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Effects of Teach-Back on Children's Treatment in Parents with Low Health Literacy

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Abstract

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MSN, Walden University, 2014

BSN, University of Texas at Arlington 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Health literacy (HL) skills are necessary to understand the context of medical information provided to patients in all settings including the emergency room. People with low health literacy (LHL) have difficulty comprehending and implementing basic tasks such as understanding medication administration. The purpose of this quasi-experimental study guided by Orem's self-care theory was to determine the effect of using the teach-back method for discharge instructions compared to standard written instructions based on parents' learning style and HL skills assessed during their visit to the emergency room. The Newest Vital Sign (NVS) tool was reworded to assess the parents' HL. A panel of experts reviewed the tool independently, judged appropriateness and accuracy of the questions, and suggested minor changes. Interrater reliability was assessed in a pilot study with 14 participants, and the strength of the agreement was classified as good (κ = 0.61–0.80) to very good (κ = 0.81–1.00). The NVS was used to determine the literacy levels of 16 participants. The data were analyzed using the Mann-Whitney U test to compare the median scores in comprehension, adherence, and recall. Results revealed no statistically significant increase in comprehension adherence and recall when using the teach-back method (n = 9) compared to the standard written instructions (n = 7). The small sample size was a limitation. Modifying teaching methods for those with LHL to assure complete understanding of important health information will affect positive social change. Further research addressing low health literacy in parents who speak languages other than English is necessary to assure the results are applicable to the general population.

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Dedication and Acknowledgement

My dissertation work is dedicated to both my late parents, Christel and Bernd Schroeter. Their selfless acts, many sacrifices and all the support and positive reinforcements throughout my upbringing have given me the solid foundation, strength and willpower to realize my dreams. I know that they both would be so extremely proud of my accomplishments today.

I extend my gratitude to Dr. Leslie Hussey for being my chair and supporting me through this long journey. She had many words of encouragement, her continued guidance and many gentle but stern nudges to get this done helped me to get unstuck and not to give up. Despite many of my self-created obstacles, Dr. Hussey's determination to see me through to the finish line was remarkable.

Furthermore, I give thanks and appreciation to my husband Gus, for supporting me in my effort to complete my dream by picking up the slack when I spend hours literally locked in the office to read, study and write. To my son Jason, I hope my accomplishment will show you that it is never too late to accomplish your dream, you are never too old to learn and most of all NEVER quit. There are many other friends who have had words of encouragement to get me through the process of completing this amazing journey.

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Chapter 1: Introduction to the Study

Health literacy skills are necessary to understand choices, consequences and context of medical information and services provided to patients (Center for Disease Control & Prevention, 2016). The Institute of Medicine (IOM), World Health Organization (WHO), the Agency for Healthcare Research and Quality (AHRQ), and the Joint Commission on Accreditation of Healthcare Organizations have made it a priority to address the problem of low health literacy in an attempt to improve health outcomes (Ferguson & Pawlak, 2011). Health literacy is defined by the AHRQ (2014) as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (para.1). When compared to people with adequate health literacy, patients with low health literacy have an increased rate of using the emergency room for nonurgent complaints (Griffey, Kennedy, McGownan, Goodman & Kaphingst, 2014; Morrison, Schapira, Hoffman, & Brousseau, 2014). The financial impact of low health literacy has been tremendous, with studies reporting that approximately $75 to $125 billion dollars or 3% to 5 % of the overall healthcare cost in the United States annually are due to low health literacy (Eichler, Wieser, & Brugger, 2009).

The literature suggests that approximately 36% of the population have either basic or below basic health literacy skills (Griffey et al., 2015; Kutner, Greenberg, Jin & Paulsen, 2006). Adequate health literacy improves health outcomes and reduces admission rates and intentional or nonintentional nonadherence to the plan of care, which in turn will decrease the cost of health care and reduce the overcrowding in the

emergency rooms. Increasing the comprehension of patients' discharge instructions can lead to increased patient satisfaction, a valuable measure in today's pay-for-performance health care reimbursement system (Griffey et al., 2015; National Institute of Health, 2014). Situations involving transition of care are considered high risk areas where good communication and understanding of instructions are of utmost importance. According to the National Transition of Care Coalition (2009), discharge from the emergency department is an area where patients could be faced with significant challenges understanding their home care instructions, especially in the presence of low health literacy.

Numerous studies have evaluated adults with low health literacy and adherence to medication regimens or the plan of care and found a correlation between low health literacy, inadvertent omission of medications, and poor comprehension of discharge instructions (Lindquist et al., 2011; Gignon, Ammirati, Mercier, & Detave, 2014). Furthermore, researchers report that assessing health literacy and learning preferences combined with the implementation of innovative teaching strategies can improve the patients' comprehension of the treatment plan, lead to improved outcomes, and reduce healthcare costs (Alberti & Nannini, 2013; Chappuy et al, 2012; Gignon, et al., 2014; Giuse, Koonce, Storrow, Kusnoor & Ye, 2012; Griffey et al., 2015). A branch of health literacy is parental health literacy, which is the parents' or caregivers' ability to carry out treatment plans and make informed health care decisions for their children (Yin, et al., 2009). The teach-back method, also referred to as the show-me method, is recommended by the AHRQ in the Health Literacy Universal Precautions Toolkit. Using this method is

an effective way to check and confirm the level of understanding when delivering health information to patients (AHRQ, 2015).

Identifying parental health literacy levels could lead to significantly improved health outcomes in children. This quantitative study measured parental health literacy levels and the impact the teach-back method has on the level of understanding of the emergency room discharge instructions. In Chapter 1, I present a synopsis of the background information of the impacts of health literacy on a person's ability to make informed health care decisions. In addition, in this chapter I also discuss the problem statement, purpose of the study, research questions and hypotheses, significance of the research, definition of variables, and assumptions and limitations of the study. In addition, I present a clear description of the theoretical framework guiding this study.

Background of the Study

Health literacy has risen to the forefront of health care issues and was declared a major public health concern for our nation (IOM, 2004). Furthermore, Berkman, Sheridan., Donahue, Halpern, & Crotty (2011) published a review of the literature highlighting the effects of low health literacy on measures of health outcomes, and Kutner et al. (2006) published results of the first-ever national assessment of health literacy of the English-speaking population in the United States that clearly outlined a widespread problem. The communication of health information and health literacy are deeply linked and essential components of the mission to improve the health of all Americans, a mission outlined in both the Healthy People 2010 and Healthy People 2020 initiatives of the federal government (U.S. Department of Health & Human Services,

2010). The Health Literacy Workgroup overseen by the Department of Health & Human Services, developed the *National Action Plan to Improve Health Literacy* in 2010. The action plan is guided by two core principals, "all people have the right to health information that helps them make informed decisions and health services should be delivered in ways that are easy to understand and that improve health, longevity, and quality of life" (U.S. Department of Health & Human Services, 2010, p. 1).

In a prospective multicenter study, Chappuy et al. (2012) examined the comprehension of the medical information provided to parents while admitted in the emergency room in 13 pediatric emergency departments (EDs). The authors looked for qualities that potentially affected the lack of understanding. The study used a large sample of 380 parents and found that only19% of parents fully understood and less than half reported only sufficient understanding of the information given to them related to reasons for admission, as well as the grave outlook of their child's illness. They used identical questionnaires comprised of closed-ended questions for both the physician and the parent. The authors concluded that enhancements to the strategies of conveying health information to parents is necessary to overcome the barriers identified.

Giuse et al. (2012) conducted two back-to-back randomized studies to evaluate the differences in the patients' ability to comprehend the discharge teaching presented to them, using either the standard discharge instructions compared to instructions tailored to the patients' health literacy level or personalizing the instructions considering both the health literacy level and their learning style. Understanding of instructions was measured at discharge and at a 2 week follow up. Giuse et al. used the Short Test of Functional

Health Literacy (S-TOFHLA) and the Visual, Aural, Read/Write, Kinesthetic learning style assessment tool to guide the personalization of the instructions. The authors provided evidence that by using both the health literacy levels and the preferred learning style to customize patient teaching will result in patients' comprehension of the material provided.

A systematic review by Morrison, Myrvik, Brousseau, Hoffman, and Stanley (2013) appraised peer reviewed literature related to parental health literacy and ED use. Although the authors found mixed results, in studies evaluating a correlation between health literacy and ED use, they established that seven out of eight interventions targeting parents with presumed low health literacy can decrease the use of the ED. Limitations to this review exist in that none of the intervention studies actually measured health literacy, making it difficult to draw conclusions that the low literacy interventions actually targeted health literacy.

Health Literacy Assessment

Many health literacy assessment tools exist today, and the academic circle agrees that these tools need to provide multimodal measurements such as print literacy, numeracy or quantitative literacy, and oral literacy (Altin, Finke, Kautz-Freimuth & Stock, 2014). Ciccarelli Shah, West, Bremmeyr, and Savoy-Moore (2010), conducted a study to assess the Newest Vital Sign (NVS), a health literacy tool, for its appropriate use, approval, and time required to administer in order to assess the health literacy level. The authors used a cross sectional design and a logistical regression with a large sample size of patients of different age groups and gender. Using the logistical regression

analysis, younger age, higher formal education, health class participation, and body mass index were all identified as positive predictors of adequate health literacy. The study revealed that the NVS was able to measure the health literacy level in adults in less than 3 minutes, which makes it easy to use for healthcare providers and improves the acceptance of the tool. Furthermore, the authors found that race was related to health literacy.

In another study, Kumar et al. (2010) performed a cross sectional study evaluating the association of parental literacy and numeracy skills and their relationship to the comprehension of ordinary health related responsibilities in caring for their infants; furthermore, they examined the validity of the abbreviated Parental Health Literacy Activities Test–10 (PHLAT) scale. This study found that many parents of young children with limited literacy and numeracy skills encounter difficulties in comprehending and implementing basic health care tasks for their children in areas such as nutrition, safety, and medication administration, with only half of the parents being able to determine the proper dose of acetaminophen for their child.

A comparison between the NVS and the S-TOFHLA was done in a study by Morrison et al. (2014) with caregivers of children using the emergency room. The authors identified that the results of the NVS compared to the S-TOFHLA varied in the younger adult population, with the S-TOFHLA being less accurate in the prediction of health literacy in that population. Their recommendation was to use the NVS when assessing health literacy in parents and care givers of children.

Teach-Back Method

Griffey et al. (2015) conducted a randomized controlled quasi-experimental study to explore the effects of using the teach-back method when compared to standard discharge instructions in a convenience sample of adults with low health literacy in the ED. The authors used the Rapid Estimate of Adult Literacy in Medicine-Revised (REALM-R) to identify patients with low health literacy; nearly 50% were found to have low health literacy, and thus were eligible to be enrolled in the study. The study found there was improvement in the knowledge of discharge instruction when using teach-back in relation to post-ED medications (p = .02), post-ED self-care (p = .03) and post-ED follow-up (p = .00001).

Orem's Self-Care Deficit Nursing Theory

Using Orem's perception of self-care and dependent care, a mother's ability to perform dependent care activities is imperative to follow through on health promotion and disease prevention activities for their children (Wilson, Baker, Nordstrom, & Legwand, 2008). A parent's inability to read and comprehend can negatively impact their ability to carry out dependent care activities for their children such as signing consent, administering medications accurately, or making decisions on necessary immunizations. Sürücü and Kizilci (2012) evaluated the efficacy of using Orem's self-care deficit nursing theory (SCDNT) to improve the self-care behavior in patients with type 2 diabetes. The authors used a descriptive case study of a female patient with type 2 diabetes receiving diabetes self-management education, a problem solving process including assessment, goal setting, planning, implementation, and evaluation, steps similar to the nursing

process. The study revealed that the SCDNT can be useful in the identification, planning, and implementation of the diabetes self-management education in order to yield positive health outcomes. The authors used the nursing process, and it was identified that portions of the education included a form of teach-back, as the patient return demonstrated the individual training, inspection, and palpation method.

Furthermore, Wilson et al. (2008) used Orem's SCDNT to guide their study assessing the correlation between maternal health literacy and the mother's ability to comprehend and communicate important information on childhood immunization. The authors used a mixed methods research design using a convenience sample and the teach-back method in a walk-in urban immunization clinic. Instruments used in the study were a demographic profile assessment and the REALM, a validated health literacy assessment tool. The results identified significant lack of knowledge and comprehension as 90% of mothers were unable to discuss actions to be taken in case of an adverse reaction. The study revealed a statistically significant correlation between health literacy levels and the mother's comprehension of the benefits and risks of the vaccines; mothers with the lower REALM scores had more partially correct answers (p = .02).

Problem Statement

Little research has been done on parental health literacy and the adherence to the children's medication regimen, comprehension of illness progression, use or over-use of the emergency room for non-acute illnesses, or follow through on immunization schedules and preventative care (Chappuy et al., 2012). Furthermore, little research has been completed in emergency rooms evaluating the effects of modified teaching

strategies on patients exhibiting low health literacy. A gap exists in the literature evaluating the impact modifying teaching strategies can have on the adherence and comprehension of their children's treatment plans for parents with documented low health literacy. Studies identified a need for further research exploring the relationship of improved health outcomes when using innovative teaching strategies such as the teach-back method in an environment that is overcrowded and filled with distractions and where health providers are pressed for time, such as the emergency room, to effectively deliver health care instructions (Gignon et al., 2014; Alberti & Nannini, 2011). The teach-back method is a teaching strategy that allows the patient to verbalize their understanding of what they were taught by the provider or nurse, also called the show-me or closing-the-loop method. According to Tamura-Lis (2013), using an "evidence-based method such as the teach-back method to communicate medical information enables the clinicians to subsequently evaluate if learning has occurred" (p. 267).

More emphasis needs to be placed on identifying those with low health literacy skills and modifying the teaching methods in order to help the patients understand their health care instructions. This ultimately will lead to better health outcomes and decrease the overall cost of health care. Nurses have an ethical responsibility to assure patients are fully equipped to comprehend what is being discussed in order to make informed health care decisions, especially when consenting for procedures or surgeries and following through on discharge instructions.

Purpose of the Study

The purpose of this quasi-experimental study was to evaluate the efficacy of modifying the teaching method based on the parents learning style and health literacy skills assessed during their visit to the emergency room, using the teach-back method for discharge instructions compared to the standard written instructions and by assessing after-visit comprehension and retention of those instructions. The independent variable was defined as the teach-back method in which patients were asked to return demonstrate the information taught by the provider, and the standard written discharge instruction was the control variable. The dependent variables were defined as the parents' comprehension and retention or recall of the instructions provided. Comprehension is the ability to understand and process information presented, and retention is the patient's ability to recall new knowledge at a later time. Intervening variables were defined as the health literacy skills, learning preferences, culture, age, and gender of the parents.

Research Questions and Hypotheses

RQ1: What effect does the teach-back method have on the level of comprehension of the treatment plan when compared to using the current standard of care in parents or dependent care agent with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$1: The teach-back method has no effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$1: The teach-back method has an effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy.

$$H_1: \mu_1 > \mu_2$$

Where μ_1 is the average increase in comprehension with the use of the new discharge teaching, and μ_2 is the average comprehension with the current standard of care. The independent variable is the teach-back method with parents assigned to either the intervention group, those who receive the teach-back method, or the control group, those who receive the current standard of care. The dependent variable, the comprehension of the treatment plan, is an ordinal variable measured using a Likert type scale.

RQ2: What effect does the teach-back method have on the degree of adherence to the prescribed treatment plan when compared to using the current standard of care in parents or dependent care agents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$2: The teach-back method has no effect on the degree of adherence to the prescribed treatment plan and dependent care when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$2: The teach-back method has an effect on the degree of adherence to the prescribed treatment plan and dependent care when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 is the degree of adherence to the prescribed treatment plan when the new method, the teach-back method, is used, and μ_2 is the average comprehension with the current standard of care. The independent variable is the teach-back method with parents assigned to either the intervention group, those which receive the teach-back method, or the control group, those who receive the current standard of care. The dependent variable is an ordinal variable, the adherence to the prescribed treatment plan measured on a Likert type scale.

RQ3: What effect does the teach-back method have on the parent's ability to perform dependent care and recall the discharge instructions when compared to using the current standard of care in parents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$3: The teach-back method has no effect on the parents' ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$3: The teach-back method has an effect on the level of the parents ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 is the amount of recall of the discharge instructions when the new method, the teach-back method, is used, and μ_2 is the amount of recall of the discharge instructions with the use of the current standard of care instructions. The independent variable is the teach-back method with parents assigned to either the intervention group, those who receive the teach-back method, or the control group, those who receive the current standard of care instructions. The dependent variable is an ordinal variable, the recall of the discharge instructions measured on a Likert type scale.

Theoretical Foundation

Orem's SCDNT gradually evolved over many years of conceptualizing, collaborating, and refining of ideas about nursing practice. In Orem's SCNDT, the self-care agency is depicted as a hierarchical pyramid, similar to that of Maslow's hierarchy, where a person has to meet the basic foundational capabilities such as writing, reading, verbal skills, reasoning, and counting in order to be able to perform self-care (Parker & Smith, 2010). Furthermore, Orem's theory classifies dependent care as a condition where a person's ability to tend to their health care needs exceeds that of their abilities, thus creating a deficit and the need for a dependent-care agent. According to Taylor, Renpenning, Geden, Neuman, and Hart (2001), the basic skills of self-care are the foundation to dependent care. Orem's foundational capabilities include 10 power components or abilities necessary for self-care or dependent care, which include basic knowledge, motivation, and skills. Orem conceptualized self-care as a deliberate action to maintain life, health, and wellbeing (Orem, 2001). Orem first introduced the terms of

dependent care, dependent-care agency, and dependent-care agent back in the 1970s while developing the SCDNT. Orem (2001) claimed the dependent-care agent performs self-care functions on behalf of the self-care agent, such as the infant, child, or cognitively impaired person. When a dependent-care demand exceeds the capabilities of the dependent-care agent, a dependent-care deficit exists and it becomes necessary for nursing to intervene (Taylor et al., 2001; Kumar et al., 2010).

In health literacy, the patient must have the ability to read, comprehend, and communicate health information to contribute towards a positive health outcome. If the basic capabilities are not attained, the person will be unable to move towards self-care and someone other than self must take over (Parker & Smith, 2010). Orem's foundational capabilities are in close relationship to the basic skills necessary to develop adequate health literacy and successfully function as a health care consumer. The inability to read (illiteracy) is a major factor contributing to low health literacy, which leads to consequences of increased rates of chronic disease and mortality, as well as poorer health outcomes and a lower use of preventative services (Chappuy et al., 2012; Ferguson & Pawlak, 2011). The similarity of the concepts and the relationships between health literacy and the SCDNT made this a solid foundation from which to explore the phenomenon of parental health literacy.

Nature of the Study

Quantitative research is a very formal and objective systematic process implemented to gather numerical data in order to describe variables, examine relationships among variables, and measure the cause and effect between them (Grove,

Burns & Gray, 2013). In quantitative research, there are four commonly used research designs, the descriptive, correlational, quasi-experimental, and experimental design (Grove et al., 2013).

Quasi-experimental designs have characteristics similar to the true experimental design, except intact groups or convenience samples are used. Quasi-experimental research designs are useful in answering questions about the effectiveness of an intervention. In quasi-experimental designs, the researcher identifies the population of interest, assigns them to either the control or intervention group, applies the intervention, and measures the outcome (Creswell, 2009). For this study, a nonequivalent comparison group with postintervention evaluation was chosen. A quasi-experimental approach is consistent with collecting numerical statistics and evaluating the effectiveness of the intervention, in this case the teach-back method in the presence of parental low health literacy on the comprehension, adherence, and recall of the treatment plan when compared to using written instructions. I used a convenience sample of nonurgent, emergency room patients with chief complaints of fever or upper respiratory infection (URI) symptoms. I defined nonurgent as Emergency Severity Index (ESI) triage level 4 or 5 (AHRQ, 2011). The postintervention evaluation consisted of structured follow-up telephone questionnaires, which I analyzed by using a concordance scale to measure the level of comprehension of the provided discharge instructions. I analyzed the differences in the groups using a Mann-Whitney U test comparing the two medians. I used descriptive statistics to identify the characteristics of the subjects, with the Statistical Package for the Social Sciences (SPSS) software by IBM.

The independent variable was the teaching method used. The teach-back method included a return demonstration of the information taught by the provider. The control group received the standard discharge instructions that were currently used in the emergency room. The dependent variables were the parents' comprehension and retention (or recall) of the instructions. Comprehension is the ability to understand and process information presented (Merriam Webster, 2016), and retention is ability to recall new knowledge at a later time (Merriam Webster, 2016), where recall is defined as a person's ability to remember what has been learned in the past (Merriam Webster, 2016).

Definitions

This section contains concise operational definitions of the concepts used throughout the study, including the independent and dependent variables.

Adherence: The level to which patients' actions coincide with the recommendations and mutually agreed upon plan of care prescribed by the health care provider (Gardner, 2015).

Comprehension: The ability to understand and process information presented (Merriam-Webster, 2016).

Dependent-care deficit: The potential or actual deficit between the dependent care demand and the capabilities of the dependent care agent (Orem, 2001).

Health literacy: "[T]he degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Neilsen-Bohlman, Panzer & Kindig, 2004, pg. 4).

Health outcome: The magnitude an action, such as making health care decisions or intervention have on the end result. Outcomes can be positive or negative in nature (AHRQ, 2014).

Parental health literacy: The possession of crucial skills of parents needed to perform the duties essential to care for their families or children, including the ability to obtain health insurance, decipher the label of an over-the-counter medication, and understand a nutrition label to make informed health care decisions (Yin et al, 2009).

Retention: The patient's ability to recall new knowledge at a later time, (Merriam-Webster, 2016).

Recall: A person's ability to remember what has been learned in the past (Merriam-Webster, 2016).

Self-care deficit: A condition where a person's ability to tend to their health care needs exceeds that of their abilities, thus creating a deficit and the need for a dependent care agent to take over (Orem, 2001).

Teach-back method: A tool used when giving health care instructions that allows the healthcare provider to check for and confirm understanding. It is also referred to the close- the-loop or show-me method and is an essential tool in the Health Literacy Universal Precautions Toolkit (AHRQ, 2015).

Assumptions

Adequate health literacy skills are essential for the health care consumer in order to make appropriate health care decisions for themselves or their dependents (Griffey et al., 2015). Other assumptions of the study are that self-care is a desirable state for

patients, parents are motivated to perform dependent care for their children, and all participants will answer the questions honestly.

Scope and Delimitations

Although the study design was created with the attempt to have equal distribution of both English and Spanish speaking participants in the sample populations, the results may not be generalizable to the population of the United States as this distribution of the population was collected from a small suburban hospital setting.

Delimitations

- Only parents of children with an ESI triage level of 4 or 5 were enrolled.
- Parents of children with ESI level of greater than or equal to 3 were excluded to eliminate the potential influence of the anxiety related to the severity of the illness.
- Only patients with a chief complaint of fever and URI were included.
- Sample population was recruited in a small suburban nonteaching hospital in the Southwestern United States with an average of 35,000 annual visits.
- Language speakers of other than English were excluded due to the limited availability of the NVS tool in other languages.

Limitations

The study was limited to a single medium size nonacademic urban emergency room with approximately 35,000 annual visits, which made it possible that the results are not generalizable in other rural or intercity facilities. The main facility, a large rural emergency room within the health system, could have served as an alternate site of study,

which would have provided insight and clarity to the generalizability of the study results. Other limitations of the study included the use of a nonprobability sampling, or convenience sampling. This was addressed by randomly assigning the eligible participants to the control or intervention group. Because only English speaking participants were eligible to participate, the results were not generalizable to the other groups.

Significance of the Study

Improving the comprehension, adherence and recall of discharge instructions can prevent early return visits and reduce unnecessary emergency room visits, in turn improving the overcrowding in the emergency rooms and decreasing the overall health care costs. Furthermore, increasing the comprehension of patient discharge instructions can lead to increased patient satisfaction (Griffey et al., 2015), a valuable measure in today's pay-for-performance health care reimbursement system. Additionally, in this study I addressed a gap in the literature regarding parental low health literacy and its effects on health outcomes of their children by exploring the relationship of improving the health outcomes when using innovative teaching strategies such as the teach-back method in the emergency room to effectively deliver health care instructions.

Significance to Theory

The potential contribution of this study was to promote an increased understanding of the significant impact health literacy skills make in a person's ability to carry out self-care or dependent-care activities to be able to achieve optimal health outcomes. Furthermore, it created evidence that implementing simple nursing

interventions such as the teach-back method can positively influence health outcomes and support those with low health literacy skills in their efforts to perform self-care or dependent-care activities.

Significance to Practice

The results of the study yielded important implications not just for parents or caregivers of children, but also for health care providers, health care organizations, and federal agencies. Skills to comprehend and implement basic child health care tasks such as providing appropriate nutrition, safety, medication administration, and consent to procedures can present the parent or care giver who exhibits low literacy and numeracy skills with significant barriers. The goal of this study was to produce evidence that assessing for health literacy levels and changing the way health information is delivered to those in need will improve comprehension, thus improving health outcomes. Improving the comprehension, adherence to, and recall of discharge instructions can prevent early return visits and reduce unnecessary emergency room visits, in turn improving the overcrowding in emergency rooms and decreasing overall health care costs (Alberti & Nannini, 2013; Chappuy et al, 2012; Gignon, et al., 2014).

Significance to Social Change

Mogford, Gould and Devoght (2011) discussed that health education is the most logical way to increase health literacy. Identifying the effects of low health literacy and addressing ways to improve parents' or care givers comprehension of provided medical information for their children will affect social change in many ways. Improving health literacy will lead to reduced health disparities and ease social injustices. The results of the

proposed study yielded important implications for parents or caregivers of children, health care providers, health care organizations, and federal agencies. Skills to comprehend and implement basic child health care tasks such as providing appropriate nutrition, safety, medication administration, and consent to procedures can present the parent or care giver who exhibits low literacy and numeracy skills with significant barriers. The outcomes of this study affect social change by advocating for a change in practice by assessing parents and caregivers' health literacy level and modifying the way health care providers deliver health care information to those with low health literacy scores.

Summary and Transition

In Chapter 1, I examined the potential implications low health literacy skills have on the level of comprehension, recall, and retention of and adherence to healthcare instructions provided to patients or caregivers such as parents. I raised three research questions with associated null and alternative hypotheses for the study. Furthermore., I described Orem's SCDNT (2001), explained key definitions, outlined assumptions, described the limitations, scope, and delimitations, and discussed the significance of the study.

In Chapter 2, I describe the search strategies used for the literature review and summarize the main ideas found in the literature. I provide a detailed account of the current literature relevant to the dependent variables, comprehension, adherence, and retention, as well as the independent variable, the teach-back method. I present literature related to the theoretical foundation, the SCDNT, and the methodology used for this

study. Additionally, I review the literature related to the effects of low health literacy on children's health outcomes when dependent-care skills are insufficient. Lastly, I identify the gaps in the literature and reveal how this study will contribute to the existing body of knowledge.

Chapter 2

Literature Review

According to the National Institute of Health (2014), adequate health literacy skills are linked to improved health outcomes and lower overall health care costs. Vulnerable situations during a transition of care such as a discharge from the emergency room are circumstances where patients could be faced with challenges understanding their home care instructions (National Transition of Care Coalition, 2009). These situations require clear communications to assure complete understanding of instructions, especially in the presence of low health literacy. Identifying low health literacy skills in parents and modifying discharge teaching methods could improve their comprehension and improve health outcomes in their children. This study evaluated the efficacy of modifying the teaching method based on the parents learning style and health literacy skills assessed during their visit to the emergency room, using the teach-back method compared to the current standard of care, and then by assessing after-visit comprehension and retention of instructions.

This chapter presents the search strategies used to identify relevant literature to support the study in order to examine if using modified discharge teaching methods can increase comprehension, recall, and adherence in parents with low health literacy. I reviewed literature related to the theoretical framework, health outcomes in the presence of low health literacy levels, specific research methodology, and the teach-back method, specifically in relation to emergency discharge instructions. Furthermore, the review

includes an appraisal of the various instruments available to measure health literacy and the concepts of comprehension, recall, and adherence.

Literature Search Strategy

I conducted a systematic search of the current and available literature to examine studies applicable to the research at hand. The search encompassed health sciences such as literature from the nursing and medical field, as well as literature from the areas such as the behavioral, education, and communication fields. Initially, I identified relevant literature with the use of the database in the following search engines: Academic search complete, CINAHL and MEDLINE simultaneous search, and ProQuest Nursing & Allied Health source. Keywords used in the search were *health literacy, teach-back communication, health literacy assessment tools, emergency department discharge, Orem's self-care deficit theory*, and *health outcomes*. The search was limited to include years starting at 2001 through 2016. Special attention was placed on research studies conducted in the United States on health literacy and related health outcomes. The search was not limited to health literacy studies involving just parents and their children's health outcomes, as the search results were limited in that area. The purpose of the literature review was to present a synopsis of what is known about improving health outcomes in the presence of low health literacy and to identify a method to improve comprehension and recall of health information presented to parents in the emergency room.

Theoretical Foundation

The theoretical framework informing this study was based on the assumptions and beliefs of the philosophic system of moderate realism (Banfield, 1998). Orem's beliefs

regarding the nature of reality, the nature of human beings, and nursing as a practical science closely reflect the viewpoints of modern realism. In moderate realism, the nature of reality supports a position that the world exists independent of thought, and it is possible to gain knowledge about this world (Banfield, 1998). According to Orem (2001) "environmental conditions can positively or negatively affect the lives, health, and well-being of individuals, families, and communities" (p.79). The SCDNT include the concepts of therapeutic self-care demand, self-care agency, and nursing agency. According to Orem (2001), for people with health abnormalities to become capable in "managing a system of health-deviation self-care, they must be helped to apply relevant medical knowledge to their own care" (p.235). The six fundamental categories of health deviation self-care include the ability to seek and secure appropriate medical care when necessary, being aware of and acting on the effects of illnesses, and successfully following medically prescribed treatments. Major assumptions of Orem's theory are that people should be independent and accountable for their own or their dependents' care, be able to meet self-care requisites in order to effectively prevent illness, and have knowledge of potential health problems in order to promote self-care behaviors. Additionally, Orem proclaims that nursing is an art, a form of action between two or more people and self-care and dependent-care activities can be learned within a sociocultural environment (Orem, 2001). Orem's theory has three distinctly related parts: the theory of self-care, theory of self-care deficit, and the theory of nursing systems. Within the theory of self-care, Orem describes concepts such as self-care, self-care agency, therapeutic self-care demand, and self-care requisites. The theory of self-care

deficit explains that when the demand for self-care in an adult or dependent care in a parent exceeds their capabilities. It is then that nursing must intervene and support, act for, guide, and teach others in order to promote an environment that allows for personal development in order to meet future demands (Orem, 2001).

Furthermore, Orem (2001) asserts that for an individual to be able to perform self-care, there is a need of basic foundational capabilities such as writing, reading, verbal skills, reasoning, and counting to be present. These fundamental concepts inform the hypotheses of the study, that low health literacy, especially in parents or caregivers, affect their ability to perform self-care or dependent-care and ultimately lead to poor health outcomes in their children. Not many studies were located involving children and their care takers, thus adult studies in addressing self-care deficits were included.

Hoover et al. (2012) used Orem's dependent care agency theory to support their study correlating functional health literacy and asthma knowledge in rural parents. Their study supports that as the dependent care agents, the parents' health literacy status is directly correlated to their knowledge of the disease process, and low health literacy can lead to increased hospitalizations. Thus, if the capacity of the dependent care agent is exceeded by complex medical decision making, a dependent care deficit may exist. Care takers must be able to detect, interpret, and monitor symptoms, adjust and dispense medications, and identify triggers in order to avoid them and seek medical advice when necessary, making the care of children a perfect example for dependent care.

Mohammadpour, Sharghi, Khosravan, Alami and Akhond (2015) conducted a randomized controlled trial using a pretest–posttest model to test the effect a supportive

educational intervention, which was developed based on Orem's self-care theory, has on the patients' self-care ability. The researchers measured mean and standard deviations as well as independent and paired samples *t* tests in order to assess the self-care capability between the groups. The reported results after the intervention showed the control group had no significant change in their self-care knowledge, motivation, and skills ($p > 0.05$), whereas the intervention group showed a statistically significant increase in all three domains of self-care knowledge, motivation, and skills ($p < 0.0001$), as measured with a paired samples *t* test. The findings support that educational interventions based on Orem's self-care theory can assist health care providers including nurses to assist patients in reaching an acceptable level of self-care skills.

Similar results were reported by Altay and Çavuşoğlu (2011) when the authors used Orem's self-care theory with adolescents with asthma to measure the effects on self-care skills of medication usage, peak flow meter usage, use of an asthma action plan, keeping a follow-up schedule, and protecting against daily triggers of asthma. They hypothesized that nursing interventions based on Orem's self-care model would increase the self-care skills for asthma management in the adolescent. The authors used a two-group experimental design, with participants randomized to either the control or intervention group in an Asthma outpatient clinic in Ankara, Turkey. With the use of a self-care data form the authors assess the self-care skills in the both the control and intervention group. They reported a statistically significant increase in all five domains of the asthma self-care skills in the intervention group ($p < 0.001$) when compared to the

control group. These results support that specific targeted nursing interventions to eliminate self-care deficits can be effective.

Furthermore, Wilson et al. (2008) conducted a qualitative-quantitative design study to explore the relationship between maternal health literacy and the mothers' ability to comprehend and communicate information about childhood immunizations. Informed by Orem's SCDNT, the authors used the teach-back method to communicate immunization information to mothers at a walk-in immunization clinic. Using a general linear model, the authors evaluated relationships between correct comprehension of vaccines comparing mothers with only one child and mothers with more than one child for their health literacy skills. No significant difference was identified in comprehension levels of vaccines among mothers with one child compared to mothers with more than one child. These results point towards the need to use effective communication coupled with modified instructional strategies in order to further health literacy.

Literature Review

Health Literacy

Health literacy has become a widespread topic both across the United States and internationally. Many national organizations such as the IOM, the WHO, the AHRQ, and the Joint Commission are making it a national priority to address the problem of low health literacy in order to improve health outcomes (Ferguson & Pawlak, 2011). Several definitions of health literacy exist in the literature. The American Medical Association Ad hoc Committee on Health Literacy for the Council on Scientific Affairs (AMA, 1999) defines health literacy as "a constellation of skills, including the ability to perform basic

reading and numerical tasks required to function in the health care environment" (p.53). This definition fails to consider the importance of health literacy skills in the community or workplace. The Healthy People 2010 campaign describes health literacy as "the degree to which individuals have capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (U.S. Department of Health & Human Services, 2000, p. 11-20). Another definition has been presented by the WHO (1998): "Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to the competence and capacity to, understand, and use information in ways that promote and maintain good health" (p. 10). Health literacy is an abstract concept that cannot simply be observed, it needs to be explained by identifying more concrete concepts or characteristics of the term.

For the purpose of this study the more encompassing definition of Health Literacy as set forth by the AHRQ (2014) was used. It states that health literacy is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (para.1).

Literature (Griffey et al., 2015; Kutner et al., 2006) suggested that approximately 36% of the population have either basic or below basic literacy skills. With the ever-increasing amount of complex health information available, especially through the internet, these levels of health literacy are inadequate to allow for people to make informed health care decisions. Furthermore, Brach et al. (2012) reported recommendations from the IOM include enhancing communication between patients and

the medical provider especially in high-risk situations such as transitions of care. Discharge from the emergency room to home is considered one of those high-risk situations. It is imperative to improve health literacy in order to attain high-quality health care including safety, effectiveness, efficiency, timeliness, patient centeredness, and equitable treatment, as outlined by the IOM's report "Crossing the Quality Chasm" (IOM, 2001).

Yin et al. (2009) performed a cross sectional study examining a national representative sample of US parents using data from the 2003 National Assessment of Adult literacy, assessing parents' performance on thirteen child-health related tasks. The authors reported that a large portion (28.7%) of parents have limited health literacy skills. Parents with low health literacy had difficulty entering their child's names and birth dates correctly on health insurance forms and were unable to calculate the cost of health insurance based on family size. Furthermore, almost 50 % were unable to perform one or two medication related tasks and parents with low health literacy were 3.4 times more likely to report difficulty understanding over the counter medication labels.

In an article by Ferguson and Pawlak (2011) the authors reviewed current health literacy research and described practical interventions that can be used to improve health literacy in practice, as well as the AHRQ's toolkit for health literacy. The authors reported that much research has been done on the topic of health literacy, yet nursing's contribution to the literature has been very limited although patient education and advocacy are core principals in nursing profession. They outlined clinical interventions

such as ask me 3 and the teach-back methods as effective methods to close the disparities in the presence of low health literacy.

Health Outcomes

Poor parental health literacy and numeracy skills have been linked to poor health outcomes in studies addressing adequate asthma management (DeWalt et al., 2007; Wang et al., 2013; Brigham et al., 2016), adequate glycemic control in Type 1 Diabetes (Pulgarón et al., 2013), overall medication adherence (Lindquist et al., 2011; Yin et al., 2011; Freedman et al., 2013) and basic infant care tasks (Kumar et al., 2010).

The study by Lindquist et al. (2011) evaluated the relationship between low health literacy and discrepancies in the adherence to the medication regimen prescribed to adults after hospitalization. The authors used a telephone questionnaire 48 hours' post discharge to assess the patients self-reported compliance with the medication regimen, which two reviewers classified and coded answers into categories of unintentional or intentional non adherence, inaccurate discharge instructions, conflicting information from multiple sources, unable to obtain prescription and allergic or adverse reaction. They reported that out of all subjects who experienced medication discrepancies (56%), those with inadequate health literacy scores were significantly more likely ($p = .002$) to have unintentional non-adherence (47.7%) when compared to marginal (31.8%) or adequate health literacy (20.5%) scores. Largely the results found that health literacy was not directly related to experiencing a medication discrepancy, yet it was significantly associated with the reason for the discrepancy, pointing to a link between health literacy and unintentional medication errors post discharge.

DeWalt et al. (2007) performed a study in a pediatric clinic, using a retrospective cohort design to evaluate the relationship between parental health literacy and emergency room visits, missed school days and hospitalizations for children with asthma. Additionally, the authors identified secondary asthma care measures as rescue and controller medication use, classification of asthma severity, and parental asthma-related knowledge. They found a positive relationship between parental low health literacy, as measured using the REALM assessment tool, and parents lack of asthma-related knowledge, and the severity of the children's asthma which led to higher number of emergency room visits and more missed school days. Additionally, children of parents with low health literacy scores have a higher likelihood of having moderate to severe persistent asthma and showed a higher use of rescue medications.

Wang et al. (2013) performed a cross sectional study exploring the relationship between health literacy and health outcomes in adult asthma patients in Taiwan. The authors explored the association between health literacy and medical decision making, asthma knowledge, attitudes and self-efficacy, inhaler usage proficiency and self-management behaviors. The results found health literacy to be positively associated with proficient skills related to appropriate metered dose inhaler usage, overall asthma knowledge, attitudes and medical decision making.

Freedman et al. (2012) conducted a prospective observational study to monitor adherence of prescribed eye drop medication administration in children with glaucoma. The authors examined if medication administration adherence was related to poor parental health literacy, as well as eye drop instillation performed by the child. Although

the overall levels of adherence were reported to be high, with 93% of the prescribed doses taken the authors identified certain factors associated with poorer adherence. Using a medication event monitoring system and correcting for race using a multivariate analysis the authors reported a significant decrease in adherence with lower parental health literacy scores (p = .01). Findings in this study need to be evaluated with caution as the parents overall health literacy scores in this study were higher than what is currently reported in the literature, and the fact that a medication event monitoring system was being used could have biased the patients and improved adherence.

Yin et al. (2011) conducted an experimental study evaluating the effect of using a pictograph dosing diagram compared to text only instructions on dosing accuracy, when administering infant acetaminophen using a dropper. Furthermore, the authors evaluated if the use of the pictograph was beneficial in the various health literacy levels. In their study, they evaluated 299 parents of which 77.9% of the parents demonstrated limited health literacy (NVS score 0-3) and reported that text plus pictograph group were less likely to make a dosing error, compared to the text only group (43.9% vs. 59.0%, p = .01). The use of the pictograph instruction was also reported as statistically significant when comparing parents with low health literacy (50.4% vs 66.4%, p = .02) to those with adequate health literacy scores (p = .7).

Furthermore, Kumar et al. (2010) conducted a cross-sectional study to examine associations between caregiver literacy and numeracy skills and the understanding of common health related tasks in caring for infants. Additionally, the authors sought to validate the PHLAT. It evaluates tasks such as mixing infant formula, understanding

breastfeeding recommendations and nutrition labels, as well as making up doses of over the counter and prescription medications. The authors reported that caregivers with lower health literacy and numeracy scores consistently displayed problems with tasks related to infant care. In reporting the results, it was noteworthy that only 73% of the participants were able to correctly draw up a dose of liquid Amoxicillin with a syringe, only 69% were able to correctly read a digital thermometer and act upon the findings, and only 53% were able to determine the correct dose of liquid acetaminophen. Less than half (47%) of the participants were able to explain how to mix a 4-ounce bottle of formula using a concentrated formula, requiring a mix of equal parts of water and formula. The authors reported an internal reliability of the PHLAT as good (KR-20 + 0.76), yet the time required for the administration of this tool was reported to be 21 minutes.

A recent cross-sectional study by Pulgarón et al. (2013) explored the relationship between parental health literacy, diabetes related numeracy, and parental perceived diabetes self-efficacy on glycemic control in young children with Type 1 Diabetes. The authors reported that both numeracy skills and parental perceived diabetes self-efficacy were found to be independent predictors of glycemic control, yet they had no correlation with each other. Implication of the study results show the importance of numeracy skills especially in diabetic management, where parents are required to measure and administer exact insulin doses and adjust doses of medication depending on glucose results and carbohydrates consumed.

Additionally, Dunn-Navarra, Stockwell, Meyer, and Larson (2012) studied utilizing a descriptive survey design to explore the influence of health literacy on the

knowledge and beliefs surrounding URI, including nonjudicious use of antibiotics in Latino parents in Early Head Start programs. The authors measured the parents baseline knowledge, attitudes, and beliefs regarding the care of viral URI symptoms in young children, as well as the parental health literacy levels using both the NVS and the S-TOFHLA. The authors demonstrated a significant relationship between limited health literacy levels and limited knowledge of proper antibiotic use ($p = .003$).

Teach-Back

Many health literacy interventions exist to help patients with low health literacy achieve better health outcomes. The teach-back method also called the show me method, a technique where the healthcare provider prompts the patient to return demonstrate the information taught to them. This gives the provider an opportunity to provide clarifying feedback when necessary. This technique is recommended by the AHRQ to be used as a tool to improve spoken communication as part of their Health Literacy Universal Precautions Toolkit (AHRQ, 2015). Only few studies were identified evaluating the effectiveness of the teach-back method, and further research is needed to evaluate the efficacy of using a more labor and time intensive teaching method in an environment such as the ED.

Giuse et al. (2012) conducted a study to explore the effectiveness of modifying the delivery of instructions when teaching adults with hypertension, after measuring health literacy and learning style assessments. Using a pre-and post-test design the authors analyzed two cohorts, one who received customized educational materials based on their health literacy score alone and the other received materials based on their health

literacy scores and learning style preferences. Results showed that although in both experiments participants in the intervention groups had significant improvements in their hypertension post-test score ($p < .001$) than the control group, yet the intervention group in second experiment had even higher scores ($\Delta = 4.0$ questions; $p < .001$; $\Delta = 6.3$ questions; $p < .001$) after receiving materials modified using their health literacy and learning style preference.

Gignon et al. (2014) conducted a qualitative study exploring the compliance with discharge instructions in adults presenting to the emergency room, using semi-structured interviews. In the study almost 50% of the participants reported difficulties understanding their drug prescriptions and most of the participants felt the difficulties were due to lack of clear communication of the written prescriptions. The study further identified incongruent findings between the participants' level of satisfaction with the discharge instructions given their poor understanding.

In another study by Griffey et al. (2015) the authors evaluated the impact of using the teach-back method on the comprehension of discharge instructions and satisfaction among adult emergency room patients with limited health literacy. In their randomized controlled study, the authors randomized their teaching method, using either the teach-back method or the standard discharge instructions followed by a structured interview evaluating comprehension, perceived comprehension of their diagnosis, ED course, post ED care and reasons for return, as well as satisfaction of the care received. The study reported that patients who received the teach-back method had higher comprehension of in all the following post-ED care areas, medications ($p < .02$), self-care ($p < .03$) and

follow up instructions ($p < .0001$), yet no difference was detected in patient satisfaction or perceived comprehension.

Economic Impact

The financial impact of low health literacy has been tremendous, with studies reporting that approximately $75 to $125 billion dollars or 3 to 5 % of the overall health care cost in the United States annually are due to low health literacy (Eichler et al., 2009). The literature reports that assessing health literacy and learning preferences, combined with the implementation of innovative teaching strategies can improve the patients' comprehension of the treatment plan, lead to improved outcomes and reduce healthcare costs (Alberti & Nannini, 2013; Chappuy et al, 2012; Gignon et al., 2014; Giuse et al., 2012; Griffey et al., 2015). Furthermore, the National Institute of Health (2014) reported that adequate health literacy skills are linked to better health outcomes. Reducing existing health disparities will lead to longer life, improved quality of life and lower overall health care costs (National Institute of Health, 2014).

In a yearlong cross-sectional study, Morrison et al. (2014) evaluated the correlation between low caregivers' health literacy skills and child ED use, examining both the number and urgency of the visits. More than half of the study participants (55%) exhibited low health literacy as measured using the NVS health literacy screening tool. The authors reported that children of caregivers with low health literacy had a higher number of previous ED visits and increase odds of a non-urgent ED visit. The study showed that children with parents with low health literacy and without a chronic illness,

had three times greater odd of presenting for a nonurgent condition when compared to those with adequate health literacy scores.

Assessment of Health Literacy

Numerous validated health literacy assessment tools exist, and the academic circle agrees these tools need to provide multimodal measurements such as print literacy, numeracy or quantitative, as well as oral literacy (Altin et al., 2014), yet many of them only measure single domains and are very time consuming to administer, making them unacceptable for use in a high turnover fast-paced environment such as the emergency room. The NVS, also referred to as the "Ice Cream Label" was created by Weiss et al. (2005) and validated against some of the other more traditional tools, such as the REALM, and the Test of Functional Health Literacy in Adults (TOFHLA). In their study the authors reported an internal consistency of the NVS-E as good (Cronbach $\alpha = .76$) as well as the criterion validity ($r = 0.59$, $p < .001$)

Recent studies evaluating the NVS when compared to the traditional literacy assessment tools, reported it to be a quicker, more accurate tool to determine literacy levels and numeracy skills in younger adults, thus making it a viable option for the use in thisresearch study (Ciccarelli Shah et al., 2010; Morrison et al., 2014).

Ciccarelli Shah et al. (2010), conducted a study to assess the NVS, a health literacy tool for its appropriate use, approval and time required to administer in order to assess the health literacy level. The authors used a cross sectional design and a logistical regression with a large sample size of patients of different age groups and gender. Younger age, higher formal education, health class participation and body mass index

were all identified as positive predictors of adequate health literacy, using the logistical regression analysis. Additionally, the authors reported that race had a congruent influence on health literacy. The study revealed that the NVS was able to accurately measure the health literacy level in adults in less than 3 minutes, which makes it easy to use for healthcare providers and improves the acceptance of the tool. Although the authors did not compare the NVS to any other health literacy assessment tool in their study to report validity and reliability measurements, the validity and reliability a has been reported in other studies with a Cronbach $\alpha = .76$ and a criterion validity $r = .59$; $p = .001$ (Weiss et al., 2005).

In another study, Kumar et al. (2010), performed a cross sectional study evaluating the association of parental literacy and numeracy skills and their relationship to the comprehension of ordinary health related responsibilities in caring for their infants, furthermore they examined the validity of the abbreviated PHLAT–10 scale. This study found that many parents of young children with limited literacy and numeracy skills encounter difficulties in comprehending and implementing basic health care tasks for their children, in areas such as nutrition, safety, and medication administration, with only half of the parents being able to determine the proper dose of acetaminophen for their child.

Furthermore, a comparison between the NVS and the S-TOFHLA was done in a study by Morrison et al. (2014), with caregivers of children using the emergency room. The authors identified that the results of the NVS compared to the S-TOFHLA varied in the younger adult population, with the S-TOFHLA being less accurate in the prediction

of health literacy in that population. Their recommendation is to use the NVS when assessing health literacy in parents and care givers of children.

The NVS assesses reading, writing and numeracy skills and only takes three minutes to complete, making it an ideal tool for the use in an environment where fast turn over and a push to decrease the length of stay are a priority. The ease of administration of the assessment test will assist in sustaining the change in practice.

Methodology

Griffey et al. (2015) evaluated the use of the teach-back method to increase the understanding of discharge instructions and their correlation with patient satisfaction among adult emergency room patients with low health literacy skills, using a randomized, controlled study. Participants with low health literacy were randomized to either the teach-back or standard discharge instructions group. The authors primary outcome measures were comprehension and perceived comprehension of discharge instructions, bivariate associations between groups and outcomes were analyzed using Mantel-Hanzel chi-squared tests. Furthermore, a multivariable ordinal logistic regression model was used to identify the effects of the study groups on each individual outcome variable, while adjusting for race.

Hoover et al. (2012) used a descriptive correlational study design informed by Orem's theory to evaluate the relationships among functional health literacy, asthma knowledge, the ability to care for asthmatic children, as well as sociodemographic factors in rural parents. Using the asthma knowledge test and the TOFHLA the study found that health literacy scores are significantly related to asthma knowledge ($p = .04$). It also

correlated that parents who had not completed high school had lower scores than the ones who did, and their children were hospitalized more frequently (p = .05).

Summary and Conclusions

This literature review listed all relevant search terms, the SCDNT by Dorothea Orem and defined health literacy. Health outcomes in the presence of low health literacy were discussed, along with interventions such as the teach back method, which can have a positive effect on the overall health outcomes in patients with low health literacy.

Alberti and Nannini (2013) completed a literature review to evaluate completed research assessing patients' comprehension of discharge instructions from either the emergency room or urgent care. The authors evaluated interventions used to deliver discharge instructions, how patient comprehension was measured and looked for the most effective strategies used to verify the comprehension of the discharge instructions. The literature review revealed the increase of patient comprehension of discharge instructions is linked to using alternative teaching interventions, when compared to the written standard instructions. It also pointed to the facts that healthcare providers seldom verify patient comprehension. The authors made recommendations for further research to be done on the effects of using modified teaching strategies to deliver discharge instructions and the patients' comprehension as well as patient outcomes.

Furthermore, a mix of qualitative and quantitative studies have been done evaluating comprehension and perceived comprehension of discharge instructions (Chappuy et al., 2012; Engel et al., 2009; Griffey et al., 2015), yet only few of them address using modified teaching methods in the overcrowded emergency room

environment, which is pressed for time and filled with distractions. A gap in the literature was identified, little research has been done on the effects of parental health literacy skills and the adherence to the children's medication regimen, comprehension of illness progression, use or over use of the emergency room for non-acute illness, follow through on immunization schedules and preventative care (Chappuy et al., 2012). This study added to the literature by evaluating the impact modified teaching strategies have, on the parents' comprehension, adherence and recall to their children's agreed upon treatment plan.

The next chapter presented the detailed explanation of the research methods used to evaluate the effects the teach-back method has on the comprehension, recall and adherence to the agreed upon plan of care in parents with low health literacy.

Chapter 3: Research Method

The purpose of this study was to examine outcomes of comprehension, recall, and adherence with the use of the teach-back method in the presence of low health literacy skills when compared to using the standard written instructions only. Health literacy skills are required in order to fully understand available choices, consequences, and context of presented medical information and services available to patients (CDC, 2016). Poor health literacy leads to poor health outcomes such as accidental overdose or nonadherence to prescribed medication regimens and has been made a national and international priority to address by all health care providers (Ferguson & Pawlak, 2011).

This study was a quasi-experimental study with random assignment to either the intervention or control group. Chapter 3 describes the detailed research design and methodology. I explain in detail the study's target population, sample size, sampling procedures. Furthermore, I discuss data collection and analysis procedures and clearly describe instruments to address threats to validity and reliability. Finally, I explain any applicable ethical procedures including the approval for the Institutional Review Board (IRB) at both Walden University and the study site hospital.

Research Design and Rationale

The proposed study was a quasi-experimental posttest-only control group design using categorical groups to evaluate the effectiveness of the teach-back method (independent variable) in the delivery of discharge instructions to parents with low health literacy when compared to standard written instructions, using a posttest (interview) only to evaluate the parent's self-reported comprehension and retention of instructions. Quasi-

experimental designs have similar characteristics to true experimental design except there is no random selection of study participants. Convenience samples or intact groups are used. Quasi-experimental research designs are useful in answering questions about the effectiveness of an intervention (Grove et al., 2013). In quasi-experimental designs, the researcher identifies the population of interest using either an intact group or a convenience sample, assigns them to either the control or intervention group, applies the intervention and measures the outcome (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). As I evaluated in this study the effectiveness of the teach-back method (intervention) to improve the comprehension, recall, and adherence to the discharge plan using a convenience sample, the quasi experimental research design was an appropriate choice.

Study Variables

The independent variable, or intervention, was the teach-back method, a modified teaching strategy used to deliver health care instructions. It allows the healthcare provider to check for and confirm understanding. It is also referred to as the close- the-loop or show-me method and is an essential tool in the Health Literacy Universal Precautions Toolkit (AHRQ, 2015). The teach-back method does not test the patient's knowledge but is an evaluation method of how well the patient has been taught. Should a misunderstanding be uncovered, it allows the provider to further clarify and explain things in a different way and check again. This study evaluated if modified teaching strategies can increase parents' comprehension, recall, and adherence to their child's treatment plan, and the teach-back method has been shown to increase the comprehension

of patients understanding of health-related information in the presence of low health literacy (Griffey et al., 2015). The dependent variables were comprehension, recall, and adherence and were measured using a post discharge phone questionnaire to ascertain the parents' understanding of the discharge instructions provided to them. Potential moderating variables included the educational level of the parent and previous experience of a child with similar illness (URI or fever) or symptoms, which could have a potential positive or negative affect on the outcome variables of comprehension, recall, and adherence,

Methodology

Population

The population for this study were parents who presented to the emergency room with their child who had a chief complaint of fever or a URI.

Participants

The target population for this study were parents with low health literacy skills in a metropolitan area in the Southwestern United States who utilize the emergency room for nonacute illnesses for their children. This population typically includes Caucasian, African American, Hispanic, and Asian parents seeking care for their sick children. The pediatric emergency room was located in a nonteaching facility with approximately 35,000 emergency room visits per year. Exclusion criteria included any parent with native language other than English, child's ESI category less than four and parents who have any hearing or visual impairments.

Sampling and Sampling Procedures

I recruited participants using a convenience sampling of the accessible population of parents or caregivers with a documented low health literacy level who presented to the ED. I used convenience sampling in this study because of the availability of the subjects entering the ED chosen for the study (see Grove et al., 2013). Participants were identified after the initial emergency room triage assessment was completed. The triage nurse determined the patients' eligibility for the study according to a chief complaint of a fever or URI symptoms and a triage level of 4 or 5 (least acute categories). If the child met the criteria, the triage nurse approached the parent to introduce them to the study and referred them to me. I asked each parent if they were interested in participating. The parents of the child with these symptoms were screened for inclusion by using the NVS, a reliable and validated screening tool to determine their literacy scores prior to inclusion in the study. The NVS is a health literacy assessment tool that can be administered in only 3 minutes and is available in English and Spanish. Participants were asked to read a specially designed nutrition label and answer a series of six questions. The score was derived by assigning 1 point for every correct answer for a maximum of six points. Based on the number of questions answered correctly, the patient was assigned a literacy level between 1–6 (Weiss, et al., 2005).

- Score of 0–1 suggests high likelihood (50% or more) of limited literacy.
- Score of 2–3 suggests the possibility of limited literacy.
- Score of 4–6 almost always indicates adequate literacy.

If the NVS showed a score of less than 4, the parents were asked to enroll in the study and a consent form was signed. The NVS screening tool is a validated and rapid literacy assessment tool that on average takes only 3 minutes to complete, making it ideal to identify subjects in a fast-paced environment such as the ED (Weiss et al., 2005). Biases from using a convenience sample were minimized by randomly assigning subjects to one of two groups (the intervention and the control group). Demographic data obtained included categories such as age, gender, diagnosis, educational level, socioeconomic level, and race. Once participants consented to be in the study and were identified for inclusion, they were randomly assigned to the intervention or control group using unique numerical identifiers in form of sequential numbers. This list was only available to me and was kept strictly confidential.

Sample size. According to Frankfort-Nachmias, Nachmias, and DeWaard (2015), many misconceptions exist regarding the sample size needed for a study. The sample size was determined *a priori* by power analysis using the G*Power calculator for a two-tailed test with a power level of 80% and $\alpha = .05$ and an effect size of .50 (medium) Using the G*Power calculator for a two-tailed Mann-Whitney U test the total sample size required was $N = 134$, with $n = 67$ in each group. Enrollment in the study was planned to be ongoing until the sample size ($n = 67$) for each group was reached.

Procedures for Recruitment, Participation, and Data Collection

Participants were identified after initial emergency room triage assessment was completed. The triage nurse determined the patients' eligibility for the study according to chief complaint of fever or URI, if it was the first time the parent brought their child to

the emergency room for these symptoms, and a triage level of 4 or 5 (least acute categories). If the child met these criteria, the triage nurse approached the parent to introduce them to the study and refer them to me. I asked each parent if they were interested in participating. The parents were screened using the NVS tool to determine their literacy level, and those scoring less than 4 on the literacy assessment tool who were English speaking were approached for inclusion in the study. The study purpose and procedures were explained in detail to the potential participants, and informed consent was obtained from those who agreed to be enrolled in the study.

Data Collection

Once the consent was signed, I collected demographic information such as age (parents and child), gender (parents and child), diagnosis and first-time emergency room visit for the diagnosis, ethnicity, marital status, household income and size, and highest educational level attained (see Appendix A).

The participants were randomly assigned to either the intervention or the control group, and 48 hours after discharge from the emergency room, I conducted audio taped telephone interviews to complete the post discharge questionnaire measuring parents' self-reported comprehension, recall, and adherence to the discharge instructions received in the emergency room. The questionnaire used was modeled after the study done by Engel et al. (2009). I transcribed all interviews in full and verified accuracy. Parents or caretakers' self-reported comprehension was measured using a Likert type scale, comparing their direct recall to the ED chart.

Pilot Study

I performed a pilot study to establish validity for the slightly modified content of the comprehension tool initially developed by Engel et al. (2009). I modified the tool by rewording of questions used to assess the actual care of the children For example the original instrument states: *"What did the medical team tell you they thought was wrong with you (your diagnosis) today (or yesterday)?"* where the modified instrument will read.: *What did the medical team tell you they thought was wrong with your child (their diagnosis) two days ago?* (see Appendix B). I excluded the Mini - Cog (a dementia screening tool) and the self-reported perceived comprehension. Permission to modify was obtained from the original author (see Appendix C).

Content validity was established by a panel of experts which consist of a pediatric emergency room physician, a pediatric acute care nurse practitioner, a clinical nurse specialist in pediatric emergency care, and a staff nurse from the emergency room, all of whom have extensive experience working in the pediatric emergency room with the population of interest. According to Frankfort-Nachmias, Nachmias and DeWaard (2015) specialists in the field might be consulted and if there is agreement among the specialists that the tool measures what it intends to measure the researcher can be reasonable sure that the questionnaire has face validity. The panel of experts was given instructions on the nature of this original instrument, which was to measure the comprehension of discharge instructions in the patient being discharged from the emergency room, where as the modified instrument measured comprehension of discharge instructions in the intended audience, parents with a sick child. This panel of experts reviewed the tool to

independently judge the appropriateness and accuracy of the questions for the intended population and then met to discuss the specifications of the revised instrument. If recommendations were made, the instrument was revised and re-reviewed by the panel of experts. Once content validity was established, a pilot study was performed using a group of 10 to 20 parents, which were identified using identical inclusion criteria as in the study design and informed consent will be obtained. Once the questionnaire was completed it was scored by two people, me, and the clinical nurse specialist to establish interrater reliability. The data collected were analyzed using Cohen's Kappa, acceptable results are $\kappa = 0.41 – 1$ (Laerd, 2015). A study by Griffey et al. (2015) used this procedure to establish reliability of the instrument and reported a Cohen's Kappa $\kappa = .76$. IRB approval was applied for at both, Children's Health Children's Medical Center and Walden University.

Intervention

The study measures were the parents' self-reported comprehension, recall and adherence to the emergency room discharge instructions, when delivered using the teach-back method (intervention) or the current standard of care (control). The current standard of care are standard discharge teaching materials which are selected and readily printed from the electronic health record (EHR) for the patient. The instructions are provided by Krames for kids (StayWell, 2015) an on-demand collection of evidence-based education topics.

The teach-back method, a teaching tool recommended in the Universal Precautions Toolkit by the AHRQ, was used to assure patient understanding and prevent

adverse outcomes, such as accidental medication overdose (AHRQ, 2015). The teach-back method is also referred to as the show-me or closing the loop method. This method of teaching concentrates on the two or three most important concepts, and allows the healthcare provider to check for patient understanding by asking the patient to repeat what was taught using their own words and re-demonstrate specific instructions, such as their ability to administer the right amount of medications, demonstrate proper bulb suctioning in infants or the use of inhalers. This teaching strategy enabled verification of how well the parent could explain the instructions, provide clarification and reteach any misunderstandings followed by further re-checking for adequate understanding. A guide to the teach-back method instructions can be viewed in Appendix F and included the most important concepts for the discharge diagnoses of fever and URI. For example, important concepts in the discharge instructions of fever would include the proper treatment of fever such as calculation (dose), administration (time) and drawing up of antipyretics such as Tylenol. Additional concepts include specifics of when to call the child's health care provider or return to the emergency room. The parents were taught these instructions using simple easy to understand words, and pictures if necessary, and understanding was ascertained by asking them to repeat back in their own words what they learned, by saying, "I want to be sure that I clearly described how to decide the amount of medication to give and how often you can give it to your child. Can you tell me in your own words or show me what I described?" If a gap in understanding existed, the cycle of teaching and checking was repeated until understanding was confirmed (see figure 2).

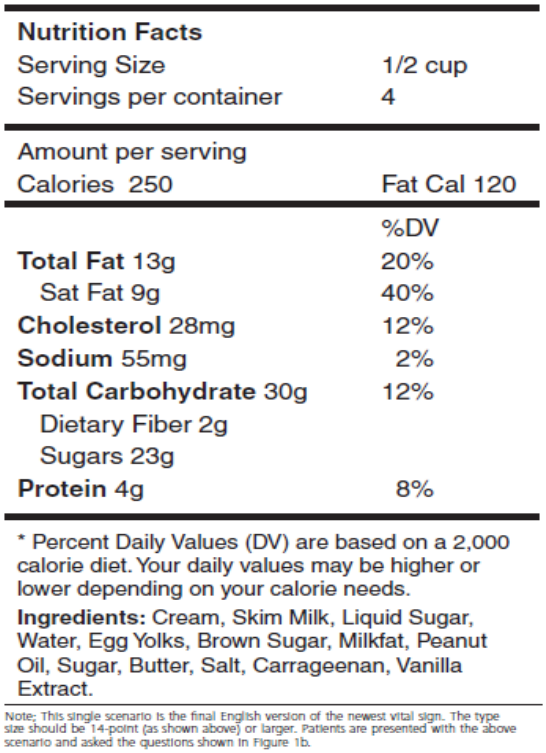
Figure 2. Teach-back model. Adapted from "Use the Teach-Back Method: Tool #5," by the Agency for Healthcare Research and Quality, 2015.

Control Group

The participants assigned to the control group received current standard of care discharge teaching materials which were selected and readily printed from the electronic health record (EHR) for the patient. The instructions, "Kid Care: Fever" and "Treating Viral Respiratory Illness in Children", are provided by Krames for kids (StayWell, 2015) an on-demand collection of evidence based education topics. These instructions were printed and provided to the patient with the (Scamman, 2018), After Visit Summary (AVS). Forty-eight hours after discharge, all the enrolled and consented parents received a phone interview using the identical interview procedure as the intervention group, including the patient interview questionnaire (see Appendix D) to assess their comprehension, recall and adherence to the discharge instructions given for their sick child.

Instrumentation and Operationalization of Constructs

The Newest Vitals Sign (NVS), a valid and reliable literacy screening tool available in English and Spanish was designed by. Weiss, a professor at the University of Arizona, and his colleagues. It has been tested for validity and reliability in many research studies and has been used to assess health literacy in a variety of different patients and health conditions (Shealy & Threatt, 2016). The NVS has been validated against several other literacy assessment tools including the TOHLFA (Weiss et al 2005) and the REALM. The NVS toolkit is readily available to medical and public health providers at no cost through the Pfizer Corporation and is accessible through the internet. In the NVS toolkit Pfizer provides the NVS tool in both English and Spanish, an implementation guide, and additional tips to help improve communication with your patients. This short six question assessment tool measures prose literacy and numeracy, as well as document literacy using an Ice cream nutrition label (see Figure 3).



Nutrition Facts	
Serving Size	1/2 cup
Servings per container	4
Amount per serving	
Calories 250	Fat Cal 120
	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 28mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

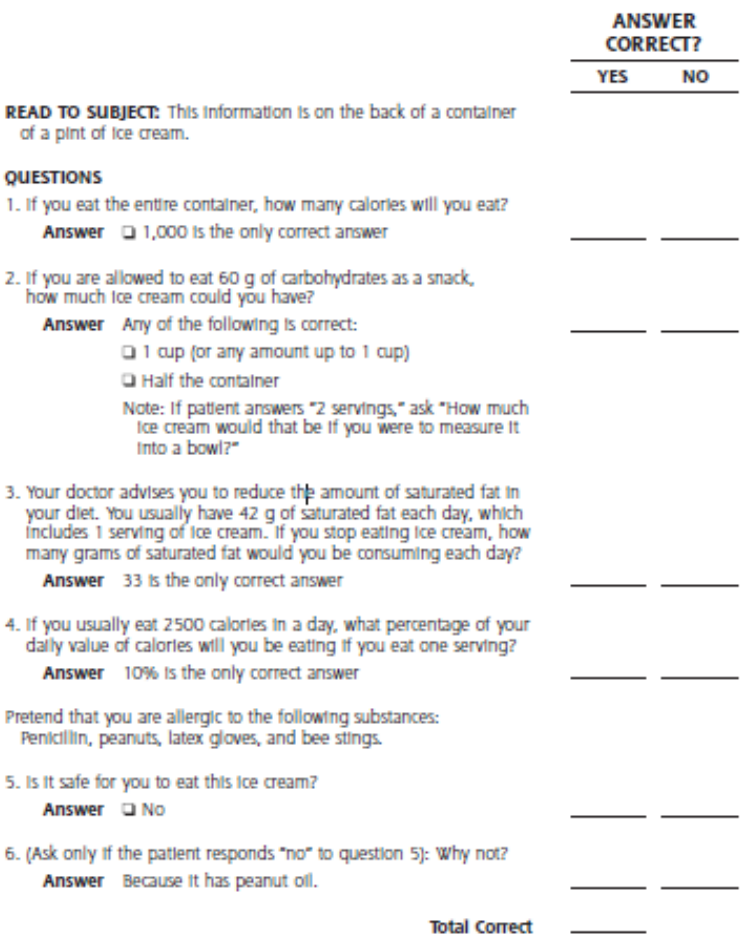
* Percent Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

Note: This single scenario is the final English version of the newest vital sign. The type size should be 14-point (as shown above) or larger. Patients are presented with the above scenario and asked the questions shown in Figure 1b.

Figure 3. The Newest Vital Sign–Ice Cream Label English.

Specific interpretation guidelines are provided; a score of 0-1 suggests a high likelihood (50% or more) of limited literacy, a score of 2-3 indicates the possibility of limited literacy and a score of 4-6 almost always indicates adequate literacy (see figure 4). This tool is quick to implement which is a perfect fit for use in an environment pressed for time and space, such as the emergency room. Newest Vital sign is openly available to the medical community for use without permission.



	ANSWER CORRECT? YES	NO
READ TO SUBJECT: This information is on the back of a container of a pint of ice cream.		
QUESTIONS		
1. If you eat the entire container, how many calories will you eat?		
Answer ❑ 1,000 is the only correct answer	_____	_____
2. If you are allowed to eat 60 g of carbohydrates as a snack, how much ice cream could you have?		
Answer Any of the following is correct:	_____	_____
❑ 1 cup (or any amount up to 1 cup)		
❑ Half the container		
Note: If patient answers "2 servings," ask "How much ice cream would that be if you were to measure it into a bowl?"		
3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes 1 serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?		
Answer 33 is the only correct answer	_____	_____
4. If you usually eat 2500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?		
Answer 10% is the only correct answer	_____	_____
Pretend that you are allergic to the following substances: Penicillin, peanuts, latex gloves, and bee stings.		
5. Is it safe for you to eat this ice cream?		
Answer ❑ No	_____	_____
6. (Ask only if the patient responds "no" to question 5): Why not?		
Answer Because it has peanut oil.	_____	_____
Total Correct	_____	

Figure 4. Newest Vital Sign: Questions and answers score sheet –English. (Weiss et al., 2005)

The questionnaire used for structured follow up telephone interviews (Appendix D), was modeled after the tool used in a study by Engel et al (2009), in which the authors measured patients' comprehension and perceived comprehension of adults discharged from the emergency room. A permission to use the tool with a slight modification, was obtained from the original author. The pilot test for this tool was explained earlier in the chapter. The questionnaire scoring used a Likert type scale which represents an ordinal level of measurement, to rate the answers about comprehension, recall and adherence

(dependent variables), ranging from no understanding to complete understanding. The numbers are not represented in equal distance or intervals (Frankfort-Nachmias & Nachmias, 2008) and zero does not mean the participant does not have any knowledge, thus zero is arbitrary. The scale used is a scale from 1-5, where 1 = No comprehension, 2 = Minimal comprehension, 3 = Partial comprehension, 4 = Near comprehension, and 5 = Complete comprehension.

Operationalization: Independent and Dependent Variables

The independent variable, the intervention, was the method of teaching which was either the standard discharge teaching (control group) or the use of the teach-back method for the delivery of the discharge instructions (intervention group). The teach-back method is one of the tools used in the Health Literacy Universal Precautions Toolkit (see Appendix J), recommended by the AHRQ (2015) and the WHO for use with patients.

The dependent variables were comprehension, recall, and adherence to the discharge instructions. Comprehension was defined as the ability to understand and process information presented (Merriam-Webster, 2016). Recall was defined as the patients' ability to remember what information has been learned in the past (Merriam-Webster, 2016) and adherence was defined as the level to which patients' actions concur with the recommendations and plan of care prescribed by the health care provider (Gardner, 2015). The dependent variables were measured using a five level Likert scale to measure the level of comprehension, comparing the parents self-reported comprehension and recall to the actual medical record. The scale is illustrated as 1 = No Comprehension, 2 = Minimal Comprehension, 3 = Partial Comprehension, 4 = Near

Comprehension and 5 = Complete Comprehension (Engel et al., 2009). Confounding variables have a potential to affect the outcome of the study, thus they must be accounted for either through the research design before the data collection or using a statistical analysis after the data are collected. Confounding variables are major threats to the internal validity of the study (Frankfort-Nachmias, Nachmias & DeWaard, 2015). In this study these variables were collected using a demographic data sheet (see Appendix A) and I planned to perform a linear regression analysis using SPSS.

Materials and Programs

NVS, a short health literacy assessment tool uses an ice-cream label (Appendix I) to assess reading, writing, and numeracy skills. This tool was initially developed by Weiss et al. (2005) and has a reported internal consistency measured using Cronbach α = .76 and an item validity of $r = 0.59$ and $p < .001$, when tested against the REALM, and the Test of Functional Health Literacy in Adults (TOFHLA) tools and was validated for oral administration only. This tool has been used in more than 25 peer-reviewed studies (Shealy & Threat, 2016) has been validated in Spanish and English and has been used in a population with widely varied patient characteristics, including ethnicity and various health conditions. In this study the NVS was used to identify parents with low health literacy for identification and inclusion in the study.

Teach-back is a teaching method recommended by the AHRQ in the Health Literacy Universal Precautions Toolkit (2010) as it can effectively eliminate gaps in communication between the health care provider and the patient, also called the "closing the loop" or "show me method." It confirms that the provider has sufficiently explained

the information provided to the patient so that the patient understands it. The teach-back method was used for the intervention group. Teach-back instructions, important teaching points for the diagnosis of Fever and URI are followed as provided by Krames for kids.

Standard Teaching Materials were the materials currently in use for discharge teaching from the emergency room and are readily available in the electronic health record (EHR) and printed for the patient on discharge. These instructions were provided by KRAMES for kids an on-demand repertoire of evidence based pediatric education topics written in an easy to understand at or below 6th grade reading level (Children's Health, 2016) and were provided to the study participants in the control group.

The *Post Discharge Interview Questionnaire* initially developed by Engel et al. (2009), has been used in several other studies (Griffey et al., 2015) to evaluate adult patients perceived comprehension of their own discharge instructions. This tool was mod,ified and pilot tested to address the population of parents or caregivers of children presenting to the emergency room and reflect information sought to measure the parental comprehension, recall and adherence to their child's discharge instructions. The answers were evaluated and scored using a five level Likert type scale of comprehension (1 = No Comprehension, 2 = Minimal Comprehension, 3 = Partial Comprehension, 4 = Near Comprehension and 5 = Complete Comprehension) by two separate people to assure interrater reliability (see Appendix E).

This intervention study was sponsored by Children's Health Children's Medical Center and an IRB application was obtained from the organization.

Operationalization of Variables

The independent variable, the intervention, consisted of the use of the teach-back method for the delivery of the discharge instructions. The dependent variables were identified as the comprehension, recall and adherence to the discharge instructions. Comprehension was defined as the ability to understand and process information presented (Merriam-Webster, 2016). Recall was defined as the patients' ability to remember what information has been learned in the past (Merriam-Webster, 2016) and adherence was defined as the level to which patients' actions concur with the recommendations and plan of care prescribed by the health care provider (Gardner, 2015). The dependent variables were measured using a five level Likert scale to measure the level of comprehension, comparing the parents self-reported comprehension and recall to the actual medical record. The scale was illustrated as 1 = No Comprehension, 2 = Minimal Comprehension, 3 = Partial Comprehension, 4 = Near Comprehension and 5 = Complete Comprehension (Engel et al., 2009).

Data Analysis Plan

The data analysis software SPSS Statistics version 25 by International Business Machines Corp. (IBM) was used to examine statistical significance between the intervention and control group and test the hypotheses. I planned on analyzing the demographic data using *t*-tests and chi square for homogeneity. This study evaluated the differences between two groups, the intervention and the control group, on an ordinal dependent variable, using the Mann-Whitney U test, which is a nonparametric test (Laerd, 2015) to compare the two medians in order to test the hypothesis. Data on

covariates such as age of parent and child, gender of parent and child (male or female), race (Hispanic, African American, Caucasian), diagnosis of child (Fever = 0, URI = 1) and first-time visit (yes or no), educational level and socio-economic status were recorded (see Appendix A). I planned on analyzing the differences in the groups using linear regression analysis to control for the extraneous variables on the measured outcome, assuring internal validity.

The independent variable was treated as a dichotomous variable and is represented by only two categories (teach-back: yes/no). The dependent variables comprehension, recall and adherence were all measured on an ordinal level which have two or more categories and can be ordered or ranked, using a five-point Likert Type scale.

Research Questions and Hypotheses

RQ1: What effect does the teach-back method have on the level of self-reported comprehension of the treatment plan when compared to using the current standard of care in parents or dependent care agent with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$1: The teach-back method has no effect on the level of self-reported comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$1: The teach-back method has an effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 is the average increase in self-reported comprehension with the use of the new discharge teaching, and μ_2 is the average self-reported comprehension with the current standard of care. The independent variable was the teach-back method with parents assigned to either the intervention group, those who received the teach-back method, or the control group, those who received the current standard of care. The dependent variable, the self-reported comprehension of the treatment plan, is an ordinal variable measured using a Likert type scale.

RQ2: What effect does the teach-back method have on the degree of adherence to the prescribed treatment plan when compared to using the current standard of care in parents or dependent care agents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$2: The teach-back method has no effect on the degree of adherence to the prescribed treatment plan and dependent care when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$2: The teach-back method has an effect on the degree of adherence to the treatment plan and dependent care when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 is the degree of adherence to the prescribed treatment plan when the new method, the teach-back method, is used, and μ_2 is the average comprehension with the current standard of care. The independent variable was the teach-back method with parents assigned to either the intervention group, those who received the teach-back method, or the control group, those who received the current standard of care. The dependent variable is an ordinal variable, the adherence to the prescribed treatment plan measured on a Likert type scale.

RQ3: What effect does the teach-back method have on the parent's ability to perform dependent care and recall the discharge instructions when compared to using the current standard of care in parents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$3: The teach-back method has no effect on the parents' ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$3: The teach-back method has an effect on the parents ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 is the amount of recall of the discharge instructions when the new method, the teach-back method, is used, and μ_2 is the amount of recall of the discharge instructions with the use of the current standard of care instructions. The independent variable was the teach-back method with parents assigned to either the intervention group, those who received the teach-back method, or the control group, those who received the current standard of care instructions. The dependent variable was measured as ordinal.

Threats to Validity

External Validity

External validity refers to the ability to generalize the results of the study to the larger populations and applied in different settings (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). Two factors in need of careful consideration to assure maximum external validity are the representative of the sample and the reactive arrangements in the study (Frankfort-Nachmias, et al., 2015). External validity can be compromised when the study is carried out in a non-natural setting such as a laboratory. This study was carried out in the pediatric emergency room, where the parents presented with their child for treatment, making it a natural setting which strengthened the external validity and making

it more generalizable to the larger population. The data collected were limited to one institution in the southern United States and may not be applicable outside of this setting.

For the purpose of this study, I selected a convenience sample using the accessible population of parents or caregivers, with a documented low health, literacy level who presented to the ED. I used convenience sampling due to the availability of the potential participants presenting to the chosen site for the study.

I accounted for the bias using a convenience sample by carefully considering the sample criteria used to determine the target population and accounting for the extraneous variables identified (Grove, et al., 2013). Data collection included categories such as age, gender, educational level, socioeconomic level, and ethnicity. All parents or caregivers of children presenting to the ED were screened for their health literacy level, using the NVS screening tool, and anyone with a score of less than 4 being discharged from the ED, was eligible to enroll in the study. Additionally, after enrollment the subject was randomly assigned to either the control or intervention group, which controls selection bias, using unique identifiers which increases the generalizability to the larger population (Frankfort-Nachmias, et al., 2015).

Internal Validity

Threats to internal validity in a two-group post-test only design, with an intervention and control group include factors of selection of subjects, experimental mortality and a selection-maturation interaction (Campbell, 1979). The study used a Posttest-Only Control Group design, which according to Frankfort-Nachmias, et al. (2015) controls for all intrinsic sources of invalidity. With this design both groups will

undergo the same maturation process and with the exclusion of a Pretest, testing and instrumentation become irrelevant sources of invalidity. Furthermore, experimental mortality or participant drop out affects internal validity, by changing the final sample of the study. With the use of telephone interviews 48 hours' post discharge, I will know when the necessary sample size has been reached. Factors of selection bias were controlled by the random assignment to the control or intervention group using even and odd numbers of assignment.

Construct Validity

Construct validity is obtained if the researcher relates their measuring instruments to the theoretical framework of the study (Frankfort-Nachmias & Nachmias, 2008). The SCDNT or the dependent care deficit nursing theory, by Dorothea Orem was the guiding theoretical framework for this study. Orem (2001) concludes that a person must have required resources such as the capacity and motivation to learn to perform the self-care or dependent-care activities required. The SCDNT has been used in studies (Sutters, Savedra, & Miaskowski, 2011; Wilson et al., 2008) evaluating the effectiveness of educational interventions in the presence of low health literacy in parents, as well as the correlation between health literacy and the ability to comprehend and effectively communicate health needs of their children. The questionnaire used measured the understanding of their diagnosis, return instructions, self-care and medication administration, as well as tests and treatments performed while in the ED and any follow up care recommended.

Ethical Procedures

For this study prior to data collection, approval from the Institutional Review Board at Walden University as well as Children's Health was obtained. The IRB approval assured adherence to University's standards as well as U.S. federal regulations were followed based on the process set forth by the Code of Federal Regulations Title 45 CFR 46 (Protection of Human Subjects, 2009) All participants enrolled in the study signed an informed consent accounting for all three ethical principles such as respect for person, beneficence and justice. All parents presenting to the emergency room for a non-urgent illness (ESI level 4 & 5) were screened for their health literacy levels. All subjects scoring less than four on the NVS, the health literacy screening tool were approached for inclusion. The study was designed to have a control and intervention group, with the intervention being the teach-back method. No potentially beneficial treatment was being withheld from the control group, as all participants at a minimum received the current standard written discharge instructions.

Precautions to protect the data collected from participants was kept confidential by assigning participants unique identifiers. Access to data collected was password protected to assure confidentiality of information gathered from participants, as set forth by the Health Insurance Portability and Accountability Act (HIPAA).

Summary

In chapter 3, I provided a description of the research method including the study population, sampling method and procedures, instrumentation, materials, operational

definitions of variables. Study questions and hypotheses were discussed in detail. Independent, dependent and confounding variables were identified.

The purpose of this quasi-experimental study was to evaluate the effects using the teach-back method, the independent variable has on the comprehension, recall and adherence to the prescribed discharge plan. I used a convenience sample of parents with low health literacy scores presenting to the Pediatric Emergency Room in a non-teaching hospital. It was a contrasted (two) group design, the intervention and control group with random assignment to either group. A Mann-Whitney-U test was performed to evaluate the differences between the two groups by measuring the two medians to test the hypothesis and a logistic regression will account for the confounding variables with the use of SPSS 21.

Chapter 4 describes in detail the results of the pilot study conducted to test the research instrument (questionnaire), actual data collection procedures including any variations from the initial plan, and the intervention fidelity. Additionally, it will include a full report of the statistical analysis findings and answers to the research questions.

Chapter 4

Introduction

The purpose of this quasi-experimental study was to evaluate the efficacy of modifying the teaching method based on the parents learning style and health literacy skills assessed during their visit to the emergency room using the teach-back method for discharge instructions compared to the standard written instructions by assessing after-visit comprehension and retention of the instructions. I evaluated if using the teach-back method (independent variable) for the delivery of discharge instructions would improve the parents' after visit comprehension level, adherence and retention (dependent variables) compared to the standard written instructions. Initial approval to allow for data collection, analysis, and access to the electronic health record was obtained from study site hospital's IRB (STU 022017-062) and Walden University's IRB (# 04-25-17-0333449). Furthermore, a site approval was obtained from the children's medical center to allow for recruitment of participants in the ED.

The research questions for my study were:

RQ1: What effect does the teach-back method have on the level of comprehension of the treatment plan when compared to using the current standard of care in parents or dependent care agent with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$1: The teach-back method has no effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$1: The teach-back method has an effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 was the average increase in comprehension with the use of the new discharge teaching, and μ_2 was the average comprehension with the current standard of care. The independent variable was the teach-back method with parents assigned to either the intervention group, those who received the teach-back method, or the control group, those who received the current standard of care. The dependent variable, the comprehension of the treatment plan, was an ordinal variable measured using a Likert type scale.

RQ2: What effect does the teach-back method have on the degree of adherence to the prescribed treatment plan when compared to using the current standard of care in parents or dependent care agents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$2: The teach-back method has no effect on the degree of adherence to the prescribed treatment plan and dependent care when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$2: The teach-back method has an effect on the degree of adherence to the prescribed treatment plan and dependent care when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 was the degree of adherence to the prescribed treatment plan when the new method, the teach-back method, is used, and μ_2 was the average comprehension with the current standard of care. The independent variable was the teach-back method with parents assigned to either the intervention group, those who received the teach-back method, or the control group, those who received the current standard of care. The dependent variable was an ordinal variable, the adherence to the prescribed treatment plan measured on a Likert type scale.

RQ3: What effect does the teach-back method have on the parent's ability to perform dependent care and recall the discharge instructions when compared to using the current standard of care in parents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$3: The teach-back method has no effect on the parents' ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy.

$$H_0: \mu_1 = \mu_2$$

$H_1$3: The teach-back method has an effect on the parents' ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy

$$H_1: \mu_1 > \mu_2$$

Where μ_1 was the amount of recall of the discharge instructions when the new method, the teach-back method, was used, and μ_2 was the amount of recall of the discharge instructions with the use of the current standard of care instructions. The independent variable was the teach-back method with parents assigned to either the intervention group, those who receive the teach-back method, or the control group, those who receive the current standard of care instructions. The dependent variable was an ordinal variable, the recall of the discharge instructions measured on a Likert type scale.

In chapter 4, I present the data collection procedures and analysis including results from the pilot study used to measure interrater reliability of the slightly modified questionnaire previously developed by Engel et al. (2009). The chapter includes the time frame used for data collection, recruitment and response rates, along with any variances from the plan as initially discussed in Chapter 3. Additionally, I discuss challenges in treatment and intervention fidelity. Finally, I present the results of the study by reporting statistical analysis findings organized by each individual research question and hypothesis.

Pilot Study

I conducted a pilot study to establish validity and measure interrater reliability for the slightly modified content of the comprehension tool initially developed by Engel et al. (2009). I modified the tool by rewording questions used to assess the actual care of the children. Content validity or assuring the tool actually measures what was intended to be measured was established using a panel of experts, a pediatric emergency room physician, pediatric acute care nurse practitioner, clinical nurse specialist in pediatric emergency care and a staff nurse, all of whom have extensive experience working with the population of interest. The panel of experts was given explicit instructions on the nature of the original instrument, which measured comprehension of discharge instructions in adult patients being discharged from the ED, as well as the need for modification in order to measure the comprehension of discharge instructions in parents with a sick child. Each panel member reviewed the tool independently, judged appropriateness and accuracy of the questions, and then met to discuss the specifications and make any necessary recommendation for change. After completion of their review, the expert panel suggested to make some minor changes to some the wording of a few questions on the instrument. These changes were incorporated into the final document and unanimously approved by the panel.

Once the content validity was established, I conducted a pilot study to measure the interrater reliability of the concordance tool using two independent raters, the emergency room clinical nurse specialist and myself. Fourteen participants gave consent and were enrolled using identical inclusion criteria as in the proposed study design

between May 15, 2017, and August 6, 2017. A total of 34 potential participants were identified and provided consent for participation. Eight (24%) of the 34 participants were disqualified due to a measured health literacy level of four or higher. Furthermore, the attrition rate was 35.3%, as 12 out of 34 participants failed to complete the phone interview. A sample size of 14 (N = 14) qualified participants were enrolled.

Each qualified consenting participant was randomized to receive either the teach-back method or standardized discharge instructions. To eliminate variances in the deliverance of the teach-back method, discharge instructions were given by myself to all participants randomized to receive their discharge instruction using the teach-back method. Participants who were randomized to the standard method of discharge instruction received their discharge by their primary nurse assigned to them. Two to three days after discharge from the ED, I called the participants and asked them a series of questions using the Script for Patient Phone Interview (see Appendix D). These phone calls were all recorded and stored to a portable USB drive for ease of sharing between the two concordance raters. After all interviews were independently scored by both raters, the data were analyzed using the weighted kappa (κ_w) procedure in the IBM SPSS statistical software in order to verify the interrater reliability of the concordance scale. A decision to use the Cohen's weighted kappa (κ_w) score instead of the Cohen's kappa (κ) as initially identified in the proposal was made as the response options of the concordance scale were ordinal rather than nominal and there was some identified overlap, violating one of the assumptions of the Cohen's kappa(κ).

Weighted kappa (κ_w) procedure with quadratic weights (see Cicchetti & Allison, 1971) was performed to determine if there was agreement between the two rater's concordance scoring of the participants phone interviews. The concordance score of the 14 participants who were rated was determined using a 5-point Likert type scale from 1 (no concordance) to 5 (complete concordance).

Results

There was a statistically significant agreement between the two raters in question # 15 κ_w = .765 (95% CI, .561 to .968), p = .002 (Table 1), question # 16 κ_w = .877 (95% CI, .584 to 1.170) p = .001(Table 2), question # 17 κ_w = .601 (CI 95%, .316 to .886), p = .011(Table 3), question # 19 κ_w = .914 (95% CI, .843 to .985), p < .001 (Table 4) and question # 20 κ_w = .839, (95% CI, .661 to 1.017), p = .001(Table 5). The strength of the agreement was classified as good (κ = 0.61 – 0.80) to very good (κ = 0.81 – 1.00) according to Landis and Koch (1977) and excellent according to Fleiss et al (2003).

Table 1

R1 Comprehension Versus R2 Comprehension Question #15

Weighted kappa results						
Weighting	Kappa	Asymptotic Standard Error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.765	.104	3.141	.002	.561	.968

Table 2

R1 Treatment Versus R2 Treatment Question #16

Weighted kappa						
Weighting	Kappa	Asymptotic standard error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.877	.150	3.322	.001	.584	1.170

Table 3

R1 Post Discharge Care Versus R2 Post Discharge Care

Weighted kappa						
Weighting	Kappa	Asymptotic standard error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.601	.145	2.532	.011	.316	.886

Table 4

R1 Post Discharge Care Versus R2 Post Discharge Care Question #19

Weighted kappa						
Weighting	Kappa	Asymptotic standard error	*Z*	*p* Value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.914	.036	3.483	.000	.843	.985

Table 5

R1 Return to ED Instructions Versus R2 Return to ED Instructions Question #20

	Weighted kappa					
Weighting	Kappa	Asymptotic standard error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.839	.091	3.209	.001	.661	1.017

However, there was no statistically significant agreement between the two raters on question # 18 κ_w = .381 (95% CI, -.169 to .930), *p* = .094 (Table 6), question # 21 κ_w = .380 (95% CI, .040 to .791), *p* = .133 (Table 7) and question # 22 κ_w = -.460 (95% CI, -.898 to - .023), *p* = .058 (Table 8). The strength of this agreement was classified as fair (κ = 0.21 – 0.40) to poor (κ = < 0.20) according to Landis and Koch (1977) and poor according to Fleiss et al. (2003).

Table 6

R1 Post Discharge Care Versus R2 Post Discharge Care

	Weighted kappa					
Weighting	Kappa	Asymptotic standard error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.381	.280	1.676	.094	-.169	.930
Weighting	Kappa	Asymptotic Standard Error	Z	P Value	Lower 95% Asymptotic CI Bound	Upper 95% Asymptotic CI Bound
Quadratic	.380	.173	1.503	.133	.040	.719

Table 7

R1 Adherence Versus R2 Adherence Question #21

	Weighted kappa					
Weighting	Kappa	Asymptotic standard error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	.380	.173	1.503	.133	.040	.719

Table 8

R1 Adherence Versus R2 Adherence Question #22

	Weighted kappa					
Weighting	Kappa	Asymptotic standard error	*Z*	*p* value	Lower 95% asymptotic CI bound	Upper 95% asymptotic CI bound
Quadratic	-.460	.223	-1.898	.058	-.898	-.023

Changes

After reviewing the results of the interrater reliability and detailed discussion with the CNS and my Committee Chair, a decision was made to make some changes to the questions on the tool (see Appendix G) and a request for modification was sent to the UTSW IRB. In order to minimize participation or survey fatigue, modifications included moving the comprehension questions, originally part 3 of the survey, in front of the satisfaction questions, originally part 2. In addition, some questions were combined, question #18 and #21 were asking almost identical information so the decision to combine the two was made. Some wording was changed to clarify the questions some

and make them less confusing (see Appendix H). The modification was approved on September 9, 2017 (#Mod2 STU 022017-062).

Data Collection

Data collection turned out to be more challenging than anticipated. Due to some major life changes, and personal circumstances, including an unforeseen job change (my position at the data collection site was eliminated) which severely limited my access to data collection.

In addition to these challenges the ability to identify the participants for the study proved to be more difficult than originally planned. In order to identify participants, the second triage nurse would approach the parents of children meeting the inclusion criteria to inquire if they would be interested in participating in the study. Many triage nurses were new to their positions due to high turnover rate, and despite my detailed explanation on how to identify and approach the participants, many of the potential participants were missed, making recruitment very slow. This could have been due to their low comfort level of recruiting research participants or preoccupation with their new task of triaging and making decision on patient priorities and acuity. Furthermore, I had to find a balance between the ED's extremely high census, due to a Flu epidemic starting in December of 2017 through March 2018 and the opposite extreme of the low census, between April and October, especially with the chief complaints of fever and URI, chosen for the inclusion criteria. Data collection began on December 7, 2017 and ended on January 24, 2019, with many interruptions in between.

Results

The hypotheses were tested using primary data from a quasi-experimental study posttest-only using two independent groups randomly assigned to the intervention or control group, to evaluate the effectiveness of the teach-back method (independent variable) in the delivery of discharge instructions to parents with low health literacy when compared to standard written instructions, using a posttest (interview) only to evaluate the parent's self-reported comprehension, adherence and retention of instructions.

Descriptive and Demographic Characteristics of the Sample

Age. The age of the enrolled participants ranged from 19 years of age through 49 years, with the majority being less than 40 years old (19 – 23 years = 3; 24 – 28 years = 4; 29 – 33 years = 4 & 34 – 38 years = 4). In the intervention group the majority of participants 66% (6 of 9) reported their age to be between 29 and 38 years of age, with only 28% in the control group (2 of 7). Respectively in the control group most participants 57% (4 of 7) reported their age to be between 19 – 28 years of age, with only 33% (3 of 9) in the intervention group. Only one participant in the control group reported their age to be greater 39 years of age (49 years), with none of the participants in the intervention group reporting an age older than 38 years of age.,

Ethnicity. About one-half of the enrolled participants reported their ethnicity as being Hispanic (8 out of 16), whereas five were African American, one was Asian, and one was Caucasian (1 participant did not answer the question). In respect to the randomly assigned groups in the intervention group five participants (55.5%) were Hispanic (but English speaking) and in the control group three (43%) reported they were Hispanic.

Furthermore, the intervention group had two African American, one Caucasian and one Asian participant, with three participants reporting to be African American in the control group and one participant chose not to answer.

Gender. Thirteen (81.25%) of the enrolled participants were female (13/16) and only 18.75% were males. Respectively, 85% of enrolled participants in the control group were females and 78% in the intervention group. Fourteen percent of the participants in the control group and 22% in the intervention group were males.

Education. Seventy five percent of all enrolled participants reported to have a high school diploma or above, with 43.75% (7/16) participants reporting some college, 18.75% (3/16) reported to have a bachelor's degree. Only one of the participants reported to have less than a high school diploma. In the intervention group, all of the participants reported to have a high school diploma or more, with two (22%) participants reporting a bachelor's degree. Whereas in the control group one participant (14%) reported to have less than a high school diploma and one (14%) reported to have a bachelor's degree. Additionally, one (14%) of the control group reported to have a high school diploma and four (57%) reported to have some college education. It is noteworthy that the one participant in the control group who had less than a high school diploma was the oldest participant in the study at 49 years of age.

Household income. The reported household income levels ranged from less than $5,001 to $10,000 a year to greater than $50,000 a year. Three of sixteen (18.75%) participants reported their income to be greater than $45,000 a year, and one reported their income to be between $5001 - $10,000 a year. Three of sixteen (18.75%)had an

income level of $30,001 - $35,000 and five of sixteen (31%) of the participants choose not to answer. Evaluating the income reports broken down by individual groups there was overall higher income levels reported in the intervention group. 44% (4 of 9) participants in the intervention group reported an income of greater than $35,000 a year where no one in the control group reported an income level of more than $35,000. Yet the intervention group had one participant report income of $5001 - $10,000, with the lowest income in the control group being reported at $10,001 - $15,000 (1 of 7). 42% (3 of 7) of the participants in the control group and 22% (2 of 9) in the intervention group chose not to answer.

Treatment and Intervention Fidelity

Treatment or intervention fidelity was assured by limiting the providers of the treatment or intervention. I provided discharge instructions to all participants assigned to the intervention group, verifying their understanding of instructions by using the teach-back method. This assured the intervention protocol was standardized and minimized treatment contamination or inconsistencies and eliminating the need for provider monitoring.

Results of Data Analysis

The health literacy score for each participant was measured using the NVS tool or commonly referred to as the "Ice Cream label"(see Appendix I), where a score of 0 – 1 suggests a high likelihood of limited literacy, a score of 2 – 3 indicates the possibility of limited literacy and a score of 4 – 6 almost always indicates adequate literacy. Criteria for enrollment in the study was an NVS score of less than 4. Fifty percent of the enrolled

participants scored a 3, with 25% of the participants each scoring either a 2 or 1. Statistical analyses were conducted using SPSS 25 to determine if there were differences in comprehension, adherence and recall scores between the Teach Back and Non-Teach back groups.

Assumptions

The Mann-Whitney U test has four basic assumptions which need to be met. The first assumption is that the dependent variable is measured at a continuous or ordinal level. Ordinal variables include Likert type items (a 5 or 7 point scale from "strongly agree" to "strongly disagree"). The dependent variables in this study were comprehension, recall, and adherence which were all measured on an ordinal level using a five-point Likert Type scale from "Complete Concordance" through "No Concordance." Another assumption is that the independent variable must consist of two categorical independent groups, a dichotomous variable consisting of two groups for example are "males" and "females" or "intervention- yes" and "intervention-no." The independent variable was treated as a dichotomous variable and was represented by only two categories (teach-back: yes/no), thus meeting the assumption. I coded the dichotomous variable as 1(yes) when teach-back was used and 2 (no) when teach-back was not used. Furthermore, the third assumption for the Mann-Whitney U test is that there is an independence of observations, assuring that there is no relationship between observations in each group. Each group should have different participants and no participants should be in more than one group. Using medical record numbers, I assured that each group had different participants and no participants were in more than one

group or enrolled more than once. Finally, the fourth assumption, a critical assumption of the Mann-Whitney U test, is that the distribution of the scores for both groups of the independent variable have the same shape. Using SPSS version 25 the distributions of the comprehension, adherence, and recall scores for the two groups were found to be similar as assessed by visual inspection (see figures 5, 7 & 9).

The research questions and associated hypotheses for this study were:

RQ1: What effect does the teach-back method have on the level of comprehension of the treatment plan, when compared to using the current standard of care, in parents or dependent care agent, with low health literacy skills, who have brought their children to the emergency room for treatment?

$H_0$1: The teach-back method has no effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy.

$H_1$1: The teach-back method has an effect on the level of comprehension of the treatment plan and care of the child when compared to using the current standard of care in parents with low health literacy.

A Mann-Whitney U test was conducted to determine if there was a difference in the median comprehension scores between the teach-back and the non-teach back groups. Distributions of the comprehension scores for the two groups were similar, as assessed by visual inspection (Figure 5). Comprehension scores for the teach-back group (mean rank = 8.33) and the non-teach back group (mean rank = 8.71) were not statistically

significantly different, $U = 33$, $z = .170$, $p = .918$. Therefore, the null hypothesis was retained.

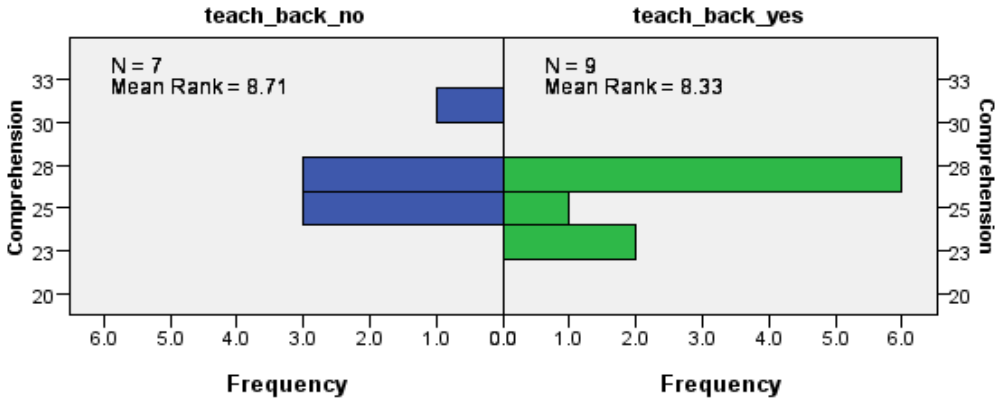


Figure 5. Independent samples Mann-Whitney U test distribution–comprehension.

Total N	16
Mann-Whitney U	33.000
Wilcoxon W	61.000
Test Statistic	33.000
Standard Error	8.830
Standardized Test Statistic	.170
Asymptotic Sig. (2-sided test)	.865
Exact Sig. (2-sided test)	.918

Figure 6: Independent samples Mann-Whitney U test comprehension scores.

RQ2: What effect does the teach-back method have on the degree of adherence to the prescribed treatment plan, when compared to using the current standard of care

in parent's or dependent care agents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$2: The teach-back method has no effect on the degree of adherence to the prescribed treatment plan and dependent care, when compared to using the current standard of care in parents with low health literacy.

$H_1$2: The teach-back method has an effect on the degree of adherence to the prescribed treatment plan and dependent care, when compared to using the current standard of care in parents with low health literacy

A Mann-Whitney U test was conducted to determine if there was a difference in the median adherence scores between the teach-back and the non-teach-back groups. Distributions of the adherence scores for the two groups were similar (Figure 7), as assessed by visual inspection. Adherence scores for the teach-back group (mean rank = 8.78) and the non-teach back group (mean rank = 8.14) were not statistically significantly different, $U = 29$, $z = -.282$, $p = .837$. Therefore, the null hypothesis was retained (see Figure 8).

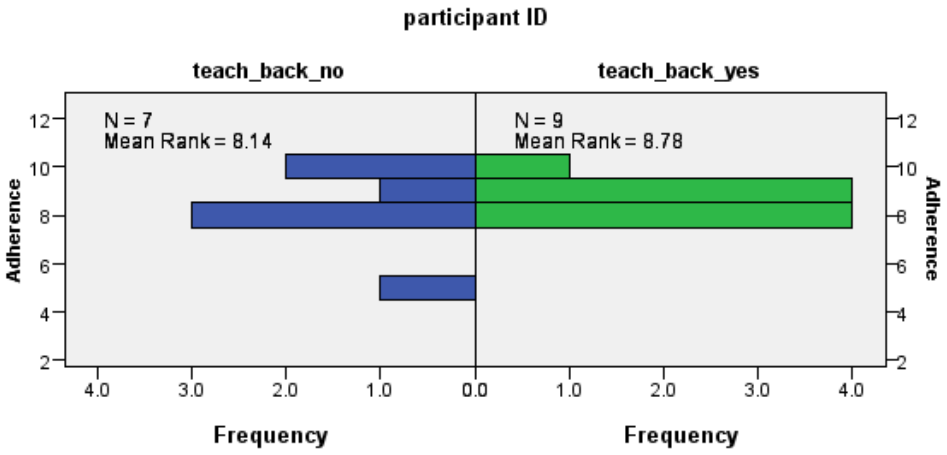


Figure 7. Independent-samples Mann-Whitney U Test distribution–adherence.

Total N	16
Mann-Whitney U	29.000
Wilcoxon W	57.000
Test Statistic	29.000
Standard Error	8.874
Standardized Test Statistic	-.282
Asymptotic Sig. (2-sided test)	.778
Exact Sig. (2-sided test)	.837

Figure 8. Independent-samples Mann-Whitney U test adherence scores.

RQ3: What effect does the teach-back method have on the parent's ability to perform dependent care and recall the discharge instructions when compared to using the current standard of care in parents with low health literacy skills who have brought their children to the emergency room for treatment?

$H_0$3*:* The teach-back method has no effect on the parent's ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy.

$H_1$3*:* The teach-back method has an effect on the parent's ability to recall discharge instructions when compared to using the current standard of care in parents with low health literacy

I conducted a Mann-Whitney U test to determine if there was a difference in the median recall scores between the teach-back and the non-teach-back groups. Distributions of the recall scores for the two groups was similar, as assessed by visual inspection (Figure 9). Recall scores for the teach-back group (mean rank = 8.28) and the non-teach-back group (mean rank = 8.79) were not statistically significantly different, U = 29.5, z = -.214, p =.837 (Figure 10) The null hypothesis was retained.

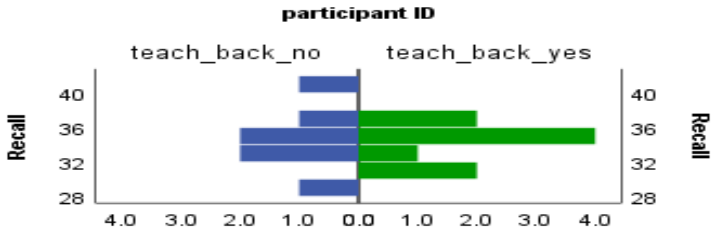


Figure 9. Independent-samples Mann-Whitney U test distribution recall scores.

Test Statistics[a]

	Recall
Mann-Whitney U	29.500
Wilcoxon W	74.500
Z	-.214
Asymp. Sig. (2-tailed)	.830
Exact Sig. [2*(1-tailed Sig.)]	.837[b]

a. Grouping Variable: participant ID

b. Not corrected for ties.

Figure 10. Independent-samples Mann-Whitney U test –recall scores.

Summary

There were one more female than males who brought their child to the emergency room. In both groups, all participants were younger than 36 years of age, except for one who was 49 years of age. None of the participants were younger than 19 years of age. The majority had an education level of a high school diploma or higher. Most of the participants reported their ethnic background to be either Hispanic (but English speaking) or African American. This study included one Caucasian and one Asian participant. There was generally a higher income level reported in the intervention group, when compared to the control group.

When comparing the teach-back method to the standard written instructions, there was no significant increase in the parents' comprehension, adherence, and recall. Therefore, the null hypothesis was retained that there was no increase in the parents' level of comprehension, adherence, and recall of the discharge instructions when using

the teach-back method compared to the standard written instructions, in parents with a literacy level of less than 4 measured using the NVS.

I will provide further discussion on the interpretation of the findings and recommendations for future research in Chapter 5. Furthermore, I will also address implications for social change and change in practice.

Chapter 5

The purpose of the study was to evaluate the efficacy of modifying the teaching method based on the parents' health literacy skills assessed during their visit to the emergency room, using the teach-back method for discharge instructions compared to the standard written instructions. This was a quasi-experimental study to determine parents' level of comprehension, adherence, and retention (dependent variables) of standard written discharge instructions compared to using the teach-back method (independent variable).

I collected data using a convenience sampling strategy and the inclusion criteria were limited to those who were English-speaking parents in a medium size nonacademic urban emergency room in the southwestern United States making the results not generalizable to other rural and intercity facilities. Analyzing the data using a Mann-Whitney U test, I determined that the use of the teach-back method caused no statistically significant increase in comprehension, adherence, or retention of the discharge instructions given to parents with low health literacy upon leaving the emergency room.

Interpretation of Findings

I did not find a significant difference in parents' increase in comprehension, adherence, or recall when the teach-back method was used compared to the standard written instructions The teach-back method, or show-me method, is a technique where the healthcare provider allows for the patient to return demonstrate the learned material, allowing for clarification where necessary. The AHRQ (2015) made the teach-back method a recommendation as part of their Health Literacy Precautions Toolkit to be used

in the delivery of health-related instructions in an attempt to improve the spoken communication among providers and their patients.

Alberti and Nannini (2013) identified an increase in comprehension of discharge instructions when alternative teaching interventions are used when compared to the written standard instructions. Only limited research is available where the authors evaluated the use of a more time-consuming teaching method in the delivery of discharge instructions in a busy environment such as the ED. Griffey et al. (2015) reported a higher comprehension score in emergency discharge instructions related to medication ($p < .02$), self-care ($p < .03$) and follow up ($p < .0001$) when the teach-back method was used, yet no difference was detected in the patient's perceived comprehension. Slater, Huang and Dalawari (2017) reported a positive correlation when using the teach-back method and the patient's recall of discharge instructions when compared to the preintervention group. A Mann-Whitney U test was used to measure the mean percent of correct answers evaluating diagnosis, medication reconciliation, follow up instructions, and return to ED precautions. The authors reported a mean percent of correct answer of 70% pre-intervention versus 82.1% postintervention ($p < 0.005$), when adjusted for age and education. The results of my study could not confirm these findings, which could be due to the relatively small sample size, some of the exclusion criteria (language), geographic location of the study, or the educational campaign launched at the time of inception of the study in the same facility requiring all healthcare providers to use the teach-back method when delivering medical instructions to the patients and parents. Curan et al (2019) closely examined 75 articles in their systematic review that focused on discharge

communication in the ED as their primary objective. They affirmed that education was the most common intervention and most of the research was focused on improving parent knowledge and changing their behavior. Improving discharge communication in the pediatric emergency setting can significantly improve parent comprehension and health outcomes for children.

Limitations of the Study

Several limitations presented in this study. The largest limitation was the small sample size due to the loss of access to the population, which decreases the generalizability of this study. While there were several high-volume months, the high seasonal fluctuations of included diagnoses extended the time to collect data for the study. Furthermore, the drop out or attrition rate, where participants did not follow through with the survey, was higher than anticipated, leading to the smaller sample size.

In retrospect, the delivery of the discharge instructions to the control group was completed by the primary nurse, which was the standard of care. I could not provide oversight over the primary nurses for each participant, so it is unclear if any inconsistencies existed and which teaching method was used for the delivery of the discharge instructions.

An added limitation to this study was the language requirement in the inclusion criteria, although the NVS tool used to measure health literacy is published in English and Spanish, this study only included English speaking parents. The typical population in this emergency room includes Caucasian, African American, Hispanic, and Asian parents where many of the Hispanic and Asian population have other than English as their native

language. This limitation adversely affected the sample size and the generalizability to the general population.

Furthermore, I conducted the study in only one suburban emergency room in the Southwestern United States, which may not be reflective of conditions in a different area in the United States or a larger inner-city emergency room.

Recommendations

Research has shown that low health literacy leads to poor health outcomes and increased health care costs (Berkman et al., 2011). Patients with low health literacy are ill prepared to make informed health care decisions, take medications as prescribed or recognize side effects, comprehend consents, and maneuver through filling out insurance forms. The IOM (2004) has made it clear that hospitals should assure that health information is delivered using a clear, easy to understand communication technique. Addressing low health literacy has been on the forefront of health care concerns (Berkman et al, 2011). Discharge from the emergency room can present the patient with substantial challenges trying to follow their homecare instructions (Chappuy et al, 2012), and the teach-back method has proven to increase retention of ED discharge instructions and should become a common method used to discharge patients form the ED (Slater et al., 2017). Most of the research has been done evaluating adults and their aftercare instructions (Griffey et al, 2015), yet little has been done evaluating innovative teaching strategies such as the teach-back method to increase comprehension in parents with low health literacy. Assessing health literacy needs to become another part of the required patient assessment at every patient provider encounter (Slater et al., 2017). With today's

technology and the accessibility of patient information, once assessed the health literacy score can become a permanent part of the medical record visible with every encounter to alert the healthcare providers when alternative teaching is necessary. All healthcare facilities should integrate consistent training on the use of innovative teaching methodologies such as teach-back and regularly assess their providers for drifting from best practices (Griffey et al, 2015). More research on which teaching method or if the development of a less time-consuming teaching method for the use in overcrowded emergency rooms is needed. I evaluated the use of the teach-back method for the delivery of discharge instructions to parents with low health literacy to increase their comprehension, adherence, and recall after bringing their child to the emergency room. As this study had a very small sample size, I would recommend using a large sample size and changing the inclusion criteria to allow for Spanish speaking parents to be enrolled. Additionally, more research should be done in a larger intercity facility allowing for a larger pool of available participants.

Implications

Positive Social Change

Identifying low health literacy levels and modifying teaching strategies will allow for parents, care givers, and patients to gain important skills to follow basic health care instructions and successfully navigate through the complicated and ever-changing health care system. One of the most logical ways to improve patient and caregiver health literacy is to provide meticulous health education (Mogford et al., 2011). The use of the teach-back method can be advantageous for health care providers to ensure a complete

understanding of such meticulous health information. Although after analyzing these data I did not find a statistically significant increase in the mean comprehension, adherence, and retention scores of parents with low health literacy scores when using the teach-back method when compared to the standard written instructions, these results could be due to the rather small sample size or the educational campaign launched simultaneously to my data collection at the facility to urge the use teach-back for all delivery of health education.

The challenge exists in training all healthcare providers in the fundamental elements of health literacy practice and sustaining ongoing support for the use of tools to increase patients understanding such as the teach-back method. Continued training and retraining are necessary to prevent drift from best practice

Methodological, Theoretical and Empirical Implications

The theoretical framework of this study was based on Orem's SCDNT. Similarities exist between the basic skills necessary to perform self-care or dependent care (Orem, 2001) and health literacy.

Orem's perception was that basic knowledge, motivation, and skills are necessary to perform adequate self-care or dependent care. In health literacy, basic skills such as the ability to read, comprehend, and communicate basic health information are necessary in order to achieve positive health outcomes. Orem's foundational capabilities are in close relationship to the basic skills necessary to develop adequate health literacy and successfully function as a health care consumer. As discussed by Ferguson and Pawlak (2011) and Chappuy et al. (2012), the inability to read is a major contributing factor to

low health literacy, which leads to consequences of increased rates of chronic disease and mortality, as well as poorer health outcomes and a lower use of preventative services. With those similarities in mind, Orem's theoretical framework of SCDNT should serve in further research addressing health literacy and positive health outcomes.

Recommendations for Practice

Although I did not find any statistically significant increase in comprehension, adherence, and recall when using the teach-back method, it is important to note that due to the loss of access to the population in this study, the sample size was small, which limited the representativeness of the results. Health literacy is an ongoing problem leading to adverse health outcomes and should continue to be studied.

Since the inception of this study, the hospital implemented a substantial literacy campaign, training all bedside nurses and providers in the use of teach-back when delivering health education and instructions. Ongoing education, training, and retraining of all healthcare providers, especially bedside nurses, in necessary to maintain the standard of teaching among all nurses who discharge patients from the emergency room.

Conclusion

The U.S. Department of Health and Human Services (2010) defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions" (para. 1). Adequate health literacy has been identified as one of the crucial components in improving health outcomes and lower overall health care costs (National Institute of Health, 2014). Nonetheless, health literacy is not consistently assessed during health-

related patient provider encounters. Providing patients and care givers with the necessary health information using clear, easy to understand communication techniques will improve health literacy, lead to better understanding of health care instructions, and ultimately improve health outcomes.

Nurses assess patients to evaluate the level of understanding of the information presented so the patient can make informed health care decisions, sign consents, and follow through on discharge instructions. Understanding the diagnosis, how to take medications, report side effects of medications prescribed, and when to follow up with a physician after a visit to the emergency room can reduce unnecessary return emergency room visits. The results of my study did not show a statistically significant increase in comprehension, adherence, and recall of discharge instructions in parents with low health literacy when using the teach-back method. The small sample size and certain exclusion criteria such as excluding native speakers of the Spanish language makes the findings not generalizable. Through the literature presented, clear communication and education, especially in the presence of low health literacy, is a key to improving comprehension when delivering health care instructions, indicating that further research is necessary to identify the best method to educate patients or caregivers on homecare and follow up instructions.

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Appendix A: Demographics Information Sheet

Emergency Department Discharge Instruction Comprehension Study Demographic Information Sheet

Case/Consent #: _____
Date/Time: _____
Initials: _____

Demographic Information

1.) Age (parent): _____ years old **2.) Age of Child: _____ years old**

3.) Gender – Parent
○ Male ○ Female

4.) Gender - Child
○ Male ○ Female

5.) Child's Diagnosis
○ Fever ○ URI

6.) Number of times this illness occurred in past
_____

7.) Education Level (parent)
○ Less than HS Diploma ○ High School ○ Some College ○ Bachelor degree or above

8.) Marital Status
○ Married ○ Single ○ Divorce

9.) Ethnicity
○ Caucasian ○ Hispanic ○ African American

10.) Household Income

How much did you earn before taxes and other deductions, during the past 12 months?

○ Less than $5,000 ○ $5,001 - $10,000 ○ $10,001 - $15,000 ○ $15,001 - $20,000
○ $20,001 - $25,000 ○ $25,001 - $30,000 ○ $30,001 - $35,000 ○ $35,001 - $ 40,000
○ $40,001 - 45,000 ○ 45,001 - $50,000 ○ > 50, 000
○ Don't know ○ No response/Prefer not to answer

11.) Household Size: _____

Appendix B: Modified Patient Interview Questions

Emergency Department Discharge Instruction Comprehension Study Script for Patient Phone Interview **Case/Consent #: _____ Date/Time: _____ Initials: _____**

Part 3 – Comprehension

Next, I am going to ask you some questions about what the medical team told you about your child's medical problem two days ago. You may refer to your discharge instruction sheets to answer these questions.

15. What did the medical team tell you they thought was wrong **with your child (their diagnosis) two days ago**?
    Follow up with: Why did they think this happened? What was the cause of their symptoms?
16. What test (s) did **your child have done two days ago**?
    a. Why did **your child have this test done**?
    b. What were the results (what did the results show)?
    c. Was there anything else?

If necessary, prompt with examples of treatments: i.e. Did your child get any medicines, IV Fluids, or breathing treatments?

17. What medications if any, were prescribed **for your child to take at home**?
    a. Why does **your child need to take this medication(s)?**
    b. Was there anything else?
18. What did the medical team tell you to do (besides taking medication) to take care of **your child's medical problem**?
    a. Why do you need to do these things?
    b. Was there anything else?

If necessary, prompt with examples: For example, are you to do anything to help with your child's symptoms, like apply hot or cold compresses, avoid certain activities, or wear a splint or brace?

19. After you left the emergency department, are you supposed to follow up with any doctors about **this problem with your child**?
    a. Who?
    b. When?
    c. Why do you need to take you child to see another doctor?
20. What symptoms or changes should cause you to come back to the emergency department **with your child**?
    a. Why do you need to **bring your child back for these symptoms or changes**?
    b. Was there anything else?

Appendix C: Permission to Use Letter

Re: Patient Comprehension Questionnaire

On Tue, Nov 15, 2016 at 3:23 AM, Kirsten Engel <kirsten.g.engel@gmail.com> wrote:

Dear Marion
I sincerely apologize for my late response. I had a major computer disaster last week and have fallen horribly behind.
Needless to say, your questionnaire looks great. I will really look forward to learning more about the results of your study. If you have the time to send me an abstract or short summary at some point, I would be most grateful.
Best wishes and thanks again for staying in touch.
Cheers,
Kirsten

On Mon, Nov 7, 2016 at 8:19 PM, Marion Kopulos <marion.kopulos@waldenu.edu> wrote:

Dr. Engel,

I am contacting you to give you a short update and ask permission to modify the questionnaire you originally used in your study in 2009.
I have attached a copy of how I arranged and modified the questionnaire to make it fit to my research project for my dissertation.
I needed to modify the process and the questions slightly as I am targeting a different patient population.
The screening for HL will be done on the front end as it is the qualifier for inclusion, then I kept the patient satisfaction questions and comprehension questions but not the Mini Cog or the perceived comprehension.

Thank you for your time.

Marion Kopulos

--
Kirsten G Engel
+45 60 51 04 22

Appendix D: Script for Parent Phone Interview

Emergency Department Discharge Instruction Comprehension Study
Script for Patient Phone Interview
Page 1 of 5

Case/Consent #: _____
Date/Time: _____
Initials: _____

Instructions:
During initial encounter with patients who will participate in phone interviews

1. Obtain consent
Part 1 – Literacy

2. Administer NVS tool to identify Health Literacy score for inclusion in study
Suggestion on how to approach the parent:
"We are asking our patients to help us learn how well patients can understand the medical information that doctors give to them. Would you be willing to help us by looking at some health information and then answering a few questions about that information? Your answers will help our doctors learn how to provide medical information in ways that patients will understand. It will only take about 3 minutes" (Pfizer Inc., 2011).

The NVS (see NVS toolkit) is a short health literacy screening tool, which takes three minutes to complete, to determine the level of health literacy. Anyone with a score of less than 4 will be eligible for inclusion in the study.

- Score Interpretation
  - A score of 0 – 1 suggests a high likelihood (50% or more) of limited literacy.
  - A score of 2 – 3 suggests the possibility of limited health literacy.
  - A score of 4 – 6 almost always indicates adequate literacy.

Emergency Department Discharge Instruction Comprehension Study Script for Patient Phone Interview
Page 2 of 5

Case/Consent #: _____
Date/Time: _____
Initials: _____

In the emergency department, patients typically are cared for by a team of health care providers, including doctors, nurses, technicians, etc. During the interview, I may use the words "medical team" to include all of these people.

Part 2 – Satisfaction

Next I would like to ask you some questions about your satisfaction with the care you received in the emergency department two days ago. For each question please rate your satisfaction using responses of poor, fair, good, very good, or excellent (page # 2 of interview packet).

	Poor	Fair	Good	Very Good	Excellent
Time					
1. The amount of time you spend waiting to be seen by the doctor	☐	☐	☐	☐	☐
2. The amount of time you spend waiting in the emergency department after you were seen by the doctor	☐	☐	☐	☐	☐
Communication Process					
3. The medical team explained the information to you in words you could understand	☐	☐	☐	☐	☐
4. The medical team spoke at a reasonable rate of speed	☐	☐	☐	☐	☐
5. The medical team gave you enough time to say what was important about your child's illness	☐	☐	☐	☐	☐
6. The medical team listened carefully to what you had to say	☐	☐	☐	☐	☐
7. The medical team took your concerns seriously	☐	☐	☐	☐	☐
8. The medical team gave you enough information about your Child's medical problem	☐	☐	☐	☐	☐
9. The medical team made sure you understood what they told you about your child's medical condition	☐	☐	☐	☐	☐
Interpersonal Style					
10. The medical team treated you and your child in a friendly and courteous manner	☐	☐	☐	☐	☐
11. The medical team made you and your child feel welcome in the Emergency Department	☐	☐	☐	☐	☐

Emergency Department Discharge Instruction Comprehension Study
Script for Patient Phone Interview
Page 3 of 5

Case/Consent #: _____
Date/Time: _____
Initials: _____

12. The medical team seemed to care about you and your child as a person	☐	☐	☐	☐	☐
13. The medical team helped you feel less worried about Your child's medical problem	☐	☐	☐	☐	☐
14. The medical team treated you and your child in a Compassionate and caring manner	☐	☐	☐	☐	☐

Part 2

Case/Consent #: _____
Date/Time: _____
Initials: _____

Part 3 – Comprehension

Next, I am going to ask you some questions about what the medical team told you about your child's medical problem two days ago. You may refer to your discharge instruction sheets to answer these questions.

15. What did the medical team tell you they thought was wrong with your child (their diagnosis) two days ago?
Follow up with: Why did they think this happened? What was the cause of their symptoms?

16. What test (s) did your child have done two days ago?
    a. Why did your child have this test done?
    b. What were the results (what did the results show)?
    c. Was there anything else?

If necessary, prompt with examples of treatments: i.e. Did your child get any medicines, IV Fluids, or breathing treatments?

17. What medications if any, were prescribed for your child to take at home?
    a. Why does your child need to take this medication(s)?
    b. Was there anything else?

18. What did the medical team tell you to do (besides taking medication) to take care of your child's medical problem?
    a. Why do you need to do these things?
    b. Was there anything else?

If necessary, prompt with examples: For example, are you to do anything to help with your child's symptoms, like apply hot or cold compresses, avoid certain activities, or wear a splint or brace?

19. After you left the emergency department, are you supposed to follow up with any doctors about this problem with your child?
    a. Who?
    b. When?
    c. Why do you need to take you child to see another doctor?

20. What symptoms or changes should cause you to come back to the emergency department?
    a. Why do you need to bring your child back for these symptoms or changes?
    b. Was there anything else?

Emergency Department Discharge Instruction Comprehension Study
Script for Patient Phone Interview
Page 5 of 5

Case/Consent #: _____
Date/Time: _____
Initials: _____

Part 4 – Plans

Next I am going to ask you about your plans now that you have left the emergency department.

21. What do you plan to do to take care of your child's medical problem now that you are home?
22. What things have you already done since you got home?
23. Do you feel that your child's discharge instructions are something you can do? If not, why?
24. What are the chances you will do everything the medical team recommended? Which things do you think you won't try to do and why?

Part 5 – Pain

Now I am going to ask about any pain or discomfort your child has from the medical problem. Please rate, how much pain you think your child is having from the medical problem

25. What was your child's pain/discomfort when you first came to the emergency department?
26. What was your child's pain/discomfort when you left the emergency department two days ago?

Part 6 – Experience

Now I am going to ask you some more questions about your overall experience in the emergency department two days ago.

27. While you were in the emergency department two days ago, approximately how many times did someone caring for your child, have to stop and leave the room to do something else? In other words how many times was your child's care delayed due to interruptions?

If participant is unsure ask the following:

a. Do you remember it ever happening two days ago?
b. Did it happen more than once?

28. While you were in the emergency department two days ago, approximately how many people (including nurses, doctors, nurse practitioners, technicians, etc.) help take care of your child?

If participant is unsure ask the following:

a. How many people do you remember coming into your child's room to care for him/her?
b. Was it more or less than 5?

29. While you were in the emergency department two days ago with your child, did you have a family member or close friend with you for more than half the time of your child's visit?

Please state the case consent number and your name again, and tell the participant that the interview is completed.

Appendix E: Concordance Rating Sheet

Emergency Department Discharge Instruction Comprehension Study Concordance Rating for Patient Phone Interview

Pt. Case #: _____
Date/Time: _____
Initials: _____

Question # Diagnosis & Cause Treatment/ED Care Post-Discharge Care Return to ED Instructions	**1 – No concordance 2 – Min. Concordance 3 – Partial Concordance 4 – Near Concordance 5 – Compl. Concordance 0 – NA Not Able to Assess**	**Discordant Information Yes/No**	**Omitted Information Yes/No**
Comprehension: # 15 Diagnosis & Cause			
#16 Treatment & ED Care			
#17 Post Discharge Care			
#18 Post Discharge Care			
#19 Post Discharge Care			
#20 Return to ED Instructions			
Adherence: #21			
#22			
#23			
#24			

Appendix F: Agency for Healthcare Research and Quality Health Literacy Universal Precautions Tool Kit Tool 5 Teach-Back

This is an excerpt from the full AHRQ Health Literacy Universal Precautions Toolkit, Second Edition, available at http://www.ahrq.gov/literacy.

Use the Teach-Back Method — Tool 5

Overview

Regardless of a patient's health literacy level, it is important that staff ensure that patients understand the information they have been given. The teach-back method is a way of checking understanding by asking patients to state in their own words what they need to know or do about their health. It is a way to confirm that you have explained things in a manner your patients understand. The related show-me method allows staff to confirm that patients are able to follow specific instructions (e.g., how to use an inhaler).

- The teach-back and show-me methods are valuable tools for everyone to use with each patient. These methods can help you:
  - Improve patient understanding and adherence.
  - Decrease call backs and cancelled appointments.
  - Improve patient satisfaction and outcomes.

Fact

Studies have shown that 40-80% of the medical information patients are told during office visits is forgotten immediately, and nearly half of the information retained is incorrect.

Action

Learn the teach-back method.

- The Always Use Teach-Back! Toolkit describes principles of plain language, teach-back, coaching, and system changes necessary to promote consistent use of teach-back. Its 45-minute Interactive Teach-Back Learning Module includes key content and videos of clinicians using teach-back. The module can be used by clinicians, staff members, in a group setting, or as a self-directed tutorial.
- 5-Minute Teach-Back Video. This 5-minute video gives two examples for clinicians of how to use teach-back with medicine changes.
- Health Literacy and Patient Safety: Help Patients Understand is a 23-minute video from the American Medical Association that includes an example of a clinician using teach-back (see the last 5 minutes of the video).

Practice Experiences

"I decided to do teach-back on five patients. With one mother and her child, I concluded the visit by saying 'so tell me what you are going to do when you get home.'...She could not tell me what instructions I had just given her. I explained the instructions again and then she was able to teach them back to me… I had no idea she did not understand… I was so wrapped up in delivering the message that I did not realize it wasn't being received.

–Pediatric office

Try the teach-back method.

- **Keep in mind this is not a test of the patient's knowledge.** It is a test of how well you explained the concept.
- **Plan your approach.** Think about how you will ask your patients to teach back the information. For example:
  - "We covered a lot today and I want to make sure that I explained things clearly. So let's review what we discussed. Can you please describe the 3 things you agreed to do to help you control your diabetes?"
- **"Chunk and Check."** Don't wait until the end of the visit to initiate teach-back. Chunk out information into small segments and have your patient teach it back. Repeat several times during a visit.
- **Clarify and check again.** If teach-back uncovers a misunderstanding, explain things again using a different approach. Ask patients to teach-back again until they are able to correctly describe the information in their own words. If they parrot your words back to you, they may not have understood.
- **Start slowly and use consistently.** At first, you may want to try teach-back with the last patient of the day. Once you are comfortable with the technique, use teach-back with everyone, every time!
- **Practice.** It will take a little time, but once it is part of your routine, teach-back can be done without awkwardness and does not lengthen a visit.
- **Use the show-me method.** When prescribing new medicines or changing a dose, research shows that even when patients correctly say when and how much medicine they'll take, many will make mistakes when asked to demonstrate the dose. You could say, for example:
  - "I've noticed that many people have trouble remembering how to take their blood thinner. Can you show me how you are going to take it?"
- **Use handouts along with teach-back.** Write down key information to help patients remember instructions at home. Point out important information by reviewing written materials to reinforce your patients' understanding. You can allow patients to refer to handouts when using teach-back, but make sure they use their own words and are not reading the material back verbatim. Refer to Tool 12: Use Health Education Material Effectively for more information.

Promote the use of teach-back.

- **Train non-clinical staff.** Non-clinical staff members who interact with patients should also use teach-back. For example, staff making appointments may use it to ensure the patients understand what is required of them at the next visit such as arrival time, insurance documentation, bringing medicines, fasting, and details about referrals to other clinicians.
- **Share teach-back stories.** Ask one person at each staff meeting to share a teach-back "Aha!" moment. This serves as a reminder of the importance of using teach-back consistently.

Track Your Progress

The Conviction and Confidence Scale should be filled out before you start using teach-back and then 2, 6, and 12 months later to track your progress. Calculate the percentage of staff who have completed the scale at least twice in the past 12 months. The results can help you identify ways to build conviction and confidence in using teach-back.

The Teach-Back Observation Tool should be used by a designated observer as clinicians build their skills and confidence with teach-back. Use the findings to guide evaluation, coaching, additional learning, and establishment of consistent habits.

If you field questions from the Health Literacy Patient Survey, calculate what percentage of patients responded "Always" to question #12.

Appendix G: Revised Comprehension Questionnaire

Emergency Department Discharge Instruction **Case/Consent #:_____**
Comprehension Study **Date/Time:_____**
Script for Patient Phone Interview **Initials:_____**
Page 2 of 5

In the emergency department, patients typically are cared for by a team of health care providers, including doctors, nurses, technicians, etc. During the interview, I may use the words "medical team" to include all of these people.

Part 2 – Comprehension

Next, I am going to ask you some questions about what the medical team told you about your child's medical problem two days ago. You may refer to your discharge instruction sheets to answer these questions.

15. What did the medical team tell you they thought was wrong with your child (their diagnosis) two days ago?

Follow up with: *Why did they think this happened?*

a. Did you understand the doctor's explanation of your child's problem and their treatment?
b. Can you tell me what the doctors explanation for the cause of their symptoms and treatment was?

Symptoms: **Treatment:**

16. What test (s) did your child have done two days ago?
    a. Why did your child have this test done?
    b. What were the results (what did the results show)?
    c. Was there anything else done?

If necessary, ***prompt with examples of treatments****: i.e. Did your child get any medicines, IV Fluids, or breathing treatments, Xrays, Bloodwork, suctioning?*

17. What medications if any, were prescribed for your child to take at home?
    a. Why does your child need to take this medication(s)?
    b. How much and how often do you need to give the medication to your child?
    c. How long are you supposed to give this medication?
    d. Was there any other medications you were told to give?
18. What did the medical team tell you to do (besides taking medication) to take care of your child's medical problem?
    a. Why do you need to do these things?
    b. Was there anything else you were told to do to treat your child's medical problem?

If necessary, prompt with examples: For example, are you to do anything to help with your child's symptoms, like apply hot or cold compresses, avoid certain activities, or wear a splint or brace?

c. Is there anything else you plan to do to take care of your child's medical problem other than what the doctor told you?

Part 2

Emergency Department Discharge Instruction **Case/Consent #: _____**

Comprehension Study **Date/Time: _____**
Script for Patient Phone Interview **Initials: _____**

19. Do you feel that your child's discharge instructions are something you can do? If not, why?
a. Have you been able to do those things? Which things have you already done?
b. Is there anything you have not been able to do?

20. After you left the emergency department, are you supposed to follow up with any doctors about this problem with your child?
    a. Who?
    b. When?
    c. Why do you need to take you child to follow up with this doctor?

21. What symptoms or changes should cause you to come back to the emergency department?
    a. Why do you need to bring your child back for these symptoms or changes?
    b. Was there any other things to bring your child back to the emergency room for?

Part 3 – Plans
Next I am going to ask you about your things you have already done since you have left the emergency department.

22. What are the chances you will do everything the medical team recommended?
    a. Is there anything you won't try?
    b. Which things do you think you won't try and why

Part 3

Appendix H: Example of Changes to Questions 17 & 18

17. What medications if any, were prescribed for your child to take at home?
    a. Why does your child need to take this medication(s)?
    b. How much and how often do you need to give the medication to your child?
    c. How long are you supposed to give this medication?
    d. Was there any other medications you were told to give?
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    c. Is there anything else you plan to do to take care of your child's medical problem other than what the doctor told you?

Appendix I: Newest Vital Sign Flip Book

The Newest Vital Sign™
A Health Literacy Assessment Tool

Dear Healthcare Professional:

Thank you for your interest in the Newest Vital Sign (NVS), the first tool available to assess health literacy in English and Spanish.

Research shows that patients with low health literacy are less likely to comply with prescribed treatment and medical instructions from their physician. Identifying patients who are at risk for low health literacy allows physicians to apply specific clear health communication techniques that may enhance understanding. The Newest Vital Sign is a simple and fast way to identify those patients. The tool, which tests literacy skills for both numbers and words*, has been validated against a previously validated measure of health literacy (the TOFHLA), and has been shown to take approximately three minutes to administer.

In addition to the NVS tool, we are also including information to help enhance patient-provider communication. In this folder you will find the following materials:

- NVS Tool (nutrition label and scoring sheet tear-off pad, both two-sided in English/Spanish)
- NVS Implemenation Guide
- *Ask Me 3* (fact sheet on free educational materials from the non-profit Partnership for Clear Health Communication)
- *Help Your Patients Succeed* (tips for improving communication with your patients)
- *Why Does An Ice Cream Label Work . . .* (fact sheet explaining the design of the NVS)

The Newest Vital Sign is Pfizer Inc's most recent contribution to the health literacy movement. For more than nine years, Pfizer has been committed to raising awareness of developing solutions for low health literacy. The overall goal of our Clear Health Communication Initiative is to positively impact the health care system by enhancing patient-provider communication to increase compliance and improve patient health outcomes.

The Newest Vital Sign and companion materials are available to medical and public health providers at no cost. To learn more about our efforts to improve health literacy, please visit www.pfizerhealthliteracy.com.

Sincerely,

Richard C. Hubbard, M.D.
Senior Director, External Medical Affairs
Pfizer Inc

*Literacy is defined as the understanding and application of words (prose), numbers (numeracy), and forms, etc. (document).

Pfizer Working together for a healthier world™ February 2011

Implementation Guide for the Newest Vital Sign

Health literacy— the ability to read, understand and act upon health information — is now known to be vital to good patient care and positive health outcomes. According to the Institute of Medicine's groundbreaking report on health literacy, nearly half of all American adults — 90 million people — have difficulty understanding and using health information. When patients lack the ability to understand and act upon medical information, it can put their health at risk.

The Newest Vital Sign is a new tool designed to quickly and simply assess a patient's health literacy skills. It can be administered in only 3 minutes and is available in English and Spanish. The patient is given a specially designed ice cream nutrition label to review and is asked a series of questions about it. Based on the number of correct answers, health care providers can assess the patient's health literacy level and adjust the way they communicate to ensure patient understanding.

There are many ways to integrate the Newest Vital Sign (NVS) into a private practice or clinic setting to improve communication with patients. Improved communication can help increase your patients' ability to understand and act upon the information you provide; ultimately improving patient satisfaction and health outcomes.

How To Use the Newest Vital Sign

1. **Who and when to administer the Newest Vital Sign.**
   - **A nurse (or other trained clinic staff)** is the preferred administrator of the Newest Vital Sign.
   - Administer at the same time that other vital signs are being taken.
2. **Ask the patient to participate.**
   A useful way to ask the patient is an explanation similar to this:
   "We are asking our patients to help us learn how well patients can understand the medical information that doctors give them. Would you be willing to help us by looking at some health information and then answering a few questions about that information? Your answers will help our doctors learn how to provide medical information in ways that patients will understand. It will only take about 3 minutes."
3. **Hand the nutrition label to the patient.**
   The patient can and should retain the nutrition label throughout administration of the Newest Vital Sign. The patient can refer to the label as often as desired.

More...

4. **Start Asking the 6 questions, one by one, giving the patient as much time as needed to refer to the nutrition label to answer the questions.**
    - There is no maximum time allowed to answer the questions. The average time needed to complete all 6 questions is about 3 minutes. However, if a patient is still struggling with the first or second question after 2 or 3 minutes, the likelihood is that the patient has limited literacy and you can stop the assessment.
    - **Ask the questions in sequence.** Continue even if the patient gets the first few questions wrong. However, **if question 5 is answered incorrectly, do not ask question 6.**
    - **You can stop asking questions if a patient gets the first four correct.** With four correct responses, the patient almost certainly has adequate literacy.
    - **Do not prompt patients who are unable to answer a question.** Prompting may jeopardize the accuracy of the test. Just say, "Well, then let's go on to the next question."
    - **Do not show the score sheet to patients.** If they ask to see it, tell them that "I can't show it to you because it contains the answers, and showing you the answers spoils the whole point of asking you the questions."
    - **Do not tell patients if they have answered correctly or incorrectly.** If patients ask, say something like: "I can't show you the answers till you are finished, but for now you are doing fine. Now let's go on to the next question."
5. **Score by giving 1 point for each correct answer (maximum 6 points).**
    - **Score of 0-1** suggests high likelihood (50% or more) of limited literacy.
    - **Score of 2-3** indicates the possibility of limited literacy.
    - **Score of 4-6** almost always indicates adequate literacy.

Record the NVS score in the patient's medical record, preferably near other vital sign measures.

Best Practices for Implementation: Summary

- A nurse (or other trained clinic staff) is the preferred administrator of the Newest Vital Sign.
- Administer the NVS at the same time that the patient's other vital signs are being taken.
- Record the NVS score in the patient's chart, preferably near other vital sign measures.
- Tailor communication to ensure patient understanding.

The Newest Vital Sign™
A Health Literacy Assessment Tool

Why Does an Ice Cream Label Work as a Predictor of the Ability To Understand Medical Instructions?

A patient's ability to read and analyze any kind of nutrition label requires the same analytical and conceptual skills that are needed to understand and follow a provider's medical instructions. The skills, which are known as *health literacy,* are defined as the understanding and application of words (prose), numbers (numeracy), and forms (documents).

The use of an ice cream label is especially relevant as recent research in the *American Journal of Preventive Medicine* (November 2006) has shown that poor comprehension of food labels correlated highly with low-level literacy and numeracy skills. However, the study found that even patients with better reading skills could have difficulties interpreting the labels.

Whether reading a food label or following medical instructions, patients need to:

- remember numbers and make mathematical calculations.
- identify and be mindful of different ingredients that could be potentially harmful to them.
- make decisions about their actions based on the given information.

PROSE LITERACY:
Clinical example: The patient has scheduled some blood tests and is instructed in writing to fast the night before the tests. The skill needed to follow this instruction is **Prose Literacy.**

Ice cream label example: The patient needs this skill to read the label and determine if he can eat the ice cream if he is allergic to peanuts.

NUMERACY:
Clinical example: A patient is given a prescription for a new medication that needs to be taken at a certain dosage twice a day. The skill needed to take the medication properly is **Numeracy.**

Ice cream label example: The patient needs this same skill to calculate how many calories are in a serving of ice cream.

DOCUMENT LITERACY:
Clinical example: The patient is told to buy a glucose meter and use it 30 minutes before each meal and before going to bed. If the number is higher than 200, he should call the office. The skill needed to follow this instruction is **Document Literacy.**

Ice cream label example: The patient needs this skill to identify the amount of saturated fat in a serving of ice cream and how it will affect his daily diet if he doesn't eat it.

Nutrition Facts

Serving Size	½ cup
Servings per container	4
Amount per serving	
Calories 250	Fat Cal 120
	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 28mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

Score Sheet for the Newest Vital Sign Questions and Answers

READ TO SUBJECT:
This information is on the back of a container of a pint of ice cream.

1. If you eat the entire container, how many calories will you eat?
   Answer: 1,000 is the only correct answer

2. If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?
   Answer: Any of the following is correct: 1 cup (or any amount up to 1 cup), half the container. Note: If patient answers "two servings," ask "How much ice cream would that be if you were to measure it into a bowl?"

3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?
   Answer: 33 is the only correct answer

4. If you usually eat 2,500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?
   Answer: 10% is the only correct answer

READ TO SUBJECT:
Pretend that you are allergic to the following substances: penicillin, peanuts, latex gloves, and bee stings.

5. Is it safe for you to eat this ice cream?
   Answer: No

6. (Ask only if the patient responds "no" to question 5): Why not?
   Answer: Because it has peanut oil.

	ANSWER CORRECT?	
	yes	no
1		
2		
3		
4		
5		
6		
Number of correct answers:		

Interpretation

Score of 0-1 suggests high likelihood (50% or more) of limited literacy.
Score of 2-3 indicates the possibility of limited literacy.
Score of 4-6 almost always indicates adequate literacy.

Appendix J: Agency for Healthcare Research and Quality Teach-Back Method Guide

Teach-Back
A Guide for Staff

What is teach-back?

Teach-back **IS** a way for you to make sure your patients understand what you tell them.

Teach-back **IS NOT** a test or a quiz for patients.

How do I use teach-back?

Just ask patients to explain what you have told them using their own words. For example, if you explain what they need to do to prepare for a procedure, ask them if they can ***teach back*** to you how they are going to prepare.

Why should I use teach-back?

As part of the care team, you have an important safety role in making sure your patients understand all the information they are given during their visit.

Did you know that patients forget up to 80% of what you tell them after a visit?[1]
If they do remember, only half of what they remember is correct.[2]

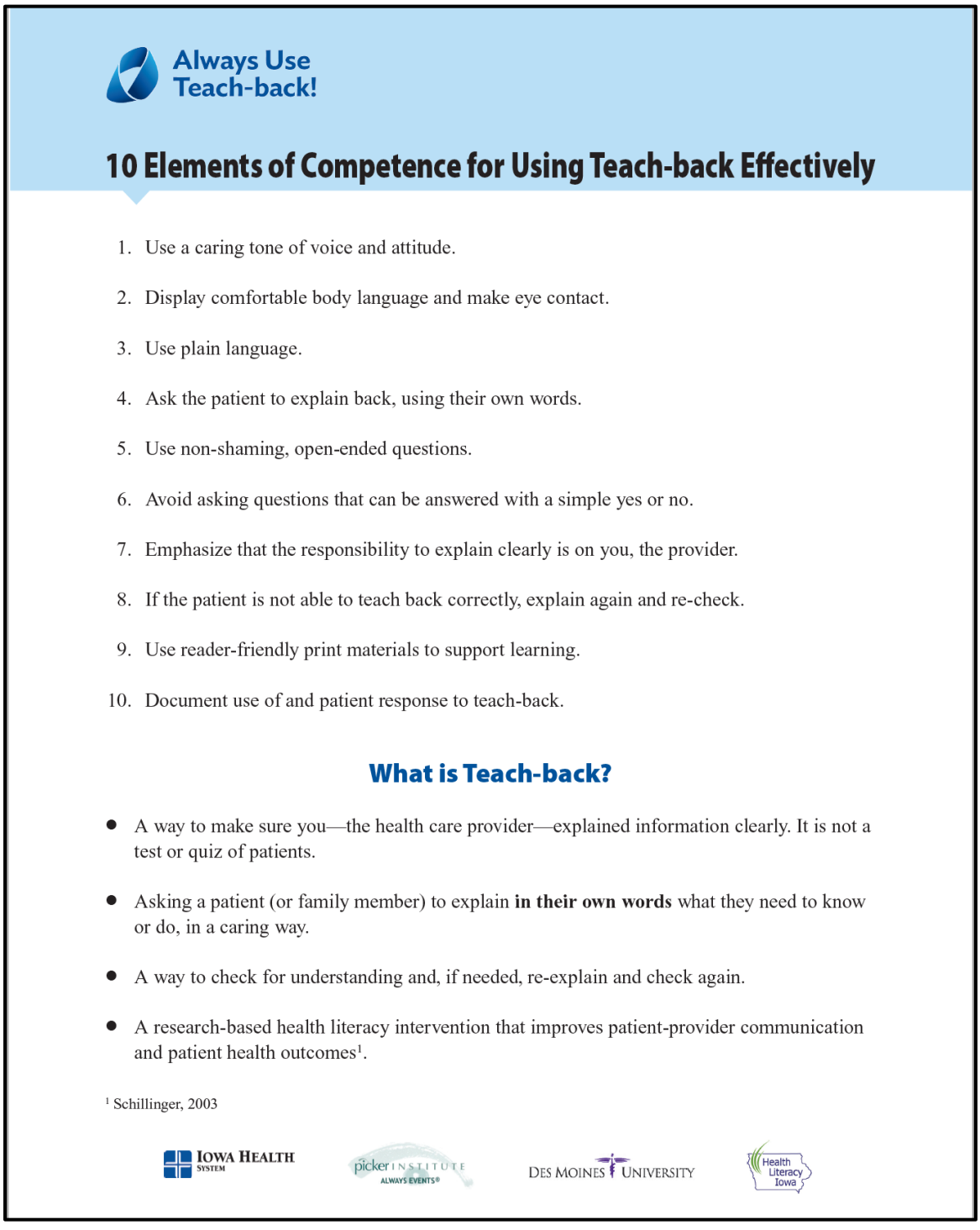
When should I use teach-back?

Use teach-back whenever explaining important concepts to patients regarding their health care, including:

- Medicines.
- Home care instructions.
- Use of a new device.
- Next steps in their care.
- Anything else that is important for them to understand.

1. Kessels RP. Patients' memory for medical information. J R Soc Med 2003;96(5):219-22. PMCID:PMC539473.
2. Anderson JL, Dodman S, Kopelman M, et al. Patient information recall in a rheumatology clinic. Rheumatology 1979;18(1):18-22.

AHRQ Agency for Healthcare Research and Quality



Always Use Teach-back!

10 Elements of Competence for Using Teach-back Effectively

1. Use a caring tone of voice and attitude.
2. Display comfortable body language and make eye contact.
3. Use plain language.
4. Ask the patient to explain back, using their own words.
5. Use non-shaming, open-ended questions.
6. Avoid asking questions that can be answered with a simple yes or no.
7. Emphasize that the responsibility to explain clearly is on you, the provider.
8. If the patient is not able to teach back correctly, explain again and re-check.
9. Use reader-friendly print materials to support learning.
10. Document use of and patient response to teach-back.

What is Teach-back?

- A way to make sure you—the health care provider—explained information clearly. It is not a test or quiz of patients.
- Asking a patient (or family member) to explain **in their own words** what they need to know or do, in a caring way.
- A way to check for understanding and, if needed, re-explain and check again.
- A research-based health literacy intervention that improves patient-provider communication and patient health outcomes[1].

[1] Schillinger, 2003

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