, 2003, p.6).
- **Health outcomes**: “ A change in the health status of an individual, group or population which is attributable to a planned intervention or series of interventions, regardless of whether such an intervention was intended to change health status” (WHO, 1998, p. 10).
- **Health Status**: “A description and/or measurement of the health of an individual or population at a particular point in time against identifiable standards, usually by reference to health indicators” (WHO, 1998, p. 12).
• Health policy: “A formal statement or procedure within institutions (notably government) which defines priorities and the parameters for action in response to health needs available resources and other political pressures.” (WHO, 1998, p. 10).

• Literacy: “using printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential” (Kutner, Greenburg, Baer, 2006, p. 2).

• Low health literacy skills: the inability to comprehend health care information, follow through with health care treatments, and or make informed decisions regarding health care.

• Low Literacy or Limited Literacy: “The inability to read or write above a 7th grade reading level, which would make it hard to perform daily, necessary tasks on the job and in society” (Irvine, 1999, p. 4).

• Nursing Educator: a Registered Nurse that is at least prepared at a master’s level and employed by a state university in Louisiana working full or part-time in a school of nursing.

• Senior Level Baccalaureate Nursing Student: a student enrolled in the last semester of required clinical courses in a school of nursing at a state university in Louisiana.

• School of Nursing: a four-year accredited baccalaureate nursing program at a state university in Louisiana.
CHAPTER 2

REVIEW OF LITERATURE

The Prevalence of Health Literacy

The 2003 National Assessment of Adult Literacy (NAAL) data indicates that there is a direct correlation between years of education and literacy levels; this is consistent with findings from the 1992 National Adult Literacy Survey (NALS). Participants with less years of school had lower literacy scores (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993, Kutner, Greenburg, & Baer, 2006). With this being said, however, the data also suggests that years of schooling completed did not provide an accurate profile of an individual’s reading level. Thirteen percent of high school graduates surveyed in 2003 scored in the Below Basic in prose and document literacy, with 24% scoring Below Basic in quantitative literacy. This data suggests that healthcare providers cannot make assumptions regarding the health literacy skills of an individual based on the level of education attained. The first step in identifying a literacy problem, “…is to realize that limited literacy is a widespread phenomenon but a hidden disability” (Davis, Meldrum, Tippy, Weiss, & Williams, 1996, p.100). According to Weiss (2003), “…literacy is the single best predictor of healthcare status…” (p.11); unfortunately, most clinicians are unaware of this fact (Weiss, 2003).

Although the 2003 NAAL data suggests that the percentage of Whites, Blacks, and Asian/Pacific Islanders with Below Basic literacy decreased from 1992, 8% of Whites, 24% of Blacks, and 11% of Asian/Pacific Islanders scored within this literacy level. This underscores the lack of demographic borders among adults in America with low literacy skills. Low literacy skills continue to be prevalent among Hispanics, with a greater number of Hispanic participants scoring at the Below Basic literacy level in all categories (Kutner, Greenburg, & Baer, 2006).
Participants over the age of 65 did show some improvement in literacy scores in the 2003 NAAL survey; however, adults in this age group demonstrated the highest percentage of Below Basic literacy scores, a finding consistent with the 1992 survey. This finding is also consistent with results obtained by Williams et al. (1995). It is interesting to note that this population is also more likely to be diagnosed with a chronic disease and require healthcare services more frequently (Parker, Ratzan, Lurie, 2003).

Weiss, Reed, and Kligman (1995) further explored low literacy among older adults in a study that examined the literacy skills of 177 low-income older adults. The reading skills of participants were tested using the Instrument for the Diagnosis of Reading (IDC). Researchers also collected information regarding how subjects obtained news and information and if they experienced difficulty understanding written healthcare materials. The majority of participants in the study tested at a 5.5 grade level, while one-third tested at or below the 4th grade. All participants, regardless of reading level indicated that their primary source for news and information was the television. Researchers also discovered that over 25% of participants had difficulty understanding written materials provided by their healthcare provider and required the assistance of another person to read this information to them. Limitations of the study included limited generalizability of the findings only to low-income older adults in public assisted housing.

Gazmararian et al. (1999) conducted a study among community-dwelling Medicare enrollees in a national managed care organization. The study sought to determine the prevalence of low functional health literacy skills in the target population and characteristics associated with low functional health literacy. Participants were located in four different states. A total of 2956 spoke English and 304 spoke Spanish as their native language (Gazmararian, Baker et al., 1999). Researchers utilized the short version of the Test of Functional Health Literacy in Adults (S-
TOFHLA); available in both English and Spanish to measure literacy levels. Results of the study indicated that the majority of both English speaking and Spanish speaking participants had inadequate or marginal health literacy skills. It was also noted that there were major differences in the prevalence of low health literacy skills state; researchers attributed this to differences in race, language, and socioeconomic status within a given location (Gazmararian, Baker et al., 1999). Characteristics associated with low functional health literacy include black race, older age (over 85), fewer years of school completed, and “blue collar” work history (Gazmararian, Baker et al., 1999).

Using the same target population and a similar study design, Baker, Gazmararian, Sudano, and Patterson (2000) examined what cognitive, health, and behavioral factors are associated with functional health literacy among older adults. Low literacy levels proved to be highly correlated with the Mini Mental State Examination (MMSE), the instrument utilized to measure cognitive function (Baker et al., 2000). Hierarchical linear regression models were also run to determine if a model existed to explain the variance in S-TOFHLA scores. Gender, race, years of school completed, reading frequency, diabetes, mental health, and vision were all independent predictors of functional health literacy.

Benson and Forman (2002) examined health literacy in older adults with focus on comprehension of written healthcare information among residents of an affluent retirement community. This study utilized the Test of Functional Health Literacy (TOFHL) to assess the residents’ comprehension of written health care materials. Thirty percent of participants had poor comprehension of written health care information based on TOFHL scores. Many also had difficulty with the numeracy questions suggesting they may have difficulty managing medication regimes.
Health Literacy: A Health Policy for the United States

One of the leading advocates for improving health literacy in the United States is Dr. Richard Carmona, United States Surgeon General (McGray, 2005). Carmona has identified three public health priorities: health prevention, public health preparedness, and eliminating health care disparities (Office of the Surgeon General, 2004). In the Keynote Address at the National Student Nurses Association on April 6, 2005, health literacy, Carmona stated, was “woven” through all three priorities. He also highlighted the important role of nurses in addressing this national health problem with his comment, “As nurses, you are on the front lines of improving health literacy” (Carmona, 2005, ¶ 22).

The Department of Health and Human Services (DHHS), Office of Disease Prevention and Health Promotion (2000) established a framework for health prevention, Health People 2010. Two overarching goals related to health are outlined in this national platform for health prevention: 1) increase quality and years of healthy life, and 2) eliminate health disparities. Recognizing that health literacy skills are imperative to accomplishing these goals, Health Communication is one of the 28 focus areas outlined in Health People 2010. One of the objectives included within the Health Communication focus is, “Improve the health literacy of persons with inadequate or marginal literacy skills.” (DHHS Office of Disease Prevention and Health Promotion, 2000) This health literacy agenda also advocated for health literacy research, training for health professionals, and an assessment of providers’ communication skills by their patients (DHHS, Office of Disease Prevention and Health Promotion, 2000).

Patient education standards established by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) have also contributed to an increasing awareness of health literacy among health care agencies. This regulating agency now requires that healthcare agencies provide healthcare instructions that are appropriate for the healthcare needs of each
individual patient. In addition, the health instructions must be developed following an assessment of learning needs that reflect cultural, religious, and learning skills of the individual (JCAHO, 2005).

The Institute of Medicine of the National Academies appointed a Committee on Health Literacy that published the report, *Health Literacy: A Prescription to End Confusion*. One finding highlighted in this report revealed that health care providers have, “…limited education, training, continuing education, and practice opportunities to develop skills for improving health literacy” (Committee on Health Literacy of the Institute of Medicine, 2004, p.11). The committee strongly recommended that efforts to increase awareness of healthcare professionals in the area of health literacy be initiated.

The American Medical Association (AMA) recognized the importance of educating physicians on health literacy and developed the program, *Health literacy: A Manual for Clinicians*. Some educators are advocating for health literacy training to begin in medical school and have incorporated health literacy modules within the medical school curriculum (Weiss, 2003).

Another organization actively promoting health literacy awareness is the Partnership for Clear Health Communication sponsored by Pfizer (Pfizer, 2004). The American Nurses Association is one of the 19 partners participating in this coalition that serves health care consumers, healthcare providers, and policymakers in efforts to improve health literacy skills nationally (Partnership for Clear Health Communication, n.d.).

Most recently, interventions directed at improving health literacy skills have been incorporated in elementary and secondary schools. Integrating health education into the school system contributes to improving positive health behaviors of students and may eventually impact the overall health of the community (Joint Committee on National Health Education Standards,
The Joint Committee on National Health Education Standards developed National Health Education Standards and Performance Indicators as, “…the first of several steps in the journey toward health literacy in the United States” (Joint Committee on National Health Education Standards, 1998).

The World Health Organization (WHO) (1998) links the functional component of health literacy to the concepts of empowerment and self-efficacy. Nutbeam (2000) also places strong emphasis on the concept of empowerment in his discussion of health literacy strategies for the 21st century. Providing healthcare information to patients in a way that is clear and understandable is only the first step towards functional health literacy. Healthcare providers must strive to go beyond this basic level of health literacy and move towards helping patients develop the knowledge and skills that they need to manage their own health care. At the highest level, healthcare practitioners should be empowering both individuals and communities to effect social and organizational changes that facilitate community development.

**Consequences Associated with Low Health Literacy Skills**

Low health literacy skills threaten the healthcare status of the individual and the integrity of the entire health care system. Individuals with inadequate health literacy do not actively participate in health prevention activities and consequently may enter the healthcare system late, resulting in fewer treatment options and poorer prognosis. Other consequences of inadequate health literacy for the individual include lack of adequate knowledge regarding healthcare status, non-compliance with care, and an increase risk for hospitalization. These outcomes place considerable financial burdens on the healthcare system nationally.

Weiss, Hart, McGee and D’Estelle (1992) examined the relationship between literacy level and health status among a group of adults enrolled in an adult education program. Stratified random sampling was used to select subjects for the study (n = 193). A tool with established
validity, the Sickness Impact Profile (SIP), was administered orally and utilized to measure physical health, psychosocial health, and overall health status. For the purposes of data analysis, subjects were grouped as follows: those with reading levels at or below grade level 4 and those with reading levels above grade level 4. To test for differences in SIP scores between groups, a general linear model was used; in addition, the researchers adjusted for demographic covariables. Results of the study suggested a relationship among all three components of the SIP and reading level, with the SIP physical score and reading level most significant. Participants with lower reading scores were more likely to report poorer physical health.

Parents seeking care for their children at two university clinics were included in a convenience sample ($n = 646$) in a study conducted by Fredrickson et al. (1995). Participants consented to taking the Wide Range Achievement Test (WRAT) and completing a health behavior survey. The reading levels of parents were four to five grades below highest year of school reported, a finding that has strong implications for healthcare providers relating health care information to these parents.

Recognizing that health literacy involves more than reading, the relationship between functional health literacy and self-reported health and use of health services was the focus of a study conducted by Baker, Parker, Williams, Clark, and Nurss (1997). The TOFHLA was used to measure the functional health literacy of 2,659 subjects seeking care at two urban public hospitals. Findings suggested that subjects with inadequate health literacy reported poorer health than those with adequate health literacy, and contrary to what the researchers hypothesized, health literacy levels were not associated with use of ambulatory care after adjusting for demographic variables. Researchers did note, however, that subjects with inadequate health literacy ratings were more likely to report being hospitalized during the previous year than those with adequate health literacy skills. One of the most important findings was that the study refuted
years of schooling as a valid assessment for determining the relationship between education and health.

Baker, Parker, Williams, and Clark (1998) conducted a study, which sought to identify a relationship between health literacy and risk for hospitalization. Health literacy levels of participants \((n = 958)\) were measured using TOFHLA and results showed that participants with inadequate health literacy were significantly more likely to be hospitalized during the study period than those with marginal or adequate health literacy. Because 92% of participants in the study were African American and 56% lacked any form of health care, the generalizability of this study was limited. This prompted a follow-up cohort study by Baker et al. (1996) that included 3,260 Medicare managed care enrollees, a much larger sample size than the earlier study. As with the previous study, researchers noted that other dependent variables were associated with the risk for hospitalization; however, after adjusting for these variables, researchers discovered that patients with inadequate health literacy were significantly more at risk for hospitalization. Results of both studies also indicated that years of school completed was not a significant predictor of hospital admissions.

Baker et al. (2004) reanalyzed the data from their study conducted in 1994 through 1995 to explore the relationship between inadequate health literacy and use of physician outpatient services. Inadequate health literacy was not a significant factor in the use of outpatient healthcare in this study; however, researchers did discover a higher incidence of emergency room visits among patients with inadequate and marginal health literacy. The researchers questioned whether individuals with inadequate and marginal health literacy substitute emergency room visits for routine outpatient services. Scott, Gazmararian, Williams and Baker (2002) also studies Medicare managed care enrollees to evaluate the use of health prevention services; specifically, the administration of influenza and pneumococcal vaccinations among all participants and
mammograms and Papanicolaou smears among women participants. Data analysis indicated that participants with inadequate health literacy were significantly less likely to participate in all four health prevention activities.

Early entry into the healthcare system for treatment of disease often provides patients with more treatment options and improves health care outcomes. Bennett et al. (1998) explored the relationship between poor literacy skills and the presentation of prostate cancer among low-income black and white men. The health literacy scores of a convenience sample of patients, \((n = 212)\), were measured using the Rapid Estimate of Adult Literacy in Medicine (REALM). Although the findings of the study indicated that black men were more likely to present with advanced-staged prostate cancer, race was not a significant predictor of prostate cancer after adjusting for literacy, age, and city. In fact, both black and white males with low literacy levels were more likely to present with advanced-stage prostate cancer.

In their discussion of health screenings for women, Lindau, Tomori, McCarville, and Bennett (2001) identified low health literacy skills as a primary barrier to healthcare. The authors’ review of the literature indicated that women with low health literacy are less likely to participate in recommended health screenings and are more likely to enter the healthcare system late for treatment of cervical cancer. Lindau et al. (2001) also commented that although the need for low literacy interventions was great, “…most public health efforts to increase screening fail to reach low literacy populations” (p. 320).

To assess the impact of health literacy on screening and care of sexually transmitted infections (STI), Fortenberry et al. (2001) conducted a cross sectional survey of subjects \((n = 809)\) that were recruited from health care clinics, community based organizations, and street intercept. Recognizing the importance of health screenings and timely follow-up for health care with STI’s, the researchers assessed the health literacy of participants using REALM. Personal
interviews, conducted by trained interviewers, provided demographic data and information regarding attitudes and behaviors influencing treatment for gonorrhea. Results of the study indicated that participants with higher REALM scores were more likely to undergo screening for gonorrhea; in fact, the likelihood of undergoing screening increased by 10% with scores at or above 9th grade. It is interesting to note that although participants with lower REALM scores were less likely to participate in screening, they perceived themselves at greater risk for contacting gonorrhea within the next 12 months.

Health literacy as a barrier to adequate knowledge regarding personal health has been investigated in several different areas of health care. Williams, et al. (1995) conducted one of the first groundbreaking studies using the TOFHLA to assess the ability of patients to function within the healthcare system. Eligible participants were enrolled in the study sequentially while awaiting medical care. The study included 2,659 subjects, primarily indigent and minority patients, seeking healthcare at two urban public hospitals. Results of the study indicated that the majority of patients had difficulty with medication administration. Subjects also had difficulty following directions for follow-up appointments.

In the area of women’s health, Gazmararian, Parker, and Baker (1999) explored the relationship between health literacy and knowledge and practices related to family planning. The sample for the study was randomly selected from a list of Medicaid managed care enrollees. The S-TOFHLA was utilized to measure the health literacy levels of 406 women included in the study. Trained interviewers also obtained information on maternal characteristics and family planning knowledge and practices through personal interviews. Significant findings from the study included the following; women with lower literacy skills were more likely to want more information on birth control and women with low literacy skills were unaware of when they were more likely to become pregnant. Results of the study also suggested that low literacy women
were more likely to use an intrauterine device for birth control. This was of special concern to researchers considering the implications of low literacy and consent requirements for this procedure.

Arnold et al. (2001) conducted another women’s health study and examined the relationship between reading level, smoking status, and general knowledge of tobacco effects among pregnant women. Six hundred women were recruited for the study. A questionnaire assessed the tobacco knowledge, attitudes, and practices of the target population. Health literacy levels were measured using REALM. Participants with lower literacy levels demonstrated less knowledge regarding the health hazards related to smoking. It is interesting to note, however, that reading levels were not related to smoking practices.

Kalichman and Rompa (2000) explored the relationship between health literacy and knowledge of HIV and treatments, health care status, and experiences of people living with HIV. Three hundred and thirty-nine participants were recruited for the study. Health literacy was measured using TOFHLA and proved to be a significant factor in a participant’s knowledge of HIV and compliance with treatment regimes. Outcomes of the study indicated that patients with inadequate health literacy experienced poorer health outcomes as evidenced by lower CD4 T-lymphocyte counts, higher viral loads, and higher rates of hospitalizations.

Several studies have investigated the relationship between health literacy and knowledge of chronic disease. Testing the immediate recall of diabetic information, influences of text and reader characteristics on recall, and congruency between patient and physician regarding information needs was the focus of a study conducted by Reid et al. (1995). Recall was low for all subjects \((n = 26)\) who agreed to participate in the study; however, subjects with a high school education or less had significantly less recall than those completing more years of schooling. Only one-third of the patients in the study agreed with physicians on the information that should
be provided to patients about diabetes. Participants rated information related to disease outcomes and treatments as important; physicians placed more importance on the pathophysiology of the disease process.

In a cross sectional survey of 402 patients diagnosed with hypertension and 114 patients with diabetes seeking care at general medical clinics in two different locations, Williams, Baker, Parker, and Nurss (1998) investigated the effects of health literacy on these chronic diseases. Health literacy was assessed using the TOFHLA and participants were also asked to complete basic knowledge questions related to their diagnosis. There was a strong positive correlation between a patient’s TOFHLA score and knowledge of their disease. Patients with inadequate health literacy were unable to differentiate normal blood pressure readings from high blood pressure readings, identify signs and symptoms of hypoglycemia, or identify lifestyle choices appropriate to managing their chronic disease. Gazmararian, Williams, Peel, and Baker (2003) conducted a similar study using Medicare enrollees over the age of 65 as the target population with similar results. Participants with inadequate or marginal health literacy ratings, as measured by S-TOFHLA knew significantly less about their chronic diagnosis and related treatment plans.

Drug therapy, and more specifically, use of inhalers, is a critical component in the management of chronic asthma. To examine the relationship between literacy and asthma knowledge and ability to correctly use a metered-dose inhaler (MDI), Williams, Baker, Honig, Lee, and Nowlan (1998) conducted a study using a convenience sample (n = 469) of asthma patients. The patients were receiving annual follow-up care at an asthma clinic or acute care for an asthma attack at an emergency room. Literacy levels were assessed using REALM and patients’ knowledge of asthma was assessed using an orally administered questionnaire, followed by demonstration of a MDI. There was a direct correlation between literacy level and asthma knowledge in this study after adjusting for several covariants. Although there was a strong
correlation between literacy level and correct use of a MDI, incorrect use of a MDI was prevalent among all literacy groups.

The relationship between literacy level and knowledge of self-care after receiving discharge instructions following orthopedic surgery was the focus of a study by Wilson and McLemore (1997). REALM was used to assess the literacy level of a convenience sample of 26 patients admitted to an acute care facility for hip or knee replacement surgery. Patients participated in a pre-op teaching program that included a variety of teaching formats: written instructions, verbal counseling, and viewing a video. Patients were also provided with written instructions on exercise/activity restrictions following surgery. After written self-care instructions were provided on the day of discharge, a Discharge Teaching Questionnaire (DTQ), for either knee or hip surgery, was administered orally. None of the patients scored 100% on the DTQ, and using Pearson’s product-moment correlation coefficient, no significant relationship between literacy levels and DTQ score was noted. The researchers attributed this finding to the fact that the health care materials utilized in the study exceeded the reading level of participants.

The emergency room was another area for research related to comprehension of discharge instructions. Spandorfer, Karras, Hughes, and Caputo (1995) measured literacy levels of 217 subjects using the Wide Range Achievement Test (WRAT). Subjects were enrolled consecutively in the study after being discharged from the emergency room during 12 six hour time frames. Data analysis after completing a logistic regression analysis revealed that the WRAT score was the only variable that significantly affected reading comprehension of discharge instructions. Low literacy scores were associated with decreased comprehension of discharge instructions. Despite the fact that the mean reading ability of participants was recorded at a 6th grade level and the readability level of written instructions was eleventh grade, the mean comprehension scores, according to criteria established for the study, indicated that patients
demonstrated a good understanding of the intent of the instructions. Researchers attributed this finding to supplemental oral instructions provided by the emergency room physicians.

Low health literacy levels have also been linked to decreased compliance with health care treatments and poor clinical outcomes. Kalichman, Romachandran, and Catz (1999) sought to determine the significance of health literacy relative to other predictors of compliance with HIV-AIDS drug therapy. The researchers analyzed data on 184 patients recruited for the study, who were receiving three antiviral drugs for the treatment of HIV-AIDS. The health literacy of participants was measured using TOFHLA; participants also agreed to complete a health and treatment interview that provided demographic data, information on health status, and treatment compliance. Patients with lower health literacy scores were four times more likely to report skipped doses of antiviral medication, lower CD4 T lymphocyte counts, and higher viral loads.

Breast cancer is one of the leading health care problems affecting women in the United States. Li et al. (2000) examined compliance with standard breast-conservation therapy (BCT) and clinical outcomes among 55 minority women with early stages of breast cancer. Compliance with BCT was defined as completion of the entire course of radiation therapy and clinical follow-up. Researchers reported that because of the small sample size, no statistical correlations between compliance and educational level was noted; however, they did observe a trend suggesting lower literacy levels correlated with lower BCT compliance.

The focus of a study conducted by Kaufman, Skipper, Small, Terry, and McGrew (2001) was the effect of functional health literacy on the initiation and continuance of breast-feeding among 61 first time mothers aged 18 years or older. All women that volunteered for the study had an infant between the ages of 2 and 12 months and were receiving care from a public health unit. Literacy screening was conducted using REALM and participants were divided into two groups: those who breast-fed only during the first two months postpartum and those that did not
breast-feed or did not exclusively breast-feed for the first two months postpartum. Two levels of literacy were identified among participants in the study, seventh to eighth grade level and high school level. A statistically significant correlation was found between literacy levels and breast-feeding during the first two months postpartum; women with higher literacy levels were more likely to breast-feed exclusively.

Self-management of diabetes is becoming more complex. Patients are expected to perform blood sugar self-testing at least daily, make judgments regarding insulin dosing, and self-administer insulin. All of these skills require a minimal level of health literacy. These expectations prompted Schillinger et al. (2002) to examine the relationship between health literacy and clinical outcomes related to diabetes among 408 patients diagnosed with type 2 diabetes. S-TOFHLA measured the health literacy of participants and was treated as the dependent variable. Two independent variables were established for the study, plasma hemoglobin A\textsubscript{1c} (HbA\textsubscript{1c}) and self-reported diabetes complications. After adjusting for sociodemographic variables and established diagnostic and treatment factors, research findings indicated that patients with inadequate health literacy were significantly more likely to have poor glycemic control. In addition, patients with inadequate literacy were more likely to report problems with diabetic retinopathy.

Three studies were conducted to explore the relationship between low health literacy and healthcare costs. An early study conducted by Weiss et al. (1994) suggested that low literacy levels do not significantly contribute to higher healthcare costs; however, this was disputed in a later study conducted by Weiss and Palmer in 2004. Weiss et al. (1994) obtained a random sample \((n = 402)\) selected from a roster obtained from a large Medicaid provider. Subjects provided demographic data and underwent literacy testing conducted by trained personal. The tests were conducted in English or Spanish using the Instrument for the Diagnosis of Reading
Medical charges were measured over a period of one year using data collected from a computerized billing system. Medical charges ranged from zero to $95,002.10 with charges distributed across all reading levels. The results of the study suggest no statistical relationship between reading levels and Medicaid charges, a finding the researchers indicated may be have been related to the fact that low literacy adults may seek out medical services less frequently. This may be due to lack of information regarding available resources, poor access to healthcare, preferences for alternative therapies, or lack of self-empowerment. A limitation of the study was that subjects were not separated by eligibility categories, and many in fact were relatively healthy young females seeking medical care for pregnancy and childcare.

The follow-up study conducted by Weiss and Palmer (2004) randomly selected 18% of the sample population from the original study after excluding those enrolled because of pregnancy. The methodology for the follow-up study was similar. IDR was utilized for literacy testing and medical costs were totaled over a period of one year. Unlike the previous study in which individual grade levels categorized the subjects, two levels of reading categorized subjects in this study. Low-level readers included subjects with reading levels at or below grade 3. Subjects testing at or above a grade 4 reading level were categorized as high-level. The results from the T-test suggested that low-level readers had significantly higher medical costs. In addition, results of the multivariable analysis indicated that reading level was a significant predictor of medical costs.

**Health Literacy Screenings**

The most frequent method utilized by healthcare providers to assess the literacy levels of patients seeking healthcare is to determine the number of years of schooling completed. Several studies have compared results from valid literacy screening instruments to years of school completed and results indicate that individuals read at least two grade levels below the literacy
assessment score, while some may read as much as four to five grade levels below (Baker et al., 2002; Davis et al., 1993; Doak & Doak, 1980; Fredrickson et al., 1995; Kirsch et al., 1993; Murphy, Chesson, Walker, Arnold, & Chesson, 2000; Parker, Baker, Williams, & Nurss, 1995; Williams et al., 1995; Wilson & McLemore, 1997). Many advocated that health literacy screening is the best way for healthcare providers to plan and implement healthcare teaching (Brooks, 1998; Davidhizar & Brownson, 1999; Devereux, 2004; Doak, Doak, & Root, 1996, Erlen, 2004; Harris, 1998; Murphy & Davis, 1997; National Work Group on Literacy and Health, 1998; Treacy & Mayer, 2000). Several screening tools are available for use by healthcare providers; while some are more practical than others in the healthcare setting, most have been utilized in health literacy research. Instruments measuring literacy skills fall into two categories, word recognition tests and comprehension tests (Davis, Michielutt, Askov, Williams, & Weiss, 1998).

The TOFHLA is a comprehension health literacy test designed to test both reading comprehension and numeracy and is available in both English and Spanish. It has been used extensively in research and takes about 22 minutes to administer (Mika, Kelly, Price, Franquiz, & Villarreal, 2005; Weiss, 2003) Several pilot studies conducted by Parker et al. (1995) have confirmed both the content validity and reliability of the instrument. The S-TOFHLA takes about 7 minutes to administer (Baker, Williams, Parker, Gazmararian, & Nurss, 1999; Mika et al., 2005) and may be more practical for screening purposes in health care settings (Hartsell, 2005). The reliability and validity of the S-TOFHLA was confirmed by Baker et al. (1999).

During the administration of both the long and short version of TOFHLA patients are provided with healthcare information in some format, such as a prescription drug label or medical consent form. They were then asked to respond to questions that assessed their
understanding of the materials (Mika et al., 2005; Weiss, 2003). Results are then categorized as inadequate, marginal, and adequate.

Several word recognition tests are available: the Wide-Range Achievement Test (WRAT-R 3), the Peabody Individual Achievement Test-Revised (PIAT-R), the Slosson Oral Reading Test (SORT-R), the Cloze Test, and the Rapid Estimate of Adult Literacy in Medicine (Davis, Michielutte et al., 1998; Doak, Doak, & Root, 1996; Foltz & Sullivan, 1998; Weiss, 2003). Early research in health literacy utilized several of these methods; however, the REALM screening instrument has predominated the field because the short version of this instrument can be administered quickly by healthcare providers. This is a strong advantage considering the multiple demands placed on their time (Foltz & Sullivan, 1998; Hartsell, 2005; Murphy & Davis, 1997). Doak, Doak, and Root (1998) outline the advantages of REALM over WRAT-3 from the patient’s perspective, “…it is more likely to be accepted by patients in a health care setting because it uses medical and health-related words” (p. 32).

Healthcare providers can utilize the REALM to help identify patients who have difficulty understanding common terms used during healthcare teaching. The short version requires patients to read 66 commonly used medical terms and word difficulty increases as the test progresses (Davis, Long et al., 1993). This instrument has more practical application than the original 125 word screening instrument and can be administered in two to three minutes (Davis. Long et al., 1993). Two disadvantages of the instrument are that it is currently not available in Spanish, and the tool tests word recognition only, not comprehension or numeracy skills (Foltz & Sullivan, 1998; Hartsell, 2005; Weiss, 2003).

Davis, Long et al. (1993) conducted a study to examine the validity of the short version of REALM. Researchers used a convenience sample \( n = 203 \) of indigent and low-income patients waiting to see a physician at four public university hospitals. Trained research assistants
administered reading tests after written consent was obtained and confidentiality of test results assured. Pearson product-moment correlation coefficients were calculated to determine the criterion validity of the shorten version of REALM with three standardized reading tests: SORT-R, the reading recognition sections of the Peabody Individual Achievement Test-Revised (PIAT-R), and the Wide Range Achievement Test-Revised (WRAT-R). There proved to be a highly significant correlation between REALM and all three standardized tests. Davis, Long et al. (1993) also reported that the test experience was viewed as positive by both patients and clinicians. Foltz and Sullivan (1998) concurred with these comments, pointing out that the written instructions that accompany the instrument may help to quell fears associated with poor reading skills.

The prevalence of low literacy rates in the United States underscores the need for nurses to conduct some form of health literacy assessment with patients before providing healthcare information (Foltz & Sullivan, 2005; Hartsell, 2005; Murphy & Davis, 1997;). Unfortunately, many factors serve as obstacles to completing a thorough health literacy assessment. Of the estimated 90 million adults scoring within the two lowest literacy levels, most do not perceive themselves to be “at risk” (Kirsch et al., 1993). In fact, the majority of adults in the two lowest literacy levels described their ability to read or write English as “well” or “very well” (Kirsch et al., 1993).

Baker et al. (1996) conducted a qualitative study to determine the difficulties that patients with low literacy skills have interacting within the healthcare system and to identify coping skills used to handle these problems. Sixty patients from two hospitals participated in the study: 47 were black, 12 were Latino, and one was white. Low literacy levels of participants were confirmed though use of the REALM screening tool. Forty-nine subjects participated in 10 separate focus group sessions and the remaining 11 were interviewed individually (Baker et al,
Six themes emerged, “A dominant theme occurring throughout all of these was the tremendous shame patients with low literacy felt about their reading difficulties” (Baker et al., 1996, p. 330). The feeling of shame contributed to intimidation during interactions with healthcare providers, “…making them less likely to ask questions or admit they do not understand” (Baker et al., 1996, p. 331). Most patients did not relay that they had reading difficulties, some because of embarrassment, and others because they did not feel this would be of interest to their healthcare provider (Baker et al., 1996).

Parikh, Parker, Nurss, Baker, and Williams (1996) examined the relationship between shame and low health literacy in the healthcare setting. The researchers hypothesized that shame would deter low literacy patients from admitting reading difficulties. The study was conducted at a large acute care public hospital in Atlanta, Georgia. A total of 202 patients were included in the study; the majority of participants were African American. Participants completed a demographic survey and TOFHLA. They then answered questions related to difficulty reading and shame conducted through one on one interviews with a trained research assistant. Only two-thirds of participants with low literacy skills in the study admitted they had trouble reading. For some, this was the first time that they acknowledged poor reading skills and the shame associated with illiteracy (Parikh et al., 1996). In fact, two-thirds of these participants had never told their spouse, one-half of these participants had never told their children, and 19% of these participants had never before told anyone including those who were providing health care about their difficulty reading (Parikh et al., 1996). The Committee on Health Literacy established by the Institute of Medicine identified the shame and stigma associated with limited literacy as a major barrier to improving health literacy (Committee on Health Literacy of the Institute of Medicine, 2004).
The purpose of the exploratory study conducted by Brez and Taylor (1997) was to gain an understanding of the response of patients with low literacy skills to screening of reading ability conducted in acute care settings for the purposes of planning patient teaching. One theme identified by the researchers was the support for literacy screening. Overall, patients agreed that nurses and doctors should be aware of a patient's reading ability because they felt that this information would improve communication between patient and healthcare provider. This support for screening was complicated, however, by a second theme that emerged, the risk of exposure. Participants expressed some conflict regarding the stigmas associated with illiteracy and their willingness to disclose reading difficulties. Consequently, participants felt that healthcare providers should initiate literacy screenings since most patients, they related, would not provide this information voluntarily. Some also expressed emotional discomfort during testing and commented on the importance of conducting screenings in a non-threatening manner. Healthcare providers performing literacy screenings should be sensitive to the stigmas associated with illiteracy and ensure privacy during testing as well as confidentiality of results.

Weiss (2003) provided several assessment clues to clinicians to help them recognize patients with low literacy levels: incomplete forms, non-compliance with treatment regimes, missed appointments, and inability to verbalize basic information related to healthcare status and treatment plan.

Providing Information to Individuals with Low Health Literacy Skills

Although written health care materials are used extensively in a variety of clinical settings, several research studies indicate that the readability level is not appropriate for the average patient seeking healthcare (Brock, Williams, & Beauchesne, 2000; Cotugna, Vickery, & Carpenter-Haefele, 2005; Davis, Crouch, Wills, Miller, & Abdehou, 1990; Fagerlin et al., 2004; French & Larrabee, 1999; Larson & Schumacher, 1992; Ledbetter, Hall, Swanson, & Forrest,
In fact, findings from these studies indicate that most healthcare materials exceed the 5th grade reading level recommended by the National Work Group on Literacy and Health (1998) by several grade levels.

Several experimental studies have been conducted in an attempt to provide healthcare providers with information on the most effective methods for providing healthcare information to patients with low literacy skills. Hussey (1994) used a convenience sample (n = 80) of adults 65 years of age and older to examine the effects of two different teaching methods on medication knowledge and compliance. Participants’ baseline knowledge of medication was tested using the Medication Knowledge and Compliance Score (MKCS). Subjects were alternatively assigned to one of two groups: group one received verbal medication instructions only, and group two received verbal instruction plus an individualized Picture Schedule design for the study. Results of dependent t-tests indicated that knowledge and compliance with medications increased among participants in both groups; however, multiple regression analysis indicated that the Picture Schedule did explain more variance in medication compliance among participants with lower medication compliance scores.

Meade, McKinney, and Barnas (1994) conducted a study to evaluate the effectiveness of printed or videotaped information when presenting information about colon cancer. The study included 1,100 patients who were randomly assigned to one of three experimental groups: control, booklet, or videotape. A pre-test was administered to assess the baseline knowledge of colon cancer. Results of the study indicated that there was no statistically significant difference in post-test scores among the three treatment groups. The researchers commented that these
results may in part be do to the fact that all forms of instruction reflected the learning needs and cultural preferences of the target population.

Murphy, Chesson, Walder, Arnold, and Chesson (2000) conducted a study that also compared the effectiveness of written material versus videotape among patients with sleep apnea. A smaller sample size was used ($n = 96$); however, participants were randomly assigned to experimental groups. Videotapes significantly improved comprehension of patient understanding of sleep apnea in only two areas. In fact, results of the study suggest that low level readers had difficulty with both teaching methods and commented that both materials should included fewer polysyllabic words and more personal communication reflecting cultural preferences.

Two studies focused on the impact of illustrations on knowledge comprehension and reader preference. Michielutte, Bahnson, Dignan, and Schroeder (1992) compared two brochures on cervical cancer and condyloma. A bulleted text brochure written at a 7.7 grade level was compared with a narrative style brochure that included illustration written at an 8.4 grade level. Although no significant differences were noted in ease of reading between the two brochures, findings did indicate that the brochure with illustrations received a significantly higher overall rating from all participants. In addition, reading comprehension of low-level readers was significantly higher when illustrations were used with narrative text.

Austin, Matlack, Dunn, Kesler, and Brown (1995) also conducted a study to exam the effectiveness of illustrations. Patients seeking healthcare from an emergency room in a rural hospital were randomly assigned to two experimental groups ($n = 101$): one group received only written discharge instructions, while the second group received written discharge instructions with illustrations. Results indicated that participants reading the discharge instructions with illustrations had statistically higher comprehension scores than those who received text only
instructions; this was especially true for those patients with an educational level below 12\textsuperscript{th} grade.

Davis, Fredrickson et al. (1997) compared two pamphlets on polio immunization; one developed by the CDC and an easy to read pamphlet developed by researchers at Louisiana State University (LSU). Both pamphlets were written at a 6\textsuperscript{th} grade level. The LSU pamphlet included fewer words, instructional graphics and use of color. The LSU pamphlet was also developed with input from members of the target population. Overall, participants ($n = 610$) indicated a significant preference for the LSU pamphlet because it was colorful, contained illustrations, was easy to read, and had a question-answer format. Findings of the study also suggested that those participants with a 7\textsuperscript{th} or 8\textsuperscript{th} grade reading level who read the LSU pamphlet achieved significantly higher reading comprehension scores than participants with the same reading level who read the CDC brochure. However, among participants with lower reading levels (0-3\textsuperscript{rd} grade and 4\textsuperscript{th} – 6\textsuperscript{th} grade), the LSU brochure did not prove to increase comprehension. These findings suggested that many patients might have difficulty comprehending written materials even when written at recommended reading levels.

Patients receiving a low literacy brochure on pneumococcal vaccines were four times more likely to discuss the vaccine with their physician and five times more likely to receive the vaccine (Jacobson et al., 1999). The results of study suggested that low literacy literature could initiate discussion between patient and physician and engage patients in decisions regarding their health care.

Wydra (2001) conducted a study to examine the effectiveness of an interactive multi-media program on self-care management of cancer symptoms to determine if patients with low-literacy skills would benefit from a computer assisted program. Pre-and post-tests measured knowledge of cancer symptom self-management among participants ($n = 174$) who were
randomly assigned to a group viewing the interactive multi-media program and the control group that received standard instructions. In addition to providing symptom control content, the interactive multi-media program provided instructions on how to use the computer. All subjects in the experimental group, regardless of literacy level, demonstrated significant improvement in the ability to self-manage cancer symptoms.

The Committee on Health Literacy of the Institute of Medicine (2004) states that, “Culture gives significance to health information …” (p. 9). This idea is widely supported in the literature (Curry, Hogstel, Davis, Frable, 2002; Cutilli, 2005; Davis, Long et al., 1998; Davis, & Frable, 2002; Dreger & Tremback, 2002; Feifer, 2003; Harris, 1998; Mayeaux et al., 1996; Meade, McKinney & Barnas, 1994; Murphy et al., 2000; The American Academy of Pediatrics, 2004; The National Work Group on Literacy and Health, 1998; Treacy & Mayer, 2000). Using the work of Paulo Freire as a conceptual framework for developing health care information materials, Rudd and Cummings (1994) advocate, “… involving the learners early and at every stage in the process.” (p. 325) The authors believe that this involvement will engage the individual in the learning process, ensure that information is relevant to the learner, and promote empowerment for health.

Recognizing the potential impact that a community member may have on another, Bill-Harvey et al. (1989) conducted a study to determine the effectiveness of a program on osteoporosis conducted by trained community members for low-income older adults. Results of the study indicated that the program was positively received among the target population and knowledge and attitudes concerning osteoporosis significantly improved among participants. Curry et al. (2002) also conducted a community- based intervention on osteoporosis including a convenience sample of 188 women ranging in age from 40 to 96 years. Knowledge of osteoporosis increased among all participants and the majority of women indicated that they
intended to use the knowledge presented in the program. It is also significant to note that the majority of participants received the program positively.

Twenty-eight adults enrolled in an adult basic education program for reading were asked to provide input for a nutrition curriculum in a study conducted by Murphy et al. (1996). All participants read at or below a 6th grade reading level and were black with a mean age of 26. Baseline knowledge of nutrition was assessed using REALM. After participating in the program participants demonstrated a significant increase in knowledge related to food measurement, portion sizes, and ability to read labels. The researchers attributed the increase in knowledge of nutrition to the input provided by participants into the curriculum design.

Howard-Pitney, Winkleby, Albright, Bruce, and Fortmann (1997) compared the Stanford Nutrition Action Program (SNAP) to an existing nutrition program offered at a vocational training site. The SNAP program was, “…tailored to the cultural, economic, and learning needs of low-literacy, low-income adults …” (p. 1971) and significantly improved nutritional behaviors among participants in this group when compared to the existing curriculum.

Davis, Berke. et al. (1998) examined the effectiveness of three approaches for mammography screening. Participants \( n = 445 \) 40 years of age and older were randomly assigned to one of three interventions. Group 1 received a personal recommendation to undergo mammography screening. Group 2 received a personal recommendation and a low-literacy culturally appropriate brochure on mammography. Group 3 was given a personal recommendation, low-literacy culturally appropriate brochure, and participated in an interactive motivational group session designed in collaboration with women from the target group and conducted by a peer educator. Participants in Group 3 received significantly more mammograms in the first three months of the study than participants in the other two groups. However, after 2 years there was no significant difference in mammography screening between the three groups.
suggesting the need for more frequent interventions in addition to providing culturally sensitive interventions.

Rudd et al. (2004) developed a Community Asthma Program to improve the knowledge and awareness of community members in an urban area. An outcome of this community health intervention included a glossary of asthma terms developed with input from community members. The glossary was well received within the community and was measured as “superior” by the Suitability Assessment of Reading Materials (SAM) developed by Doak, Doak and Root (1996).

Suggestions for developing written healthcare information are provided by Doak, Doak, and Root (1996). These suggestions are outlined as follows:

1. Identify and receive input from the target audience to ensure that material is culturally relevant and appropriate.
2. Avoid symbols and technical jargon.
3. Provide examples for medical terms that are difficult to understand.
4. Limit the message to three or four main ideas; present the most important information in the beginning.
5. Font size should be between 12 and 14.
6. Use fonts with serifs, avoid fancy or script lettering, and avoid using all capital letters.
7. Use dark letters on light paper.
8. Provide ½ to 1 inch white space.
9. Use active voice.
10. Include some form of interaction with the reader, for example short questions that require short written answers.
Two methods used in research to determine the reading level of healthcare information include the McLaughlin’s SMOG formula and the Fry method. Doak, Doak, and Root (1996) and the Office of Communication at the Center of Disease Control (CDC) (1998) recommend that healthcare providers assess the readability level of written materials provided to patients using the Fry method. The Fry method is a systematic approach to calculating the reading level of written information conducted by counting the number of syllables and sentences from three passages within the document.

The Flesch-Kincaid Grade level score or Flesch Reading Ease score are also available on Microsoft Word and can quickly provide health care providers with the reading level of healthcare information. It is important to note, however, that these programs may not be as accurate as the Fry method and should only be used as an estimate of reading level (CDC, 1998; Doak, Doak, Root, 1996).

Although assessing the reading level is critical, it is not the only criteria that should be used by healthcare providers to determine the appropriateness of healthcare information for a target population (CDC, 1998; Doak, Doak, & Root, 1996). The Suitability Assessment of Materials (SAM) developed by Doak, Doak, and Root (1996) is an instrument that includes six criteria for rating the appropriateness of healthcare information: content, literacy demand, graphics, layout and typography, learning stimulation, motivation, and cultural appropriateness. Each criterion is scored, totaled, and then converted to a percentage rating. After determining the percentage rating, the healthcare information is categorized as superior material, adequate material, or not suitable material.

There is strong support in the literature for obtaining feedback from patients, referred to by some as the “teach-back” method, to verify understanding of healthcare information (Brooks,
1998; Davis, Meldrum, Tippy, Weiss, & Williams, 1996; Devereux & Porche, 2004; Doak, Doak, & Root, 1996; Dreger & Tremback, 2002; Erlen, 2004; Fiefer, 2003; Larson & Schumacher, 1992; Mayeaux et al.1996; Meade, Byrd, & Lee, 1989; Murphy & Davis, 1997; Schloman, 2004; Schwartzberg, 2002; Weiss, 2003) This technique assists healthcare providers to evaluate a patient’s understanding of health care information by simply asking the patient to repeat the information back verbally or perform a return demonstration.

**Summary**

Research findings support that a large number of individuals seeking healthcare have low health literacy skills. These findings also indicate that low health literacy skills are linked to poor knowledge of health, poor health care outcomes, an increased risk for hospitalization, and higher healthcare costs. The literature overwhelmingly supports the need for nurses to develop competency in both health literacy assessment and interventions; yet, the researcher could not find any studies that have investigated the preparation of baccalaureate nursing students in health literacy or the relationship between selected variables and health literacy knowledge. Data regarding the knowledge and experiences of senior level baccalaureate nursing students related to health literacy is severely lacking in the literature and serves as the basis for the primary purpose of this study.
CHAPTER 3

METHODOLOGY

Population

The census population for this research study was senior level baccalaureate nursing students enrolled in the last semester of required clinical courses in a school of nursing (SON). A SON is defined as a four-year accredited baccalaureate nursing program at a state university in Louisiana. The following state universities in Louisiana offer a baccalaureate nursing degree and were asked to participate in this research study:

1. Grambling State University
2. Louisiana State University Health Science Center
3. McNeese State University
4. Nicholls State University
5. Northwestern State University
6. Southeastern Louisiana University
7. Southern University-Baton Rouge
8. University of Louisiana Lafayette
9. University of Louisiana Monroe

Approval for implementation of this study was obtained from the Louisiana State University Institutional Review Board for Human Subject Protection (LSU IRB) prior to initiation. The study was granted exempt status approval #3259 (Appendix A).

Seven SON Administrators were initially contacted and informed of the research study by telephone. The remaining two SON administrator were contacted by email. A total of eight SON Administrators agreed to participate in the study. One SON Administrator thought it was in the best interest of the students enrolled in the program not to participate in the study. The researcher
provided documentation of LSU IRB approval to each institution. In addition, five SON Administrators required approval from their institution’s Institutional Review Board for Human Subject Protection (IRB) Committee before consenting to participate in the study (Appendix B).

After receiving permission to proceed with the study from the SON Administrator, the name and contact number of a senior level faculty member was obtained. The senior level faculty member assisted the researcher in establishing the population frame for the research study by providing the number students enrolled in their last semester at their SON. The population frame for the study consisted of 395 last semester senior nursing students enrolled at the eight schools of nursing participating in the study between the Spring 2006 and Fall 2006 semesters.

**Instrumentation**

The Health Literacy Knowledge and Experience Survey (HL-KES) was created for the purposes of this study following a review of the literature that indicated that there was no existing instrument available that would be appropriate for gathering the data required for this study. There are three sections included in the instrument: health literacy knowledge, health literacy experiences, and demographic data (Appendix C).

Five content experts evaluated the content validity of the HL-KES. A physician, nationally recognized as a leading expert in the field of health literacy, and a member of the Interagency Task Force on Health Literacy in Louisiana, served as a content expert. One of the five content experts also included a Professor in the Department of Internal Medicine and School of Public Health at a state university in Louisiana who is also serving as the Director of the Office of Medical Education Research and Development and the Director of the Academy for the Advancement of Education Scholarship. The remaining three content experts are Registered Nurses with doctoral degrees and expertise in the areas of: public health, nursing education, and
health issues among migrant farm workers. Two of these nurses also served on the Interagency Task Force on Health Literacy in Louisiana.

Part 1 of the HL-KES originally consisted of 30 multiple-choice items. The weighted importance of the content areas for test construction was derived from the review of the literature. Bloom identified six cognitive levels moving from simple to complex that can be utilized to categorize test items (Nilson, 1998). The first three cognitive levels identified by Bloom: knowledge, comprehension, and application were utilized for test construction. The researcher did not develop questions at the analysis, synthesis, and evaluation level since it was anticipated that these were intellectual behaviors beyond those expected of a senior level baccalaureate nursing student in the area of health literacy. Application questions addressing the content areas of health literacy screening, guidelines for presenting health care information, and evaluating the effectiveness of healthcare information were included in the HL-KES since these are skills that senior level baccalaureate nursing students are expected to perform upon entry into nursing practice. Table 1 presents the content areas included in Part 1 of the HL-KES.

Table 1. Content Area, Number of Test Items, and Cognitive Level for Part 1 of the Health Literacy Knowledge and Experience Survey.

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Number of Test Items</th>
<th>Cognitive Level&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines for Presenting Written Healthcare Information</td>
<td>11</td>
<td>5 2 4</td>
</tr>
<tr>
<td>Basic Facts on Health Literacy</td>
<td>6</td>
<td>4 2</td>
</tr>
<tr>
<td>Health Literacy Screening</td>
<td>6</td>
<td>2 2</td>
</tr>
<tr>
<td>Consequences Associated with Low Health Literacy</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Evaluating the Effectiveness of Healthcare Information</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<sup>a</sup>Bloom’s Cognitive Levels (Nilson, 1996). Only three levels of Bloom’s Taxonomy were used in this study.
Part 2 of the HL-KES was designed to elicit information related to the health literacy experiences of the participant while enrolled in a SON. Nine questions specifically related to a participant’s experiences in conducting health literacy screenings and presenting healthcare information were developed for this section. Students were asked to respond to the questions using a four point likert-type scale (Appendix C).

Demographic data were collected in Part 3 of the HL-KES. Seven variables were included in this section: gender, age, ethnicity, prior educational experiences, certifications, grade point average (GPA), and the frequency of interaction with healthcare providers for their own personal healthcare needs or the healthcare needs of a significant other.

A panel of five content experts was contacted by email to establish the content validity of Part 1 and Part 2 of the HL-KES. Initially, Part 1 of the HL-KES consisted of 30 questions and Part 2 consisted of a nine-items. The content experts were instructed to rate each item using a four point scale: (1) not relevant, (2) fairly relevant, (3) relevant, or (4) very relevant (Appendix D). Rubio, Berg-Weger, Tebb, Lee, and Rauch (2003) recommend analyzing the content expert’s ratings by calculating the content validity index (CVI). This is accomplished by first calculating the CVI of each item then determining the CVI of the instrument. The CVI of each item was calculated by counting the number of experts who rated the item as (3) or (4), using the scale above, then dividing that number by the total number of content experts evaluating the instrument. A CVI rating of 1.0 was calculated for 28 items. The CVI rating for the remaining two items was .80. The CVI for the instrument was then determined by averaging the CVI across all items. A CVI of .80, as recommended by Davis (1992) was the standard used to confirm content validity. The HL-KES had an overall CVI rating of .98. These results indicate that there was 98% agreement among content experts on the content validity of the instrument.
The content experts were also requested to comment on the syntax of the items included on the survey as well as the overall format of the survey. This feedback prompted the researcher to delete one item from the instrument and make editorial changes in the stems and distractors of several items prior to the distribution of the survey for the pilot study.

The pilot study was conducted with junior level baccalaureate nursing students enrolled in a SON participating in the research study with permission of the SON Administrator and the institution’s IRB. A member of the nursing faculty assigned to junior level nursing students at the SON was contacted by email and a date, time, and location was scheduled to conduct the pilot study. The researcher distributed a cover letter required by the institution’s IRB committee (Appendix E), a copy of the HL-KES pilot survey, and a number two pencil to each student present at the beginning of a scheduled class session. After receiving a brief description of the purpose of the study and directions for completing the HL-KES, students were also guaranteed anonymity, reassured that completing the HL-KES would have no influence on any of their course grades, and informed that completion of the survey indicates informed consent for participation in the pilot study. Fifty-eight junior level baccalaureate nursing students were present when the survey was distributed and 57 agreed to participate in the pilot study by submitting a completed survey.

The time required for participants to complete the pilot test ranged between 15 to 20 minutes. Following completion of the survey participants were also asked to complete the HL-KES Pilot Study Evaluation Tool (Appendix F). Fifty-seven students participating in the pilot study responded to at least one item on the Health Literacy Knowledge and Experience Survey Pilot Study Evaluation Tool. Twenty-eight students commented that the readability of the survey was “good”, “easy to read”, or “OK”; however, eight students commented that it was “wordy” or “too long”, and five students commented on their lack of knowledge about the content. Thirty-
seven students indicated that they had no difficulty with the directions on the survey, one student commented that the directions were “long”, and another indicated that the directions were “wordy”. Fifteen students indicated that the length of the survey was “OK”; however, 29 students indicated that the survey was “too long”.

After data collection for the pilot study was completed an item analysis on the knowledge section of the instrument was conducted. The item analysis included calculation of item discrimination indices and item difficulty indices. Items with an item difficulty index below .30 and greater than .70 (McDaniel, 1974) and an item discrimination index less than 0.19 (Ebel, 1972) were reviewed. The data from the pilot study was also analyzed in light of the feedback from the content experts. Several of the item stems and item distractors were revised in an effort to provide more clarity and improve the quality of the survey item. These revisions were also made in an effort to reduce reading time required to take the survey. The final draft of the HL-KES utilized for data collection can be viewed in Appendix C.

Data Collection

After receiving permission to proceed with the study from the SON Administrator, the researcher scheduled a date, time, and location to distribute the HL-KES with senior level nursing faculty at each SON. All students participating in the study were enrolled in the last semester of required nursing courses.

Data collection took place during the Spring, Summer, and Fall semesters of 2006. All senior level baccalaureate nursing students had completed a community health clinical experience. The enrollment in baccalaureate nursing programs at the eight institutions agreeing to participate in the study ranged from 26 to 68 students. The HL-KES was distributed at the beginning of a scheduled class session at five of the eight schools of nursing participating in the study. Two schools of nursing had oral presentations scheduled on the date designated for
distribution of the HL-KES. The researcher felt that it was in the best interest of the students to distribute the HL-KES after the oral presentations were completed. In another SON the senior level faculty member scheduled the HL-KES survey to be distributed on the last day of class and notified the researcher on the scheduled day that the students were taking a test on that day. The researcher felt it was in the best interest of the students to distribute the survey after the students completed the test since students were scheduled to return to class following the test. In both cases there was over 60 minutes of class time remaining; which was more than sufficient time needed to complete the HL-KES based on results of the pilot study. It is significant to note that the senior level faculty member administering the test did not feel that it was a major stressor to any student since no one was in jeopardy of failing the class.

The researcher distributed the HL-KES at seven of the eight universities participating in the study. At one university, due to a scheduling conflict, the senior level faculty member served as a research assistant and distributed the HL-KES. The faculty member was instructed to read the HL-KES Introduction and Directions to students (Appendix C). On the day scheduled for data collection several events occurred that distracted the students in the classroom environment and led to the distribution of surveys prior to the scheduled oral presentations instead of following the oral presentations as originally planned. Consequently, only 23 out of 60 students were able to participate in the study on that day. The researcher scheduled a second date for data collection the following week because of the low rate of participation from this SON. Oral presentations were also scheduled on this day; however, distribution of the HL-KES took place after the presentations as originally planned. Students were instructed not to take a survey if they had completed one the previous week and an additional 23 students agreed to participate in the study on that day. The school enrollment and level of student participation at each SON participating in research study is presented in Table 2.
Table 2. The School of Nursing (SON) Enrollment, Absences at Data Collection, and Level of Participation in the Health Literacy Knowledge and Experience Survey (HL-KES).

<table>
<thead>
<tr>
<th>School of Nursing</th>
<th>N&lt;sup&gt;a&lt;/sup&gt;</th>
<th>n&lt;sup&gt;b&lt;/sup&gt;</th>
<th>n&lt;sup&gt;c&lt;/sup&gt;</th>
<th>n&lt;sup&gt;d&lt;/sup&gt;</th>
<th>n&lt;sup&gt;e&lt;/sup&gt;</th>
<th>n&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Louisiana Lafayette</td>
<td>68</td>
<td>3</td>
<td>63</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Southeastern Louisiana University</td>
<td>65</td>
<td>6</td>
<td>42</td>
<td>4</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Louisiana University Health Science Center</td>
<td>60</td>
<td>5</td>
<td>51</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Northwestern State University</td>
<td>57</td>
<td>0</td>
<td>50</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>University of Louisiana Monroe</td>
<td>44</td>
<td>1</td>
<td>40</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Nicholls State University</td>
<td>38</td>
<td>1</td>
<td>35</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>McNeese State University</td>
<td>37</td>
<td>3</td>
<td>32</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grambling State University</td>
<td>26</td>
<td>2</td>
<td>23</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>395</td>
<td>21</td>
<td>336</td>
<td>21</td>
<td>4</td>
<td>13</td>
</tr>
</tbody>
</table>

<sup>a</sup> The number of senior level nursing students enrolled in a SON.

<sup>b</sup> The number of senior level nursing students absent on the designated date for data collection at a SON.

<sup>c</sup> The number of senior level nursing students completing Part 1, 2, and 3 of the HL-KES at a SON.

<sup>d</sup> The number of senior level nursing students completing Part 1 and 2 of the HL-KES at a SON

<sup>e</sup> The number of senior level nursing students completing Part 1 only of the HL-KES at a SON.

<sup>f</sup> The number of senior level nursing students refusing to participate in the HL-KES at a SON.

Students present on the date and time scheduled for data collection were provided with all supplies required to complete the survey, the survey instrument and a number two pencil.

Students enrolled at one SON also received a cover letter with the HL-LES as required by the institutions’ IRB (Appendix E). After receiving a brief description of the purpose of the study and directions for completing the HL-KES, students were also guaranteed anonymity, reassured
that completing the HL-KES would have no influence on any of their course grades, and informed that completion of the survey indicated informed consent for participation in the research study (Appendix C).

**Data Analysis**

Data entry and analysis were conducted using SPSS. The data collected for this study were statistically analyzed as described for each research question listed below.

Research Question 1 sought to answer the question, what are the selected characteristics of senior level baccalaureate nursing students enrolled in state universities in Louisiana, namely, age, gender, ethnicity, prior educational experiences, certifications, grade point average (GPA), and frequency of interaction with healthcare providers for their own personal healthcare needs and or the healthcare needs of a significant other? Part 3 of the HL-KES provided information on the demographic characteristics of the study population (Appendix C). Participants were asked to enter their age in years and their GPA in required nursing courses at the beginning of the current semester. The ordinal variable age and the interval variable GPA were summarized using the mean, standard deviation, frequencies, percentages, and range. The nominal variables: gender, ethnicity, and certifications, and the ordinal variables: prior educational experiences and the frequency of interaction with healthcare providers for their own personal health care needs or the healthcare needs of a significant other were summarized using frequencies and percentages in categories.

Research Question 2 sought to answer the question, what is the health literacy knowledge of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES? Part 1 of the HL-KES measured the health literacy knowledge of the census population. Analysis of this research question was conducted by measuring the mean, standard deviation, and range of the HL-KES scores from all participants in the study. An
analysis of correct and incorrect responses to the HL-KES was also conducted within the five content areas identified as pertinent to assessing the health literacy knowledge of senior level baccalaureate nursing student: 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.

After the instrument was distributed and completed by the students an item analysis on the knowledge section of the instrument was performed. Two item analysis procedures, the item discrimination index and the item difficulty index, were calculated for each item. The item difficulty index was calculated by dividing the total number of correct responses by the total number of respondents. The item discrimination index was calculated by subtracting the number of correct responses by those scoring in the lower third of the group from the number of correct responses by those scoring in the lower third of the group and dividing the total number of correct response from those scoring in the upper third. McDaniel (1974) recommends an item difficulty index between .30 and .70. Any item following outside this parameter will be examined. An item discrimination rating below 0.19 (Ebel,1972) will also be to review.

Research Question 3 sought to answer the question, what are the health literacy experiences of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES? Part 2 of the HL-KES measured the health literacy experiences of senior level baccalaureate nursing students. The responses to the nine-item scale included in this section were treated as interval data and measured by frequencies, percentages in categories, grand mean, and standard deviation. The reliability of Part 2 of the HL-KES was measured using Cronbach’s alpha. A criterion rating of .60 or better was considered a good estimate of reliability (Robinson, Shaver, & Wrightsman, 1991). Principle Component Analysis using the varimax rotation method was also conducted to explore the structure of the variables
within the scale. Two criteria were used to determine how many factors should be utilized in data analysis: eigenvalues greater than one and Cattell’s scree test. The factor loading guidelines recommended by Comrey (1973) were utilized to identify the number of variables within a given construct: 0.71 or higher was considered excellent, 0.63 or higher was considered very good, 0.55 was considered good, 0.45 was considered fair, and 0.32 poor was considered.

Research Question 4 sought to answer the question, does a relationship exist between the health literacy experiences and health literacy knowledge of senior level baccalaureate nursing students enrolled in schools of nursing at state universities in Louisiana as measured by the HL-KES? The Pearson product-moment correlation coefficient was used to measure the relationship between health literacy experiences and health literacy knowledge. The results were interpreted utilizing the following descriptors proposed by Davis (1971): .70 or higher coefficient indicates a very strong association, .50 to .69 coefficient indicates a substantial association, .30 to .49 coefficient indicates a moderate association, .10 to .29 coefficient indicates a low association, and .01 to .09 coefficient indicates a negligible association.

Research question 5 sought to answer the question, does a model exist that explains the variance in health literacy knowledge of senior level baccalaureate nursing students as measured by the HL-KES? The potential exploratory variables that were used in this analysis were age, gender, ethnicity, prior educational experiences, certifications, GPA, the frequency of interaction with healthcare providers for their own personal healthcare needs or the healthcare needs of a significant other, and health literacy experiences. Even though the variables age, gender, GPA, prior educational experiences and interaction with healthcare providers for personal healthcare needs or the healthcare needs of a significant other have not been addressed in the literature they have been incorporated in the study for exploratory reasons. Females often assume the caregiver role in a family health literacy knowledge may be influenced by caregiver responsibilities.
addition, it is possible that the educational and life experiences of the growing number of older students pursuing a career in nursing may influence health literacy knowledge. A forward multiple regression analysis was conducted to evaluate how well the characteristics of senior level baccalaureate nursing students listed above predict the dependent variable health literacy knowledge.

The data was examined for normal distribution, linearity, and homoscedasticity. A scatterplot was used to examine the relationship among the potential exploratory variables and health literacy knowledge. The independent variable ethnicity was not dichotomous, so it was recoded into two dichotomous variables: white or non-white and African American or non-African American. Twenty-three participants (6.4%) responded to ethnicity as other. These cases were omitted from the multiple regression analysis because they were not a clearly delineated ethnic group. The data was examined for outliers by examining the standardized and studentized residuals. Standardized residuals (ZRESID) greater than 2 were considered possible outliers as recommended by Pedhazur (1997). The formula provided by Pedhazur (1997) $t_{cv} = N - K - 1$ was used to calculate studentized residuals (SRESID). SRESID values greater than the $t_{cv}$ were also viewed as a possible outlier. Influence analysis was completed by examining Cook’s D and leverage values. Cook’s D values greater than 1 and leverage values greater than .5 were examined for the possibility of measurement error.

The independent variables included in the analysis were examined for the presence of collinearity. Any variable with a variance inflation factor greater than 5.3 and a tolerance level below .19 were suspect of a multicollinearity problem (Hair, Anderson, Tatham, & Black, 1998).

The forward method was used to enter the predictors into the multiple regression analysis. A model summary was presented in tabular format. In addition regression coefficients and beta weights were summarized and reported. The effect size for multiple regression was
interpreted using the standards for interpreting effect size established by Cohen (1988): an $R^2$ value greater than .0196 was considered a small effect size, an $R^2$ value greater than .13 was considered a moderate effect size, and an $R^2$ value greater than .26 was considered a large effect size.
CHAPTER 4

FINDINGS

The purpose of this study was to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students currently enrolled in state universities in Louisiana. In addition, this study sought to determine what factors may be related to the health literacy knowledge of senior level baccalaureate nursing students currently enrolled in state universities in Louisiana. Eight of nine baccalaureate nursing programs at state universities in Louisiana agreed to participate in the study. Data collection took place between the Spring of 2006 and Fall of 2006. During this time the total enrollment of the eight baccalaureate nursing programs participating in the study was 395 students. A total of 361 students consented to participate in the study.

Research Question 1: Selected Characteristics of Respondents

Research Question 1 sought to answer the question, what are the selected characteristics of senior level baccalaureate nursing students enrolled in state universities in Louisiana, namely, age, gender, ethnicity, prior educational experiences, certifications, grade point average (GPA), and frequency of interaction with healthcare providers for their own personal healthcare needs and or the healthcare needs of a significant other? Part 3 of the Heath Literacy Knowledge and Experience Survey (HL-KES) provided information on these selected characteristics of the census population.

Participants were asked to enter their age and GPA. When reviewing the data for accuracy, it was noted that one respondent entered an age of 11 on Part 3 of the HL-KES. This prompted the researcher to review all responses from the participant and it was noted that “a” was entered as a response to all items on Part 1 of the HL-KES and “always” was entered as a response to all items on Part 2 of the HL-KES. The decision was then made to delete the entire case from the
data file. Two other responses to items on Part 3 of the HL-KES were of concern. One participant responded 69 to age and another respondent recorded 4.99 as a GPA. The decision to recode both of these responses as missing data was made since the remaining items on the HL-KES in both cases appeared to be valid.

The mean age of participants was 25.78 ($SD = 5.41$) with the youngest participant reporting an age of 21 and the oldest participant reporting an age of 51. The majority of participants (67.7%) were between the ages of 21 and 25 years of age. Only nine participants fell between the ages of 41 and 51. Table 3 presents the age distribution of participants.

Table 3. Age Distribution of Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$N$</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n^a$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in Years</td>
<td></td>
<td>25.78</td>
<td>5.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 – 25</td>
<td>346</td>
<td>25.78</td>
<td>5.41</td>
<td>234</td>
<td>67.5</td>
</tr>
<tr>
<td>26 – 30</td>
<td></td>
<td></td>
<td></td>
<td>58</td>
<td>16.8</td>
</tr>
<tr>
<td>31 – 35</td>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td>8.5</td>
</tr>
<tr>
<td>36 – 40</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>4.5</td>
</tr>
<tr>
<td>41 – 45</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>46 – 51</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>346</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

$a$ Fourteen respondents failed to respond to the age item on the HL-KES.

The majority of senior level baccalaureate nursing students that agreed to participate in the study were female ($N = 300, 85.7\%$) and only a small percentage (14.3\%) were male. Ten participants did not respond to the gender item. Participants were also asked to record their
ethnicity as ‘White’, ‘African American’, or ‘Other’. The largest ethnic group participating in the survey was ‘White’ \((N = 287, 82.2\%)\), followed by a small number of African Americans \((N = 39, 11.2\%)\). Twenty-three participants (6.6%) responded ‘Other’ to the ethnicity item and 11 participants did not respond to this item.

Participants were asked to enter their GPA in required nursing courses at the beginning of the current semester. The responses ranged from the lowest GPA of 2.00 to the highest GPA entered at 4.00. The mean GPA of participants was 3.22. Table 4 presents the distribution of GPAs among senior level baccalaureate nursing students participating in the study.

Table 4. Distribution of Grade Point Average (GPA) in Required Nursing Courses at the Beginning of the Semester as Reported by Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Variable</th>
<th>(N)</th>
<th>(M)</th>
<th>(SD)</th>
<th>(n^a)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>334</td>
<td>3.22</td>
<td>.35</td>
<td>11</td>
<td>3.3</td>
</tr>
<tr>
<td>2.00 – 2.50</td>
<td>11</td>
<td>3.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.51 – 3.00</td>
<td>100</td>
<td>30.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.01 – 3.50</td>
<td>157</td>
<td>46.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.51 – 4.00</td>
<td>66</td>
<td>19.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>334</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Twenty-six respondents failed to respond to this GPA item on the HL-KES.

The majority of participants \((N = 277, 79.8\%)\) reported no prior educational degree. A small percentage \((N = 66, 19.0\%)\) reported at least one undergraduate degree before entering nursing school and only four participants \((1.2\%)\) reported earning at least a master’s degree before entering nursing. Thirteen participants chose not to answer the prior education experiences item. Only 90 participants \((25.8\%)\) indicated that they were certified in some area of healthcare; while
259 (74.2%) participants indicated that they were not certified in an area of healthcare. Eleven participants did not respond to the healthcare certification item. Most participants \(N = 163, 47.0\%\) indicated that they interacted with healthcare providers for their own personal healthcare needs or the healthcare needs of a significant other annually. Data regarding the interaction with healthcare providers as reported by senior level baccalaureate nursing students participating in the study are presented in Table 5.

Table 5. The Interaction with Healthcare Providers for Personal Healthcare Needs or the Healthcare Needs of a Significant Other as Reported by Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Variable</th>
<th>(N)</th>
<th>(n^a)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction with Healthcare Provider</td>
<td>347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every Few Years</td>
<td>55</td>
<td>15.9</td>
<td></td>
</tr>
<tr>
<td>At least once a year</td>
<td>163</td>
<td>47.0</td>
<td></td>
</tr>
<tr>
<td>3 –4 times a year</td>
<td>129</td>
<td>37.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>347</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Thirteen respondents failed to respond to the Interaction with Healthcare Provider item on the HL-KES.

Research Question 2: Health Literacy Knowledge

Research Question 2 sought to answer the question, what is the health literacy knowledge of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES? Part 1 of the HL-KES measured the health literacy knowledge of senior level baccalaureate nursing students enrolled in a state university in Louisiana. Twenty-nine multiple choice items were designed to assess the participant’s health literacy knowledge. Five responses were constructed for one multiple-choice item; four responses were constructed
for the remaining 28 multiple-choice items. All distractors where chosen by at least one participant; suggesting that the alternative answers for each item were plausible. A thorough examination of the data was conducted before data analysis was initiated. As previously mentioned one respondent responded “a” to all items in Part 1 of the HL-KES and the decision was made to delete all responses to this survey from the data file.

Responses to the Part 1 of the HL-KES suggest that participants have some health literacy knowledge; but knowledge gaps do exist. The majority of participants (63.1%) correctly identified the behaviors associated with functional health literacy skills. However, responses from 36.9% of participants suggest that many senior level baccalaureate students do not know that functional health literacy skills involves the ability to read, comprehend and make decisions about healthcare.

Although the majority of participants (63.5%) associated low health literacy skills with all ethnic groups; only 48.6% of respondents were aware that low health literacy levels are most prevalent among individuals 65 years of age and older. When questioned about the best predictor of healthcare status participants (65.0%) overwhelmingly chose socioeconomic status. In fact, only 15.3% of participants chose literacy, the correct answer, as the best predictor of healthcare status.

Roughly 84% of participants were aware that patients with low health literacy skills are often diagnosed late and have fewer treatment options that those with adequate health literacy skills. The majority of participants (70.2%) were also knowledgeable regarding the lack of participation in preventative healthcare among patients with low health literacy skills. Another outcome commonly associated with low health literacy skills is the inability of the individual to apply healthcare information to their health situation; 83.3% of participants were able to identify this consequence associated with low health literacy skills.
Responses to items on the Rapid Estimate of Adult Literacy (REALM) and the Test of Functional Health Literacy (TOFHLA) suggest that participants have limited knowledge of these health literacy screening tools. Only 44.2% of participants knew that the REALM is used to assess the ability of an individual to read common medical terms; and only 17.8% of respondents were aware that TOFHLA is utilized to assess both reading and numerical skills of individuals. It is interesting to note that although knowledge of health literacy screening tools was limited, most participants (83.3%) were able to choose the best approach to conducting an assessment of health literacy skills and another (68.1%) recognized that health literacy screenings increased the effectiveness of healthcare teaching provided by the nurse.

One item on Part 1 of the HL-KES was designed to determine if senior level baccalaureate nursing students were knowledgeable about the recommended reading level of health care materials. Only 14.4% chose the correct answer, fifth grade, while another 41.9% chose eighth grade, and the remaining 20.3% indicated that reading levels for healthcare materials could be as high as tenth or twelfth grade. Although 49.7% of participants indicated that asking a patient to read the label on a medication bottle would be the best estimate of a patient’s reading ability; a large group of respondents (33.6%) associated the last grade completed in school with reading ability. Participants (82.5%) were also unfamiliar with the Fry Method; a method recommended by the Center for Disease Control (CDC) to assess the readability level of written materials.

Patients in healthcare settings with low health literacy skills often experience feelings of shame and will not readily admit that they cannot read. In addition, these feelings of shame often prevent patient’s from asking questions about healthcare information that they do not understand. Two questions were direct at knowledge of these behavior associated with low health literacy skills and the majority of participants answered both questions correctly. Close to 90% of
participants were aware that individuals with low health literacy skills will not readily admit that they have difficulty reading when provided with healthcare materials; and 67.2% of respondents were aware that patients with low health literacy skills often pretend to read information given to them by healthcare providers.

Four items included in Part 1 of the HL-KES were directed at knowledge of typography and layout recommendations for written healthcare materials and the majority of participants answered these questions correctly. With regard to recommendations for appropriate word choices; however, only a slim majority of participants (57.8%) chose a heading for a brochure on hypertension that reflective recommendations to use a questions answer format with common terms. Several students (35.3%) instead chose a heading that included the term hypertension in lieu of high blood pressure. However, 84.6% of respondents were able to identify appropriate word choices and use of active voice in written healthcare materials for diabetes.

An additional finding of interest is that although the majority of participants (70.6%) recognized that the first step in developing healthcare materials was to find out from the target audience what they need to know, when questioned about the best way to ensure the culturally appropriateness of healthcare materials less than half of respondents (44.7%) would include community members in the design of the materials. In fact, 35.0% of respondents indicated that reviewing research on the community’s culture would be a better way to ensure the cultural appropriateness of a brochure; over including community members in the design of a brochure.

With regards to evaluating health literacy interventions students 64.6% chose the “teach back” method as the most effective way for nurses to evaluate a patient’s understanding of healthcare information. A note of interest, however, is that 19.1% of participants indicated that a pre-test post-test would be the most effective way to evaluate how well a patient with low health
literacy skills understood healthcare teaching. Responses to Part 1 of the HL-KES are presented in Table 6 correct answers are presented in bold face.

Table 6. Responses to Part 1 of the Health Literacy Knowledge and Experience Survey (HL-KES) by Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Item^b</th>
<th>%^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. When working with individuals who have low health literacy skills the nurse should keep in mind that these individuals:</td>
<td>88.9 2.2 6.2 1.7 356</td>
</tr>
<tr>
<td>16. After providing written healthcare information to a patient he states, “Let me take this information home to read.” This may be a clue to the nurse that the patient:</td>
<td>4.2 6.4 1.4 88.0 359</td>
</tr>
<tr>
<td>27. Which of the following instructions on the management of diabetes would be best understood by an individual with low health literacy skills?</td>
<td>84.6 6.4 4.7 4.2 358</td>
</tr>
<tr>
<td>6. Patients with low health literacy skills:</td>
<td>8.1 3.1 5.0 83.9 360</td>
</tr>
<tr>
<td>9. The nurse should keep in mind that individuals with low health literacy levels:</td>
<td>7.8 3.4 5.0 83.8 358</td>
</tr>
<tr>
<td>15. Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient?</td>
<td>11.4 3.9 83.6 1.1 359</td>
</tr>
<tr>
<td>22. Recommendations for developing written healthcare materials include:</td>
<td>12.3 83.6 3.3 .8 359</td>
</tr>
<tr>
<td>20. The first step in developing written healthcare information is to:</td>
<td>4.7 16.1 70.6 8.6 360</td>
</tr>
<tr>
<td>7. Health behaviors common among patients with low health literacy skills include:</td>
<td>70.2 8.4 13.9 7.5 359</td>
</tr>
<tr>
<td>23. When listing side effects for a handout on chemotherapy the oncology nurse should limit the list to:</td>
<td>23.7 69.4 5.0 1.9 359</td>
</tr>
<tr>
<td>18. Which of the following is true with regards to written healthcare information?</td>
<td>14.5 69.1 10.3 6.1 359</td>
</tr>
<tr>
<td>14. What is the strongest advantage to conducting health literacy screenings? Health literacy screenings:</td>
<td>8.1 68.8 18.5 4.5 356</td>
</tr>
<tr>
<td>8. Patients cope with low health literacy skills by:</td>
<td>22.1 2.2 8.4 67.2 357</td>
</tr>
</tbody>
</table>

(Table continued)
<table>
<thead>
<tr>
<th>Item&lt;sup&gt;b&lt;/sup&gt;</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4. What is the likelihood that a nurse working in a public health clinic, primarily serving low-income minority patients, will encounter a patient with low health literacy skills?</td>
<td>.8</td>
<td>4.4</td>
<td>28.1</td>
<td>66.7</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>29. The most effective way for a nurse to determine how well a patient with low health literacy skills understands healthcare information is to:</td>
<td>19.1</td>
<td>5.9</td>
<td>64.6</td>
<td>10.4</td>
<td>356</td>
<td></td>
</tr>
<tr>
<td>2. Low health literacy levels are common among:</td>
<td>23.0</td>
<td>12.4</td>
<td>1.1</td>
<td>63.5</td>
<td>356</td>
<td></td>
</tr>
<tr>
<td>17. An individual with functional health literacy skills will be able to:</td>
<td>11.7</td>
<td>3.3</td>
<td>21.7</td>
<td>63.2</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>25. Which of the following would be the most effective wording for a heading in a brochure on hypertension?</td>
<td>35.5</td>
<td>4.5</td>
<td>58.1</td>
<td>2.0</td>
<td>358</td>
<td></td>
</tr>
<tr>
<td>24. Written healthcare information provided to a patient related to a specific disease should include:</td>
<td>56.0</td>
<td>32.2</td>
<td>9.0</td>
<td>2.8</td>
<td>357</td>
<td></td>
</tr>
<tr>
<td>28. Which of the following approaches to patient education provides minimal opportunity for the patient to actively engage in learning?</td>
<td>16.9</td>
<td>52.7</td>
<td>16.1</td>
<td>14.4</td>
<td>355</td>
<td></td>
</tr>
<tr>
<td>12. Which of the following questions would provide the nurse with the best estimate of reading skills of the patient?</td>
<td>34.2</td>
<td>13.7</td>
<td>50.0</td>
<td>2.0</td>
<td>358</td>
<td></td>
</tr>
<tr>
<td>3. The research on health literacy indicates that:</td>
<td>29.2</td>
<td>49.3</td>
<td>14.8</td>
<td>6.7</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>1. Low health literacy levels are most prevalent among which of the following age groups?</td>
<td>36.9</td>
<td>4.7</td>
<td>3.9</td>
<td>5.8</td>
<td>48.6</td>
<td>360</td>
</tr>
<tr>
<td>10. The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to:</td>
<td>34.2</td>
<td>2.0</td>
<td>18.9</td>
<td>44.9</td>
<td>354</td>
<td></td>
</tr>
<tr>
<td>26. The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to:</td>
<td>35.0</td>
<td>10.8</td>
<td>9.4</td>
<td>44.7</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>19. The recommended reading level for healthcare information is:</td>
<td>37.6</td>
<td>42.1</td>
<td>11.4</td>
<td>8.9</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>13. Which statement best describes the Test of Functional Health Literacy? This instrument is:</td>
<td>18.0</td>
<td>4.8</td>
<td>31.8</td>
<td>45.4</td>
<td>355</td>
<td></td>
</tr>
<tr>
<td>5. The best predictor of healthcare status is:</td>
<td>65.0</td>
<td>15.3</td>
<td>.8</td>
<td>18.9</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>21. Which of the following statements best describes the Fry Method?</td>
<td>13.7</td>
<td>41.9</td>
<td>33.7</td>
<td>10.8</td>
<td>344</td>
<td></td>
</tr>
</tbody>
</table>

Note: The correct answers are indicated by bold faced numbers.

<sup>a</sup>The percentages of responses in each category for Part 1 of the HL-KES (Appendix C).
<sup>b</sup>Items included in Part 1 of the HL-KES (Appendix C).
<sup>c</sup>The total number of responses to each item included in Part 1 of the HL-KES (Appendix C).
After reviewing the responses to each of the 29 items in Part 1 of the HL-KES the responses were then recoded as correct or incorrect; non-responses were recoded as incorrect. Upon completion of these procedure measures of central tendency were calculated. The health literacy knowledge scores of participants ranged from 3 to 26 with a mean score of 17.76 (SD = 3.93) and median score of 18.00. The distribution of health literacy scores was negatively skewed (-.587) and leptokurtic (.454) indicating a higher frequency of health literacy scores around the mean. The histogram in Figure 1 presents the distribution of health literacy scores.

![Histogram for Health Literacy Scores of Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana Participating in the Health Literacy Knowledge and Experience Survey.](image)

The lowest score possible was 0 and the highest score possible was 29. The health literacy knowledge scores of participants ranged from 3 to 26. Results of the interquartile range (IQR = 6) indicates that the health literacy knowledge scores of the middle half of participants ranged from 15 to 21. Therefore, only 25% of participants had health literacy knowledge scores below 15, and 25% of participants had health literacy knowledge scores above 21. These results suggest that most senior level baccalaureate nursing students enrolled at state universities in
Louisiana have some knowledge of health literacy but knowledge gaps exist. Table 7 presents the frequency and percentages of health literacy knowledge scores among senior level baccalaureate nursing students enrolled at state universities in Louisiana. The majority of participants ($N = 262, 69.9\%$) had health literacy knowledge scores that ranged from 15 to 22, which is consistent with results from the $IQR$. Only two participants (0.6\%) scored below six.

Table 7. Frequencies and Percentages of Health Literacy Knowledge Scores Among Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Scorea</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>7 - 14</td>
<td>71</td>
<td>19.7</td>
</tr>
<tr>
<td>15 - 22</td>
<td>252</td>
<td>69.9</td>
</tr>
<tr>
<td>23 - 29</td>
<td>35</td>
<td>9.8</td>
</tr>
<tr>
<td>Total</td>
<td>360</td>
<td>100</td>
</tr>
</tbody>
</table>

*a The health literacy knowledge scores from Part 1 of the Health Literacy Knowledge and Experience Survey (HL-KES).

Further analysis of the responses to the HL-KES was conducted within the five content areas identified as pertinent to assessing the health literacy knowledge of senior level baccalaureate nursing student: 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 use of these five content areas follows the test blueprint originally designed for development of the multiple-choice items included in Part 1 of the HL-KES. Table 8 presents a breakdown of correct and incorrect responses by participants within each content area.
Table 8. Frequencies and Percentages of Correct and Incorrect Responses to Items within the Five Content Areas of Part 1 of the Health Literacy Knowledge and Experience Survey (HL-KES) by Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Content Area a</th>
<th>Item</th>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( n )</td>
<td>( % )</td>
</tr>
<tr>
<td><strong>Basic Facts on Health Literacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>What is the likelihood that a nurse working in a public health clinic, primarily serving low-income minority patients, will encounter a patient with low health literacy skills?</td>
<td>240</td>
<td>66.7</td>
</tr>
<tr>
<td>17.</td>
<td>An individual functional health literacy will be able to:</td>
<td>227</td>
<td>63.1</td>
</tr>
<tr>
<td>2.</td>
<td>Low health literacy levels are common among:</td>
<td>226</td>
<td>62.8</td>
</tr>
<tr>
<td>3.</td>
<td>The research on health literacy indicates that:</td>
<td>177</td>
<td>49.2</td>
</tr>
<tr>
<td>1.</td>
<td>Low health literacy levels are most prevalent among which of the following age groups?</td>
<td>175</td>
<td>48.6</td>
</tr>
<tr>
<td>5.</td>
<td>The best predictor of healthcare status is:</td>
<td>55</td>
<td>15.3</td>
</tr>
<tr>
<td><strong>Consequences Associated with Low Health Literacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Patients with low health literacy skills:</td>
<td>302</td>
<td>83.9</td>
</tr>
<tr>
<td>9.</td>
<td>The nurse should keep in mind that individuals with low health literacy levels:</td>
<td>300</td>
<td>83.3</td>
</tr>
<tr>
<td>7.</td>
<td>Health behaviors common among patients with low health literacy skills include:</td>
<td>252</td>
<td>70.0</td>
</tr>
<tr>
<td>8.</td>
<td>Patients cope with low health literacy skills by:</td>
<td>240</td>
<td>66.7</td>
</tr>
<tr>
<td><strong>Health Literacy Screening</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>When working with individuals who have low health literacy skills the nurse should keep in mind that these individuals:</td>
<td>320</td>
<td>88.9</td>
</tr>
<tr>
<td>15.</td>
<td>Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient?</td>
<td>300</td>
<td>83.3</td>
</tr>
<tr>
<td>14.</td>
<td>What is the strongest advantage to conducting health literacy screenings? Health literacy screenings:</td>
<td>245</td>
<td>68.1</td>
</tr>
<tr>
<td>12.</td>
<td>Which of the following questions would provide the nurse with the best estimate of reading skills of the patient?</td>
<td>179</td>
<td>49.7</td>
</tr>
<tr>
<td>10.</td>
<td>The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to:</td>
<td>159</td>
<td>44.2</td>
</tr>
</tbody>
</table>

(Table continued)
<table>
<thead>
<tr>
<th>Content Area a</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Which statement best describes the Test of Functional Health Literacy? This instrument is:</td>
</tr>
<tr>
<td>16.</td>
<td>After providing written healthcare information to a patient he states, “Let me take this information home to read.” This may be a clue to the nurse that the patient:</td>
</tr>
<tr>
<td>18.</td>
<td>Which of the following is true with regards to written healthcare information?</td>
</tr>
<tr>
<td>21.</td>
<td>Which of the following statements best describes the Fry Method?</td>
</tr>
<tr>
<td>22.</td>
<td>Recommendations for developing written healthcare materials include:</td>
</tr>
<tr>
<td>23.</td>
<td>When listing side effects for a handout on chemotherapy the oncology nurse should limit the list to:</td>
</tr>
<tr>
<td>24.</td>
<td>Written healthcare information provided to a patient related to a specific disease should include:</td>
</tr>
<tr>
<td>25.</td>
<td>Which of the following would be the most effective wording for a heading in a brochure on hypertension?</td>
</tr>
<tr>
<td>26.</td>
<td>The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to:</td>
</tr>
<tr>
<td>27.</td>
<td>Which of the following instructions on the management of diabetes would be best understood by an individual with low health literacy skills?</td>
</tr>
<tr>
<td>28.</td>
<td>Which of the following approaches to patient education provides minimal opportunity for the patient to actively engage in learning?</td>
</tr>
<tr>
<td>29.</td>
<td>The most effective way for a nurse to determine how well a patient with low health literacy skills understands healthcare information is to:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>64</td>
<td>17.8</td>
</tr>
<tr>
<td>303</td>
<td>84.2</td>
</tr>
<tr>
<td>300</td>
<td>83.3</td>
</tr>
<tr>
<td>254</td>
<td>70.6</td>
</tr>
<tr>
<td>249</td>
<td>69.2</td>
</tr>
<tr>
<td>248</td>
<td>68.9</td>
</tr>
<tr>
<td>208</td>
<td>57.8</td>
</tr>
<tr>
<td>200</td>
<td>55.6</td>
</tr>
<tr>
<td>187</td>
<td>51.9</td>
</tr>
<tr>
<td>161</td>
<td>44.7</td>
</tr>
<tr>
<td>144</td>
<td>40.0</td>
</tr>
<tr>
<td>135</td>
<td>37.5</td>
</tr>
<tr>
<td>316</td>
<td>87.8</td>
</tr>
<tr>
<td>230</td>
<td>63.9</td>
</tr>
</tbody>
</table>

a The content areas for items listed in Part 1 of the HL-KES (Appendix C).
The two content areas in which the majority of respondents answered correctly to all items were: consequences of low health literacy skills and evaluation of health literacy. Regarding basic knowledge of health literacy the majority of participants answered three of the six questions designed for this content area correctly. Incorrect responses suggest knowledge gaps exist in the ability of respondents to identify individuals 65 years of age and older as a high risk group for low health literacy ($n = 185, 51.4\%$), and the association of socioeconomic status as the best predictor of healthcare status over literacy ($n = 305, 84.7\%$). In addition, incorrect responses in this content area indicate that 50.8\% of participants ($n = 183$) do not know that most individuals read three to five grade levels lower that the last year of school completed.

Six questions addressed the participant’s knowledge of health literacy screening. The majority of respondents answered three of these items correctly suggesting that participants know that individual’s with low health literacy skills will not admit they have difficulty reading ($n = 320, 88.9\%$), are knowledgeable regarding the best approach to health screening ($n = 300, 83.3\%$), and aware that screening for health literacy will improve the effectiveness of healthcare teaching ($n = 245, 68.1\%$). The items answered incorrectly by the majority of respondents included two questions on health literacy screening tools and one item designed to determine if respondents were knowledgeable regarding the most effective way for a nurse to determine the reading skills of a patient. Incorrect responses to the REALM and TOFHLA health literacy screening tools were ($n = 201, 55.8\%$) and ($n = 296, 82.2\%$) respectively. Less than half of the participants ($n = 179, 49.7\%$) indicated that having a patient read the label on a medication bottle is the best indicator of reading ability.

Respondents answered eight items correct from a total of eleven items designed to measure knowledge related to guidelines for written healthcare materials. Over 50\% of participants were aware appropriate word choices, recommendations for typology and layout,
and the importance of finding out what the target audience needs to know as the first step in developing healthcare information. Less than half of participants were knowledgeable regarding the recommended reading level for healthcare materials ($n = 135, 37.5\%$), the Fry Method ($n = 144, 40.0\%$), the importance of including community members to ensure the culturally appropriateness of healthcare materials ($n = 161, 44.7\%$).

Results of the item analysis revealed that the item difficulty indices ranged from .15 to .88. Two items had an item difficulty index less than 0.3 and seven items rated greater than 0.7. The item discrimination indices ranged between .00 and .50. A negative discrimination index was calculated for only one item and a second item received a rating of 0.0. Ebel (1972) recommends that the test constructor review low discriminating items; however, low discrimination in and of itself is not cause for eliminating an item. McDaniel (1994) describes educational significance as a “value judgment”, and since all five content experts gave these items a high content validity rating, the items were retained. The item difficulty and the item discrimination indices are presented in Table 9.

Table 9. Item Difficulty Indices and Item Discrimination Indices for Responses to Part 1 of the Health Literacy Knowledge and Experience Survey (HL-KES) by Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Item</th>
<th>Item Difficulty Index</th>
<th>Item Discrimination Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.   Low health literacy levels are most prevalent among which of the following age groups?</td>
<td>.48</td>
<td>.24</td>
</tr>
<tr>
<td>2.   Low health literacy levels are common among:</td>
<td>.62</td>
<td>.21</td>
</tr>
<tr>
<td>3.   The research on health literacy indicates that:</td>
<td>.49</td>
<td>.32</td>
</tr>
<tr>
<td>4.   What is the likelihood that a nurse working in a public health clinic, primarily serving low-income minority patients, will encounter a patient with low health literacy skills?</td>
<td>.66</td>
<td>.32</td>
</tr>
<tr>
<td>5.   The best predictor of healthcare status is:</td>
<td>.15</td>
<td>-.01</td>
</tr>
<tr>
<td>6.   Patients with low health literacy</td>
<td>.83</td>
<td>.28</td>
</tr>
</tbody>
</table>

(Table continued)
<table>
<thead>
<tr>
<th>Item</th>
<th>Item Difficulty Index</th>
<th>Item Discrimination Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Health behaviors common among patients with low health literacy skills include:</td>
<td>.70</td>
<td>.33</td>
</tr>
<tr>
<td>8. Patients cope with low health literacy skills by:</td>
<td>.66</td>
<td>.40</td>
</tr>
<tr>
<td>9. The nurse should keep in mind that individuals with low health literacy levels:</td>
<td>.83</td>
<td>.24</td>
</tr>
<tr>
<td>10. The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to:</td>
<td>.44</td>
<td>.33</td>
</tr>
<tr>
<td>11. When working with individuals who have low health literacy skills the nurse should keep in mind that these individuals:</td>
<td>.88</td>
<td>.20</td>
</tr>
<tr>
<td>12. Which of the following questions would provide the nurse with the best estimate of reading skills of the patient?</td>
<td>.49</td>
<td>.33</td>
</tr>
<tr>
<td>13. Which statement best describes the Test of Functional Health Literacy? This instrument is:</td>
<td>.17</td>
<td>.00</td>
</tr>
<tr>
<td>14. What is the strongest advantage to conducting health literacy screenings? Health literacy screenings:</td>
<td>.68</td>
<td>.37</td>
</tr>
<tr>
<td>15. Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient?</td>
<td>.83</td>
<td>.34</td>
</tr>
<tr>
<td>16. After providing written healthcare information to a patient he states, “Let me take this information home to read.” This may be a clue to the nurse that the patient:</td>
<td>.87</td>
<td>.28</td>
</tr>
<tr>
<td>17. An individual with functional health literacy skills will be able to:</td>
<td>.63</td>
<td>.10</td>
</tr>
<tr>
<td>18. Which of the following is true with regards to written healthcare information?</td>
<td>.68</td>
<td>.36</td>
</tr>
<tr>
<td>19. The recommended reading level for healthcare information is:</td>
<td>.37</td>
<td>.20</td>
</tr>
<tr>
<td>20. The first step in developing written healthcare information is to:</td>
<td>.70</td>
<td>.36</td>
</tr>
<tr>
<td>21. Which of the following statements best describes the Fry Method?</td>
<td>.40</td>
<td>.20</td>
</tr>
<tr>
<td>22. Recommendations for developing written healthcare materials include:</td>
<td>.83</td>
<td>.31</td>
</tr>
<tr>
<td>23. When listing side effects for a handout on chemotherapy the oncology nurse should limit the list to:</td>
<td>.69</td>
<td>.33</td>
</tr>
</tbody>
</table>

(Table continued)
<table>
<thead>
<tr>
<th>Item</th>
<th>Item Difficulty Index</th>
<th>Item Discrimination Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Written healthcare information provided to a patient related to a specific disease should include:</td>
<td>.55</td>
<td>.41</td>
</tr>
<tr>
<td>25. Which of the following would be the most effective wording for a heading in a brochure on hypertension?</td>
<td>.57</td>
<td>.35</td>
</tr>
<tr>
<td>26. The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to:</td>
<td>.44</td>
<td>.50</td>
</tr>
<tr>
<td>27. Which of the following instructions on the management of diabetes would be best understood by an individual with low health literacy skills?</td>
<td>.84</td>
<td>.31</td>
</tr>
<tr>
<td>28. Which of the following approaches to patient education provides minimal opportunity for the patient to actively engage in learning?</td>
<td>.51</td>
<td>.43</td>
</tr>
<tr>
<td>29. The most effective way for a nurse to determine how well a patient with low health literacy skills understands healthcare information is to:</td>
<td>.63</td>
<td>.40</td>
</tr>
</tbody>
</table>

a Items listed in Part 1 of the HL-KES (Appendix C)
b The item difficulty = number of correct answers divided by the total number of respondents.
c Item Discrimination Index = Response frequency of the upper third – the response frequency of the lower third/ the total number of responses from the upper third.

Research Question 3: Health Literacy Experiences

Research Question 3 sought to answer the question, what are the health literacy experiences of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES? A review of the literature assisted the researcher in identifying nine likert-type scale items to measure the health literacy experiences of senior level baccalaureate nursing students for Part 2 of the HL-KES (Appendix C). Participants were asked to describe how often they participated in a learning activity related to health literacy using the following scale: “1 = Never”, “2 = Sometimes”, “3 = Frequently”, or “4 = Always”.

The data was examined for accuracy prior to data analysis, and as previously mentioned the respondent that recorded an age of 11 responded “always “ to all items in Part 2 of the HL-
KES and the decision was made to delete that case from the data file. Responses to Part 2 of the HL-KES indicated that over 60% of participants described the frequency of their health literacy experiences while enroll in nursing school as ‘never’ or ‘sometime’ for eight items on the nine item scale. This included emphasis of health literacy content in the nursing curriculum ($n = 232$, 65.1%), use of health literacy screening tools ($n = 300$, 84.1%), evaluating reading level ($n = 274$, 76.7%), evaluating cultural appropriateness ($n=239$, 67%), and evaluating use of illustrations ($n = 217$, 60.8%). It is interesting to note that although the majority of participants had ‘never’ or only ‘sometime’ evaluated the reading level of written healthcare materials, the majority of participants ($n = 253$, 70.8%) frequently used written healthcare materials for healthcare teaching.

Three items on the nine-item health literacy experience scale explored the use of alternative teaching strategies used by participants when providing healthcare teaching to individuals or community groups while enrolled in nursing school. The majority of participants ($n = 223$, 62.5%) reported ‘never’ using audiotapes to provide healthcare teaching; compared to the reported use of videotapes and computer instruction as ‘never’ ($n = 163$, 45.8) and ($n = 162$, 45.4%) respectively. The alternative teaching strategy reported most often as ‘frequently’ or ‘always’ used to provide healthcare teaching to an individual or community group was computer software ($n = 93$, 26.1%), followed by use of videotapes ($n = 47$, 13.2%).

According to Robinson, Shaver, and Wrightsman (1991) the nine-item health literacy experience scale demonstrated an exemplary rating for reliability (Cronbach’s $\alpha = .82$). Table 10 presents the frequency and percentage of responses by participant’s responses to health literacy experience scale included in Part 2 of the HL-KES.
Table 10. Frequencies and Percentages of Responses to the Health Literacy Experience Scale by Senior Level Baccalaureate Nursing Students Enrolled at State Universities in Louisiana.

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. How frequently was health literacy emphasized in your nursing curriculum?</td>
<td>356</td>
<td>25</td>
<td>7.0</td>
<td>207</td>
<td>58.1</td>
</tr>
<tr>
<td>31. How often did you use a health literacy screening tool to assess the health literacy skills of an individual?</td>
<td>357</td>
<td>182</td>
<td>51.0</td>
<td>118</td>
<td>33.1</td>
</tr>
<tr>
<td>32. How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?</td>
<td>357</td>
<td>119</td>
<td>33.3</td>
<td>155</td>
<td>43.4</td>
</tr>
<tr>
<td>33. How often did you evaluate the cultural appropriateness of healthcare materials, including written handouts, videos, audiotapes, before using them for patient teaching?</td>
<td>357</td>
<td>77</td>
<td>21.6</td>
<td>162</td>
<td>45.4</td>
</tr>
<tr>
<td>34. How often did you evaluate the use of illustrations in written healthcare materials before using them for patient teaching?</td>
<td>357</td>
<td>64</td>
<td>17.9</td>
<td>153</td>
<td>42.9</td>
</tr>
<tr>
<td>35. How often did you use written materials to provide healthcare information to an individual or community group?</td>
<td>357</td>
<td>19</td>
<td>5.3</td>
<td>85</td>
<td>23.8</td>
</tr>
</tbody>
</table>

(Table continued)
<table>
<thead>
<tr>
<th>Item</th>
<th>$N^b$</th>
<th>Never</th>
<th>Sometime</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>36. How often did you use videotapes to provide healthcare information to an individual or community group?</td>
<td>357</td>
<td>223</td>
<td>62.5</td>
<td>99</td>
<td>27.7</td>
</tr>
<tr>
<td>37. How often did you use videotapes to provide healthcare information to an individual or community group.</td>
<td>356</td>
<td>163</td>
<td>45.8</td>
<td>146</td>
<td>41.0</td>
</tr>
<tr>
<td>38. How often did you use computer software to provide healthcare information to an individual or community group?</td>
<td>357</td>
<td>162</td>
<td>45.4</td>
<td>102</td>
<td>28.6</td>
</tr>
</tbody>
</table>

*a* Items included in Part 2 of the HL-KES (Appendix C).

*b* The total number of respondents to an item included in Part 2 of the HL-KES.

*c* The frequency and percentages of responses in each category for Part 2 of the HL-KES (Appendix C).

The following scale was utilized to interpret mean health literacy experience scores: 1 – 1.49 = Never, 1.50 – 2.49 = Sometime, 2.50 – 3.49 = Frequently, 3.50 - 4 = Always. Analysis of the mean score of eight items on the health literacy experience survey indicates that participants engaged in health literacy experiences only ‘sometime’ while enrolled in nursing school. The mean scores of items on the nine-item health literacy experience scale ranged between 1.51 and 2.83. The item with the lowest mean was the use of audiotapes to provide healthcare information. The only health literacy experience that respondents engaged in ‘frequently’ while enrolled in nursing school was the use of written healthcare materials to provide healthcare information to individuals or community groups. The grand mean for the nine-item scale was 2.04 (SD = .53). Table 11 presents the mean and standard deviation of each item included in Part 2 of the HL-KES.
Table 11. The Mean and Standard Deviation for each Item included in the Health Literacy Experience Scale.

<table>
<thead>
<tr>
<th>Item</th>
<th>N(^b)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>35. How often did you use written materials to provide healthcare information to an individual or community group?</td>
<td>3.57</td>
<td>2.83</td>
<td>.77</td>
</tr>
<tr>
<td>30. How frequently was health literacy emphasized in your nursing curriculum?</td>
<td>356</td>
<td>2.37</td>
<td>.74</td>
</tr>
<tr>
<td>34. How often did you evaluate the use of illustrations in written healthcare materials before using them for patient teaching?</td>
<td>357</td>
<td>2.30</td>
<td>.85</td>
</tr>
<tr>
<td>33. How often did you evaluate the cultural appropriateness of healthcare materials, including written handouts, videos, audiotapes, before using them for patient teaching?</td>
<td>357</td>
<td>2.19</td>
<td>.86</td>
</tr>
<tr>
<td>32. How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?</td>
<td>357</td>
<td>1.96</td>
<td>.85</td>
</tr>
<tr>
<td>38. How often did you use computer software to provide healthcare information to an individual or community group?</td>
<td>357</td>
<td>1.90</td>
<td>.98</td>
</tr>
<tr>
<td>37. How often did you use videotapes to provide healthcare information to an individual or community group?</td>
<td>356</td>
<td>1.69</td>
<td>.73</td>
</tr>
<tr>
<td>31. How often did you use a health literacy screening tool to assess the health literacy skills of an individual?</td>
<td>357</td>
<td>1.68</td>
<td>.82</td>
</tr>
<tr>
<td>36. How often did you use audiotapes to provide healthcare information to an individual or community group?</td>
<td>357</td>
<td>1.51</td>
<td>.77</td>
</tr>
</tbody>
</table>

Note. Scale: 1 – 1.49 = Never, 1.50 – 2.49 = Sometimes, 2.50 – 3.49 = Frequently, 3.50 - 4 = Always. The grand mean for the nine-item scale was 2.04 (SD = .53).

\( ^a \) Items included in Part 2 of the HL-KES (Appendix C).

\( ^b \) The total number of respondents to an item included in Part 2 of the HL-KES.

An exploratory factor analysis was conducted on the nine-item health literacy experience scale to determine the presence of any sub-constructs within the scale. 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, 1997).
Responses from participants \((n = 357)\) completing Part 2 of the HL-KES provided a subject to variable ratio of 39:1; which exceeds the 10:1 subject to variable ratio recommended by Munro (1997). The principal component analysis was conducted with eigenvalues set at greater than 1.0 as the criterion for factor extraction. Table 12 presents the initial eigenvalues for the nine items included in Part 2 of the HL-KES, the total variance explained by each item, and the communality coefficients which demonstrate the amount of variance in the variables accounted for by the extracted factors (University of New Castle upon Tyne, 2002).

Table 12. The Initial Eigenvalues, Total Variance, and Communality Coefficients for the Health Literacy Experience Scale.

<table>
<thead>
<tr>
<th>Item</th>
<th>Initial Eigenvalues</th>
<th>% of Variance</th>
<th>(h^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. How frequently was health literacy emphasized in your nursing curriculum.</td>
<td>3.79</td>
<td>42.11</td>
<td>.40</td>
</tr>
<tr>
<td>31. How often did you use a health literacy screening tool to assess the health literacy skills of an individual?</td>
<td>1.35</td>
<td>15.04</td>
<td>.50</td>
</tr>
<tr>
<td>32. How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?</td>
<td>.94</td>
<td>10.52</td>
<td>.58</td>
</tr>
<tr>
<td>33. How often did you evaluate the cultural appropriateness of healthcare materials before using them for patient teaching?</td>
<td>.77</td>
<td>8.62</td>
<td>.65</td>
</tr>
<tr>
<td>34. How often did you evaluate the use of illustrations in written healthcare materials before using them for patient teaching?</td>
<td>.53</td>
<td>5.91</td>
<td>.61</td>
</tr>
<tr>
<td>35. How often did you use written materials to provide healthcare information to an individual or community group?</td>
<td>.51</td>
<td>5.76</td>
<td>.27</td>
</tr>
<tr>
<td>36. How often did you use audiotapes to provide healthcare information to an individual or community group?</td>
<td>.44</td>
<td>4.95</td>
<td>.80</td>
</tr>
<tr>
<td>37. How often did you use videotapes to provide healthcare information to an individual or community group?</td>
<td>.37</td>
<td>4.13</td>
<td>.77</td>
</tr>
<tr>
<td>38. How often did you use computer software to provide healthcare information to an individual or community group?</td>
<td>.26</td>
<td>2.93</td>
<td>.53</td>
</tr>
</tbody>
</table>

Note. Scale: 1 – 1.49=Never, 1.50 – 2.49=Sometime, 2.50 – 3.49=Frequently, 3.50 - 4=Always.

\(^a\) Items included in Part 2 of the Health Literacy Knowledge and Experience Survey.

\(^b\) \(h^2\) = communality coefficient.
Two factors were extracted that accounted for 57.15% of the variance in health literacy experience responses reported by senior level baccalaureate nursing students. Cattell’s scree plot corroborated these results since two factors presented before the plotted line turned sharply to the right. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .810; a value greater than 0.5 which is indicative of sampling adequacy (University of New Castle upon Tyne, 2002). A Bartlett Test of Sphericity was also conducted and results ($\text{Approximate Chi-Square} = 1081.038$, $df = 36$, $p < .001$) indicated that the items were sufficiently correlated to conduct a factor analysis.

Measures of sampling adequacy (MSA) were checked utilizing the anti-image matrices. Seven values ranged between .803 and .833; values rated as meritorious by Hair, Anderson, Tatham, and Black (1998). The remaining two variables had MSA values of .713 and .726 and are also more than acceptable according to Hair et al. (1998).

The categories “Core Health Literacy Experiences” and “Technology Health Literacy Experiences” were utilized to describe the health literacy experiences in the two factor solution. Six items measured “Core Health Literacy Experiences” included learning experiences related to emphasis of health literacy in the nursing curriculum, use of health literacy screening tools, evaluating the reading level of written healthcare materials, assessing cultural appropriateness of healthcare materials, evaluating illustrations utilized in healthcare materials, and use of written materials to provide healthcare information. The remaining three items identified as “Technology Health Literacy Experiences” included the use of audiotapes, videotapes, and computer software to provide healthcare information. “Core Health Literacy Experiences” explained 42.11% of the variance and “Technology Health Literacy Experiences ” explained another 15.04% of variance in health literacy experiences. The rotated component matrix for both subscales is presented in Table 13.
Table 13. Variables and Factor Loadings for the Health Literacy Experience Scale for the Rotated Two Factor Solution Using Principal Component Analysis with Varimax Rotation.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item*</th>
<th>Loading of Items by Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Health Literacy Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. How often did you evaluate the cultural appropriateness of healthcare materials, including written handouts, videos, audiotapes, before using them for patient teaching?</td>
<td>.796</td>
<td>.133</td>
</tr>
<tr>
<td>34. How often did you evaluate the use of illustrations in written healthcare materials before using them for patient teaching?</td>
<td>.782</td>
<td>.084</td>
</tr>
<tr>
<td>32. How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?</td>
<td>.737</td>
<td>.200</td>
</tr>
<tr>
<td>30. How frequently was health literacy emphasized in your nursing curriculum?</td>
<td>605</td>
<td>.189</td>
</tr>
<tr>
<td>31. How often did you use a health literacy screening tool to assess the health literacy skills of an individual?</td>
<td>.587</td>
<td>.397</td>
</tr>
<tr>
<td>35. How often did you use written materials to provide healthcare information to an individual or community group?</td>
<td>.512</td>
<td>.132</td>
</tr>
<tr>
<td><strong>Technology Health Literacy Experiences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. How often did you use audiotapes to provide healthcare information to an individual or community group?</td>
<td>.165</td>
<td>.880</td>
</tr>
<tr>
<td>37. How often did you use videotapes to provide healthcare information to an individual or community group?</td>
<td>.106</td>
<td>.872</td>
</tr>
<tr>
<td>38. How often did you use computer software to provide healthcare information to an individual or community group?</td>
<td>.307</td>
<td>.664</td>
</tr>
</tbody>
</table>

Note. Scale: 1 – 1.49=Never, 1.50 – 2.49=Sometime, 2.50 – 3.49=Frequently, 3.50 - 4=Always. The grand mean for the ‘Core Health Literacy Experiences’ Subscale was 2.22 (SD = .57), Cronbach’s alpha = .79. The grand mean for the ‘Technology Health Literacy Experiences’ Subscale was 1.69, (SD = .69), Cronbach’s alpha = .76. The items in bold font in each column represent the items that combined to create each factor.

* Items included in Part 2 of the Health Literacy Knowledge and Experience Survey.

The following factor loading guidelines outlined by Comry (1973) where used to interpret the factor loadings: 0.71 or higher is excellent, 0.63 or higher is very good, 0.55 is
good, 0.45 is fair, and 0.32 is poor. All factors loadings for each factor were at or above the rating of good as recommended by Comrey (1973). According to Robinson, Shaver, and Wrightsman (1991) both subscales demonstrated extensive reliability with Cronbach’s alpha results of .79 and .76 respectively. The mean score for ‘Technology Health Literacy Experiences’ (M = 1.69, SD = .69) was slightly lower than ‘Core Health Literacy Experiences’ (M = 2.22, SD = .57). These results suggest that students had engaged in ‘Core Health Literacy Experiences’ more than ‘Technology Health Literacy Experiences’; however, using the interpretive scale provided, participants engaged in the health literacy experiences included in each subscale only ‘sometime’.

**Research Question 4: Relationship between Health Literacy Experiences and Health Literacy Knowledge**

Research Question 4 sought to answer the question, does a relationship exist between the health literacy experiences and health literacy knowledge of senior level baccalaureate nursing students enrolled in schools of nursing at state universities in Louisiana as measured by the HL-KES? The Pearson product-moment correlation coefficient was used to measure the relationship between health literacy experiences and health literacy knowledge. An exploratory factor using the principal component analysis method of factor extraction and varimax rotation method extracted two factors, Core Health Literacy Experiences and Technology Health Literacy Experiences. The relationship between these two sub-constructs and health literacy knowledge was also measured.

A scatterplot was created to determine if a linear relationship existed between health literacy experience responses and health literacy knowledge scores. The location of the data points on the scatterplot suggested a low negative linear relationship between health literacy experiences and health literacy knowledge. The results of the Pearson product-moment
correlation coefficient for the nine-item health literacy scale and the two subscales are presented in Table 14.


<table>
<thead>
<tr>
<th>Scale</th>
<th>N</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Health Literacy Subscale</td>
<td>356</td>
<td>-.226</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Health Literacy Experience Scale</td>
<td>355</td>
<td>-.198</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Core Health Literacy Subscale</td>
<td>356</td>
<td>-.147</td>
<td>.005</td>
</tr>
</tbody>
</table>

a The Health Literacy Experience Scale and the two subscales, Core Health Literacy Experiences and Technology Health Literacy Experiences.
b The total number of respondents to an item included in Part 2 of the HL-KES.

The results of the Pearson product-moment correlation were interpreted using the descriptors proposed by Davis (1971). Although statistically significant, the nine-item health literacy experience scale and the two subscales have a low association with health literacy knowledge. In addition, the negative r value for the nine-item health literacy scale and the two health literacy subscales suggest that as health literacy knowledge increases with fewer health literacy experiences.

**Research Question 5: Predictors of Health Literacy Knowledge**

Research question 5 sought to answer the question; does a model exist that explains the variance in knowledge of health literacy as measured by the HL-KES? The potential explanatory variables that were used in this analysis were age, gender, ethnicity, prior educational experiences, certifications, GPA, the frequency of interaction with healthcare providers for their own personal healthcare needs or the healthcare needs of a significant other and health literacy...
experiences. A forward multiple regression analysis was conducted to evaluate how well the selected characteristics of senior level baccalaureate nursing students enrolled in state universities in Louisiana explain health literacy knowledge.

Health literacy raw scores, a continuous variable, functioned as the dependent variable in the multiple regression analysis (MRA). Respondents were directed to record age in years and GPA in required nursing courses at the beginning of the semester that data collection occurred. Both variables were continuous data. The variables frequency of interaction with healthcare providers for personal healthcare needs or the healthcare needs of a significant other and prior education experiences were ordinal data, treated as interval data for the multiple regression analysis (MRA). The categorical variables gender and certification in an area of healthcare were both dichotomous independent variables and therefore did not require recoding. The categorical data ethnicity was recoded for the multiple regression analysis. Part 3 of the HL-KES offered three choices for participants to respond to ethnicity: White, African American, and Other. The decision was made to remove the ethnicity category of “other” from the MRA because this category did not clearly delineate an ethnic group. The two factors identified as a result of the factor analysis on the nine-item health literacy experience scale, “Core Health Literacy Experience” and “Technology Health Literacy Experiences” were entered as two distinct variables for the MRA.

All data was examined for outliers by examining the standardized and studentized residuals. Standardized residuals (ZRESID) greater than 2 were considered possible outliers as recommended by Pedhazur (1997). The formula provided by Pedhazur (1997) $t_{cv} = N - K - 1$ was used to calculate studentized residuals (SRESID) and SRESID values greater than the $t_{cv}$ were viewed as a possible outlier. The data set was sorted in ascending order and cases 32 through 40 were identified as possible outliers based on ZRESID and SRESID scores. Further
analysis of outliers was conducted through examination of influential observations. Cook’s D values greater than 1 and leverage values greater than .5 were viewed as influential data. No Cook’s D or leverage value exceeded these parameters for influential observations. One survey, previously mentioned under the discussion of Research Question 2, was eliminated from the data file because the participant entered 11 for age, answered “a” to all items in Part 1 of the HL-KES, and “always” to all items in Part 2 of the HL-KES. The age entry of 69 and GPA entry of 4.99 were recoded as missing data. It was also anticipated that some health literacy scores might appear as outliers since the extent to which health literacy content was presented in the nursing curriculum was uncertain. The data collected for the study was self-reported, and since the purpose of the study was to assess the health literacy knowledge and experiences of participants based on their responses, it was decided to retain the data identified as outliers in cases 32 through 40.

To determine if the sample size (N= 323) was adequate for the MRA Cohen’s (1987) formula for power analysis was utilized. An alpha level of 0.5, a moderate effect size of 0.13, and power of 0.80 were selected for calculating the power analysis. When eight predictor variables were entered into the formula with the selected values for alpha, effect size and power a minimum sample size of 118 was calculated indicating that the sample size for the MRA was more than adequate.

A plot of residuals was constructed to test for the assumptions of normality, linearity, and homoscedasticity within the multiple regression analysis. Although the majority of residuals appear to be at the center of the scatterplot for each value of the predicted score, the distribution of plots indicates that there may be a slight deviation from normality. The researcher decided not to transform the data because of the difficulty it may present in interpretation of the results. The scatterplot does appear oval in shape indicating even distribution of the residual scores above and
below zero, suggesting a linear relationship between the independent and dependent variables (Princeton University Data and Statistical Services. 2006). The scatterplot also suggests that assumption of homoscedasticity has been met since the data is not scattered evenly about the line of best fit (Pedhazur, 1997). Figure 2 presents the scatterplot of standardized predicted values and standardized residual values.

Analysis of the Pearson product-moment correlations revealed that the independent variables gender, prior educational experiences, and frequency of interaction with healthcare providers were not significantly related to the dependent variable; therefore, they were removed from the MRA. The independent variable most significantly correlated with the dependent variable health literacy knowledge was Technology Health Literacy Experiences. Table 15 presents the results of the Pearson product-moment correlation significant levels with the independent variables removed from the MRA presented in bold face.
Table 15. Pearson Product-Moment Correlations Between the Independent Variables and Dependent Variable Health Literacy Knowledge Scores.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>N</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>350</td>
<td>.03</td>
<td>.252</td>
</tr>
<tr>
<td>Frequency of Interaction with a Healthcare Provider</td>
<td>347</td>
<td>.04</td>
<td>.206</td>
</tr>
<tr>
<td>Prior Educational Experiences</td>
<td>347</td>
<td>.07</td>
<td>.094</td>
</tr>
<tr>
<td>Age</td>
<td>346</td>
<td>.09</td>
<td>.044</td>
</tr>
<tr>
<td>Ethnicity White</td>
<td>356</td>
<td>.12</td>
<td>.010</td>
</tr>
<tr>
<td>GPA</td>
<td>334</td>
<td>.14</td>
<td>.004</td>
</tr>
<tr>
<td>Ethnicity African American</td>
<td>359</td>
<td>-.14</td>
<td>.004</td>
</tr>
<tr>
<td>Core Health Literacy Experiences</td>
<td>357</td>
<td>-.14</td>
<td>.004</td>
</tr>
<tr>
<td>Certification in an Area of Healthcare</td>
<td>349</td>
<td>-.17</td>
<td>.001</td>
</tr>
<tr>
<td>Technology Health Literacy Experiences</td>
<td>357</td>
<td>-.21</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note. Variables in bold font are not significantly correlated to the dependent variable and were not incorporated in the regression analysis.

The forward method was utilized to enter the remaining predictor variables: certification in an area of healthcare, age, GPA, ethnicity White, ethnicity African American, Core Health Literacy Experiences, and Technology Health Literacy Experiences into the MRA. To conduct the MRA, the probability of $F$ to enter the equation was set at .05. Five variables entered the model to explain a total of 11.6% of the variance in the dependent variable health literacy knowledge scores.

The independent variables included in the analysis were examined for the presence of collinearity. Variance inflation factors (VIF) of included variables ranged between 1.027 and 1.062 with VIF values of excluded variables, Ethnicity White and “Core Health Literacy Skills”, 2.648 and 1.332 respectively. The tolerance levels of independent variables included in the model ranged between .942 and .973 with tolerance levels of excluded variables, Ethnicity White and “Core Health Literacy Skills”, .378 and .751 respectively. These results suggest that multicollinearity was not present among the variables included in the MRA (Hair et al., 1998).

Five independent variables entered the forward multiple regression analysis model with health literacy knowledge as the dependent variable: Technology Health Literacy Experiences,
certification in an area of healthcare, GPA, age, and ethnicity African American. Results of the Oneway analysis of variance (ANOVA) presented in Table 16 demonstrates that the linear combination of Technology Health Literacy Experiences, certification in an area of healthcare, GPA, age, and ethnicity African American significantly related to health literacy knowledge ($F_{5,23} = 8.45, p< .001$).

Table 16. Results from the Analysis of Variance for the Forward Multiple Regression Analysis of Health Literacy Knowledge Scores.

<table>
<thead>
<tr>
<th>Model</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>$F^a$</th>
<th>$p^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>588.26</td>
<td>5</td>
<td>117.65</td>
<td>8.48</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Within Groups</td>
<td>4478.83</td>
<td>323</td>
<td>13.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5067.09</td>
<td>328</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Independent variables included in the Regression Model: Technology Health Literacy Experiences, Certification, Grade Point Average, Age, and Ethnicity African American. Dependent variable: Health Literacy Knowledge Scores.

$^a$One Way Analysis of Variance

$^b$.05 Alpha Level for the 2 Tailed Test of Significance

The first independent variable to enter the model was technology health literacy experiences, which explained 4.5% of the variance in the dependent variable. Certification in an area of healthcare entered the model next to explain another 2.1% of the variance in health literacy scores and the remaining variables GPA, age and ethnicity African American explained the remaining 5% of the variance in the dependent variable. The independent variables Technology Health Literacy Experiences, certification in an area of healthcare, GPA, age, and ethnicity African American explained a total of 11.6% of variance in health literacy knowledge.

The following standards for interpreting effect size developed by Cohen (1988) were utilized to interpret the results of the MRA: R2 greater than .0196 = small effect size, R2 greater than .13 =
moderate effect size, and R2 greater than .26 = large effect size. The results of the forward multiple regression analysis revealed a small effect size according to Cohen’s (1988) guidelines.

Tables 17 through 19 present the model summary for the forward multiple regression analysis of health literacy knowledge scores.

Table 17. Model Summary for the Forward Multiple Regression Analysis of the Health Literacy Knowledge Scores.

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>SEE</th>
<th>R² Change</th>
<th>F Change</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>.21</td>
<td>.045</td>
<td>.04</td>
<td>3.84</td>
<td>.04</td>
<td>15.41</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2b</td>
<td>.25</td>
<td>.066</td>
<td>.06</td>
<td>3.80</td>
<td>.02</td>
<td>7.46</td>
<td>.007</td>
</tr>
<tr>
<td>3c</td>
<td>.28</td>
<td>.083</td>
<td>.07</td>
<td>3.78</td>
<td>.01</td>
<td>5.97</td>
<td>.015</td>
</tr>
<tr>
<td>4d</td>
<td>.32</td>
<td>.102</td>
<td>.09</td>
<td>3.74</td>
<td>.01</td>
<td>6.87</td>
<td>.009</td>
</tr>
<tr>
<td>5e</td>
<td>.34</td>
<td>.116</td>
<td>.10</td>
<td>3.72</td>
<td>.01</td>
<td>5.05</td>
<td>.025</td>
</tr>
</tbody>
</table>

aVariables included in the Regression Model; Technology Health Literacy Experiences.
bVariables included in the Regression Model: Technology Health Literacy Experiences and Certification.
cVariables included in the Regression Model: Technology Health Literacy Experiences, Certification, and Grade Point Average (GPA).
dVariables included in the Regression Model: Technology Health Literacy Experiences, Certification, GPA, and Age.
eVariables included in the Regression Model: Technology Health Literacy Experiences, Certification, GPA, Age, and Ethnicity African American.

Table 18. Standardized and Unstandardized Coefficients for the Variables Included in the Forward Multiple Regression Analysis of the Health Literacy Knowledge Scores.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>13.97</td>
<td>2.32</td>
<td>6.02</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Technology Health Literacy Experiences</td>
<td>-0.99</td>
<td>0.30</td>
<td>-3.28</td>
<td>.001</td>
</tr>
<tr>
<td>Certification</td>
<td>-1.40</td>
<td>0.48</td>
<td>-2.90</td>
<td>.004</td>
</tr>
<tr>
<td>Grade Point Average</td>
<td>1.47</td>
<td>0.58</td>
<td>2.54</td>
<td>.012</td>
</tr>
<tr>
<td>Age</td>
<td>0.10</td>
<td>0.03</td>
<td>2.74</td>
<td>.006</td>
</tr>
<tr>
<td>Ethnicity: African American</td>
<td>-1.50</td>
<td>0.66</td>
<td>-2.24</td>
<td>.025</td>
</tr>
</tbody>
</table>
Table 19. Excluded Variables, Standardized Coefficients, t Values, Significant Levels, Partial Correlations, Tolerance Levels, and Variance Inflation Factors (VIF) for the Forward Multiple Regression Analysis of Health Literacy Knowledge Scores.

<table>
<thead>
<tr>
<th>Variables Excluded from Final Model</th>
<th>Beta in</th>
<th>t</th>
<th>p</th>
<th>Partial correlation</th>
<th>Collinearity statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>Ethnicity: White Core Health Literacy Experiences</td>
<td>.01</td>
<td>.21</td>
<td>.833</td>
<td>.01</td>
<td>.378</td>
</tr>
<tr>
<td></td>
<td>-.03</td>
<td>-.53</td>
<td>.596</td>
<td>-.03</td>
<td>.75</td>
</tr>
</tbody>
</table>
CHAPTER 5
SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

Purpose and Research Questions.

The purpose of this study was to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students currently enrolled in baccalaureate nursing programs at state universities in Louisiana. In addition, this study sought to determine what factors may be related to the health literacy knowledge of senior level baccalaureate nursing students currently enrolled in baccalaureate nursing programs at state universities in Louisiana. The following research questions were addressed in this study:

1. What are the selected characteristics of senior level baccalaureate nursing students enrolled in state universities in Louisiana, namely, age, gender, ethnicity, prior educational experiences, certifications, grade point average (GPA), and frequency of interaction with healthcare providers for their own personal healthcare needs and or the healthcare needs of a significant other?

2. What is the health literacy knowledge of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the Health Literacy Knowledge and Experience Survey (HL-KES)?

3. What are the health literacy experiences of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES?

4. Does a relationship exist between the health literacy experiences and the health literacy knowledge of senior level baccalaureate nursing students enrolled in schools of nursing at state universities in Louisiana as measured by the HL-KES?
5. Does a model exist that explains the variance in knowledge of health literacy as measured by the HL-KES? The potential explanatory variables that will be used in this analysis were age, gender, ethnicity, prior educational experiences, certifications, GPA, the frequency of interaction with healthcare providers for their own personal healthcare needs or the healthcare needs of a significant other, and health literacy experiences.

**Procedures.**

The target population for this research study was senior level baccalaureate nursing students enrolled in the last semester of required clinical courses in a school of nursing (SON) at a state university in Louisiana. Because this was a relatively small population, the researcher chose to conduct a census population study.

Eight of nine baccalaureate nursing programs at state universities in Louisiana agreed to participate in the study. Data collection took place between the Spring of 2006 and Fall of 2006. During this time the total enrollment for all eight baccalaureate nursing programs participating in the study was 395. A total of 361 students consented to participate in the study.

The Health Literacy Knowledge and Experience Survey (HL-KES) was created for the purposes of this study following a review of the literature that indicated that there is no existing instrument available that would be appropriate for gathering the data required for this study. There are three sections included in the instrument: health literacy knowledge, health literacy experiences, and demographic data (Appendix C). The weighted importance of the content areas for test construction was derived from the review of literature. Five content areas were identified as pertinent to assessing the health literacy knowledge of senior level baccalaureate nursing student: basic facts on health literacy, consequences associated with low health literacy skills, health literacy screenings, guidelines for writing healthcare materials, and evaluation of health literacy interventions.
The first three cognitive levels identified by Bloom: knowledge, comprehension, and application were utilized for test construction. The researcher anticipated that questions written at the analysis, synthesis, and evaluation level were intellectual behaviors beyond those expected of a senior level baccalaureate nursing student in the area of health literacy and were therefore omitted.

Five content experts in the areas of health literacy, nursing education, and nursing research rated the content validity of the HL-KES. Data analysis indicated that there was 98% agreement among the content experts on the content validity of items included on the HL-KES. This exceeds the recommended rating of 80% for new measures (Davis, 1992) indicating that the items included on the HL-KES were very relevant to assessing the knowledge and experiences of health literacy among senior level baccalaureate nursing students.

The pilot study was conducted with junior level baccalaureate nursing students. An item analysis was then conducted that included calculation of the item difficulty index and item discrimination index for each item on Part 1 of the HL-KES. After revisiting comments made by content experts and data from the pilot study final revisions were made to Part 1 of the HL-KES for distribution of the HL-KES to the census population.

The researcher conducted data collection in seven of the eight nursing schools participating in the study on a date scheduled with nursing faculty from each institution. A nursing faculty member served as a research assistant in one SON; however, it was necessary for the researcher to make a follow-up visit to that SON for data collection because of unforeseen circumstances that contributed to a poor response rate on the initial date scheduled for data collection.

The HL-KES was distributed to senior level baccalaureate nursing students during scheduled class time. After receiving a brief description of the purpose of the study and
directions for completing the HL-KES, students were guaranteed anonymity, reassured that completing the HL-KES would have no influence on any of their course grades, and informed that completion of the survey indicated informed consent for participation in the research study (Appendix C). A total of 361 students agreed to participate in the study. This was a descriptive study using quantitative data. The statistical program SPSS was used by the researcher to compile and analyze the data.

Summary of Findings

Research Question 1: Selected Characteristics of Respondents. Research Question 1 sought to answer the question, what are the selected characteristics of senior level baccalaureate nursing students enrolled in state universities in Louisiana namely: age, gender, ethnicity, prior educational experiences, certifications, grade point average (GPA), and frequency of interaction with healthcare providers for their own personal healthcare needs and or the healthcare needs of a significant other? Findings indicate that the majority of senior level baccalaureate nursing students enrolled at state universities in Louisiana were white females with an average age of 25 and an average GPA of 3.2. The majority of senior level baccalaureate students reported that they were not certified in another area of healthcare and held no prior educational degrees. In addition, the majority of participants reported interaction with a healthcare provider at least once a year for personal healthcare needs or the healthcare needs of a significant others.

Research Question 2: Health Literacy Knowledge. Research Question 2 sought to answer the question, what is the health literacy knowledge of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the Health Literacy Knowledge and Experience Survey (HL-KES)? The mean health literacy score was 17.2 (SD = 3.93) suggesting that senior level baccalaureate nursing student’s who participated in the study have some health literacy knowledge, but knowledge gaps exist.
To identify knowledge gaps analysis of the responses to the HL-KES was conducted within the five content areas identified as pertinent to assessing the health literacy knowledge of senior level baccalaureate nursing student: 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 majority of participants (63.1%) correctly identified the behaviors associated with functional health literacy skills; however, responses from the remaining 36.9% suggest that many senior level baccalaureate students do not have a basic understanding of the definition of health literacy. Responses did indicate that the majority of respondents (62.8%) were aware that although low health literacy skills are common among all ethnic groups, low-income minority patients are a high-risk group. In fact, senior level baccalaureate students associate socioeconomic status so closely with low health literacy skills that an overwhelming number of respondents (65.0%) chose socioeconomic status over the correct answer, even though literacy is the best predictor of healthcare status. The fact that participants chose socioeconomic status over literacy as the best predictor of healthcare status may indicate that participants may underestimate the impact that literacy has on an individual’s healthcare status.

Participants were less familiar with the prevalence of low health literacy skills among older adults. In fact, less than half of the respondents (48.6%) knew that low health literacy skills were more prevalent among individuals 65 years of age and older than any other age group. Another knowledge gap exists regarding the use of grade level as an indicator of health literacy skills. Based on their responses a large percentage of participants (50.8%) were not cognizant of the fact that most individual’s read three to five grade levels lower than the last year of school completed and that the last grade completed in school is not an accurate reflection of an individual’s reading ability.
Responses to questions concerning the consequences of health literacy suggest that students have a strong understanding of this content area. The majority of senior level baccalaureate nursing students participating in the study were able to discern that patients with low health literacy skills are diagnosed late, have fewer treatment options, are less likely to participate in preventative healthcare, and have difficulty applying healthcare information to their healthcare situation. Participants’ responses also suggest that senior level baccalaureate nursing students are aware that individuals with low health literacy skills will often pretend to read information given to them as a means of coping with low health literacy skills.

Analysis of the responses for health literacy screenings suggests that most participants (83.3%) were able to choose the best approach to conducting an assessment of health literacy skills and another (68.1%) recognized that health literacy screenings increased the effectiveness of healthcare teaching provided by the nurse. Participants (88.9%) were also aware that individuals with low health literacy skills often experience shame and will not readily admit that they have difficulty reading when provided with healthcare materials. As expected participants demonstrate limited knowledge of the Rapid Estimate of Adult Literacy in Medicine (REALM) and the Test of Functional Health Literacy (TOFHLA), the two health literacy screening tools referred to most frequently in the literature.

The area of greatest concern, within the content area of health literacy screenings was the participants’ association of educational level with low health literacy skills. Only 49.7% of senior level baccalaureate nursing students surveyed indicated that having the patient read the label on a medication bottle would be the best estimate of a patient’s reading skills. Another 34.2% indicated that determining the patient’s last grade level completed was the best estimate of a patient’s reading skills. Although inaccurate, this approach to determining the reading skills of a patient is commonly used in the clinical setting.
Findings from analysis of the content area, guidelines for writing healthcare materials, suggest that the most participants (68.9%) were aware of the importance of illustrations to improve the understanding of healthcare materials. Students also seem knowledgeable regarding the recommendations for the typography and layout for healthcare materials. With regard to recommendations for appropriate word choices; however, only a slim majority of participants (57.8%) chose a heading for a brochure on hypertension that reflective recommendations to use a questions answer format with common terms. Several students (35.3%) instead chose a heading that included the term hypertension in lieu of high blood pressure. It is also apparent that a large portion of senior level baccalaureate nursing students (62.5%) do not know that fifth grade is the recommended reading level for healthcare materials (Office of Communication, Center for Disease Control and Prevention (CDC), 1999). Respondents are unfamiliar with the Fry Readability Method, a method recommended by the CDC to evaluate the readability level of written documents before use for healthcare teaching. An additional finding of interest is that although the majority of participants (70.6%) recognized that the first step in developing healthcare materials was to find out from the target audience what they need to know, when questioned about the best way to ensure the culturally appropriateness of healthcare materials less than half of respondents (44.7%) would include community members in the design of the materials.

With regards to evaluating health literacy interventions students 64.6% chose the “teach back” method as the most effective way for nurses to evaluate a patient’s understanding of healthcare information. A note of interest, however, is that 19.1% of participants indicated that a pre-test post-test would be the most effective way to evaluate how well a patient with low health literacy skills understood healthcare teaching.
**Research Question 3: Health Literacy Experiences.** Research Question 3 sought to answer the question, what are the health literacy experiences of senior level baccalaureate nursing students enrolled in state universities in Louisiana as measured by the HL-KES? The factor analysis revealed that two factors were responsible for explaining 57.15% of the variance in health literacy experiences. Factor One consisted of six variables and was assigned the label of “Core Health Literacy Experiences”. Three variables loaded onto Factor Two and this factor was assigned the label “Technology Health Literacy Experiences”. The reliability rating for the nine-item scale was exemplary (Robinson, Shaver, & Wrightsman, 1991). The reliability ratings for the two subscales are extensive (Robinson, Shaver, & Wrightsman, 1991).

The overall mean for the nine-item scale was 2.04 (SD = .53) indicating that students reported participating in the health literacy experiences included on the nine-item scale “sometime”. The overall mean for the “Core Health Literacy Experiences” and “Technology Health Literacy Experiences” subscales were 2.22 (SD = .57) and 1.69 (SD = .69) respectively. These results suggest that the health literacy experiences of senior level baccalaureate nursing students are somewhat limited. In fact, only one health literacy experience had an item mean rating of “frequently”, and that was the opportunity to use written healthcare information to provide information to individuals and or community groups. What is disturbing about this finding is that although participants reported “frequent” use of written healthcare materials to provide healthcare information, they reported evaluating the reading level, use of illustration, and cultural appropriateness of those materials only “sometime”.

**Research Question 4: Relationship between Health Literacy Experiences and Health Literacy Knowledge.** Research Question 4 sought to answer the question, does a relationship exist between the health literacy experiences and health literacy knowledge of senior level baccalaureate nursing students enrolled in schools of nursing at state universities in Louisiana as
measured by the HL-KES? Findings for Research Question 4 revealed a low negative statistically significant relationship between health literacy experiences and health literacy knowledge. Although statistically significant, the nine-item health literacy experience scale and the two subscales have a low association with health literacy knowledge. In addition, the negative $r$ value for the nine-item health literacy scale and the two health literacy subscales suggest that as health literacy knowledge increases with fewer health literacy experiences.

**Research Question 5: Predictors of Health Literacy Knowledge.** Research question 5 sought to answer the question, does a model exist that explains the variance in knowledge of health literacy as measured by the HL-KES? The potential exploratory variables that were used in this analysis were age, gender, ethnicity, prior educational experiences, certifications, GPA, the frequency of interaction with healthcare providers for their own personal needs or the healthcare needs of a significant other. The multiple regression analysis revealed that five variables: Technology Health Literacy Experiences, certification in an area of healthcare, GPA, age, and ethnicity African American entered the regression equation to explain a significant ($F=8.48$, $p < .001$).

The variable “Technology Health Literacy Experiences” emerged as a predictor of health literacy scores in the first to explain 4.5% of variance in health literacy knowledge. Certification in some area of healthcare entered the model next to explain another 2.1% of the variance in health literacy knowledge. The remaining variables GPA, age, and ethnicity African American entered to explain the remaining 5.0% of variance in health literacy knowledge. Technology Health Literacy Experiences, certification in an area of healthcare, GPA, age, and ethnicity African American explained a total of 11.6% of the variance in health literacy knowledge, a small effect size according to the standards established by Cohen (1988).
Conclusions

Conclusion One

The ethnicity of the majority of senior level baccalaureate nursing students enrolled in state universities in Louisiana is White.

The census population of senior level baccalaureate nursing students enrolled at state universities in Louisiana is not reflective of statewide enrollment by ethnicity as reported by the Louisiana Board of Regents (2003). The Louisiana Board of Regents conducted a statewide student profile that included all full time students enrolled in state universities in Louisiana. African American students account for 28.89% of student enrollment in four-year programs offered by state universities in Louisiana. Another 4.45% of the student population is comprised of students reporting their ethnicity as Asian, American Indian, or Hispanic. Only 10.8% of senior level baccalaureate nursing students reported their ethnicity as African American and 6.4% of participants reported their ethnicity as “other” on the HL-KES.

Conclusion Two

Senior level baccalaureate nursing students enrolled at state universities in Louisiana are entering the workforce with some health literacy knowledge, but whether it is sufficient to meet the healthcare needs of those seeking healthcare in Louisiana is questionable.

Nurses assume a major role in educating healthcare consumers about their healthcare needs; therefore, it is critical that nurses have a working knowledge of health literacy and strategies to improve the health literacy skills of their patients. Although, participants responses indicated knowledge of consequences associated with low health literacy skills and evaluation of health literacy interventions, results from the study suggest that senior level baccalaureate nursing students are entering the workforce with knowledge gaps in health literacy; particularly
in the areas of identifying older adults as a high risk group, conducting health literacy screenings, and implementing health literacy interventions.

**Conclusion Three**

The health literacy experiences of senior level baccalaureate nursing students enrolled in state universities in Louisiana are limited in several areas: conducting health literacy screenings, assessing the readability level of written healthcare materials, and assessing the cultural relevance of written healthcare materials for an individual or specific community group. In addition, nursing students do not appear to have much experience using alternative teaching materials such as, audiotapes, videotapes, or computer assisted instruction when providing healthcare teaching either to an individual or community group.

**Conclusion Four**

There is a low association between health literacy experiences and health literacy knowledge.

The statistically significant inverse correlation that exists between health literacy experiences and the two subscales, Core Health Literacy Experiences and Technology Health Literacy Experiences, and health literacy knowledge is perplexing. One would think that health literacy experiences would increase health literacy knowledge scores; however, results of the study suggest that students with higher health literacy knowledge scores had fewer health literacy experiences. This may be a function of better test taking skills among a certain group of students, or it might indicate that students are provided with health literacy content in cognitive courses but not given an opportunity to implement this information in the clinical setting.

**Conclusion Five**

Technology Health Literacy Experiences, certification in an area of healthcare, GPA, age, and ethnicity African American explain a small portion of the variance in health literacy scores.
Although the findings may direct future research, the conclusions drawn from the forward multiple regression analysis should be read with caution since the results of the study revealed a small effect size.

It is not certain as to why students who reported fewer “Technology Health Literacy Experiences” scored higher in health literacy knowledge. This may suggest that health literacy content may be presented in cognitive courses; however, participants may not have had access to audiotapes, videotapes, and computer assisted instruction to provide healthcare instruction in the clinical lab setting.

The entry of the variable, certification in an area of healthcare, with a negative beta value suggests that students coming into baccalaureate nursing programs with some type of certification in an area of healthcare scored lower in health literacy. This supports King, Schlundt, Pichert, Kinzet, and Backer (2002) claim that healthcare providers, “…rarely receive training in effective teaching techniques.”

Older students and students with higher GPA’s had more knowledge in health literacy. Results of the forward multiple regression analysis also indicate that students reporting the ethnicity “African American” scored lower in health literacy knowledge.

**Implications and Recommendations**

Nurse educators in Louisiana need to address the low enrollment of qualified minority students in baccalaureate nursing programs at state universities. School of Nursing Administrators should develop initiatives to recruit qualified minority students since increasing the number of nurses from minority groups may have a positive impact on health literacy skills of individuals in high risk groups (Evans & Greenberg, 2006, Mullins, Blatt, Gbarayor, Yang, & Baquet, 2005). In addition, nursing faculty at state universities in Louisiana should develop and
implement mentoring programs for minority students to ensure the retention and graduation of these underrepresented cultural groups (Klisch, 2000).

Nursing educators in Louisiana have an obligation to prepare nursing students to assume the professional roles of the nurse in a variety of healthcare settings. Delineating priority content areas and clinical experiences can be difficult when confronted with the overwhelming pace of new discoveries in medical technology and nursing research (Sorrell, 2006). After all, the program objectives for most baccalaureate nursing schools are to prepare a generalist, and the reality is that many facets of nursing are learned after graduation with on the job training. Nurses, however, have traditionally demonstrated a strong commitment to patient education and view this as a strong component of their professional practice (Marcum, Ridenour, Shaff, Hammons, & Taylor, 2002; Roberts, 2004). Nurses need to be able to identify patients with low health literacy skills and implement effective teaching strategies that will help them understand healthcare information and make informed decisions about their healthcare. 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).

The nursing faculty in baccalaureate nursing schools in Louisiana should examine the health literacy content in nursing programs. Louisiana ranks forth in overall poverty and poverty among children in the nation (Council for a Better Louisiana, 2003). According to the United States Department of Health and Human Services Administration on Aging (2005), persons over the age of 65 require more frequent hospitalizations and incur higher healthcare expenditures than any other age group. These statistics suggests that a large percentage of healthcare recipients in Louisiana are at high risk for low health literacy. Graduates from baccalaureate nursing programs in Louisiana need to be more aware of the unique needs of individuals with
low health literacy skills so that they are able to plan and implement effective healthcare teaching. Senior level baccalaureate nursing students’ exposure to health literacy within the nursing curricula needs to be more comprehensive. This may require nursing faculty to update their own health literacy knowledge through continuing education. Increasing awareness and knowledge of health literacy knowledge among nursing faculty will facilitate the integration of health literacy content in both cognitive and clinical lab nursing courses.

If health literacy knowledge gaps exist with the baccalaureate nursing curricula, it is possible that knowledge gaps exists among practicing nurses in Louisiana. The health literacy knowledge and skills of practicing nurses should be the focus of future research to ensure that consumers of healthcare in Louisiana are receiving healthcare information that is understandable. Every effort should be made to raise the health literacy awareness and knowledge of practicing nurses; for it is the right of every patient to receive healthcare information in a manner in which is understandable. It would also be interesting to explore the different levels of health literacy knowledge and experiences among registered nurses and advanced practice nurses. This information may prove useful to both undergraduate and graduate nursing faculty when planning educational experiences for students.

Nursing faculty need to provide more health literacy experiences, in a variety of healthcare settings, to nursing students enrolled in baccalaureate nursing schools. Nursing students need more experience checking the reading level of healthcare materials. It is unacceptable that participants reported using written healthcare materials “frequently” and testing the readability level of these materials only “sometime”. Although it is appropriate for nurses to use pamphlets and brochures developed for the sole purpose of healthcare teaching, nurses must serve as a patient advocate and determine if written healthcare materials are appropriate for an individual or a select community group. Senior level baccalaureate nursing
students should be required to assess the reading level of all written healthcare materials before using them for patient teaching. This should be an integral part of the clinical component of the baccalaureate nursing curricula.

Of additional concern is the lack of experience regarding the use of health literacy screening tools. Although there is some debate over the practical use of formal health literacy screening tools in the clinical area (Sorrell, 2006), many recognize the important role these tools have in helping nurses match the reading ability of patients to the reading level of healthcare materials (Baker, Williams, Parker, Gazmararian, & Nurss, 1999; Foltz, 1998; Hartsell, 2005). These different opinions regarding the use of health literacy screening tools may exist among nursing faculty and explain why senior level baccalaureate nursing students report using health literacy screening tools only “sometime”. If nursing faculty are not familiar with health literacy screening tools and have not utilized these tools during their own clinical practice, they may not consider this a priority content area for instruction. With that being said, it should be noted that even those that feel that health literacy screening tools are too cumbersome for the clinical area do recognize the importance of conducting some type of rudimentary assessment of a patient’s ability to read. At the very least, it is recommended that the nurse have the patient read a passage from written healthcare materials as a means of determining reading ability (Sorrell, 2006). Although it is positive that the majority of senior level baccalaureate nursing students indicated that they would implement this basic reading assessment, it is disturbing that a strong segment of participants instead indicted that grade level is the best indicator of reading ability. This is basic information about how to conduct a health literacy screening. Content related to health literacy screening tools should, at a minimum, be presented in cognitive courses. There should also be multiple opportunities for nursing students to perform some form of health literacy screening on
individuals throughout the nursing curricula. Nursing faculty need to directly observe students performing this skill to evaluate the student’s competency in this area.

The delivery of effective health literacy interventions is dependent on the ability of nurses to deliver information within the context of an individual’s culture. The demographic profile of senior level baccalaureate nursing students may present challenges to them as they enter the healthcare arena and are required to communicate healthcare information to individuals from diverse cultural groups. Although incorporating cultural competence training within nursing curriculums is taking place (Caffrey, Neander, Markle, & Stewart, 2005; Evans & Greenberg, 2006, Kennell, Nyback, & Ingalsbe, 2005) results from this study indicated that participants have limited experiences in assessing the cultural appropriateness of healthcare materials and do not seem to understand the importance of obtaining input of community members in the development of healthcare materials. This may be reflective of the lack of formal training in transcultural nursing among nursing faculty discovered in a study conducted by Sealey, Burnett, and Johnson (2006). There is a strong cultural component within the content of health literacy that should be addressed within nursing curricula at state universities in Louisiana. More specifically, nursing faculty need to link health literacy interventions to components of cultural competence.

Additional research should be conducted by nurse educators to examine the relationship between health literacy experiences and health literacy knowledge more closely. Experimental studies that compare health literacy knowledge among students engaged in different levels of health literacy experiences would be beneficial to nurse educators responsible for planning educational experiences for students. The two factors that emerged as constructs to explain the variance in health literacy experiences: “Core Health Literacy Experiences” and “Technology Health Literacy Experiences” also warrant further study.
Nursing educators should continue to explore factors that may influence the health literacy knowledge of senior level baccalaureate nursing students. Although results of the study revealed a small effect size, some implications for nursing practice can be inferred. The nursing shortage has prompted many schools of nursing to take a hard look at required nursing courses for applicants entering the program with work experience in healthcare. Lower health literacy scores among participants with some type of certification in healthcare may have implications for nursing programs offering a fast track curriculum for this student population and should be further researched.

Age as a predictor of health literacy knowledge should be explored further in nursing research. As the number of non-traditional students enrolling in nursing programs continues to rise nurse educators should consider how their life experiences impact learning. These students may assume the role of caregiver within their family and are more aware of the issues of health literacy.

Klisch (2006) highlights the high attrition rate among minority students in nursing and attributes this problem to the multiple challenges that these students are confronted with, especially those who speak English as a second language. It is not clear what factors may have contributed to lower health literacy scores among African American senior level baccalaureate nursing students, and it is recommended that the influence of ethnicity on health literacy scores be the focus of future research.
REFERENCES


APPENDIX A
LOUISIANA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD FOR
PROTECTION OF HUMAN SUBJECTS APPROVAL LETTER

APPLICATION FOR EXEMPTION FROM INSTITUTIONAL OVERSIGHT

Unless they are qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/projects
using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or
exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

Instructions: Complete this form.

Exemption Applicant: If it appears that your study qualifies for exemption send:

(A) Two copies of this completed form,
(B) a brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts A & B).
(C) copies of all instruments to be used. If this proposal is part of a grant proposal include a copy of the proposal
and all recruitment material.
(D) the consent form that you will use in the study. A Waiver of Written Informed Consent is attached and must be completed
only if you do not intend to have a signed consent form.
(E) Certificate of Completion of Human Subjects Protection Training at http://lcm.e.cancer.gov/clinicaltrials/learning/humanparticipant-
protections.asp. (Unless already on file with the IRB.)

to: ONE screening committee member (listed at the end of this form)in the
most closely related department/discipline or to IRB office.

If exemption seems likely, submit it. If not, submit regular IRB application. Help is available from Dr. Robert Mathews,
578-8692, irb@lsu.edu or any screening committee member.

Principal Investigator Cathy Cormier
Ph: 985-542-8121

E-mail: cormier@lsu.edu

Dept/Unit School of Human Resource Education and Workforce Development

If Student, name supervising professor Dr. Joe Kotlik
Ph: 225-576-5753

Mailing Address 408 Oak Hollow Dr., Hammond, LA 70401
Ph: 985-542-6121

Study exempted by
Louisiana State University
Institutional Review Board
203 B-1 David Boyd Hall
225-578-8692
Robert C. Mathews, Chair

Project Title: Health Literacy: The Knowledge and Experiences of Senior Level Baccalaureate Nursing Students

Agency expected to fund project: N/A

Subject pool (e.g. Psychology Students). Senior Level Baccalaureate Nursing Students (all over the age of 18)

Circle any “vulnerable populations” to be used: (children <18; the mentally impaired, pregnant women, the aged, other).

Projects with incarcerated persons cannot be exempted.

I certify my responses are accurate and complete. If the project
scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative
of all non-LSU institutions in which the study is conducted.

PI Signature __________________________ Date 3/4/06 (no per signatures)

Screening Committee Action: Exempted ___ Not Exempted ___ Category/Paragraph ___

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APPENDIX B

INSTITUTIONAL REVIEW BOARD FOR PROTECTION OF HUMAN SUBJECTS APPROVAL LETTERS FROM MCNEESE STATE UNIVERSITY, NICHOLLS STATE UNIVERSITY, NORTHWESTERN STATE UNIVERSITY, SOUTHEASTERN LOUISIANA UNIVERSITY, AND UNIVERSITY OF LOUISIANA LAFAYETTE

HSIRB
Human Subjects Institutional Review Board
McNeese State University
P.O. Box 90415
Lake Charles, LA 70609
(318) 475-5753

TO: Cathy Cormier

DATE: April 13, 2006

SUBJECT: Research

Dear Cathy:

We are pleased to inform you that the Human Subjects Institutional Review Board of McNeese State University has approved your research project, entitled "Health Literacy: The Knowledge and Experiences of Senior Level Baccalaureate Nursing students in Louisiana". Your proposal appears to be in compliance with the federal regulations concerning the use of human subjects.

Please retain this letter of approval and the proposal you submitted. If you have any questions, please contact me at (337) 475-5753.

Sincerely,

Peggy Wolfe, Ph.D.
HSIRB Chairperson

PW/dg
NICHOLLS STATE UNIVERSITY

Human Subjects Institutional Review Board

MEMORANDUM

TO: Cathy Cormier R.N., M.N.

FROM: J. Steven Welsh, Ph.D., Chairperson
Human Subjects Institutional Review Board
Nichols State University
P.O. Box 2075
Thibodaux, LA 70310

DATE: July 7, 2006

RE: Request to collect data at Nicholls State University

The HSIRB is in receipt of your request to conduct research involving human participants at Nicholls State University and the IRB Exemption approval from the Louisiana State University Institutional Review Board. You are authorized recruit subjects to complete your research project entitled Health Literacy: The Knowledge and Experiences of Senior Level Baccalaureate Nursing Students.

If you have additional questions, please do not hesitate to contact me at (985) 448-4370 or steven.welsh@nicholls.edu.
April 28, 2006

Ms. Cathy Cormier
408 Oak Hollow Dr.
Hammond, LA  70401

Dear Ms. Cormier:

Regarding your research proposal, "Health Literacy: The Knowledge and Experiences of Senior Level Baccalaureate Nursing Students in Louisiana." (proposal number 04.06.002), based on the information provided in your application and the additional information received on April 28, 2006, the project warrants the Exemption from Review Status.

Sincerely,

[Signature]

Marcelline Fuselier
Human Subjects IRB Chair

CC: Professor Joe W. Kotrlik
Institutional Review Board
Box 11851
Phone: 549-2077

DATE: March 29, 2006
TO: Cathy Cornier
FROM: Dr. Michelle Hall, Chair
RE: IRB Action on Proposed Project

This memo is to inform you of the IRB action with regard to your proposal:

Title: Pilot Study: Health Literacy: the Knowledge and Experiences of Senior Level Baccalaureate Nursing Students in the state of Louisiana

This proposal was given: Expedited Review: ______

                       Full Committee Review: ______

                       Exempt: X ______

The result was: Full Approval: X ______

                       Denied Approval: ______

If anything other than Full Approval is recommended, it is your responsibility, as investigator, to submit changes/corrections or plans to accommodate conditions listed below to the Office of Sponsored Research and Contracts prior to initiating the project.

Failure to acquire full approval by IRB before implementation for any project which involves humans or live vertebrate animals means that the PI is not acting in "good faith" with university policy and is not, therefore, guaranteed the protection of the university.

Committee Comments:

IRB Number: 2006-061
Proposal Number _SP06-35NURS

The University of Louisiana Lafayette Institutional Review Board
APPLICATION FOR REVIEW OF RESEARCH INVOLVING HUMAN SUBJECTS

For IRB approval, submit your proposal to: Evelyn Wills, Chair, U.L. Lafayette IRB in the College of Nursing and Allied Health Professions, V.L.Wharton Hall. If you have questions or wish to check the status of your proposal, please call the Chair of the IRB, Dr. Wills at 482-5607

Please fill in this application form completely. [Do not state, “refer to pages in proposal” for requested information.] Attach additional information to this form only after the space available for response to a given question has been used. All proposals and applications are to be typed or word processed.

RESPONSIBLE FACULTY OR STAFF
SUPERVISOR/INVESTIGATOR: Dr. Joe Kotlik

NAME OF INVESTIGATOR(S): (if different) Cathy Cormier

DEPARTMENT AND CAMPUS ADDRESS:
129 Old Forestry Bldg, BR, LA 70803-5477
Phone: 225-578-8753
email: jnkotlik@lsu.edu

DEPARTMENT AND CAMPUS ADDRESS: Home address: 408 Oak Hollow Dr Hammond, LA 70401 Phone: (H) 985-542-6121 (C) 985-974-4190 email: ccormier@selu.edu

This Application is for a: x Dissertation  

TITLE OF PROPOSAL/PROJECT: Health Literacy: The Knowledge and Experiences of Senior Level Baccalaureate Nursing Students

In making this application, I certify that I have read and understood the guidelines and procedures developed by The University of Louisiana Lafayette for the protection of human subjects and that I will comply with both the letter and the spirit of the University's policies. I further acknowledge my responsibility to report any significant changes in the protocol involving human subjects and to obtain written approval from the Institutional Review Board for these changes prior to making these changes. I understand that IRB approval extends for one year, and if the project continues beyond the date of approval, then I will notify the IRB and request a renewal.

Signature(s): Principal Investigator(s)/Faculty Sponsor

Student

Date Signed 1/13/06

For Thesis/Dissertation:

Signature, Dean of Graduate School

Date Signed

This proposal has been reviewed and approved by The University of Louisiana Lafayette Institutional Review Board for compliance with the Code of Federal Regulations 45 CFR 46, Protection of Human Subjects and as amended.

Approved: Chair, U.L. Lafayette -IRB

Date Approved 1/12/2006

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APPENDIX C
HEALTH LITERACY KNOWLEDGE AND EXPERIENCE SURVEY

Health Literacy Knowledge and Experience Survey

Introduction: Health literacy is the ability to read, understand and make informed decisions about health care. The purpose of this study is to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students enrolled at state universities in Louisiana.

Your participation in the study will contribute to the body of knowledge on health literacy and provide valuable information to nursing faculty responsible for developing a nursing curriculum that prepares nursing students with the skills needed to provide healthcare to individuals with low health literacy skills.

Your responses will be kept anonymous and in no way affect your grade in any nursing course. I encourage you to participate in this research study; however participation is optional for all students. Informed consent is implied with completion of the survey.

Part 1: Health Literacy Knowledge

Directions: Questions 1-29 are multiple-choice questions. Choose the best answer and record only one response for each question.

1. Low health literacy levels are most prevalent among which of the following age groups?
   ○ 16 to 24 years of age.
   ○ 25 to 34 years of age.
   ○ 35 to 44 years of age.
   ○ 45 to 54 years of age.
   ○ 65 years of age and older.

2. Low health literacy levels are common among:
   ○ African Americans.
   ○ Hispanic Americans.
   ○ White Americans.
   ○ All ethnic groups.

3. The research on health literacy indicates that:
   ○ the last grade completed is an accurate reflection of an individual's reading ability.
   ○ most individuals read three to five grade levels lower than the last year of school completed.
   ○ if an individual has completed high school they will be functionally literate.
   ○ if an individual has completed grammar school they will be functionally literate.

4. What is the likelihood that a nurse working in a public health clinic, primarily serving low-income minority patients, will encounter a patient with low health literacy skills?
   ○ almost never
   ○ occasionally
   ○ often
   ○ very often

5. The best predictor of healthcare status is:
   ○ socioeconomic status.
   ○ literacy.
   ○ gender.
   ○ educational level.

6. Patients with low health literacy skills:
   ○ rate their health status higher than those with adequate literacy skills.
   ○ experience fewer hospitalisations than those with adequate literacy skills.
   ○ are often prescribed less complicated medication regimes than those with adequate health literacy skills.
   ○ are often diagnosed late and have fewer treatment options than those with adequate health literacy skills.

7. Health behaviors common among patients with low health literacy skills include:
   ○ disinterest in learning about healthcare problems.
   ○ an unwillingness to make lifestyle changes necessary to improve health.
   ○ the inability to learn how to correctly take prescribed medications.
8. Patients cope with low health literacy skills by:
   - asking multiple questions about healthcare instructions that they do not understand.
   - exploring treatment options before signing surgical consent forms.
   - relying heavily on written healthcare instructions.
   - pretending to read information given to them by healthcare providers.

9. The nurse should keep in mind that individuals with low health literacy levels:
   - can understand written healthcare information if they are able to read it.
   - will not be able to learn about their healthcare needs.
   - have lower intelligence scores than average readers.
   - have difficulty applying healthcare information to their health situation.

10. The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to:
    - determine the reading level of written healthcare information.
    - assess the math skills of an individual required for medication administration.
    - evaluate the overall quality of written healthcare information.
    - assess the ability of an individual to read common medical terms.

11. When working with individuals who have low health literacy skills the nurse should keep in mind that these individuals:
    - may not admit that they have difficulty reading.
    - will readily share that they need assistance with written information.
    - will frequently ask questions about information they do not understand.
    - should not be expected to manage their healthcare since they cannot read.

12. Which of the following questions would provide the nurse with the best estimate of reading skills of the patient?
   - "What is the last grade you completed in school?"
   - "Do you have difficulty reading?"
   - "Would you read the label on this medication bottle for me?"
   - "Do you need eye glasses to read?"

13. Which statement best describes the Test of Functional Health Literacy? This instrument is:
    - used to assess the reading comprehension and numerical skills of an individual.
    - an effective tool for assessing the reading level of individuals.
    - used only with individuals who are not proficient in English.
    - recommended for determining the reading level of written healthcare materials.

14. What is the strongest advantage to conducting health literacy screenings? Health literacy screenings:
    - provide nurses with a good estimate of the educational level of individuals.
    - can be used to diagnose learning difficulties that serve as barriers to patient teaching.
    - assist healthcare agencies to comply with educational standards established by the Joint Commission on Accreditation of Health Organizations.

15. Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient?
    - "It is necessary for me to assess your reading level; this will take a few minutes, and it is very important."
    - "I need to conduct a test to see if you can read. Please read these words for me."
    - "I want to make sure that I explain things in a way that is easy for you to understand. Will you help me by reading some words for me?"
    - "I need to administer a reading test to you. If you cooperate this will not take long."

16. After providing written healthcare information to a patient he states, "Let me take this information home to read." This may be a clue to the nurse that the patient:
    - is in a hurry and does not have time for instruction.
    - is not interested in learning the information.
    - is noncompliant with healthcare treatments.
    - may not be able to read the materials.
17. An individual with functional health literacy will be able to:
   - follow verbal instructions but not written healthcare instructions.
   - read healthcare information but have difficulty managing basic healthcare needs.
   - read and comprehend healthcare information.
   - comprehend and actively participate in decisions concerning healthcare.

18. Which of the following is true with regards to written healthcare information?
   - Most healthcare information is written at an appropriate reading level for patients.
   - Illustrations can improve a patient's understanding of written information.
   - Patients are usually provided with information that they think is important to know about their healthcare status.
   - Overall patients comprehend written information better than verbal instructions.

19. The recommended reading level for written healthcare information is:
   - 5th grade.
   - 8th grade.
   - 10th grade.
   - 12th grade.

20. The first step in developing written healthcare information is to:
    - outline the content.
    - list the learning objectives.
    - find out what the audience needs to know.
    - research the content area.

21. Which of the following statements best describes the Fry Method?
    - This formula is used to calculate word difficulty in a written document.
    - This method calculates the readability level of a written document by counting selected syllables and sentences within the document.
    - It is an effective tool used for measuring how well a patient understands healthcare information.
    - This instrument is used to evaluate the cultural appropriateness of written healthcare instructions.

22. Recommendations for developing written healthcare materials include:
    - using dark colored papers for printing.
    - presenting information in the form of a conversation.
    - including abbreviations when possible to save space.
    - printing words in fancy script.

23. When listing side effects for a handout on chemotherapy the oncology nurse should:
    - limit the list to:
      - 2-3 items.
      - 5-6 items.
      - 10-12 items.
      - 15-20 items.

24. Written healthcare information provided to a patient related to a specific disease should include:
    - all treatment options available to manage the disease.
    - a detailed explanation of the pathophysiology of the disease.
    - statistics on the incidence of the disease.

25. Which of the following would be the most effective wording for a heading in a brochure on hypertension?
    - HYPERTENSION: THE SILENT KILLER
    - Symptoms of high blood pressure
    - How do I know that I have high blood pressure?
    - What factors contribute to hypertension?

26. The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to:
    - review research on the community's culture.
    - obtain input from nurses who have worked in the community.
    - explore the types of materials currently available.
    - include community members in the design of the brochure.
27. Which of the following instructions on the management of diabetes would be best understood by an individual with low health literacy skills?
   - Check your blood sugar every morning.
   - Insulin should be taken as directed by your physician.
   - Diabets is a disease of energy metabolism.
   - Complications associated with insulin include hypoglycemic reactions.

28. Which of the following approaches to patient education provides minimal opportunity for the patient to actively engage in learning?
   - Incorporating short answer questions periodically throughout written healthcare materials and providing space for the patient to write responses.
   - Instructing the patient to watch a video after providing written instructions.
   - Providing pictures for the patient to circle in response to questions asked in a healthcare brochure.

29. The most effective way for a nurse to determine how well a patient with low health literacy skills understands healthcare information is to:
   - Utilize a pre-test before instruction and a post-test following instruction.
   - Ask the question, "Do you understand the information I just gave you?"
   - Have the patient teach back the information to the nurse.
   - Verbally ask the patient a series of questions following instructions.

Part 2: Health Literacy Experiences

Directions: Questions 30-38 ask you to describe how often you participated in learning activities related to health literacy. Choose the response that best describes health literacy experiences while enrolled in nursing school.

30. How frequently was health literacy emphasized in your nursing curriculum?
   - Never
   - Sometimes
   - Frequently
   - Always

31. How often did you use a health literacy screening tool to assess the health literacy skills of an individual?

32. How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?

33. How often did you evaluate the cultural appropriateness of healthcare materials, including written handouts, videos, audiotapes, before using them for patient teaching?

34. How often did you evaluate the use of illustrations in written healthcare materials before using them for patient teaching?

35. How often did you use written materials to provide healthcare information to an individual or community group?

36. How often did you use audiotapes to provide healthcare information to an individual or community group?

37. How often did you use videotapes to provide healthcare information to an individual or community group?

38. How often did you use computer software to provide healthcare information to an individual or community group?
Part 3: Demographic Data

Directions: Questions 39 - 45 relate to demographic data. Choose the response that characterizes you best.

39. Gender
   ☐ male
   ☐ female

40. Ethnicity:
   ☐ White
   ☐ African American
   ☐ Other

41. Prior educational experience:
   ☐ No prior degrees
   ☐ At least one undergraduate degree before entering nursing school
   ☐ At least a master’s degree before entering nursing.

42. I am certified in some area of healthcare. (nursing assistant, radiology technician, emergency medical technician, licensed practical nurse)
   ☐ No
   ☐ Yes

43. How frequently do you interact with healthcare providers for your own personal health care needs or the healthcare needs of a significant other?
   ☐ Every few years
   ☐ At least once a year
   ☐ Three to four times a year

44. Please enter your age in years.

45. Please enter your grade point average in required nursing courses at the beginning of this semester.

Thank you for completing this survey. Please place your survey in the box provided in the front of the room.
APPENDIX D
DIRECTIONS TO CONTENT EXPERTS FOR CONTENT VALIDITY RATING

Dear (Content Expert’s Name), (Date)

Thank you for agreeing to review the Health Literacy Knowledge and Experience Survey. After reviewing the instrument please record your rating to the left of each item directly on the survey using the following Likert scale:

(1) Not Relevant (2) Fairly Relevant (3) Relevant (4) Very Relevant

I would also encourage you to provide any additional comments regarding the item directly onto the instrument. You may return the survey to me electronically at ccormier@selu.edu.

Thank you for supporting this research project.

Sincerely,
Cathy Cormier
985-549-5541
cormier@selu.edu
AppENDIX E
SOUTHEASTERN LOUISIANA UNIVERSITY COVER LETTER

Dear Students,

I am conducting a research study in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Louisiana State University. The purpose of the study is to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students enrolled at state universities in Louisiana.

Your participation in the study will help me to establish the reliability and face validity of the instrument designed specifically for this study. I would like you to answer each question on the survey, but you have the right to leave any question unanswered if you choose.

Your responses will be kept anonymous and in no way affect your grade in any nursing course. I encourage you to participate in this research study; however, participation is optional for all students and refusal to participate will not affect your class standing or course grade.

Thank you for your support of my research project.

Sincerely,

Cathy Cormier

Instructor

School of Nursing

Southeastern Louisiana University
1. How would you describe the readability of the test?

2. Please describe any difficulties you may have had with the directions on the survey.

3. How would you describe the length of the survey?

4. Please feel free to share any additional comments that you have regarding this survey.
VITA

Catherine Mary Neville Cormier was born on July 31, 1957, in Queens, New York. As a young girl she traveled extensively across the country with her parents: the late John J. Neville and Eileen P. Neville; and siblings: John Jr., Susan, and Maura while her father pursued a career as an officer in the United States Air Force. At the age of seven her father was stationed at Westover Air Force Base in Chicopee, Massachusetts. The family established roots in Western Massachusetts, and this is where Catherine, better known as Cathy, called home for most of her childhood and young adulthood.

Cathy graduated from Cathedral High School in 1975. It was during her senior year in high school that she decided to pursue a career in nursing. She attended St. Anselem College in Manchester, New Hampshire, and graduated in 1979 with a Bachelor of Science degree in nursing. She began her nursing career at Bay State Medical Center in Springfield, Massachusetts, working on an orthopedic unit. She loved the work but hated the graveyard shift. With no hope for a change in work hours anytime soon, Cathy decided to be adventurous and seek employment out of state. She applied for a position at Touro Infirmary in New Orleans, Louisiana. The hospital was eager to hire her because of the nursing shortage they were experiencing at the time, and Cathy was eager to experience a new town with better work hours. Cathy fell in love with New Orleans and remained at Touro Infirmary living in the Garden District until 1985.

While at Touro Infirmary, Cathy enrolled in the Graduate Nursing Program at Louisiana State University Health Science Center in New Orleans, Louisiana. In 1982 she earned a Master of Nursing degree (M.N.) in the area of Adult Health and Illness. It was during her graduate studies that she first experienced Hospice Nursing. Since then, the Hospice philosophy has remained an integral part of her nursing practice and personal view on end of life issues. For a
short period of time Cathy had the opportunity to work at the Connecticut Hospice in Branford, Connecticut. This was one of the most enriching experiences of her nursing career.

Cathy transferred from the surgical unit at Touro Infirmary to Touro School of Nursing after earning her M.N. She soon realized that her position as a faculty member within the school of nursing allowed her to do the two things she loved most, teach and practice nursing. In 1984 Cathy married Bill Cormier. Cathy and Bill bought a house in Slidell, Louisiana, and Cathy commuted to Touro Infirmary School of Nursing until she had her first child Billy. She then decided to work part-time at a job closer to home while her husband and she raised a family.

For the next eight years Cathy was employed part-time at Slidell Memorial Hospital in Slidell, Louisiana. In 1985 she started on an orthopedic/pediatric unit and then transferred to the Home Health Department in 1990. While employed at Slidell Memorial Home Health she became certified in Home Health Nursing by the American Nurses Credentialing Center. During this timeframe her family expanded to include two more boys, Timothy and John.

In 1993 the family moved to Hammond, Louisiana, and Cathy continued her Home Health and Hospice Nursing at North Oaks Regional Medical Center. Cathy was eager to return to teaching and when a position became available at Southeastern Louisiana University (SLU) in 1996 she applied. She has been an instructor at SLU for the past 10 years and her teaching responsibilities include: Pathopharmacology, Community Health Assessment, Foundation of Nursing Clinical Lab, and an elective in Death and Dying. She has served on the School of Nursing Curriculum Committee at SLU for the past ten years and the College Curriculum for the past seven years. In 2001-2002 she received the Excellence in Teaching Award from the SLU College of Nursing and Health Sciences and in 2003-2004 she was awarded the Outstanding Teacher Award from SLU Beta Phi Society.
Cathy is a member of the Tangipahoa Nurses Association and is currently serving as a Board Member. Professional memberships also included Sigma Theta Tau International Honor Society of Nursing, and the American Nurses Association.