Pictography: a method for adult patients with literacy barriers to understand medications

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Pictography: An Alternative Instruction Method for Adult Patients with Literacy Barriers to Understand Medication

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Dedication

“If you are thinking ahead, sow a seed. If you are thinking ten years ahead, plant a tree. If you are thinking one hundred years ahead, educate the people”

- Chinese Poet

To all the individuals that participated in this study and to all the teachers and mentors that give of their time and talent to inspire those to read. Each of you deeply influenced my perspectives and taught me to view the world through more than one lens. You are a source of inspiration for me each day of my professional practice. Thank you for making this project possible.

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ABSTRACT
CHAPTER I

Introduction

The primary teaching methodology used by health care professionals is the written word (Fisher, 1999). A vast number of leaflets and booklets exist on health education, the management and treatment of various diseases, medications, pre and post-operative care, and nutrition. The prevalence of low literacy in the United States is well documented and it permeates all patient populations, medical conditions, socioeconomic classes, and age groups (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). Low literacy affects the goal of health, as patients are not able to perform necessary functions in the health care environment such as reading and following the directions on a prescription label (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999).

This chapter introduces a study of pictography as a method for adult patients with literacy barriers to understand medication instructions. The nursing problem and purpose of this study will be discussed. Use of King’s (1991) theoretical framework as a guide the study will be introduced. The research methodology will be briefly explained with the research questions identified, and the theoretical and operational definitions reviewed. The chapter also includes a statement on the significance of the study to nursing and assumptions intrinsic in executing the study. The chapter concludes with a summary.

Statement of the Problem

The United States Department of Education recognized a relationship between literacy and healthcare and found it imperative that literacy be linked to health care focusing on health literacy. In an effort to link literacy and health care, the United States Department of Education defined health literacy as “a patient’s ability to read and comprehend basic concepts and tasks
needed to function sufficiently in the health care system” (United States Department of Education [US Dept. of EDU, 2003]).

The term “functional health literacy” was born out of the definition of health literacy and is defined as, “the ability to use reading, writing, and computation skills at a level of proficiency necessary to meet the needs of everyday life situations, function on the job and in society, achieve one’s goals, and develop one’s knowledge and potential” (Andrus & Roth, 2002, p. 283). Functional health literacy includes such tasks as reading, understanding and comprehending medication instructions and directions, interpreting appointment slips, following instructions for diagnostic tests, and understanding other essential health related materials (Kirsch, et al., 1993; Andrus & Roth, 2002, US Dept. of EDU, 2003).

The prevalence of inadequate functional health literacy or the inability for patients to function effectively in the health care environment is widespread (Kirsch, et al., 1993). An accurate appraisal of this problem is reflected in a 1992 survey of adult literacy in the United States that was conducted by the United States Department of Education’s National Center for Education Statistics (Kefalides, 1999). The National Center for Education Statistics published in 1993 that of more than 26,000 randomly selected Americans who were surveyed an estimated 40-44 million Americans, or approximately one-quarter of the population, were functionally illiterate (Kefalides, 1999; Kirsch, et al., 1993). An additional 50 million Americans had marginal literacy skills. This study indicated that in the United States alone, nearly half of the adult population has marked deficiencies in reading and computation skills (Kirsch, et al., 1993). By having deficiencies in basic reading, computation, and comprehension skills the lives of many people in the United States are significantly affected. For example, the Adult Literacy in
America: National Adult Literacy Survey discovered that subjects who reported an illness had lower literacy scores than subjects who did not report an illness (Kirsch, et al., 1993). The consequence of inadequate health literacy crosses all aspects of health care and impacts all health care professionals (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). The consequences of inadequate health literacy include poorer health status, lack of knowledge of health care and medical condition, decreased comprehension of health information, lack of understanding and use of preventative services, poorer compliance rates, increased hospitalizations, and increased health care costs (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999; National Work Group on Literacy and Health, 1998).

There exists in the literature a plethora of studies examining the readability and appropriateness of written patient education materials for the adult patient (Albright, deGuzman, Acebo, Paiva, Faulkner, & Swanson, 1996; Conlin & Schumann, 2002; French & Larrabee, 1999; Meade, Diekmann & Thornill, 1992; Mumford, 1997; Murphy, Chesson, Berman, Arnold & Galloway, 2001; Wilson, 1996, 2000). Many studies have also been conducted on the challenges inappropriate written patient education materials bring to the adult patient with literacy barriers (Albright, et al., 1996, French & Larrabee, 1999, Wilson, 1997, 1999). Comparatively fewer studies have focused on revising and creating written patient education information at a reading level comparable to the reading level of adult patients with significant literacy barriers (Horner, Surratt & Juliusson, 2000). No published research literature was located on identifying and implementing solutions to address the health care needs of adult patients with literacy barriers so severe that they cannot read or write.
Literacy barriers affect millions of people in today’s society and contribute significantly to the lack of adherence to medication regimen. Medication instructions are on a label placed on the actual medication container in the form of written instructions and directions. Adults, in increasing numbers, are facing the laborious task of taking multiple prescription medications on a daily basis (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). Regardless of literacy level, all adult patients are required to self medicate after prescriptions are filled, follow numerical directions, comprehend written directions for how and when to take medications. For the adult patient with literacy barriers, this task can be more than a stumbling block, it can be the blockade to a healthier life.

Health care professionals, have the duty to increase the awareness of inadequate health literacy and begin to identify and implement solutions to improve the health care needs of patients with literacy barriers. The aim of this research is to explore a method that may bridge the gap between the complexity of reading and understanding the directions on medication labels for the adult patient with literacy barriers.

Statement of Purpose

The purpose of this study is to explore pictography as a method for adult patients with literacy barriers to increase the understanding of medication dosages, medication times and reason for giving/taking the medications.

Nursing Theoretical Framework

Imogene King’s theory of goal attainment (1989, 1990, 1997) derived from King’s conceptual model is the theoretical framework for this study. The ultimate objective of King’s theory of goal attainment is health. The major elements of the theory of goal attainment are seen “in the interpersonal systems in which two people, who are usually strangers, come together in a health
care organization to help and be helped to maintain a state of health that permits functioning in roles” (King, 1990, p. 142). King’s theory of goal attainment depicts human beings interacting to form interpersonal systems. The relevant concepts for the current study for interpersonal systems are interaction, communication, and transaction (King, 1990).

Within Imogene King’s theory of goal attainment, nurses interact with clients to communicate information needed to establish mutual goals by exploring and agreeing on means to achieve goals (1989, 1990, 1997). Transaction, the process of achieving goals, then occurs which helps individuals maintain their health so they can function in their roles.

The process of goal attainment leads to positive outcomes, which improves effective nursing care (King, 1990). The goal of this research is to improve patient outcomes, thus increasing health, by exploring a method to increase the understanding of medication dosages, medication times and the reason for giving/taking medication for adult patients with literacy barriers.

Research Questions

* Does the use of pictography identify and distinguish medication dosages for adult patients with literacy barriers?
* Does the use of pictography identify and distinguish medication times for adult patients with literacy barriers?
* Does the use of pictography identify and distinguish the reason for taking the medication for adult patients with literacy barriers?

Definition of Terms

Pictography

Conceptual definition. The conceptual definition of pictography is, “a stylized picture representing a word or idea” (Webster, 2001, p. 833).
Operational definition. Pictography is operationalized for this study as the use of pictures and/or symbols for the purpose of providing instructions for medication dosages, medication times, and reason for giving/taking medications.

Adult Patients

Conceptual definition. The conceptual definition of adult patients is a personal system. The concepts within the personal system which are fundamental in understanding human beings are perception, self, body image, growth and development, time, and space (King, 1990).

Operational definition. The operational definition of adult patients, for the purposes of this study, are human beings with literacy barriers, who are of the chronological age of 18 years or older.

Literacy Barriers

Conceptual definition. Literacy barriers are conceptualized as obstacles to reading and writing.

Operational definition. Literacy barriers in this study are operationalized as Comprehensive Adult Student Assessment System for English as Second Language learners with a raw score of 220 or below (corresponding with below a Sixth Grade Level reading and writing level).

Significance

Health literacy was identified as a health care public policy issue by the National Adult Literacy Survey in 1992. In the United States, the largest group of illiterate adults is Caucasian, native born, who have attended public school (Davidhizar & Brownson, 1999). The cost burden to the American health system is estimated at tens of billions of dollars annually (Kefalides, 1999). Rapid advances in medical research and technology have made communicating patients’ diagnostic and treatment options highly complex. As a result, patients often have difficulty
understanding their medication regimen, which can result in poor health outcomes. Nurses play an important role in communicating with and educating patients within the hospital and in outpatient settings. Health care professionals need to address the challenge of identifying patients with literacy barriers and properly communicating with them to assist them in health related materials or instructions.

Exploring a method for understanding medication directions for adult patients with literacy barriers is clinically significant in relation to morbidity, mortality and cost. The study will contribute to nursing knowledge in both education and practice and will stimulate additional research in this area. Illiteracy is a fundamental problem faced by all health care providers. Many adult patients with literacy barriers encounter a health care team that has limited resources in the form of alternatives to written material for nonreaders (French & Larrabee, 1999). Increasing the resources for all health care professionals, and incorporating this knowledge of alternatives to the written word into nursing practice could enhance the care of adult patients with literacy barriers.

Noncompliance with drug therapies can be a significant consequence of inadequate health literacy (Schillinger, Grumbach, Piette, Wang, Osmond, & Daher, et al., 2002; Kalichman, Ramachandran, & Catz, 1999). Poor compliance may result from a willful disregard for instructions, but also because of a failure to understand directions (Schillinger, et al., 2002). Nursing needs to take the initiative in decreasing morbidity and mortality in patients with literacy barriers by increasing the compliance of drug therapies through use of methods to understanding of medication directions.

In summary, exploring pictography as a method to understand medication instructions and directions for adult patients with literacy barriers, contributes to nursing education and practice.
Professional nurses may have an additional method of communicating medication instructions and directions to adult patients with literacy barriers to assist in correct administration of the patients’ medications.

Assumptions

An assumption of this study is that the pictures in the pictography tool will represent either medication dosages, medication times, or reason for giving/taking medications for adult subjects with literacy barriers. An additional assumption of this study is that the adult subjects with literacy barriers will truthfully and openly verbalize what the pictures express to them.

In this research project it is assumed that adult patients with literacy barriers have a desire and right to knowledge and understanding of their medication dosages, medication times, and reason for giving/taking medications. It is also assumed that, for adult patients with literacy barriers, the written word alone is inadequate to understand medication dosages, medication times, and/or reason for giving/taking medication. Lastly, it is assumed that the scores on the CASAS tests are accurate and that during the time under study there were no changes in the levels of literacy for any of the adult subjects.

Summary

The prevalence of low literacy in the United States and the significance low literacy has on health care was introduced within this chapter. Literacy barriers specifically affect adult patients taking medications. Within the theoretical framework of Imogene King’s theory of goal attainment, this study intends to explore pictography as a method to identify and distinguish medication dosages, medication times, and the reason for giving/taking medications for adult patients with literacy barriers. This research is intended to contribute to the education and practice of professional nurses.
CHAPTER II

Literature

The study will explore the effectiveness of pictography for communicating medication dosages, medication times and/or reasons for giving/taking medication. This chapter describes the theoretical framework and reviews research literature significant to the study. An overview of Imogene King’s theory of goal attainment will also be discussed in relation to the variables contained in this study. The literature section identifies the following concepts: literacy barriers, assessment tools, assessment of patient education materials, and consequences of inadequate health literacy. The review of literature identifies a chasm in existing nursing research as it pertains to functional health literacy and identifies how the nursing discipline can make a difference. The chapter concludes with a summary.

Theoretical Framework

Imogene King’s theory of goal attainment (King, 1989, 1990, 1997) guided this research study. King’s (1997) conceptual system is defined as, “a set of elements connected by communication links that exhibits goal-directed behavior” (p. 180). King’s (1990, 1997) conceptualization of nursing and the theory of goal attainment declares health as the ultimate goal of the interaction between nurse and patient indicates that the focus of nursing is the care of human beings.

Nursing phenomena is concerned with the health of the individual, which King (1990, 1997) terms “personal systems”, the health of groups (of at least two persons) termed “interpersonal systems” and the health of society termed “social systems”. The personal system, interpersonal system and social system are the building blocks and foundation of King’s theory of goal
attainment. These three dynamic interacting open systems serve as the focal point for organizing knowledge about individuals, groups, and society (King, 1990, 1997). The theory of goal attainment accomplishes several purposes: to identify concepts that are critical knowledge for nursing as a discipline, to derive and test theories in research resulting in scientific knowledge for nursing, develop curriculum for nursing education, and to implement theory-based practice to deliver quality care to all human beings (King, 1990, 1997).

At the personal systems level, individuals desire to execute tasks associated with activities of daily living requiring both interaction and decision-making (King, 1989, 1997). Interaction is defined as “a process of perception and communication between person and environment and between person and person, represented by verbal and nonverbal behaviors that are goal directed” (King, 1990, pp. 141-142).

At the interpersonal systems level, individuals have the potential to make transactions that include goal setting, and selecting measures to attain goals to maintain their health and function in roles (King, 1989, 1997). King (1990) defines transaction as “observable behaviors of human beings interacting with their environment” (pp. 145-146). Transaction represents the evaluation component of human interactions and involves change.

At the social systems level, individuals have a continuous exchange with persons in the environment. The continuous exchange of social roles, behaviors, and practices are developed to maintain values (King, 1990). Language is the social link that facilitates interpersonal communications within systems.

King’s theory of goal attainment involves the nurse and patient mutually communicating information, establishing goals, and taking action to obtain the goals (King, 1989, 1990, 1997). The nurse and the patient, who are usually strangers, come together in a health care organization
to help or to be helped to a mutual state of health, representing the interpersonal system in action (King, 1990).

The relevant concepts of the theory for the current study include interaction, perception, communication, transaction, self role, stress, time, and personal space (King, 1997). King (1989) identifies the concepts of the theory as being interrelated in every nursing situation. To capture the essence of these interrelated concepts, King states that:

Nurse and client interactions are characterized by verbal and nonverbal communication, in which information is exchanged and interpreted; by transactions, in which values, needs, and wants of each member of the dyad are shared; by perceptions of nurse and client and the situation; by self role of client and self in role of nurse; and by stressors influencing each person and the situation in time and space (King, 1990, p.144). Of these concepts, King indicates that only interactions and transactions are directly observable.

The conceptualization of King’s theory of goal attainment model applicable to this study can be seen in Figure 1.
Figure 1

Conceptualization of Goal Attainment in Adult Patients with Literacy Barriers

Nurse Perception

Interaction
1. Through communication
2. Mutual Goal Setting
3. Explore means to achieve goal

Transaction
1. Goal Attainment
2. Understands medication dosages, times, and reasons for giving/taking medications

Patient Perception
The nurse and adult patient are both personal systems interacting with each other to obtain a common goal focused on health. King (1990) viewed perception as fundamental to understanding one’s environment. Perception is “each person’s representation of reality” (King, 1990, p. 145). The elements of perception are the importing of energy from the environment, organizing it by information, transforming energy, processing and storing information, and exporting information in the form of overt actions, thus perception influences behaviors (King, 1990). Information will be exchanged and interpreted by both the nurse and adult patient during the perception phase.

Nurses and patient interact with each other through communication to share information needed to establish mutual goals and to explore and agree on means to achieve goals. The overall goal is to help individuals maintain health so they can function in their roles. Through communication, during the interaction phase, the nurse and adult patient set the mutual goal of understanding and comprehending medication instructions to improve health.

When transactions occur between nurses and patients, goals are attained. Understanding and comprehension of medication instructions using pictography is assessed during the transaction phase.

Figure 1 represents a continuous open system with each concept being interrelated in the person to person interaction. If goal attainment is not achieved, partially achieved, or new goals identified, the arrows represent the fluidity of the model as communication is reverted back to the interaction phase where once again the individual’s perceptions and communication skills continue to influence the new continuing interactions. Information is restructured and the process of goal attainment resumes.
Utilizing King’s theory of goal attainment for this study will contribute to new knowledge gained for both the discipline of nursing and for patients with literacy barriers. The need for new knowledge is a continuous nursing process as nurses strive to enhance the health state for adult patients with literacy barriers.

In conclusion, King’s theory of goal attainment was chosen for this research given that achievement of goals represents an outcome, and outcomes demonstrate evidence-based nursing practice. King’s theory of goal attainment can be utilized wherever people are in their communities, regardless of age, economic status, and culture or health state. Within the theory of goal attainment, interacting individuals mutually set goals and agree on the process to attain the goals. The theory of goal attainment is directly applicable to identification of pictures relevant to medication dosages, medication times, and reason for giving/taking medications.

Review of Research

The majority of published research studies on literacy and health care focus on the readability of written patient education materials. Few studies have focused on the readability of medication instruction labels and limited studies found have focused on improving the understanding and comprehension of medication instructions for patients with literacy barriers.

**Literacy Barriers**

Literacy defined by Webster is “the state or quality of being literate, ability to read and write” (Webster, 2002, p. 640). The National Adult Literacy Survey is based on a more comprehensive definition of literacy, and in its 1991 National Literacy Act, Congress defined literacy as: “an individual’s ability to read, write, and speak in English, and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one’s goals, and develop one’s knowledge and potential” (Andrus & Roth, 2002). The aim of the survey was to
profile the English literacy of adults in the United States based on their performance across a wide array of tasks that reflected the types of material and demands they encountered in their daily lives. The average adult in the United States reads at an eighth to ninth grade level (Kirsch, et al., 1993).

The National Adult Literacy Survey described literacy in three dimensions: prose literacy, document literacy, and quantitative literacy (Kirsch, et al., 1993). Prose literacy is the ability to understand written news stories, editorials, and poems (Kirsch, et al., 1993). Document literacy is the ability to understand bus or train schedules, maps, graphs, and charts. Quantitative literacy is the ability to use numbers, calculate total cost of a purchase, balance a checkbook, and understand fractions (Kirsch, et al., 1993). To understand and implement the health care system today, patients must be able to use all three dimensions. An example of the significance of the three dimensions of literacy to health care can be seen in the maze of paperwork required for entry into the health care system. Patients taking medications need to be literate in both prose and quantitative literacy to understand and comprehend their medication regimen.

Health literacy surfaced from a rising concern among health care providers and adult education practitioners about the number of patients who do not possess the literacy skills required to maintain a healthy lifestyle. The United States Department of Education found it imperative that literacy be linked to health care focusing on health literacy. In an effort to link literacy and health care, the United States Department of Education defined health literacy as “a patient’s ability to read and comprehend basic concepts and tasks needed to function sufficiently in the health care system” (US Dept. of EDU, 2003). The term functional health literacy was born out of this definition and is commonly defined as, “the ability to read, understand, and act on health information” (Kirsch, et al., 1993).
Functional health literacy includes such tasks as reading, understanding and comprehending medication instructions and directions, interpreting appointment slips, following instructions for diagnostic tests, and understanding other essential health related materials (Kirsch, et al., 1993; US Dept. of EDU, 2003) The link between literacy and health has been the basis of many research studies; the use of the term and definition of functional health literacy has been utilized as a common denominator among researchers to study the effects of literacy barriers and health (Meade, et al., 1992; Wilson, 1996, 1997, 2000; Albright, et al., 1996; French & Larrabee, 1999; Horner, et al., 2000; Murphy, et al., 2001, Conlin & Schumann, 2002).

Assessment Tools

Assessment of patients reading level.

Health care professionals rely on written materials as tools for educating patients. However, health care professionals cannot assume that all patients know how to read. Assessing a patient’s reading skills in the clinical setting can be helpful by providing insight into an individual’s ability to function adequately in the health care system. This is particularly true since two of the studies found a significant number of patients read at or below the eighth grade level (Wilson, 1997; Murphy, et al., 2001).

The Rapid Estimate of Adult Literacy in Medicine (REALM) screening instrument is a word recognition test frequently used in health care settings and research (Wilson, 1997; Murphy, et al., 2001; Conlin & Schumann, 2002). The tool contains 66 common medical terms, in large font, for body parts and illnesses, arranged in order of difficulty. Patients pronounce each word aloud and if unable to pronounce several consecutive words, they are asked to pronounce as many remaining words as possible (Wilson, 1997; Murphy, et al., 2001). The REALM raw score of 0-66 can then be converted into four reading grade levels: Third grade and below raw score
between (1-18), fourth to sixth grade (19-44), seventh to eighth grade (45-60), and ninth grade and above (61-66) (Wilson, 1997; Murphy, et al., 2001). The Rapid Estimate of Adult Literacy in Medicine has a test-retest reliability of .99 and has been correlated with other standardized tests.

The Slosson Oral Reading Test-Revised (SORT-R) is another measurement to estimate a patient’s reading level (French & Larrabee, 1999). The SORT-R is based on a patient’s ability to recognize and pronounce words. The tool consists of 10 word lists, containing 20 words each, again, arranged in order of difficulty. Similar to the REALM, the SORT-R takes the raw score, and converts it into a reading grade level. The Slosson Oral Reading Test-Revised reliability coefficient based on the split half Spearman-Brown, Rulon, and the Kuder-Richardson is reported as .98 and a one week test-retest coefficient is .98 (French & Larrabee, 1999).

Unlike the REALM and SORT-R, the Test of Functional Health Literacy in Adults (TOFHLA) is designed to test a patient’s ability to complete basic reading and numeracy skills needed to adequately function in a healthy setting (US Dept. of EDU, 2003). The TOFHLA measures the patient’s ability to read and comprehend written samples of medication labels, the Medicaid rights and responsibility forms, as well as other forms used in the health care environment (Kirsch, et al., 1993). A 50-item reading comprehension section and 17-item numeracy section compose the TOFHLA yielding a total score of 0-100. Scores on the TOFHLA are classified into the inadequate (score between, 0-59), marginal (scores of, 60-75) or adequate (scores of, 76-100) functional health literacy. Using a test to determine both basic reading and numeracy skill level, nurses and health care providers will be able to identify individuals who are at greater risk of developing medical problems due to literacy barriers.
Reliability of the TOFHLA has been calculated by Cronbach’s Alpha at .98 (Nurss, Parker, Williams & Baker, 2001).

The Comprehensive Adult Student Assessment System (CASAS) was developed in 1980 for youth and adult learners to assess a learner’s ability to apply basic reading skills to common everyday life situations and is commonly used for assessment of individuals who use English as a second language (CASAS, 2004, Competencies, para. 1). The CASAS is generally used in programs which have an employability focus (Anderson, 1996). Reliability is not reported. The range of competencies measures a broad spectrum of levels so programs can teach and measure competency attainment from beginning literacy through high school completion. The mission of the Comprehensive Adult Student Assessment System is to assist adults functioning at or below a high school level in attaining basic literacy skills to effectively function in the community, family and on the job (CASAS, 2004, Mission Statement, para. 1).

The Tests of Adult Basic Education (TABE) measure reading, writing, and mathematics achievement and are applicable to students in diploma programs or who desire to test for their General Education Diploma (GED) (Anderson, 1996). There are seven sections measuring vocabulary, reading comprehension, language mechanics, language expression, spelling, mathematical calculation, and mathematical concepts/application. Four levels correspond in difficulty to grades and a locator test is used to match learner skill levels to test levels. Internal reliability has been reported as high; however reliability is not reported in the manuals (CASAS, 2004, Adult Life Skills- Reliability, para. 1). TABE is widely used in adult education programs, was revised in 1986, and has correlated moderately with comparable scores on the GED.

Determining the reading level of a patient is a more accurate measurement of a patient’s actual reading ability than the patient’s report of the highest grade completed (Wilson, 1997;
French & Larrabee, 1999, Murphy, et al., 2001; Conlin & Schumann, 2002). Reporting comparable results, researchers have said that patients can read as many as three grades below reported grade level completed (Wilson, 1997; Murphy, et al., 2001; Conlin & Schumann, 2002). The difference between reported grade level and actual reading level can be significant in understanding and comprehending written medication instructions. Not only is the task at hand to assess and determine the reading level of patients, but also to determine the readability, or grade level, of written health instructions.

Assessment of patient education materials.

Assessment of patient education materials allows health care professionals to identify appropriate health education materials for the patient. In addition, it identifies a gap for researchers to close through development of patient education materials appropriate for patients with literacy barriers. If the patient education materials are written at a level beyond the patients understanding and comprehension, the materials are virtually useless.

Research studies have indicated that written materials for health education should be analyzed in two forms, readability (Meade, et al., 1992; Wilson, 2000; Albright, et al., 1996; Horner, et al., 2000; Murphy, et al., 2001) and suitability (Wilson, 1999; Murphy, et al., 2001). Research in this area has led to a variety of tools to assess the readability of written text. Regardless of the tool chosen, all tools fall into two categories: those that are computer generated and those that are calculated by hand.

In addition to identifying the grade level of patient education materials, the suitability of the education materials must also be determined. Grade level of readability is one of many factors that contribute to the overall suitability of materials. To address this concern, Doak and Doak developed the Suitability Assessment of Materials (SAM) (Wilson, 1999). The SAM scores
material in six categories: content, literacy demand, graphics, layout and topography, learning stimulation and cultural appropriateness. The SAM yields a final percentage score, which falls into one of three categories: superior, adequate, or not suitable (Wilson, 1999). The advantage of measuring both the reading level of the patient and the readability and suitability of the written health education material is to identify if a disparity exists between the reading level of the patient and the reading level of the written health education material. This will then determine the suitability of the written health education material.

Several research studies set out to examine the readability of written patient education materials and to determine if they were appropriate for patients. Conlin and Schumann (2002) through a descriptive study, using a convenience sample of 34 patients recovering from open heart surgery, reported a grade level ranging from 6.41 to 15.45 required for understanding and comprehending discharge instructions and consent forms.

Meade et al. (1992) found similar results with the education material distributed by the American Cancer Society. Through a descriptive correlation design the mean grade required to understand and comprehend the educational material was 11.9. The mean reading level of the American Cancer Society educational material exceeds the national average reading level of eighth to ninth grade creating a wide variance for patients with literacy barriers. The study does indicate that efforts have been made since 1985 to decrease the mean reading level of material but it still exceeds the national average reading level (Meade, et al., 1992).

Albright et al. (1996) also found patient education material to be written above the national average through a descriptive study using American Cancer Society literature distributed from a regional office. Albright et al. (1996) studied materials from four hospitals units, used fifty pieces of the most widely used patient education materials that were selected by nurse
representatives of each area and still identified a mean reading level of tenth grade. Albright et al. (1996) and Meade et al. (1992) found that the written information related to maternity care was the only material written at or below the national average.

Murphy et al. (2001) assessed the suitability of various neurological patient education brochures, as well as neurology information on the World Wide Web and found a range from sixth to seventeenth grade level required to understand and comprehend the written health information. The suitability rating indicated that the material was not suitable for the national average reading level (Murphy, et al., 2001). Murphy’s et al. (2001) results were also consistent with both Meade et al. (1992) and Albright et al. (1996).

Wilson (1999), using Leininger’s Culture Care Diversity theoretical framework, through a non-experimental descriptive design, determined the reading level of patient education materials, which were used by nurses only, to be inadequate. A random sample of 47 patient education materials in a local health department and a home health care agency were used in five areas (child health, cardiovascular disease, diabetes, women’s health, and medications). The readability level required to understand and comprehend the patient education material ranged from ninth grade to graduate level education. In addition, the materials used failed to recognize cultural beliefs, values, languages, perceptions and attitudes held by patients and families.

Wilson (2000) examined the appropriateness and readability of patient education information materials used by nurses in home care. Wilson used a convenience sample of 20 different types of patient information materials from five metropolitan home care agencies in the Midwest and once again found the written patient information to be inappropriate for urban patients in home care programs. The reported mean reading level of materials was twelfth grade; however the range was from ninth to seventeenth grade (Wilson, 2000).
Mumford (1997) examined the readability of written patient information materials that had been designed by nurses in a large teaching hospital. A non-experimental descriptive design was used for 24 leaflets designed by nurses. Several readability tools were used with a similar result of high reading levels required with a mean reading level of eleventh grade. None of the studies found the written patient education materials suitable for the national average reading level of eighth to ninth grade.

Limited research has been done on how to revise existing written patient education materials to close the gap on reading levels and readability of information. The gap between the reading level of patients, and the readability and suitability level of written patient education materials, was shown in Meade’s et al. (1992) study with similar findings were seen in studies as late as 2001, showing a nine-year span without any significant improvement. The United States Food and Drug Administration has proposed a simpler, more concise language to be used on medication labels in lieu of more complex or technical wording to assist patient in understanding their medications (Farley, 2003, para. 1,3).

One study by Horner, Surratt, and Juliiusson (2000) examined the process used to revise and create educational materials for low-income ethnically diverse families with existing literacy barriers that have children with asthma. The study reported a decreased reading level after computer revision.

Nurses and health care professionals are confronted daily by the lack of health educational resources to meet the needs of patients with literacy barriers. Both nurses and health care professionals need to be involved in the revision of patient education materials to improve patient outcomes.
Reading and Understanding Medications

Literacy barriers are of particular concern in understanding and comprehending medication instructions. Over and above written patient education information in the form of brochures and leaflets, patients are also tasked with reading medication information inserts. Wilson (1999) evaluated the suitability of United States pharmacopoeia Dispensary Information (USP-DI) drug leaflets for educating urban inpatients at a psychiatric unit. Through a descriptive study Wilson used a convenience sample of 44 USP-DI drug information leaflets on a 31-bed inpatient psychiatric unit at a Midwestern urban hospital. Of the 44 leaflets used, half were determined to be more difficult to read and half were identified as easy to read. Neither group had illustrations or graphics. The mean reading level of the more difficult material was greater than ninth grade indicating, once again, that the USP-DI drug leaflets were unsuitable as an education tool for psychiatric inpatients with poor reading ability. The mean reading level of the 22 leaflets identified as “easy to read” was not disclosed.

Patient information leaflets are supplied with all dispensed medications. Strydom, Forster, Wilkie, Edwards, and Hall (2001) identified gaps in medication knowledge and information sources. Patients with learning disabilities had difficulties in reading and understanding medication labels and manufacturers’ inserts (Strydom, et al., 2001). Strydom et al. (2001) found that 48% of the 21 subjects studied, were not able to read the medication label or recall what was written on the label. When asked why they could not read the label, most individuals indicated that the label was too difficult to read or the print was too small (Strydrom, et al., 2001). The results of the study produced a draft leaflet design with pictures rather than symbols. Comprehension improved with the use of pictures instead of symbols (Strydom, et al., 2001).
In addition to struggling with education materials, patients often are unable to correctly interpret dosing instructions. A study was conducted to compare patient interpretation of prescription labels with health professionals’ assumption of the message conveyed (Holt, Dorcheus, Hall, Beck & Hough, 1992). Three hundred twenty-one individuals were asked to explain how they would take a product labeled with one of six different common instructions. Responses were rated as technically correct, incorrect, or unknown. The only instruction that was understood consistently (96.8%) was “Take 1 tablet daily” (Holt, et al., 1992). The instructions, “Take 1 tablet three times a day,” “Take 1 tablet twice daily,” and “Take 2 tablets daily”, were deemed correct in only 6.7%, 12.9%, and 9.0% of respondents (Holt, et al., 1992). Multiple daily dosages were judged as correct only if dosages were 8 or 12 hours apart. Many responses were evaluated as incorrect because of associations with daily terms (e.g., morning, noon, and bedtime), meals, or unevenly spaced dosing intervals. Correct responses were much higher for the specific instructions, “Take 1 tablet every 8 hours” (56.3%) and “Take 1 tablet every 12 hours” (56.9%) (Holt, et al., 1992). Although the strict interpretation of directions used in Holt’s study may not be relevant and applicable to all drugs, many drugs do require attention to dosing intervals and patients should be aware of this. A portion of patients (.3-6.6%) chose an incorrect number of doses/day, which is particularly alarming. The reading difficulty of these common instructions, after testing with two readability tools, was found to be at a third to fifth grade reading level (Holt, et al., 1992).

A study was also conducted to examine the readability of 21 common over-the-counter drug labels. Only one product was found to require less than a seventh grade reading level for interpretation (Holt, Holland, Hughes & Coyle, 1990). The study also evaluated the visual acuity required to read over-the-counter drug labels. The majority of labels required a 20/50 visual
acuity at a reading distance of sixteen inches, and some packaging had a print so small that a
20/20 visual acuity was required. Nearly 100 million people in the United States have some type
of refractive vision disorder requiring correction, and many of these will have difficulty reading
the small print found on drug labels (Holt, et al., 1990).

There is an increasing amount of literature regarding programs using visual aids to
communicate health information to low literate persons (Doak, Doak & Routs, 1996). The
majority of these programs utilized visual aids during teaching sessions with the patients but do
not give the patients pictures to take with them for reminders or to use for future reference. One
study by Houts, Bachrach, Witmer, Tringali, Bucher and Localio (1998) hypothesized that
pictures could improve recall of spoken medical instructions. The subjects used were Junior
College students who were literate individuals. The pictures were used as an adjunct for recall,
not for initial understanding of the written word. The results of the study indicated that all
subjects had higher recall with pictographs than without, and the lowest recall score with
pictographs (55%) was higher that the highest recall score without pictographs (32%). The
subjects in this study averaged 8.7 grade reading level with the lowest reading level being 5.8.
The recommendation for further study included carrying out research with low literate and
studied nonliterate female adults in Cameroon, West Africa who had a prescription for oral solid
antibiotics and the use of pictures and symbols as visual aids to compare comprehension and
compliance measures. Ngoh and Shepherd (1997) found that to make educational information
more understandable, visual aids must be simple, practical, and related to what the patient is
familiar with and comprehends. To the nonliterate, abstract, technical, or difficult to understand
visual aids have no meaning. The results showed that the women in the experimental groups with
visual aids alone or visual aids plus an Advance Organizer (methodology to bridge the gap from what the learner already knows to what the learner needs to know) scored significantly higher than the control group in both the comprehension and compliance measures. The study does point out that the pictographs used for the study were culturally specific, and may not successfully cross over to other cultures.

Using picture and graphic symbols are part of a method to communicate for those persons that are non-literate or have low literacy skills. This area is not new to those who work with the developmentally disabled. Augmentative and Alternative Communication (AAC) is key to persons that are developmentally disabled and the use of picture communication boards is one method that allows persons to communicate (Romski & Sevcik, 1997). Advances in AAC research and the medium for representation by which language is communicated have been an issue that has been clinically researched to identify if the physical symbols used resembles its intended meaning (Romski & Sevcik, 1997). The use of augmentative and alternative communication is one key to unlocking the world for children and adults with significant developmental disabilities (Romski & Sevcik, 1997). The use of augmentative and alternative communication may also be central to unlocking the key to non-literate and low literate adults with intact cognitive skills to understanding how to take their medications through the use of symbols.

Murphy and Davis (1997) conducted research on assessing patients with low literacy levels using the REALM test and then recommended guidelines to assist identified patients with literacy barriers to understanding medication directions. Among the recommendations, Murphy and Davis (1997) included using simple pictures, which had symbols, “such as the sun to represent morning and the moon to represent night”. Murphy also recommended the use of
color, “to direct the reader’s eye to the most relevant information”, and to use color appropriate to the message.

A study by Ngoh and Shepherd (1997), using culturally sensitive visual aids recognized that graphic illustrations play an important role in communicating health information. In developing the visual aids for the study, Ngoh and Shepherd used universal symbols and illustrations to increase familiarity of the pictures used help communicate the intended message.

These findings reaffirm that nurses and health care professionals cannot assume that written instructions or verbal messages are consistently clear and understandable, or that the instructions or verbal messages will be implemented as intended. In addition, these findings clearly demonstrate that an additional communication method to the written word must be studied to assist the adult patient with literacy barriers to understand their medications.

Consequences of Inadequate Health Literacy

The health literacy problem is a crisis of understanding medical information rather than an access to information. The health of 90 million people in the United States may be at risk because of the difficulty patients experience in understanding and acting on health information (Kirsch, et al., 1993). Health literacy can be considered the foundation of the health care delivery system, affecting the spectrum of care from prevention and screening, to history taking and explaining diagnosis and treatment (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). Consequences of inadequate health literacy include, but are not limited to: lack of knowledge, decreased comprehension about medical care and medical conditions, poor compliance, and increased health care costs.
Lack of Knowledge and Decreased Comprehension

A study in general medicine clinics at two urban public hospitals evaluated 402 patients with hypertension and 114 patients with diabetes mellitus to examine the relationship between functional health literacy and knowledge of chronic disease (Williams, Baker, Parker, & Nurss, 1998). The TOFHLA was used to measure functional health literacy. Two validated questionnaires assessed knowledge of hypertension and diabetes. The study found that functional health literacy scores strongly correlated with patients’ knowledge of their illness. Forty-nine percent of patients with hypertension and 44% of patients with diabetes had inadequate functional health literacy. Of the patients with inadequate functional health literacy, 80% answered at least half of the questions incorrectly, 50% of the diabetic patients did not know the symptoms of hypoglycemia, and 58% of the hypertensive patients could not identify a normal blood pressure (Williams, et al., 1998).

Poorer Compliance

The relationship between functional health literacy and predictors of adherence to treatment of HIV and AIDS was studied in 182 patients with human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS) (Kalichman, et al., 1999). Those with inadequate functional health literacy had significantly lower CD4 cell counts (p<.05) and were less likely to have an undetectable viral load compared with adequate functional health literate adherent subjects (p<.05). Both univariate and multivariate tests showed that years of education and health literacy were significant independent predictors of treatment adherence. People of lower education and lower literacy were between three and four times more likely to have missed a dose of antiretroviral medications in the previous two days. (Kalichman, et al., 1999).
Similarly, a study investigated the association between health literacy and diabetes outcomes among 408 patients with type 2 diabetes cared for in the clinics of a public hospital (Schillinger, et al., 2002). The s-TOFHLA, an abbreviated form of the TOFHLA, was used to determine health literacy and glycemic levels as measured controlled by hemoglobin A1C (Schillinger, et al., 2002). The study found that for patient’s who have type 2 diabetes and access to primary care physicians in public hospital clinics, health literacy was independently associated with glycemic control (Schillinger, et al., 2002). Thus, those with adequate health literacy had tighter glycemic control over those patients with inadequate functional health literacy (Schillinger, et al., 2002). In addition, inadequate health literacy was also associated with a higher prevalence of retinopathy and other self-reported complications of diabetes.

**Increased Health Care Costs**

It has only been within the last few years that a correlation between inadequate health literacy and health care cost has been recognized. Patients with low health literacy are twice as likely to report poor health and twice as likely to be hospitalized (Baker, Parker, Williams, & Clark, 1998).

Baker et al. (1998) analyzed the effect of illiteracy on hospitalization. The investigator followed 1000 patients for two years at a large municipal hospital in downtown Atlanta. Using the TOFHLA, Baker et al. classified each patient’s level of literacy. The study found that of the 1000 patients studied, 15% of patients classified as having “adequate literacy” was hospitalized compared to 32% of patients classified as having “inadequate literacy” over the two-year period. In addition, the proportion of patients with two or more hospitalizations was 5% for those with adequate literacy; and 14% for those with inadequate literacy. Baker et al. also observed that
illiterate patients are more likely to be hospitalized and have two or more hospitalizations creating increased health care costs.

The Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs (1999) also reported that patients with low literacy might also have higher health care costs. Medicaid subjects who read at the lowest grade levels (0-2) had an average health care costs of $12,974 compared with $2,969 for the overall Medicaid population (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999; National Work Group on Literacy and Health, 1998).

Summary

This chapter has provided an overview of King’s theory of goal attainment. Within an open system, perception, interaction, and transaction lead to outcomes representing effective nursing care with health as the primary goal. Pictography as a method to understand directions for taking medications for adult patients with literacy barriers has been visualized using King’s framework and concepts.

The review of research has demonstrated that appropriate interaction is essential for patients with literacy barriers. The first step toward addressing the concerns of inadequate health literacy is acknowledging that the problem exists. Study findings emphasize the need to be aware of the prevalence of inadequate health literacy and indicate the disparity between completed grade level and actual reading level. Current research has examined patient education materials from many different angles with the same central theme of a divergence between the reading level of patients and the readability of patient education material. The health care system places considerable reading and comprehension demands on individuals within the health care environment. It is important for nurses and health care professionals to be educated about the
prevalence and consequences of inadequate health literacy so that individuals who struggle with this problem can be compassionately identified. Once identified, health care professionals can begin to close the literacy gap for patients with literacy barriers and improve patient outcomes. Continued research is necessary to determine and develop strategies for improving the functional health literacy status of patients with literacy barriers.
CHAPTER III

Method

Low literacy permeates all populations and affects health goals. The aim of this study was to explore pictography as a method to identify and distinguish medication dosages, medication times, and reason for giving/taking medications, for the adult patient with literacy barriers. The design of the study, the sample selection including target population, sample size and inclusion and exclusion criteria, are described in this chapter. Materials for the study, data collection procedures, and data analysis will also be discussed. In addition, the methods utilized to explore pictography will also be discussed.

Design

An exploratory design was used for this research study. An exploratory design is used to increase the knowledge of the field of study and is often used in preliminary studies to test a methodology (Burns & Grove, 2001). This design was selected to explore the use of pictography and the identification of medication dosages, medication times, and type of medication for the adult patient with literacy barriers.

Subjects

Setting

This study was conducted at a Midwestern literacy center, which is accredited by Literacy Volunteers of America. The study was conducted in the subjects’ natural classroom setting.
Sample

A convenience, purposive sample was utilized for this research study. The study included 18 subjects. Inclusion criteria included that each subject was involved in the literacy center program, eighteen years of age or older, had literacy barriers as determined by the Comprehensive Adult Assessment System for English with a raw score of 220 or below (corresponding with below a sixth grade reading and writing level) administered by the Midwestern Literacy Center. The adult with literacy barriers is sought in this study to explore the pictography as a method to understanding medication dosages, medication times, and reason for giving/taking medication. The adult subject was not excluded from the research project based on race, religion, marital status, or employment.

Material

The materials used for this study was a pictography tool of medication dosages, medication times and reason for giving/taking medications reflecting the pictures drawn by several artists (Appendix A). The artists consisted of a children’s illustrator, an artist with an elementary education background, and an artist with literacy barriers. The artists were informed about the study’s objectives and received a list of pictures to be drawn. Once the artists returned the drawings they were reviewed by a speech therapist, who then added a few pictures to enhance content validity. The picture banks of all the pictures were randomly organized by category. Each category of pictures was followed by an additional blank area for the subject to draw an original picture if the subject chose to do so.

Validity of an instrument is the extent to which the instrument actually reflects the abstract concept being examined (Burns & Grove, 2001). All subjects completed the data collection form in their natural classroom, during their usual class time, with their teacher present.
minimizing environmental external factors disrupting the setting. During the study, there were no known historical events that may have influenced the responses of the subjects, or mortality threats to the study and all subjects were within the same group maximizing internal validity of the study. All of the students enrolled in the literacy program that met the criteria for the study voluntarily agreed to participate in the study, minimizing threats to external validity (Burns & Grove 2001).

Data Collection

Sampling

Adults who met the research criteria were read an information letter informing them of the research project and inviting them to participate. The letter informed the adult subjects that they were under no obligation to participate in the research project and there were no repercussions if they choose not to participate. All subjects were informed that they may refuse to participate at any time during the project.

Protection of Human Rights

The study subjects were informed that permission was received from the Literacy Program to utilize the site for this research project and were assured that their relationship with the literacy center would not be affected in any way by their refusal to participate in the research project. All study subjects were also informed that the Internal Review Board (IRB) of Medical College of Ohio (MCO) approval was obtained prior to implementation of this research study.

Data Collection and Recording

Data collection was initiated after IRB approval was obtained. The adult subjects who met the research criteria were read a letter informing them of the research study and inviting them to participate. An interview with the adult prospective subject was conducted privately with their
respective teacher present in their natural classroom setting. An information sheet was given to the prospective subject by the data collector explaining the research study (Appendix B). The information sheet was read aloud and a copy was given to each prospective subject. The prospective subject was given an opportunity to ask any questions pertaining to the research or rights as a research subject. It was determined by verbal consent that the adult subject understood both the research study and their rights as a subject. Completion of the data was considered consent to participate. All data received was held anonymous with no names or identifiers attached to any of the data, therefore protecting the subject’s privacy and confidentiality. There was no monetary cost to the subjects, nor was there compensation to the subjects.

When all of the prospective subject’s questions were answered and the subject verbally agreed to be a subject in the research study, the data collector proceeded with the data collection form (Appendix A). The subject was asked general demographic information questions included in most studies including age, gender, ethnic background, and average annual income. They were also asked how many and what type of prescription and over-the-counter medication they were currently taking. The subject’s current literacy level was obtained from their teacher and recorded on the data collection form. The picture text reflecting pictures of medication dosages, medication times, and reason for giving/taking medications was used in a questionnaire form. The pictures were randomly organized by category and shown to each subject in the same sequence utilizing a window overlay exposing only one picture at a time. The data collector asked the subject to express in words what the picture represents to them and the data collector recorded the words on the provided key (Appendix A). At the completion of each category the data collector revealed the intent of the category and gave the subject an opportunity to draw an
original picture (Appendix A). There was no additional follow-up or contact with the adult subject after the data collection forms were completed during the one-time meeting.

Data Analysis

Data obtained from the adult subjects were entered into the computer program SPSS Version 11.0 for Windows. Descriptive analysis and frequencies of correct responses was used for the research questions:

* Does the use of pictography identify and distinguish medication dosages for adult patients with low literacy barriers?
* Does the use of pictography identify and distinguish medication times for adult patients with low literacy barriers?
* Does the use of pictography identify and distinguish the reason for giving medications for adult patients with low literacy barriers?

Summary

This chapter describes the exploratory design of the research study with the purpose of exploring the pictography as a method for the adult patient with literacy barriers to understand medication dosages, medication times and type of medication. The pictography developed by several artists was used as the tool to explore the pictography as a method to understand medication dosages, medication times and reason for giving/taking medications. The sample size and selection were discussed along with the materials for the research project, and specific data collection procedures. Statistical methods for data analysis were also discussed.
CHAPTER IV

Results

The purpose of this study was to explore pictography as a method to increase the understanding of medication dosages, medication times and/or reason for giving/taking medications, for the adult patient with literacy barriers. The study explored selected pictures from different mediums associated with medication dosages, medication times and/or reason for giving/taking medications to determine if the selected pictures would represent a predetermined word/concept to the adult patient with literacy barriers.

This chapter presents the data and findings of the study. Descriptive data was presented regarding the study subjects. Additional data are presented to address the research questions in the following order:

1. Does the use of pictography identify and distinguish medication dosages for adult patients with literacy barriers?
2. Does the use of pictography identify and distinguish medication times for adult patients with literacy barriers?
3. Does the use of pictography identify and distinguish the reason for giving/taking medications for adult patients with literacy barriers?

Sample

Study subjects were recruited from a Midwestern literacy center. Inclusion criteria were that each subject was enrolled in a literacy program, eighteen years of age or older, had literacy barriers due to being non-fluent English speaking individuals, and were assessed using the Comprehensive Adult Assessment System for English as a second language learners with a raw
score of 220 or below corresponding with below a sixth grade reading and writing level. All subjects were identified and selected by the Director of the Literacy Coalition Program. All of the students enrolled in the literacy program that met the criteria were invited to participate in the study. All of the subjects who met criteria voluntarily agreed to participate in the study. Of the twenty subjects that met the age criteria, only eighteen met the Comprehensive Adult Assessment System for English as second language learner’s raw score of 220 or below. The two subjects that were excluded had raw scores that were above the criteria of 220 even though their reading and writing level remained below a sixth grade level. This may have occurred because their raw scores were just slightly above 220 (224 and 229).

The sample of adults with low literacy who met the inclusion criteria is representative of the target population of adult patients with literacy barriers. Of the 18 subjects, 13 (72.2%) were male and 5 (27.8%) were females. Subjects ranged in age from 22 to 67 years of age with a mean age of 36.56 (SD=13.09). Subjects ethnicity included Hispanic (n=10, 55.6%) and Caucasian (n= 8, 44.4%) with all of the sample population being bilingual, speaking Spanish as their first language. Of the 12 subjects that reported an annual income, the minimum reported income was $6,000 with a maximum of $40,000 (M= $14,492, SD= $9,070). Of the 18 subjects, 9 (50%) reported that they were not currently taking any prescription medications, 4 (22.2%) reported taking only one prescription medication, 2 (11.1%) subjects reported taking two prescription medications, 1 (5.6%) subject reported taking three prescription medications, and 1 (5.6%) subject reported taking seven prescription medications. One subject omitted the question. A variety of reasons for taking the prescription medications were described including: edema, Hepatitis C, Diabetes, deep vein thrombosis, allergies, hypertension, seizures, Crohn’s disease, psychiatric disorders, pain, hyperlipidemia, and birth control. Birth control pills were the only
prescription medication identified by two subjects; all the other reasons for taking the prescription medication were reported only once.

Of the 18 subjects, 5 (27.8%) reported not currently using over-the-counter medications, 7 (38.9%) reported using one over-the-counter medication, 5 (27.8%) subjects reported using two over-the-counter medications, and only 1 (5.6%) subject reported taking three over-the-counter medications. Several different reasons were reported for using over-the-counter medications with 7 (38.9%) subjects stating headache, 2 (11.1%) subjects stating cold, and 1 (5.6%) subject each reporting allergies, eye dryness, sinus problems, sore-throat, muscle aches, and vitamins.

Fifteen subjects (83.3%) had literacy levels which corresponded to grade one or below. Three subjects (16.7%) had literacy levels which corresponded to grades two through five.

Findings

The data consisted of the verbal description by each subject of pictures representing information related to taking medication. The pictures were randomly displayed to the subject with regards to medication dosages, times, and/or reason for giving/taking medications. Thus, each set of pictures represented a specific dosage, time and/or reason for giving/taking a medication. Each subject was asked, “What does this picture represent to you?” Each response from the subject was recorded and then coded as a correct response or incorrect response based on the intended meaning of each picture. After the subject completed an entire category of pictures, the researcher verbally communicated to the subject what the category was intended to represent. Each subject then had an opportunity to draw an original picture to represent a personal interpretation of the topic. None of the subjects chose to draw an original picture of the topic.
Research Question 1

Does the use of pictography identify and distinguish medication dosages for adult patients with literacy barriers?

The answer to this question was explored using 17 pictures representing five different medication dosages. The pictures intended to describe “half a teaspoon” (row 1), “one teaspoon” (row 2), “half a pill” (row 3), “one pill” (row 4), and “two pills” (row 5). Figure 2 shows all the pictures representing each different dosage level and indicates the percentage of the 18 subjects who had a correct response to each picture representing medication dosages.
**Figure 2.** Sixteen pictures representing five different medication dosages

| Medication Dosages |
|-------------------|-----------------|-----------------|-----------------|-----------------|
|                   | Column 1        | Column 2        | Column 3        | Column 4        |
| Row 1             | 1 (5.6%)        | 8 (44.4%)       | 13 (72.2%)      |                 |
|                   | ![Image 1]      | ![Image 2]      | ![Image 3]      |                 |
| Row 2             | 8 (44.4%)       | 9 (50%)         | 13 (72.2%)      |                 |
| Row 3             | 4 (22.2%)       | 7 (38.9%)       | 10 (55.5%)      | 11 (61.1%)      |
| Row 4             | 9 (50%)         | 9 (50%)         | 11 (61.1%)      | 12 (66.7%)      |
| Row 5             | 11 (61.1%)      | 13 (72.2%)      | 14 (77.8%)      |                 |
|                   | ![Image 15]     | ![Image 16]     | ![Image 17]     |                 |
There were 12 pictures out of the 17 presented where at least 50% of the subjects identified the pictures as they were clinically intended. The lowest response was the picture in Row 1, Column 1 with only one correct response (5.6%). The other subjects identified that picture with a variety of responses including: “cup of medicine”, “quarter cup”, “cup to take medicine”, “glass with water”, and “two teaspoons every five hours”.

Another problem with some of the pictures was the identification with a food source. For example, when identifying the pictures for “half a pill”, in row 3 there were 38.9% correct responses with the picture in Column 2. Over 50% of the incorrect responses identified a food source for that picture: and half a cheese”. When identifying “one pill”, in row 4, 22.2% of the respondents suggested, “egg” for the picture in Column 1 and 16.8% stated, “cheese” or “cake” for the picture in column 3.

Color was shown to be a factor in correct responses in four out of five dose categories. “Half a teaspoon”, “one teaspoon”, “half a pill”, and the “two pills” were all influenced by color. The highest correct response rate within the dosage category was to the color image of “two pills” in Row 5, Column 3 with approximately 78% correct responses.

In general, the pictures with the simplest conceptual design received the greatest number of correct responses. A simple conceptual design is one that is clear, plain, practical, and related to what the subject is familiar with. In contrast, a complex design is abstract, technical, and difficult to understand.

An exception to both color and design was the picture representing “one pill” in Row 4, Column 4. For the “one pill” group, the picture yielding the greatest number of correct responses had the most complex conceptual design and was expressed as a black and white
image. However, at least 50% of the subjects correctly identified all of the pictures within the “one pill” group.

**Research Question 2**

Does the use of pictography identify and distinguish medication times for adult patients with literacy barriers?

The answer to this question was explored using 23 pictures representing six different medication times in two subcategories: “with” and “without food” (Figure 3), and times throughout the day (Figure 4).

Figure 3 shows all the pictures representing “with” and “without food” along with the percentage of the 18 subjects who had correct responses to each picture. The “with food” pictures are represented in Row 1, and “without food” pictures are represented in Row 2.
**Figure 3.** Eight pictures representing “with” and “without food”.

<table>
<thead>
<tr>
<th>Medication Times “With” and “Without Food”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Row 1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Row 2</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Less than 50% of the subjects identified any of the eight pictures for medication times related to “with” and “without food” as they were clinically intended. In fact, one picture showing a sandwich to indicate “with food” (Row 1, Column 1) was not identified as intended by any subjects. For this picture, more than 50% of the subjects stated “bread” and 22.2% said, “I don’t know”. Another example of a picture with low correct responses (22.2%) was the picture representing “without food” with a place setting and diagonal red line transecting the place setting (Row 2, Column 3). This picture had several interpretations including: “don’t use the plate”, “half a plate”, “silverware checked off”, and “no fork, plate, knife, or spoon”.

Pictography
In contrast to pictures representing medication dosages in Figure 2, medication times “with” and “without food,” was not influenced by color with the largest proportion of correct responses represented by black and white images. The pictures with a simple conceptual design, in black and white images, received a slightly higher percentage of correct responses than the complex color pictures. The shape of a single black “X” over the illustration of food received the greatest number of correct responses for “without food” over the universal symbol of the red circle with a line transecting the circle.

Figure 4 shows all the pictures representing medication times throughout the day and indicates the percentage of the 18 subjects who had correct responses to each picture representing “morning” (Row 1), “noontime” (Row 2), “evening” (Row 3), and “nighttime” (Row 4).
Figure 4. Fifteen pictures representing medication times “throughout the day”.

<table>
<thead>
<tr>
<th>Medication Times “Throughout the Day”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td><strong>Row 1</strong></td>
</tr>
<tr>
<td><strong>Row 2</strong></td>
</tr>
<tr>
<td><strong>Row 3</strong></td>
</tr>
<tr>
<td><strong>Row 4</strong></td>
</tr>
</tbody>
</table>
There was less than a 50% correct response rate produced when identifying medications times throughout the day. The highest percentage correct within the medication times category was 44.4% in Row 1, Column 4 and showed a rooster crowing in the morning. Other responses to that image included, “rooster”, “chicken” and “time to get up”. There were two images in which no one correctly identified as “noon time” in Row 2, Columns 1 and 2. For the picture representing “noon time” in Row 2, Column 1, 33.6% responded “table” and 22.4% responded “breakfast”. The other image of “noon time” receiving no correct responses (Row 2, Column 2) did have a common literal response by many subjects stating, “tree and sun”. The pictures representing both “evening” (Row 3) and “nighttime” (Row 4) received similar literal responses. The respondents indicated “moon and stars”, “moon”, “moon and night”, and “day” as common responses for “evening”. Respondents also indicated “moon and stars”, “night and day”, and “sun and moon” for “nighttime”.

The black and white images received lower correct response rates ranging from 0% to 11.1%. The highest correct responses were associated with color pictures ranging from 33.3% to 44.4%.

These images representing medication times illustrated by the complex circle divided into four equal sections to describe “morning” (Row 1, column 1), “noon” (Row 2, Column 4) “evening” (Row 3, Column1), and “nighttime” (Row 4, Column 2) which generated an inconsistent correct response pattern. Correct responses fluctuated from 5.6% for “morning” to 22.2 for “nighttime”. For each of these images 22.4% of the respondents stated, “I don’t know”. Other common responses included literal interpretations of the images including, “sun”, “sun and moon”, and “moon and stars”.
Research Question 3

Does the use of pictography identify and distinguish the reason for giving/taking medications for adult patients with low literacy barriers?

The answer to this question was explored using 17 pictures representing five different reasons for giving/taking medications. The pictures intended to describe “water pill” (Row 1), “pain pill” (Row 2), “chest pain” (Row 3), “fever/temperature” (Row 4), and “headache” (Row 5).

Figure 5 shows all the pictures representing each different reason for giving/taking medication and indicates the percentages of the 18 subjects who had correct responses to each picture representing reason for giving/taking medications.
Figure 5. Seventeen pictures representing five different reasons for giving/taking medications.

<table>
<thead>
<tr>
<th>Reason for Giving/Taking Medication</th>
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<tr>
<td></td>
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<tr>
<td>Column 1</td>
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<tr>
<td>Row 1</td>
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<tr>
<td>Row 2</td>
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<td>Row 3</td>
</tr>
<tr>
<td>Row 4</td>
</tr>
<tr>
<td>Row 5</td>
</tr>
</tbody>
</table>
Within the categories for Reason for giving/taking medications, the “water pill” (Row 1), and “pain pill” (Row 2) groups resulted in low correct response rates from 0% to 22.2%. The “chest pain” group had somewhat better responses with the correct response ranging from 27.8% to 44.4%. The pictures representing “fever/temperature” (Row 4), and “headache” (Row 5) resulted in the highest correct response rates averaging between 72 to 90%.

There were two pictures which were not identified correctly by any of the subjects. The first picture (Row 1, Column 1) was intended to represent “water pill”, but was identified as “triangle” (44.8%), “I don’t know” (22.4%), “capsule with water” (11.2%), “three corners” (5.6%), “water” (5.6%), “cloudy” (5.6%) and “rectangle” (5.6%). The second picture intended to represent “pain pill” and was most commonly identified by the subjects as “pain in elbow” (16.7%), “arm” (11.2%), “elbow” (11.2%), “broke elbow” (11.2%), and “pain in arm” (11.2%).

Color did not appear to influence the number of correct responses. The lower correct response groups had seven out of nine of the pictures in color. The higher correct response groups had three of the nine pictures in total color, three in partial color, and three in black and white images. The largest portions of correct responses were in the “headache” category (Row 5) with an equal amount of correct responses for both a color image and black and white image.

In general, pictures with a simple, concrete, practical design received a higher number of designated correct responses. The reason for giving/taking medications for “fever/temperature” and “headache” received the highest correct response rates ranging from 72.2% to 88.9%.
Summary

This chapter addressed the subjects, research questions, and presented the data and findings of the study. The study consisted of eighteen bilingual adult subjects with Spanish as their first language. The majority of the subjects (94.4%) had literacy levels corresponding to grade one or below.

Three categories of pictures were viewed and the subjects’ perceptions of the pictures identified the medication dosage category and the Reason for giving/taking medications category had 8 pictures where at least 50% of the subjects correctly identified the pictures as they were clinically intended. The medication times “with food” and “without food” category had less than 33% of subjects who correctly identify the pictures and the medication times “throughout the day” had less than 45% of the subjects who correctly identified the pictures as they were clinically intended.

Color was shown to be a factor in medication dosages and medication times “throughout the day”. Color did not seem to influence the higher correct responses in “fever/temperature” and “headache” category. In general, throughout all categories, pictures with simple, concrete, practical design received higher correct responses than complex designs.
CHAPTER V

Discussion

This chapter presents the findings of this study using pictography for adult patients with literacy barriers to understand medications. The study findings are discussed in comparison to current research. The findings are also discussed in terms of the theoretical framework of Imogene King’s theory of goal attainment. Conclusions, limitations of this study, implications for nursing theory, nursing practice, nursing education, and further research are presented.

Findings

The purpose of the research was to explore pictography as a method to understand medication dosages, medication times, and/or reason for giving/taking medication, for adult patients with literacy barriers. Overall simple, practical, concrete pictures using color images appeared to be most useful in representing the clinically relevant concept or idea. The picture categories with the highest percentage of correct responses included: reason for giving/taking medications for “fever/temperature” and “headache”. The highest correct responses in the medication dosage category contained straightforward, basic designs resulting in a range of correct responses from 61.1% to 77.8%.

The data show pictography is an effective method to communicate medication dosages of “half a teaspoon”, “one teaspoon”, “half a pill”, “one pill”, and “two pills” and reason for giving/taking medication for “fever/temperature” and “headache” based on the evaluative criteria for clinical relevance (Polit & Beck, 2004). Figure 6 represents the pictures which had the highest correct response rates.
Similar to the findings of the current study, using pictures to communicate medication instructions was also found effective in a study by Strydom et al. 2001 for patients who had difficulties in reading and understanding medication labels in the written form. The findings of the current study are also consistent with Ngoh & Shepherd’s (1997) study that also found that visual pictures must be simple, practical, and related to what the patient knows and understands. Ngoh and Shepherd also found that abstract, technical or obscure visual images have little or no meaning to subjects and patients with literacy barriers.

The complexity of design as shown in Figure 7 demonstrates examples of complex designs for “water pill”, “pain pill”, and “chest pain” which may have played a role in these pictures receiving a lower percentage (0% - 44.4%) of correct responses. The advanced cognitive processes and functional health literacy skills necessary to comprehend complex health concepts are often inadequate in adult patients with literacy barriers (Kirsh, et al., 1993; Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999; National Work Group on Literacy and Health, 1998).
Figure 7  Examples of Complex Designs Receiving Low Percentage of Correct Responses

Functional health literacy is necessary to comprehend many disease processes and health conditions (Kirsch, et al., 1993). Many disease processes have common symptoms that are recognized and cross educational barriers. Ngoh and Shepherd (1997) found that producing visual images required the pictures to be clear, acceptable, culturally relevant, and relate to the patients’ experiences and environment. This may be reflected in the higher number of correct responses (72.2%-88.9%) of the pictures in both the “fever/temperature” and “headache” category as shown in Figure 8.
Universal appears to have played a role in categories receiving a higher correct response rate. A universal symbol is a symbol widely recognized and implies that the symbol means the same thing to all people and all cultures. Some symbols are more widely recognized and accepted than others and tend to have similar meanings in a variety of cultures (United States Department of the Interior Bureau of Land Management, 2005, Automated Mapping International Symbols). Examples of those pictures which had higher percentages of clinically relevant responses and universal symbolism are illustrated in figure 9. The universal symbol of a rooster crowing with the sun rising, representing morning yielded more than 50% correct responses over the other illustrations within the category. Similarly, nighttime illustrated by the universal symbol of a bed with a black night sky background of stars and a moon resulted in the highest correct response rate for the nighttime category. Research shows that in many
cultures an “X” is identified as meaning “bad”, and can be used to communicate that concept, while night can be marked by the moon in the sky (Ngoh & Shepherd, 1997, Murphy, et al., 1997).

Figure 9. Examples of Utilizing Universal Symbols within Pictography

Additional Findings

Although not a goal of the study, an additional finding was that the majority of the subjects volunteered information that they turn to family members and friends to assist with medication instructions. This finding can be supported by literature indicating that interventions must build on a patient’s social system, appear in a visual, familiar design, and be culturally appropriate (Rudd, Moeykens, & Colton, 1999).

A second extraneous finding was that many of the incorrect responses by the subjects were associated with food. Many of the pictures that were not intended to represent a food source were interpreted as cheese, bread, egg, and cake. Based on King’s (1990) theory, each subject’s response was a representation of their individual perceptions of the pictures based on their past
experiences which influenced their responses. Each response was relevant to each of the
subjects who identified the picture even if the subject related the picture to food while the
investigator considered it a medication dosage.

A third finding was related to color. Many of the subjects commented that they memorize
when and how to take medication by, “the color of the tablet” or “pill”. When the subject
received a medication with the color of the tablet or pill changed, the subject often stated, “then I
do not know what to do”.

Conclusions

The findings indicate that pictography is an effective method to communicate medication
dosages and the reason for giving/taking medications on a limited basis. The most effective
design to communicate medication instructions through pictography is through the use of simple,
concrete, practical, colored pictures.

Having a sample population whose first language is Spanish implies that the percentages of
correct responses for each picture may not only be influenced by literacy barriers but also by
cultural influences. The pictures that received lower correct percentages may not have crossed
cultural barriers and, therefore may not have been as successful. This possibility was also found
in a study by Ngoh and Shepherd (1997) who studied the use of pictures and symbols as visual
aids to compare comprehension and compliance measures in nonliterate female adults in
Cameroon, West Africa.

Adult patients with literacy barriers are not able to perform the necessary functions required
to read and follow the directions on a prescription label in the form of the written word (Ad Hoc
Committee on Health Literacy for the Council on Scientific Affairs, 1999). The pictography
developed to date, may not be sufficient as a single interventional method to the written word for
The adult patient with literacy barriers to understand medication instructions.

The findings of this study have highlighted a few fundamental guidelines in developing information through pictorial representation for the purpose of increasing understanding medication instructions. Using simple, practical, colored pictures that are related to what the subjects are familiar with may be the most beneficial guideline to developing and using pictures in assisting with medication instructions.

Limitations

The voluntary nature of adults enrolling themselves in a literacy program is identified as a limitation for the research project. Adults that are enrolled in such programs may have a heightened desire to function in the literacy world resulting in a limitation of generalizability of the findings to all adults with literacy barriers.

Another limitation for the study was the obstacles and challenges in obtaining a research site due to the sensitivity of the population and logistics of interviewing each subject with their mentor/teacher present. Several potential research sites declined the opportunity to take part in the study stating they, “wanted to maintain the anonymity of their students” and “it would be very difficult to gather the students in one place at one time”.

Another limitation would be the limited diversity of the subjects. The study was conducted in one Midwestern literacy center, a small convenient purposive sample size was used, and all of the subjects, lived in the same geographical area, and were of the same cultural background. Obtaining a larger more geographically diverse sample would have given results which would be more generalizable.

Another limitation was the language differences between the researcher and the subjects. All of the subjects were bilingual claiming Spanish as their first language and English as their
second language. Each subject was interviewed privately with their teacher/translator present in their natural classroom setting. The literacy program offered several literacy classes throughout the week to accommodate their students resulting in different teachers/translators for the subjects involved in the study. The researcher’s first language is English with beginning Spanish as a second language. Some of the subjects initially expressed their responses to the pictures in Spanish requiring the teacher to translate the response in English. The Spanish language and English language do not always translate word for word, requiring the teacher/translator to have the subject explain their response when Spanish expressions were used that did not have a literal English translation creating a limitation for the study.

Implications

Nursing Theory

Using Imogene King’s (1990) goal attainment model as a theoretical framework for this study, pictography as a method for adult patients with literacy barriers to understand medication was explored. King’s goal attainment model of nursing holds the belief that at the personal systems level, individuals desire to execute tasks associated with activities of daily living requiring both interaction and decision making (King, 1989,). The subjects in this study were all enrolled in a literacy program, postulating they had the desire to execute tasks associated with activities of daily living and had made the decision to increase their literacy skills.

The role of the nurse is to mutually communicate information with the patient, establish goals, and take action to obtain those goals (King, 1989, 1990, 1997). During the interaction phase, the nurse and adult patient set mutual goals through communication to maintain health. Through this communication of perceptions, during the interaction phase, the nurse and adult patient with literacy barriers set the mutual goal of identifying if the pictography was an effective
method to understand medication instructions. Positive nursing communication, interaction, and transaction with adult patients with literacy barriers in the future could increase the understanding of medication instructions.

**Nursing Practice**

Clinically useful pictures have a high degree of relevance in clinical practice. The degree of clinical relevance is based on answering five questions to determine if the research study has a high or low degree of clinical relevance (Polit & Beck, 2004). The five questions to determining clinical relevance are based on: solving a problem faced in clinical practice, usefulness of the measures used in a study to clinical practice, usefulness of the theoretical concepts to practice, use of an effective intervention in clinical practice, and implementation into clinical practice (Polit & Beck, 2004). Polit and Beck (2004) stated that the more questions answered affirmatively, the higher the degree of clinical relevance. For the current study, each of these questions on clinical relevance can be answered with an affirmative response depicting a high degree of clinical relevance for use with individuals with low literacy skills.

There are several implications for nursing practice identified from the current study. The prevalence of low health literacy in the United States has been well documented through recent research (Kirsch, et al., 1993; Kefalides, 1999). Recent research also highlights the fact that standard patient education and care practices are insufficient to overcome the barriers presented by inadequate health literacy (Kirsch, et al., 1993; US Dept. of EDU, 2003; Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). Nursing professionals must be aware of the urgent need to address the challenge of communicating effectively with patients, many of whom have limited or low literacy skills. Many patients do not identify themselves as struggling with literacy issues nor do they ask health care professionals to assist them to read
health-related materials or instructions. Nursing must heighten their awareness and skills in identifying individuals with low literacy skills.

This study explored the use of pictography as a method for adult patients with literacy barriers to understand medications. The findings of the study indicate that pictography may be an effective method to communicate medication dosages of “half a teaspoon”, “one teaspoon”, “half a pill”, “one pill”, “two pills”, and reason for giving/taking medications for “fever/temperature” and “headache” for greater than 60% of adult patients with literacy barriers. The study also indicated that the pictures used in this current study may not be an effective way to communicate medication instructions for “with” and “without food”, medication times throughout the day, or the reason for giving/taking medications; such as “water pill/diuretic”, “pain pill”, and “chest pain” for adult patients with literacy barriers. Nursing can use this knowledge to meet the challenge of developing a product that better meets the needs of low health literacy adults.

To continue the goal of attaining health, nurses can combine verbal instructions, written instructions and pictography for the patient with literacy barriers to increase the likelihood that instructions are being carried out as directed. Nurses need to be involved in formulating and testing new strategies for improving the ability of low literacy adults to communicate concerns and understand management of their health care.

*Nursing Education*

Nurses provide a vital support role in educating patients throughout the health spectrum. It is relevant for nurses whenever the written word is used to explain medication instructions in terms that are understandable to their patients.

Nurses and health care professionals need to be educated about the prevalence and consequences of inadequate health literacy in order for individuals with low literacy skills to be
Nursing education should be implemented in the hospital, as well as at the undergraduate and graduate level nursing programs to increase understanding and awareness of patients with low health literacy.

Nurses can be involved in several types of programs to assist the current low literacy population and decrease future low literacy populations through various Read for Literacy Programs. Adult education is a critical area that nurses could volunteer their time to mentor individuals in reading skills. Additionally, nurses should be involved in task forces that combine the expertise of health professionals, education professionals, and literacy professionals to develop effective health education strategies. Collaborative efforts between multidisciplinary teams are critically needed to fully address the needs of those with limited health literacy skills. Nurses should be active members of nursing organizations to educate their colleagues, to raise the awareness level within nursing, and to advocate for the adult patient with low literacy skills.

Recommendations for Further Research

There is a critical need for additional research that will further explore strategies that complement or replace the use of written material. There is an infinite amount of pictures that could be explored to determine if they identify and distinguish medication dosages, medication times, and/or reason for giving/taking medications for adult patients with literacy barriers. Additional research should be completed using larger picture banks, expanded medication instruction categories and larger sample size. Additional research should also be completed
using a diverse population to determine if pictography is applicable across cultures and geographical areas.

Further research will enhance the content validity of the pictographic tool developed: additional testing of the instrument is required. Recognizing that it often takes years to develop validity for an instrument or tool, this study will create groundwork for the scientific work required to develop an instrument (Burns & Grove 2002).

Summary

This chapter presented the findings that the use of pictography as a method for adult patients with literacy barriers to understand medications was clinically relevant to communicate “half a teaspoon”, “one teaspoon”, “half a pill”, “one pill”, “two pills”, “fever/temperature”, and “headache”. Recommended guidelines in developing pictography to assist low literacy patients with their medication instructions included the use of simple practical, concrete, colored pictures that are culturally relevant and familiar to the subjects. In addition, the use of universal symbolism may be helpful in the development of pictography for the use of medication instruction.

In conclusion, Imogene King’s theory of goal attainment guided this study through the use of interaction and transaction to explore pictography as a method for adult patients with literacy barriers. The clinically useful pictures identified in this study have a high degree of relevance for clinical practice. It is recommended that to promote the goal of health, these pictures should be used clinically in combination with both verbal and written instructions.

Nursing and health care professionals need to be involved on all levels to advocate for adult patients with literacy barriers through education, task forces and mentoring to meet the increasing challenges of inadequate health literacy and the complex health system. The chapter
concluded with recommendations to continue research that will explore, test, and develop strategies to assist the adult patient with literacy barriers to understand medication instructions.
REFERENCES


(Original work published 1981, NY: Wiley)


Test of Adult Basic Education. *Testing and Accountability in Adult Literacy Education*

Retrieved June 2, 2004, from [http://www.nald.ca/fulltext/sticht/testing/page96.htm](http://www.nald.ca/fulltext/sticht/testing/page96.htm)


# Appendix

PICTOGRAPHY: AN ALTERNATIVE INSTRUCTION METHOD FOR ADULT PATIENTS WITH LITERACY BARRIES TO UNDERSTAND MEDICATIONS

DATA COLLECTION FORM

<p>| | | |</p>
<table>
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<tr>
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<tbody>
<tr>
<td>1. Gender</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2. Ethnicity:</td>
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<td>African American</td>
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<tr>
<td>3. Age:</td>
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<tr>
<td>4. Annual Income Average:</td>
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<tr>
<td>5. How many prescription medicines are you currently taking?</td>
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<tr>
<td>6. What is the reason/medical condition that you are taking the prescription medicine?</td>
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<tr>
<td>7. How many over-the-counter medicines are you currently taking?</td>
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<tr>
<td>8. What is the reason that you are taking the over-the-counter medicine?</td>
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<td>9. Literacy Level Score:</td>
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<td>CASSAS Score:</td>
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</table>

Attachment B
1a; 1b; 1c: Describe in words what each picture means to you:

1a. ____________________________________________

1b. ____________________________________________

1c. ____________________________________________

1d: If you would like, please draw a picture that describes “½ teaspoon”.

2a; 2b; 2c; 2d: Describe in words what each picture means to you:

2a. ____________________________________________

2b. ____________________________________________

2c. ____________________________________________

2d. ____________________________________________

2e: If you would like, please draw a picture that describes “morning”.

3a; 3b; 3c: Describe in words what each picture means to you:

3a. ____________________________________________

3b. ____________________________________________

3c. ____________________________________________

3d: If you would like, please draw a picture that describes “1 teaspoon”.

4a; 4b; 4c: Describe in words what each picture means to you:

4a. ____________________________________________

4b. ____________________________________________

4c. ____________________________________________

4d: If you would like, please draw a picture that describes a pill for edema (water pill, diuretic, excess fluid).
5a; 5b; 5c; 5d: Describe in words what each picture means to you:

5a.

5b.

5c.

5d.

5e: If you would like, please draw a picture that describes "with food".

6a; 6b; 6c; Describe in words what each picture means to you:

6a.

6b.

6c.

6d: If you would like, please draw a picture that describes "nighttime".

7a; 7b; 7c; 7d: Describe in words what each picture means to you:

7a.

7b.

7c.

7d.

7e: If you would like, please draw a picture that describes "noon-time".

8a; 8b; 8c; 8d: Describe in words what each picture means to you:

8a.

8b.

8c.

8d.
8e. If you would like, please draw a picture that describes “evening”.

9a; 9b; 9c; 9d: Describe in words what each picture means to you:

9a. 

9b. 

9c. 

9d. 

9e: If you would like, please draw a picture that describes “without food”.

10a; 10b; 10c; 10d: Describe in words what each picture means to you:

10a. 

10b. 

10c. 

10d. 

10e: If you would like, please draw a picture that describes “½ a pill”.

11a; 11b; 11c; 11d: Describe in words what each picture means to you:

11a. 

11b. 

11c. 

11d. 

11e: If you would like, please draw a picture that describes “1 pill”. 
12a; 12b; 12c: Describe in words what each picture means to you:

12a. 

12b. 

12c. 

12d: If you would like, please draw a picture that describes “pain pill”.

13a; 13b; 13c: Describe in words what each picture means to you:

13a. 

13b. 

13c. 

13d: If you would like, please draw a picture that describes “chest pain”.

14a; 14b; 14c: Describe in words what each picture means to you:

14a. 

14b. 

14c. 

14d: If you would like, please draw a picture that describes “two pills”.

15a; 15b; 15c; 15d: Describe in words what each picture means to you:

15a. 

15b. 

15c. 

15d. 

Page 5 of 12
15e: If you would like, please draw a picture that describes “fever/temperature”

16a; 16b; 16c; 16d: Describe in words what each picture means to you:

16a. 

16b. 

16c. 

16d. 

16e: If you would like, please draw a picture that describes “headache”
RESEARCH INFORMATION SHEET FOR ADULT PARTICIPANTS

PICTOGRAPHY: AN ALTERNATIVE INSTRUCTION METHOD FOR ADULT PATIENTS WITH LITERACY BARRIERS TO UNDERSTAND MEDICATIONS

Principal Investigator Katherine Sink, Ph.D.
Graduate Student Investigator Carol J. Findley, RN
Phone number(s) (419) 383-5868

Many people, who have trouble reading, have difficulty reading their prescription medicine labels. You are being asked to take part in a research study to help patients understand how to take their medicine by looking at pictures and saying what the pictures mean to you. This will help determine if pictures instead of words can help people take their medicine as they should.

If you decide to take part in this study, you will be asked to look at pictures and describe in words what the pictures mean to you. After each group of pictures, you will have an opportunity to draw your own picture, describing each group (what time to take medicine, reason for taking medicine, and how much medicine to take). The study will take approximately 30 minutes and it will be conducted during your regularly scheduled class time at Steuben County Literacy Coalition. In addition, you will be asked some general information included in most research studies including your age, gender, ethnic background, average annual income, and how many and what type of prescription medicines you are currently taking. Your name will not be on your responses.

There is no cost to you to take part in this study. Taking part in this study is voluntary. If you should decide not to take part in this study, it will not affect your future relations with the Medical College of Ohio, its personnel, and associated hospitals and the Steuben County Literacy Coalition. If you do decide to take part in this study, you are free to stop before turning in your responses.

Completing the picture text indicates that you understand the information sheet provided above, have had all your questions answered, and have decided to participate.

If you have any questions concerning this study or information sheet beyond those answered by the investigator, including questions about the research, your rights as a research subject or research-related injuries, please feel free to contact Eric Schaub, M.D., Chairman, Institutional Review Board, Medical College of Ohio, at (419) 383-6796.

Attachment A
Instruction sheet version date: 11/03/04

APPROVED BY MCO IRB
ABSTRACT

Inadequate health literacy is a pervasive problem that compromises health care and limits understanding of medication instructions. Using King’s theoretic nursing framework, the study purpose was to explore pictography as a method for adult patients with literacy barriers to understand medication dosages, times and reason for medications. The exploratory study was conducted in a Midwestern literacy center. Eighteen bilingual speaking subjects viewed and interpreted their perceptions of randomly organized pictures. The study findings indicated that pictography is a clinically relevant method to communicate medication dosages and reason for giving/taking some medications. However, it is recommended that pictography be used in combination with both verbal and written instructions and not as a single interventional method.
Pictography
Pictography