Marshall University
Marshall Digital Scholar

Theses, Dissertations and Capstones

2015

Knowledge of Health Literacy among Athletic Trainers

Janet Marie Rorrer
anetrorrer@ucwv.edu

Follow this and additional works at: http://mds.marshall.edu/etd

 Part of the Health and Physical Education Commons, and the Sports Sciences Commons

Recommended Citation
Rorrer, Janet Marie, "Knowledge of Health Literacy among Athletic Trainers" (2015). *Theses, Dissertations and Capstones.* Paper 955.

This Dissertation is brought to you for free and open access by Marshall Digital Scholar. It has been accepted for inclusion in Theses, Dissertations and Capstones by an authorized administrator of Marshall Digital Scholar. For more information, please contact zhangj@marshall.edu.

KNOWLEDGE OF HEALTH LITERACY AMONG ATHLETIC TRAINERS

A dissertation submitted to
the Graduate College of
Marshall University
In partial fulfillment of
the requirements for the degree of
Doctor of Education
in
Educational Leadership
by
Janet Marie Rorrer, Ed.D.
Approved by
Dr. Dennis M. Anderson, Committee Chairperson
Dr. Edna Meisel
Dr. Phil Rutsohn
Dr. Louis Watts

Marshall University
December 2015

SIGNATURE PAGE

I hereby affirm that the following project meets the high academic standards for original scholarship and creative work established by my discipline, college, and the Graduate College of Marshall University. With my signature, I approve the manuscript for publication.

Project Title: Knowledge of Health Literacy among Athletic Trainers

Student's Name: Janet Marie Rorrer

Department: Leadership Studies

College: The College of Education and Professional Development

Dennis M. Anderson

Committee Chairperson

Date 11/9/15

© 2015

Janet Marie Rorrer
ALL RIGHTS RESERVED

DEDICATION

This dissertation is dedicated to my husband, Dr. Clyde Jay Rorrer III, and my four wonderful daughters, Kelsey, Samantha, Abigail, and Alyssa.

ACKNOWLEDGEMENTS

I would not have been able to complete this dissertation without the help and support of many. I would like to thank my chairperson, Dr. Dennis M. Anderson, for his unwavering commitment during my doctoral journey and dissertation. You have enhanced my understanding of higher education administration and have contributed greatly to my professional development, including the challenge of successfully finishing a dissertation. To my doctoral committee members, Dr. Edna Meisel, Dr. Louis Watts, and Dr. Phil Rutsohn, thank you for your continuous support and guidance. You have each shared amazing expertise and insightful recommendations with me. To the Marshall University Educational Leadership faculty and administrative support staff, thank you for providing me with a strong and applicable doctoral level education and ongoing assistance that will benefit me for many years to come. Additionally, I am grateful to Marshall University for awarding me a doctoral grant which helped fund this dissertation.

I would also like to thank the following individuals for their help with the qualitative portion of my research, Marilyn Menconi, Briana Cicero-Johns, Bethany Meighen, and Michael Menconi. To the numerous people who so kindly babysat my growing number of children during my doctoral and dissertation journey, namely Jo Hannah Rorrer, Marilyn Menconi, Lindsey Rueckert, Carlie Null, Emily Wright, and many others, thank you for helping my kids have fun and feel so very loved when I was at class or tucked away writing.

To my husband, children, parents, parents-in-law, and friends, Jay, Kelsey, Samantha, Abby, Alyssa, Marilyn, David, Jo Hannah, Clyde, Denise, and Briana, thank you for helping me feel like “I can” and for always encouraging me to “keep going.” You have helped me stay motivated and find the energy to finish. I am also very grateful to my University of Charleston

co-workers, supervisors, and administrators for cheering me on and being more than supportive during this dissertation process.

TABLE OF CONTENTS

LIST OF TABLES

ABSTRACT

The purpose of this study was to evaluate athletic trainers' current knowledge levels of health literacy and health literacy intervention techniques. This study was conducted using a mixed-method; non-experimental, descriptive research design which included a researcher-generated quantitative survey and 18 ethnographic interviews. Quantitative surveys were distributed electronically, via Survey Monkey, by the athletic training Board of Certification to 5453 certified athletic trainers from West Virginia, Kentucky, Maryland, Ohio, Pennsylvania, and Virginia. Also, interview participants (9 male; 9 female) were randomly selected and included three athletic trainers from each of the six states, three employment settings (Clinic, College, and High School), and varying levels of education and athletic training experience. The total sample for the quantitative portion of this study was 419. Quantitative data gathered from survey responses were analyzed using descriptive and inferential statistics and qualitative data were evaluated through the systematic coding of responses to identify trends and themes. Quantitative data analysis revealed significant differences ($p < .05$) between sex, primary job title, and highest level of education completed and measured knowledge of health literacy. However, each significant finding was accompanied by a small effect size. Quantitative frequency data on measured health literacy knowledge that aligned with qualitative data indicated that participants had above average knowledge on the use of basic language and lower knowledge levels regarding limiting concepts and accurate patient indicators of low or limited health literacy. Qualitative data analysis revealed five overarching trends that centered on: (a) substantial exposure to patient-athletic trainer interactions during clinical education but limited didactic education, (b) open, honest, and customized communication with patients, (c) use of plain language and shared larger quantities of information, (d) patient retention of information concerns, (e) limited awareness of the term *health literacy*, prevalence of health literacy, and characteristics associated with low or limited health literacy. In conclusion, although athletic trainers generally understood and utilized plain language when communicating with patients it appears that there is a need for athletic trainers to better understand health literacy and integrate health literacy intervention techniques, in particular teach back and limiting concepts, during patient interactions.

CHAPTER 1

INTRODUCTION

Health literacy is defined 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" (Ratzan & Parker, 2000, p. vi). The inherent complexity of health information and decisions requires a skill set that not all individuals possess (Glassman, 2012). In 2004, the Institute of Medicine (IOM) estimated that close to half of the adult population is deficient in needed literacy skills to comprehend and use health information (Parker & Ratzan, 2010). Therefore, the ability to navigate one's way through health experiences and interactions vary from person to person, which can lead to issues such as an increased risk for medical complications, errors in medication use, and overall decreased health (Berkman et al., 2004; Glassman, 2012).

Over the past decade, health literacy has been identified as an issue that requires substantial attention from researchers, health care providers, and patients in order to improve health outcomes. The Department of Health and Human Services listed health literacy as an initiative within *Healthy People 2010* (Parker & Ratzan, 2010) and most recently included it in objectives described in the Health Communication and Health Information Technology section of *Healthy People 2020* (United States Department of Health and Human Services [HHS], 2013). Additionally, as health literacy is becoming better understood, refined recommendations for future research are emerging.

As Pleasant, McKinney, and Rikard (2011) highlight, "building a comprehensive approach to measurement of the social construct called health literacy may well be the most significant and necessary task facing health literacy research and practice" (p.11). These authors

identified three specific areas of health literacy research that require further exploration: (a) the use of sound theory when developing new ways to measure health literacy, (b) measurement of not only laypeople but also health systems and health care professionals, and (c) health literacy measurement tools that allow for assessment "across contexts including culture, life course, population group, and research setting" (Pleasant, McKinney, & Rikard, 2011, p.12).

Individuals encounter health information on a regular basis either for themselves or someone they may be caring for or assisting. The ability to assess the reliability and quality of information, evaluate risks and benefits, perform calculations, and interpret diagnostic test results can be overwhelming and confusing for many. Additionally, health information is communicated in a variety of forms such as in print (i.e. brochures, wall signs), use of visual displays (i.e. graphs), via computers, numerically, and verbally, which compounds the difficulty for individuals to utilize and apply information correctly. This inaccuracy can be physically, emotionally, and/or financially costly (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011).

Communicating with patients is a regular occurrence for all types of health care providers. The duration, seriousness, sensitivity, and setting of communication can vary based on the nature of the interaction and by the role of the health care provider. However, the need for effective delivery of the information remains constant (Street & De Haes, 2013; Raab, Wolfe, Gould, & Piland, 2011). Ensuring that health care providers are aware of health literacy principles and are trained in, and able to utilize, health literacy intervention techniques is critical.

Athletic trainers are health care providers who specialize in the prevention, evaluation, treatment, rehabilitation, and referral of patients with various illnesses and injuries. These professionals are found in a variety of settings and interact with patients throughout the age and care continuum (National Athletic Trainers' Association [NATA], 2011a). When the profession

of athletic training began early in the 20th century, athletic trainers were traditionally employed in settings such as the professional/elite and college/university arenas (NATA, 2011a). However, the employment settings for athletic trainers have become more diverse over the years and now also include environments such as physical therapy clinics, physician offices, hospitals, the military, health and fitness centers, and medical sales (NATA, 2011a). Therefore, the patient population has also grown from the typical athlete to a broad spectrum of individuals. Thus, the ability to communicate and interact with all types of patient populations is a skill that needs to be fully addressed in the initial and advanced educational preparations for this health care profession.

Studying the knowledge of health literacy and the awareness of health literacy intervention techniques among health care providers, specifically athletic trainers, is imperative. Three effective intervention techniques are widely recognized. These include plain talk, limiting concepts, and teach back. Plain talk is a strategy health care providers can utilize that replaces the use of what could be incomprehensible medical terminology with layperson terms that can improve clarity and the ability for the patient to understand the information being shared (J. Johnson, Moser, & Garwood, 2013). Limiting concepts is an intervention technique that requires the health care professional to select the most important three to five instructions or education to share with the patient. Individuals with low or limited health literacy have been shown to remember and be most compliant when take home information is limited to three to five concepts (Gainor, 2013; The Joint Commission on Accreditation of Healthcare Organizations [JCAHO], 2007; U.S. Department of Health and Human Services [HHS], 2014c). Lastly, teach back is a tool health care providers can use to establish that a patient accurately understands the information that has been shared by the provider. This technique involves the provider asking the

patient to explain back to the provider what the patient understands, or is going to do, about their specific condition. The provider can then elaborate on material or correct any inaccuracies heard during the "teach back" (J. Johnson et al., 2013).

Problem Statement

Low and/or limited health literacy of patients continues to be an area of concern for the government and health care professionals. Although substantial research has been conducted over the past 13 years, there are still many questions to be answered. Two considerations that have been identified for further study are the evaluation of health care provider understanding and knowledge of health literacy and analysis of health literacy across backgrounds and circumstances of the individuals being studied. The ability of the health care professional to be able to recall and employ interventions is important in improving provider/patient communication, patient understanding, and ultimately patient health literacy.

Athletic trainers (AT) are credentialed health care professionals that specialize in the recognition, evaluation, and treatment of injuries and illnesses. Interestingly, a literature search using the EBSCOhost Academic Search Premiere database with the combined terms of "health literacy" and "athletic training" or "athletic trainer" produced only one direct result. Additionally, the term health literacy is not located in the most recent edition, 5th, of Athletic Training Competencies which was released in 2011 and guides the curriculum of athletic training education programs (NATA, 2011b). Considering the emphasis placed on the relationship between health literacy and health outcomes and the numerous interactions that athletic trainers have with patients, this appears to be a professional population that has not received adequate attention. Therefore, it is important to assess the current status of athletic trainers' knowledge in this area.

Research Questions

1. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' employment setting?
2. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' experience level?
3. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' previous health literacy training?
4. Is there a significant correlation between an athletic trainers' perceived knowledge of health literacy and the athletic trainers' measured knowledge of health literacy?
5. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' demographics? These include:
    - Sex
    - State of employment
    - Primary Job Title
    - Secondary Job Title
    - Age
    - Highest Level of Education Completed

Purpose

The purpose of this study was to evaluate athletic trainers' current knowledge levels of health literacy and health literacy intervention techniques. Therefore, this study sought to determine the interactions, if any, between athletic trainers' employment setting, experience level, previous health literacy training, and demographics and their knowledge of health literacy. Additionally, the relationship between perceived knowledge of health literacy and measured

knowledge of health literacy was evaluated. Findings from this research will add to the health literacy body of knowledge and provide specific insight into knowledge of health literacy and the application of health literacy principles among athletic training professionals.

Significance of the Study

Patients who do not fully understand directions or processes necessary to maintain or improve their health are at risk for unintended complications (Berkman et al., 2004; Glassman, 2012). For example, a patient who is discharged from the hospital following surgery but does not grasp the importance of safely moving around and not staying completely immobile could result in admittance to the hospital days later due to compromised breathing from a life-threatening pulmonary embolism. This example is one of many that represent a serious consequence from a health literacy related failure. Additionally, there are numerous less serious issues that can arise from insufficient understanding and/or comprehension of health care information.

Health literacy research is in its infancy. This study will contribute to the information available on this topic, particularly in areas not yet well represented in the research. This study is significant because of the emphasis on gathering information on athletic trainers' knowledge and application of health literacy and health literacy intervention techniques. Furthermore, this study will provide valuable insight into the amount of previous education athletic trainers receive on health literacy and allow for multiple comparisons against personal demographics to help identify any notable characteristics that may influence knowledge scores of participants. The results of this study will offer support for future education and training recommendations of BOC athletic trainers and improve patient outcomes for those being treated by athletic trainers.

Variables

The dependent variables are:

1. AT perceived levels of patient health literacy intervention techniques
2. AT scored knowledge of patient health literacy intervention techniques

The independent variables are:

1. AT scored knowledge of patient health literacy intervention techniques
2. Employment setting
3. Experience level
4. Previous training
5. Personal demographics (age, sex, state, education level, primary job title, and secondary job titles)

Operational Definitions

The following terms have been operationally defined for this study:

- Health literacy is defined as the patient's ability to read, understand, and act on medical instructions and information, as well as the health care provider's awareness and ability to integrate knowledge of health literacy concepts and health literacy intervention techniques.
- Health literacy intervention techniques are plain talk, limiting concepts, and teach back.
- Plain talk is the use of simple language to describe medical terminology.
- Limiting concepts is the process of limiting the number of instructions/information provided to a patient by a health care professional to the most important 3-5 points.

- Teach back is a method used by health care providers to gauge patient understanding by asking the patient to repeat back a summary of the information covered in their visit.
- Measured knowledge of health literacy and health literacy intervention techniques is the score of correct answers on the section of the survey that assesses ATs' knowledge of health literacy and health literacy intervention techniques.
- Perceived knowledge of patient health literacy intervention techniques is the score from the section of the survey that asks ATs to self-assess their knowledge of health literacy intervention techniques.

Limitations

The limitations of this study are: (a) the survey will only collect data at one point in time, (b) the portion of the survey that seeks to score "knowledge of health literacy intervention techniques" is researcher generated and has not been validated outside of this project, (c) participants may not have equal representation across demographics, (d) the quality of information gathered is dependent upon the integrity of the participants' responses, (e) the time allotted for data collection is five weeks, and (f) the accuracy of BOC email address database used to distribute the survey link to the population being studied.

Methods

The population (N) of this study was 5905 BOC (board certified) athletic trainers in good standing from West Virginia (239) and the five contiguous states: Kentucky (376), Maryland (528), Ohio (1733), Pennsylvania (2021), and Virginia (1008). This study surveyed 100% of the defined population, resulting in a census. A survey was created by the researcher to measure AT demographics, AT perception of knowledge of selected health literacy intervention techniques,

and knowledge of health literacy and selected health literacy intervention techniques. Validity and reliability measures for the survey were obtained by a pilot study. Content validity of the researcher generated quantitative survey was obtained by engaging three experts in a review process in August 2011. The experts were sent the researcher's survey via email for review. All experts met together to discuss while the survey was projected on a screen. The survey was updated to reflect the expert panel's suggestions.

Demographic information was collected using a combination of nominal, ordinal, and scale measurements of data. AT perception of knowledge of health literacy intervention techniques was measured over a series of five questions using a 6-point Likert scale (ordinal measurement of data). Current knowledge of health literacy and health literacy intervention techniques was measured by a numerical score (scale data) obtained through correct/incorrect responses on coordinating survey questions. The scores can also be placed into a category such as low, limited, functional, high (ordinal data) to describe levels of measured knowledge of health literacy and intervention techniques.

After obtaining IRB approval from Marshall University, a pilot survey containing 27 questions was sent to approximately 50 BOC athletic trainers. Adjustments were made to the survey after evaluating the information gathered from the pilot study. Following additional IRB approval, the revised survey was sent to all ATs in the population that met inclusion criteria. An automated distribution service offered by the BOC was used to send an email containing the survey link. The survey was administered using SurveyMonkey.com and distributed in spring 2014. ATs were given a total of five weeks to complete the survey. One reminder email was sent after three weeks of the allotted time period. Following the reminder, two weeks was given to

collect any remaining surveys. At the end of the final week (five weeks total), the collection period was closed.

An amendment to the initial IRB approval was received to collect data through the use of 18 ethnographic interviews. Interview participants included athletic trainers that were National Athletic Trainers' Association members, and listed in the online membership directory, from West Virginia, Kentucky, Maryland, Ohio, Pennsylvania, and Virginia. Athletic trainers were also from the Clinical, College, and High School employment setting. Participants were randomly selected and subsequently called and asked if they would be willing to participate in the survey. Following an expressed interest to participate in the telephone interview an informed consent statement was read and each participant provided verbal consent by agreeing to answer the questions (See Appendix C). The interviews were audiotaped and transcribed for future use in data analysis. All interviews were coordinated and conducted by the dissertation author.

Quantitative data were entered in SPSS for statistical analysis. Descriptive Statistics, Pearson r Correlation, Independent t-test, and Analysis of Variance (ANOVA) were utilized to analyze the data collected. Furthermore, qualitative data gained from the interviews were coded and organized into trends and themes. Findings from both the quantitative and qualitative data analyses were compared to determine areas of alignment or incongruity.

Summary

Decision making and involvement in the healthcare continuum can be an overwhelming and intimidating experience for patients and/or those acting on behalf of a patient, particularly when those involved have low health literacy. In many instances, healthcare providers can implement simple measures to improve patient health literacy and ultimately exert a positive influence on a patient's entire health outcome and interaction. Currently, neither knowledge of

health literacy nor the application of health literacy intervention techniques are listed as a competency for students in athletic training education programs. Additionally, since health literacy is a recent area of focus there is a call for further research in the content area. When specifically searching for previously conducted research on athletic training health care professionals and health literacy principles only one finding was produced. Therefore, a comprehensive effort to evaluate the understanding of health literacy and health literacy intervention techniques among various types of health care providers, such as athletic trainers, is needed (Pleasant et al., 2011).

CHAPTER 2

REVIEW OF LITERATURE

Overview of Health Literacy

Health literacy is an area of study that has been developed through the mounting research findings over the past two decades connecting low literacy with decreased health status and poor health outcomes (Berkman et al., 2004; Berkman, Davis, & McCormack, 2010). The area of health literacy originated principally from the field of literacy. The term literacy was defined by the Department of Education via the National Library Act in 1991 as "an individual's ability to read, write and speak in English, and compute and solve problems at a level of proficiency necessary to function on the job and in society, to achieve one's goals, and develop one's knowledge and potential" (Kirsch, Jungeblut, Jenkins, & Kolstad, 2002, p.3). Considered a recent field of study, health literacy was defined in the year 2000 as the "capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ratzan & Parker, 2000, p. vi). This definition was published in the National Network of Libraries of Medicine (2000) and later included in the 2004 Institute of Medicine (IOM) report (Berkman et al., 2010; Parker & Ratzan, 2010; Ratzan & Parker, 2000).

The concept of health literacy was first introduced in 1974 in relation to health education and health policy issues (Simonds, 1974, as cited in Ratzan, 2001, p. 210). Health literacy began to be conceptualized in the 1980s (Eadie, 2014; Nutbeam, 2009), and theories and research about health literacy emerged in the 1980s and 1990s (Eadie, 2014). In the 1990s, researchers began working to identify and provide Americans with "the currency patients need to negotiate a complex health care system" (Parker & Ratzan, 2010, p. 20)—that is, the knowledge and understanding that allows patients to make wise health care choices. The main foci in early

research were to define health literacy, gauge the health literacy status of Americans, and identify any relationships to health literacy (Parker & Ratzan, 2010).

Some important components of health literacy, such as retention of medical information by patients, patients' ability to successfully follow medical direction, and communication between health care providers and patients, have been studied by researchers for many years. However, it was not until 2003 that the health literacy of the American public was measured via a large scale national assessment (Berkman et al., 2010). The Department of Health and Human Services, through the Healthy People 2010 initiative and health services researchers, requested that health related items be included in the 2003 Department of Education's National Assessment of Adult Literacy (NAAL), which evaluated the need for adult education due to below basic skill levels (Berkman et al., 2010). The results of the 2003 NAAL study revealed that 90% of survey respondents had trouble using widely available health information from sources such as medical offices, media, community, and retailers (Eadie, 2104; Kutner, Greenberg, Jin, & Paulsen, 2006). These results catapulted the need for individual health literacy skills into the national spotlight as a serious public health concern.

Similarly, Berkman et al. and the Agency for Healthcare Research and Quality (AHRQ) published research which connected low literacy with undesirable health outcomes and identified that strategic efforts to improve health literacy and health outcomes had potential (Berkman et al., 2004). Researchers began identifying agendas and improvement plans for comprehensive efforts to further study and measure health literacy, reduce preventable disease and disability occurrences through school-based education, involve the federal government, and improve medical care through provider health literacy education (Parker & Ratzan, 2010).

Health literacy was formally welcomed to the national scene on March 23, 2010, when the Patient Protection and Affordable Care Act was signed into law (Parker & Ratzan, 2010). This legislation recognizes a definition of health literacy that expands on Ratzan and Parker's (2000) definition to include communication among the list of health literacy skills. Also emphasized is the relevance and importance of continued research in the area of health literacy. Furthermore, the act specifically addresses the need for attention to medical prescription labeling, training of health care providers on health literacy issues, wellness in the workplace, and collaborative decision making between providers and patients (Parker & Ratzan, 2010).

Although the widely accepted and cited definition of health literacy by Ratzan and Parker (2000) generally prevails today, there have been inconsistencies in the application and interpretation of the definition, including variations of the definition offered by researchers, making consensus on one consistent definition difficult. Iterations of the aforementioned definition continue to surface and generally include more detailed and specific lists of health literacy skills and considerations. In fact, Berkman et al. (2010) identified 12 different definitions of health literacy present in the literature between 1999 and 2010. They concluded that the natural complexity of the health literacy paradigm makes it challenging to identify an absolute and correct definition for every application. Rather, the definition of health literacy that one chooses to adopt may be dependent upon the individual's objectives (Berkman et al., 2010).

The World Health Organization utilizes a broader definition of health literacy as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health. Health literacy means more than being able to read pamphlets and successfully make appointments. By improving people's access to health information and their capacity to use it

effectively, health literacy is critical to empowerment" (World Health Organization [WHO], 2014).

Health Literacy Skills and Prevalence

Health literacy involves skills that allow patients to evaluate complex medical information and make treatment decisions for themselves or their loved ones. The National Network of Libraries of Medicine (NNLM) (2013) and U.S. Department of Health and Human Services (HHS) (2014a) lists the following as important health literacy skills:

- the ability to critically analyze the integrity and quality of health information in the spoken word, print, and internet
- evaluate risks and benefits involved in health care situations and decisions, determine proper dosing of medication based on provider directions and/or medication labels
- understand various diagnostic test results
- have the ability to access health information
- have a general knowledge of the body and diseases/medical conditions

For individuals to complete such tasks, they likely need to be able to interpret visual information such as graphs or pictorial representations, be able to operate a computer effectively, have a basic understanding of the human body, be able to find and apply pertinent information, and be able to compute and cognitively process quantitative information such as food labels, measuring blood glucose, or following medication guidelines (a.k.a. numeracy) (National Network of Libraries of Medicine [NNLM], 2013; Berkman et al., 2011). Such abilities provide an optimal foundation for adequate patient compliance with self-care and chronic disease management (Berkman et al., 2011; HHS, 2014b).

Also of significant importance is the ability of both laypeople and professionals to communicate verbally. It is critical for patients to accurately state their medical concerns, health history, symptoms, and questions to providers. Just as important is the ability of the professional medical provider to use verbal and non-verbal communication in a way that enhances the layperson's ability to understand what a provider says during a medical encounter (HHS, 2014a). In recent years person-centered care, also known as patient-centered care, has become considerably integrated into health care. This approach to medicine places the patient in a shared decision-making role with the physician, with the intent to improve health care. This is a step in the right direction, but it also makes the role of health literacy all the more important (NNLM, 2013).

Over the past three decades, research has provided insight into the prevalence of health literacy, as well as identified vulnerable populations associated with low or limited health literacy. Health literacy levels have been categorized utilizing a variety of terms. Most accepted is the term *proficient* to describe the highest functioning level of health literacy. Kutner et al. (2006), together with The National Assessment of Adult Literacy (NAAL), conducted a study in 2003 which indicated that only 12% of Americans were functioning at a proficient level of health literacy. Furthermore, 36% of the population, or 80 million Americans (Berkman et al., 2011), were classified as having limited health literacy (i.e., basic or below basic levels). Individuals not within the proficient range are considered at risk for poorer health outcomes. There are a myriad of expressions used to describe individuals that do not fully possess all of the necessary skills to obtain, process, understand, and apply health care information or health care systems effectively and efficiently. Listed from higher to lower, terms such as *intermediate, marginal, limited, basic, below-basic*, and *low* are often used to describe below-desirable health literacy levels.

All types of individuals are susceptible to low or limited health literacy; hence the recommendation for providers to employ universal precautions during all patient interactions (DeWalt et al., 2010). However, populations commonly found to be at the highest risk for low or limited health literacy include older adults (over the age of 60), non-native English speakers, individuals with low socioeconomic status, ethnic and racial minorities, those with decreased health or the medically underserved, and people who did not complete high school/GED or who read at or below the sixth-grade level (Kutner et al., 2006; NNLM, 2013; Safeer & Keenan, 2005; HHS, 2014a), and who therefore may need more deliberate consideration when it comes to navigating their health.

The effects of health literacy deficiency can range in severity but ultimately result in poorer health for patients and increased financial costs. According to Scott, Gazmararian, Williams, and Baker (2002), individuals with limited health literacy are more likely to neglect preventive health care such as flu shots, mammograms, and pap smears. Additionally, Bennet et al. (1998) found that people with lower health literacy often seek medical care when they are sicker. Also, limited health literacy was found to be related to the increased presence of chronic disease and decreased ability to manage the condition. Studies specifically looking at patients with hypertension (Williams, Baker, Parker, & Nurss, 1998), diabetes (Schillinger et al. 2003), asthma (Williams et al., 1998), and HIV/AIDS (Kalichman et al., 2000) were shown to be less knowledgeable about their disease and management of their condition when compared to those with higher levels of health literacy. Additionally, emergency room visits and hospitalization rates, specifically for preventable reasons, were more frequent among individuals with limited health literacy, a pattern which results in increased health care costs (Howard, Gazmararian, & Parker, 2005; Baker et al., 2002). Self-reported health status levels were also lower, with

individuals reporting their health as poor significantly more often when they had limited health literacy (Baker, Parker, Williams, & Clark, 1997). Finally, individuals with low or limited health literacy may experience undesirable psychological effects such as feelings of shame and as a result try to hide their difficulties to maintain their self-respect (Parikh, Parker, Nurss, Baker, & Williams, 1996).

Health Care Providers and Health Literacy

Over the past thirty years the topic of health literacy has gained attention and recognition as a public health concern (Berkman et al., 2010; Eadie, 2014; J. Johnson et al., 2013; Devraj & Gupchup, 2012). Research regarding individual health literacy and health literacy efforts within medical professions and health systems continues to be an area of focus on the national front. (Kutner et al., 2006; Department of Health and Human Services [HHS], 2010a). Interestingly, the infusion of health literacy principles into medical practice has been slow and sporadic. There has not been a consistent effort to introduce health literacy concepts or train the varying levels of health care providers responsible for communicating with patients on health literacy intervention techniques (Devraj & Gupchup, 2012). Such types of health care providers include medical doctors, doctors of osteopathic medicine, pharmacists, physical therapists, chiropractors, dentists, nurse practitioners, physician assistants, nurses, athletic trainers, radiologic technologists, physical therapy assistants, licensed nursing assistants, medical assistants, phlebotomists, and so on.

A recent study conducted by Devraj and Gupchup (2012) evaluated the knowledge of and barriers to health literacy among Illinois pharmacists. The study utilized a mail-distributed survey. The results revealed that overall, Illinois pharmacists have limited knowledge of health literacy. Specifically, the survey questions answered incorrectly most often were those regarding

prevalence of low health literacy, relationship of health literacy to the patient's years of schooling, and relationship of health literacy to reading level. Additionally, the respondents identified, with greater than 70% agreement, that the following were significant barriers to addressing low health literacy with patients: (a) lack of time, (b) use of mail-in prescriptions, (c) use of drive thru or other convenient pick-up methods, (d) lack of easy to use tools for identifying patients with low health literacy, (e) lack of knowledge on how people with low health literacy hide their deficits, and (f) difficulty communicating with non-English speaking patients (Devraj & Gupchup, 2012).

A review of literature conducted by J. Johnson et al. (2013) aimed to gather articles that focused on the integration of health literacy principles in everyday practice for pharmacists. The review highlighted that pharmacists should be especially aware of inadequate patient health literacy skills due to the risk of improper medication use and general medication compliance. Of particular interest were tools used in medication counseling, assessment of patient health literacy, and the need for clear communication. In fact, studies found that medical label interpretation by patients with low health literacy were of particular concern. One study found that 42% of participants with low health literacy had difficulty comprehending the instructions to take medication on an empty stomach (Davis et al., 2006a), while another study found that low health literacy compromised the patients' ability to comprehend other instructions such as those including the terms teaspoon or tablespoon and directions to take twice daily (J. Johnson et al., 2013; Davis et al., 2006b).

J. Johnson et al. (2013) recognized that the Indian Health Service (IHS) model was considered as one of the more effective and widely used tools for enhancing medication use counseling. The IHS counseling method utilizes three open-ended questions to help pharmacists

evaluate a patient's understanding of medication use which include a) "What were you told this medication is for?" b) "How were you told to use it?" and c) "What were you told to expect?" (J. Johnson et al., 2013, p. 951). Furthermore, the authors noted that the delivery of medication information by the pharmacist may be influenced by previous communication with other health care providers about the patient and/or the pharmacist's previous interactions with the patient. Either way, the IHS model of counseling was considered a flexible tool that allows pharmacists to identify any gaps in patient understanding.

A difficult task for any health care provider can be recognizing patients with low health literacy. J. Johnson et al. (2013) states that patients with low health literacy are usually skilled at hiding health literacy deficiencies by using coping mechanisms or "avoidant behaviors." Due to embarrassment and feelings of shame because of their inability to understand and/or act on medical information, patients will often offer excuses such as, "I forgot my glasses," or delay decision making by stating that "they will read the information at home" (J. Johnson et al., 2013, p. 951). It has been noted by Parikh et al. (1996) that less than 50% of individuals who are challenged by understanding health information will even share the difficulty with family or close friends. Lastly, a study conducted by Bass, Wilson, Griffith, and Barnett (2002) revealed that medical residents were only successful at identifying 10% of the 32% of patients who had low health literacy.

To identify patients with low health literacy, health care providers can employ a variety of tools. To start, a provider may simply ask a series of informal questions to help gauge a patient's health literacy level. The key is for the provider to ask these questions in an impartial and easy-going manner so as to not sound judgmental or condescending towards the patient. Questions might include, a) "How often do you have problems learning about your medical

condition because of difficulty understanding written information?" b) How often do you have someone help you read hospital material?" or c) "How confident are you when filling out medical forms?" These questions can be incorporated during the medical interview or patients can be asked to score their responses to such questions using a Likert scale (J. Johnson et al., 2013, p. 951).

Other mainstream tools for measuring an individual's health literacy include word recognition tests such as the Rapid Estimate of Adult Literacy in Medicine (REALM) and The Wide Range Achievement Test – Revised (WRAT-R). Both of these tests evaluate an individual's ability to recognize and pronounce a series of words or passages within 3-5 minutes. The main difference between the two tests is that the REALM (and abbreviated versions of REALM, the REALM-SF and REALM-R) utilizes medical terminology and the WRAT-R uses nonmedical words and phrases. Limitations to word recognition tests are that they only assess word recognition and pronunciation and neglect comprehension and application of medical information. Due to the belief that word recognition and pronunciation measures are not an accurate determinant of comprehension, the interpretation of word recognition tests have been attributed to overestimating patient reading comprehension (J. Johnson et al., 2013).

A more thorough option is to perform a functional health literacy assessment to evaluate not only a patient's word recognition ability but also comprehension, numeracy, and real-life application. Among the tests available, the Test of Functional Health Literacy in Adults (TOFHLA) is regularly considered the tool of choice. The test is composed of 50 health-related reading comprehension questions, an additional numeracy test, questions related to prescription labels, and appointment information interpretation. Unfortunately, this assessment is not conducive to clinical practice because it takes approximately 22 minutes to complete, which is a

challenge due to the time constraints of medical visits. The abbreviated version, s-TOFHLA, although shorter, still takes a considerable amount of time to complete. Therefore, the TOFHLA and s-TOFHLA are mostly utilized in research (J. Johnson et al., 2013; Baker, Williams, Parker, Gazmararian & Nurss, 1999; Parker, Baker, Williams, & Nurss, 1995).

Recently, a different functional health literacy tool, the Newest Vital Sign (NVS), has been introduced. The NVS is considered a comprehensive and applicable measure of health literacy. This assessment can be administered in three minutes, which makes it more feasible to incorporate into clinical practice. The NVS is a tool that utilizes a pint-size ice cream carton's nutrition label and asks patients questions to measure reading, comprehension, numeracy, and reasoning (J. Johnson et al., 2013; Shah, West, Bremmeyr, & Savoy-Moore, 2010).

Because recognition of low health literacy is difficult, and not all health care providers screen their patient's health literacy skills, the use of "universal precautions" when communicating during patient interactions is critical (J. Johnson et al., 2013; Dewalt et al., 2010). Communication is a broad term that encompasses verbal, non-verbal, and written communication. Health care providers can assist patients by using clear, plain, simple, nonmedical terminology to enhance patient understanding and compliance and set the stage for a positive health care experience (Dewalt et al., 2010; HHS, 2014a).

Additionally, a provider can help patients retain the information shared during a medical visit by being concise and by using visual explanations such as illustrations or models to help explain concepts. It has been suggested that providers limit the number of concepts or instructions shared with a patient to three to five of the most important per visit, in order to assist with patient recall and adherence to instructions (Gainor, 2013; Dewalt et al., 2010; JCAHO,

2007; HHS, 2014c). In fact, as Schillinger et al. (2003) highlight, patients are able to recall about 50% of information discussed during a medical visit.

The use of communication tools such as teach back and Ask Me 3 offers providers and patients options for structured communication techniques to improve communication and help identify any information that may not be fully understood by the patient or not clearly discussed by the provider. To employ the teach back method, the provider, following the delivery of medical information or instructions, simply asks the patient to explain what they understand from the information discussed during the interaction. A provider can frame the question so it is specific to take home instructions, medication use, details of the illness/injury, or any piece of information shared. Some examples of teach back are "When you get home, what are you going to do to for your sprained ankle?" or "If you were explaining to a friend how and why you need to take this medication, what would you say?" This allows the provider to identify any gaps or misunderstandings in the patient's recall (J. Johnson et al., 2013 p. 952).

On the patient side, Ask Me 3 is a method that patients can utilize to guide their interactions with practitioners. It promotes engaged medical visits and provides patients with a foundation to gain information about their health from medical providers. Ask Me 3 was developed by the Partnership for Clear Health Communication at the National Patient Safety Foundation and is based on three simple questions patients should ask or have the answer to in every type of medical interaction. The questions are: a) "What is my main problem?" b) "What do I need to do?" and c) "Why is it important for me to do this?" (J. Johnson et al., 2013, p.952; National Patient Safety Foundation, 2014)

In 2010, Dewalt et al. and the Agency for Healthcare Research and Quality (AHRQ) published the *Health Literacy Universal Precautions Toolkit*. The toolkit was developed

specifically for health care providers to use in assessing their clinical practice, and to help them determine how to make changes to enhance communication and interaction with patients of all health literacy levels. The general term "universal precautions" represents the use of specific actions used to minimize risk for all involved when it is uncertain which patients may be affected. Most commonly, this term is used when working to minimize the risk of transmitting blood-borne pathogens. When referring to health literacy, the term refers to efforts to reduce the risk that any one patient will not understand the health care information they are given, in turn improving all patients' ability to act and make informed health care decisions (Dewalt et al., 2010). Ultimately, clear communication and the elimination of health literacy barriers can improve health care for all patients, not only those with low health literacy (Dewalt et al., 2010).

In 2014, Green, Gonzaga, Cohen, and Spagnoletti researched the knowledge, attitudes, and use of clear communication during patient interactions among second year post graduate internal medicine residents. A total of 31 participants (16 female, 15 male) completed the study, of which 23% reported having previous health literacy training. Participants underwent six hours of training with a faculty member trained in health literacy and clear communication. The residents completed a 45 minute didactic session on general health literacy principles followed by a series of exercises such as facilitated standardized patient interactions, case study review, and a health literacy task-oriented practice session. Prior to the education interventions, the participants took a pre-knowledge assessment which contained eight health literacy related questions, a pre-attitudes assessment which consisted of five Likert scale questions, and engaged in a videotaped patient encounter. Following the health literacy training, participants completed a posttest in each of those areas. Pre and posttest knowledge, attitudes, and patient interactions were scored and analyzed. Results revealed that following training, mean knowledge scores

significantly increased, attitude scores for each question significantly increased, and the use of plain language during patient interactions significantly increased.

Additionally, patients' perception of their health care provider's empathy can greatly influence communication. A study in Taiwan performed by Chu & Tseng (2013) looked at 144 orthopedic patients' perception of their physician's empathy. Results indicated that regardless of Health Literacy Score (REALM, Chinese version), higher perceived empathy of the physician (measured by Barrett-Lennard Relationship Inventory (BLRI)) during patient-physician interaction increased the patient's understanding of pre-operative health information (measured by Preoperative Information Understanding Scale (PIUS)). Therefore, in addition to assisting patients through the clinical interview and being respectful of the patient, a provider's demonstration of empathy during communication can improve understanding.

Athletic Trainers and Health Literacy

Health literacy is an important topic for all types of health care providers. This study focused on the role of health literacy for Athletic Trainers, who are health care providers with a unique array of skills. These health care professionals are educated in the areas of injury/illness prevention, on-site care of emergent and non-emergent conditions, appropriate medical referral, and treatment and rehabilitation of injuries, all in an effort to allow for the safe return of a patient to activity (Prentice, 2013). Although considered experts in the treatment of sport-related injuries within the athletic population, athletic trainers are employed in a variety of settings and trained to assist patients of varying age and activity levels (National Athletic Trainers' Association [NATA], 2014; Commission on Accreditation of Athletic Training Education [CAATE], 2012).

As Prentice (2013) highlights, in order to move the athletic training profession forward and obtain universal recognition as a health care profession from other health care professionals, athletic trainers must consistently demonstrate the professional conduct expected in the health care field. During interactions with colleagues, supervisors, community members, and patients, athletic trainers must communicate and behave in a way that allows for the progression of the athletic training profession.

To become a certified athletic trainer, one must first graduate from a CAATE-accredited athletic training education program. These programs exist both as undergraduate programs and as entry-level Masters programs. In addition to successfully completing curriculum requirements, ATs must pass the Board of Certification, Inc. (BOC) examination. Finally, they must comply with any state regulation requirements, which can range from no state regulation to licensure, the most robust form of state regulation (NATA, 2014; CAATE, 2012; Raab et al., 2011).

Raab et al. (2011) aimed to identify the characteristics of a quality athletic trainer using qualitative methods, specifically the Delphi method. The study included 13 ATs (five females, eight men) from different geographical locations and represented the clinic, high school, and college employment settings. The researchers conducted telephone and in-person interviews. They used a series of open-ended questions, follow-up questions, and intentional pauses to gain as much detail as possible. The interviews were audio recorded, transcribed, and reviewed prior to the condensing process. The researchers provided a summary of responses back to participants for content addition and/or review for accuracy. The data were then further condensed by the researchers and shared again with participants for a final review of accuracy and/or final content additions. Following the final participant review, the researchers coded the data using descriptive adjectives. Results revealed the presence of two overarching categories of traits, affective and

effective. Within those two high-level constructs, five lower-level constructs were identified; four (care, communication, commitment, and integrity) were listed under affective, and one (knowledge) was listed under effective.

Raab et al. (2011) recognized communication as one of the five constructs linked to quality athletic training. From the results gathered, the researchers described communication as the key to quality care. It was highlighted that without the ability for the AT to communicate important information in a clear and concise manner, while also doing so at an appropriate level for the individual to understand, then the skills of the AT are rendered useless. The researchers also acknowledged the fact that ATs communicate not only with a diverse patient population but also with a wide array of interested parties. These additional individuals can include parents, coaches, administrators, and/or other health care providers (physicians, physical therapists, etc.) (Laurent & Bradney, 2007). Therefore, ATs need to be able communicate effectively in all encounters (Raab et al., 2011).

Also, since ATs work in a variety of settings, the communication medium and environment can also fluctuate greatly. ATs need to be proficient in verbal, non-verbal, and written communication and be prepared to share confidential medical information in person, in writing, or over the telephone. Additionally, ATs need to be able to communicate while performing duties in various settings such as a private clinic/office setting, in a college or high school athletic training clinic, or on-site venues (i.e. football field, swimming pool, or track) (Raab et al., 2011).

ATs, like all health care providers, are patient educators. Patient education is "the process by which patients learn or acquire knowledge about their health status or condition and may involve learning in the cognitive, affective, and/or psychomotor domain" (Piccininni & Drover,

2000, p. 43). For ATs this education occurs in many different forms. ATs provide patients with education on the initial assessment of the patient's injury/illness, as well as the patient's plan of care including any referral, treatment, and rehabilitation needs. They also communicate an estimation of recovery and return to activity timelines and follow the patient's care until they have returned to full function and activity levels. Such care requires ongoing patient interactions and can include explanations of varying levels such as diagnosis, test results, or changes in a rehabilitation plan, to name just a few.

In 2010, Piccininni, a Canadian athletic therapist, performed a qualitative study that evaluated healthcare professionals' experience as patient educators. Eight healthcare providers, all Doctors of Chiropractic Medicine, participated in two semi-structured interviews. Results indicated that the participants performed mostly one-way communication, where the doctor-teacher was giving information to the patient-learner. Participants stated that most communication was verbal and one-on-one, and also indicated that they used teaching aids such as wall charts and images, anatomical models, printed information, textbook images, videos, and the internet. Also noted was that, although informed that they were welcome to ask questions, patients actually asked few questions during patient education interactions (Piccininni, 2010).

Additional findings included that participants felt well prepared from their educational background to diagnose and treat; however, they felt not well prepared to provide patient education upon entry into practice (Piccininni, 2010). Participants in the study also identified that they did not fully appreciate or understand the importance of patient education until they became more experienced. As the participants' experience grew and beliefs changed, they increasingly began to value patient education. Piccininni (2010) noted that these findings support the need for

pre-service health care provider curricula to include greater attention and content specific to developing patient education knowledge and skills in students.

Bertoncino (2010) researched athletic training students and the relationship between participants' reported communication behaviors and their observed communication skills during a medical evaluation utilizing a standardized patient. The study evaluated 39 senior undergraduate athletic training students from the Midwest, representing seven different CAATE-accredited athletic training education programs (ATEPs). Each participant was asked to complete a rhetorical sensitivity questionnaire to gather information on their perception of their communication behaviors. Rhetorical sensitivity is defined as the "tendency to adapt messages to audiences" (Littlejohn, 1996, p. 107). Following the survey, participants performed a medical evaluation on a standardized patient. The participants were instructed to "gather important medical information, perform a clinical examination, and discuss possible findings" (Bertoncino, 2010, p. iii). Lastly, the standardized patient's satisfaction with the medical visit was obtained using a Likert scale survey.

Results indicated that athletic training students who self-reported higher rhetorical sensitivity received higher scores during the observed medical interview and communicated more effectively based on the observer's perception. Those athletic training students also received higher standardized patient satisfaction scores. The researcher concluded that a discipline-specific communication course for athletic training students would be beneficial in improving the effectiveness and patient satisfaction of the medical interviews conducted by new athletic training professionals. It was also recommended that communication skills should be woven throughout the curriculum (Bertoncino, 2010).

Tebbe (2012) researched the perception of satisfaction and comfort of collegiate student athletes with AT students. An online survey consisting of 35 questions was completed by 66 (20 male, 46 female) student athletes from 22 universities. The survey included demographic questions and a series of questions based on previous perception and comfort studies. Five questions were open ended. Results indicated that student athletes perceived AT students as individuals who tape ankles, distribute water/sports drinks, and rehabilitate injuries. Athletic training students were not viewed as health care professionals and only minimally as people who participated in emergency care. Furthermore, student athletes were most satisfied with the level of respect shown to them by the athletic training students but least satisfied with the athletic training student's ability to communicate with coaches. Lastly, student-athletes reported that they were most comfortable that the athletic training students would ask a certified athletic trainer for assistance if they were unsure about a student-athlete's injury and they were least comfortable talking with an athletic training student about personal issues (Tebbe, 2012). The findings that suggest student-athletes have lower satisfaction with AT students' ability to communicate with coaches suggest that there may be a need for future development of communication curriculum for AT students.

Athletic trainers serve a diverse population of patients. It is important for ATs to recognize that within this population there are many instances where an AT is going to need to address a patient with low or limited health literacy skills. Although not limited to specific groups of people, low or limited health literacy is more likely to be present in demographic groups such as older adults, minorities, patients of low socioeconomic status, and patients who do not speak English as their primary language. Language barriers have been identified as a significant health literacy obstacle. Strough, Wimer, and Wapola (2014) suggest that ATs need to

make a conscious effort to build rapport with non-English speakers from the first interactions by asking for informed consent, utilizing interpreters and translation technology appropriately, and including cultural and family dynamics in health history. Additional recommendations include enhancing patient autonomy and shared decision making, utilizing the teach back method, use of visual aids, and generally assisting in clarifying medical information for patients. The authors stress the importance of including health literacy strategies in AT clinical practice as the profession continues to evolve.

Health Literacy Moving Forward

With the field of health literacy still in its infancy, there remains much to be understood and studied. Researchers have recognized that there has been an overwhelming emphasis on defining and documenting health literacy deficiencies, but there is agreement that the time has come to shift research efforts to exploring a more comprehensive approach to how to best address and resolve the issue (S. Johnson et al., 2011; Pleasant et al., 2011). A call for increased focus on identifying and effectively, yet efficiently, measuring intervention techniques is thought to be one way to advance research efforts in the quest to improve health literacy and, more importantly, understand the social, cultural, and cognitive constructs that influence how people make health care decisions and exhibit certain behaviors and attitudes toward health related information. Ultimately, the goal is that research efforts and findings will lead to a seamless transition of effective intervention techniques into clinical practice (S. Johnson et al., 2011).

It has been suggested that it is time to move past the core concepts and skills linked to health literacy and into exploring and/or recognizing the possible role of broader influences. One such consideration is that of personal motivation, also known as personal activation, and individual confidence, which is thought to improve self-management of health. A study

conducted by Smith, Curtis, Wardle, von Wagner & Wolf (2013) studied the relationships between personal activation and health literacy skills with mental and physical health. A total of 697 participants (471 female, 226 male) over the age of 55 completed the TOFHLA to measure functional health literacy, the Patient Activation Measure (PAM) to measure individual motivation, the Patient Reported Outcomes Measurement Information Service (PROMIS) subscales to assess anxiety and depression respectively, and the SF-36 physical health subscale. Results indicated a weak but significant relationship ($r=.11$, $p<.001$) between the TOFHLA and PAM scores. Additionally, lower TOFHLA scores were associated with lower SF-36 physical health scores ($p<.001$) and lower PAM scores were linked to lower SF-36, PROMIS anxiety, and PROMIS depression scores ($p<.001$). Due to the weak correlation between health literacy and patient activation and the connection that both the TOFHLA and PAM had with decreased health outcomes, the researchers supported the Institute of Medicine's existing idea that health literacy was indeed more of a skill-based construct, separate from the patient activation construct. Smith et al. (2013) suggest that in the future a scale that measures both health literacy and patient activation may be helpful to clinicians as they work to identify the needs of their patients. Smith et al. argue that although an individual may have health literacy skills, that fact does not indicate patient follow through or compliance with instructions. Rather, patients need to have both health literacy skills and motivation or patient activation for adherence to health regimens.

Additionally, the distinction between types of health literacy is under discussion. For example, Nutbeam (2000) suggests that within health literacy, various subcategories of health literacy exist. He also contends that the definition of health literacy is too simple and overlooks the deeper aspects of literacy. To address these problems, he introduced a classification system within health literacy that focuses on what health literacy enables an individual to do, rather than

a measurement of the individual's reading and writing skills. From this approach, three distinct classifications of health literacy emerged: basic/functional literacy, communicative/interactive literacy, and critical literacy (Nutbeam, 2000). Basic/functional health literacy refers to the basic literacy skills of reading and writing that one needs to be able to function in daily living, and relates to the narrow definition of health literacy as simply the ability to apply literacy skills to health related information. Communicative/interactive literacy is a step more advanced and combines one's cognitive and literacy skills with social skills, which allows for active participation and extraction of information through multiple forms of communication that can be applied in changing environments. Lastly, critical literacy is thought to be the highest level of literacy, in which one utilizes advanced cognitive skills and social skills to think critically and analyze material for appropriate use, ultimately leading the individual to more control over life events and situations (Nutbeam, 2000).

Another area for future discussion is whether an individual's health literacy is static or dynamic. Berkman et al. (2010) assert that health literacy levels change with various health care exposures and experiences, so health literacy develops over time. They believe that viewing health literacy as a static classification was likely due to its origin from literacy, which is considered static, and limitations of measurement tools. "We expect future movement to be toward the dynamic viewpoint, corresponding to increased sophistication in the field" (Berkman et al., 2010, p. 17). The classification of health literacy as dynamic influences not only the definition but the measurement of health literacy. Belief that health literacy is static means that one's health literacy level will not change without intensive adult education, which would indicate that a one-time measurement is sufficient. However, if classified as dynamic, health literacy would need to be measured multiple times since experience could change the result. Of

the health literacy measurement tools in use, The National Assessment of Adult Literacy (NAAL) is considered the most comprehensive but it is not available for public use and not able to be utilized in research (Berkman et al., 2010).

A proposed research agenda for health literacy was produced by Pleasant, McKinney, and Rikard (2011) and challenges researchers to focus on how individuals use information they receive from providers and how health providers and health systems are actually communicating with patients. Specifically, they called for studies that measure health literacy with instruments that are developed on sound theory, which include the health literacy of both individuals and the health literacy competency of health care providers and/or health systems, and that allow for comparison across cultures, age groups, place in life, and research settings.

In 2010, the U.S. Department of Health and Human Services (HHS) generated a report entitled "National Action Plan to Improve Health Literacy" (HHS, 2010b). The intent of the report was to engage all parties in the quest to improve health literacy. Therefore, the target audience was anyone and everyone who interacts with health care information, such as patients and their families, health care providers, health care systems, communities, organizations, professionals, policy makers, and society in general.

The HHS report outlined seven key goals to improve health literacy as follows:

> a) Develop and disseminate health and safety information that is accurate, accessible, and actionable, b) Promote changes in the health care system that improve health information, communication, informed decision making, and access to health services, c) Incorporate accurate, standards-based, and developmentally appropriate health and science information and curricula in child care and education through the university level, d) Support and expand local efforts to provide adult education, English language instruction, and culturally and linguistically appropriate health information services in the community, e) Build partnerships, develop guidance, and change policies, f) Increase basic research and the development, implementation, and evaluation of practices and interventions to improve health literacy, and g) Increase the dissemination and use of evidence-based health literacy practices and interventions (HHS, 2010b, p. 1-2).

Current research studies include the measurement of the effectiveness of using intervention techniques to teach patients and improve individual self-care abilities for patients with hypertension (Baker et al., 2011). Patient recall and retention of information is also being studied to determine if certain educational strategies are improving skills for patient diabetes management (Kandula, Malli, Zei, Larsen, & Baker, 2011). Integration of health and wellness education for youth in low-income situations (Diamond, Saintonge, August, & Azrack, 2011) and adult education is also being studied (Freedman, Miner, Echt, Parker, & Cooper, 2011; McCormack, Rush, Kandula, & Paasche-Orlow, 2011).

Summary

Over the past 30 years health literacy has become a topic deserving of continued attention and research. Though lack of health literacy was once referred to as a "silent epidemic," health literacy is now considered an issue of public health and plays an important role in formulating health policy and reform (Parker & Ratzan, 2010; S. Johnson et al., 2011; HHS, 2010b). In support of continued efforts, the HHS published the "National Action Plan to Improve Health Literacy" (HHS, 2010b). Progress defining health literacy and understanding the prevalence of low or limited health literacy in America has occurred but there are still concerns regarding the evolution of the definition, tools available to measure health literacy, and the involvement of health care professionals.

Interventions for enhancing patient health outcomes through health literacy initiatives by exploring the role and communication preparedness of health care providers have been suggested. These include working with health care providers to ensure they are educated on health literacy and how to mediate any potential negative consequences for patients with low or limited health literacy (JCAHO, 2007; HHS, 2010b). Health care professionals regularly provide

information to patients utilizing a variety of communication methods such as verbal, print, or pictures. Yet, only recently has there been a significant push to engage and train providers on health literacy with most research occurring within the physician and pharmacist populations. To date, health literacy research published in athletic training related journals has been limited to one article in January 2014 (Strough et al., 2014), and the national education accrediting agency for athletic training, CAATE, has not incorporated specific health literacy education requirements in their athletic training competencies document (CAATE, 2011). Including athletic trainers in the national dialogue and education of health literacy is long overdue.

CHAPTER 3

RESEARCH METHODS

The purpose of this study was to evaluate athletic trainers' current knowledge levels of health literacy and health literacy intervention techniques. Therefore, this study will seek to determine the interactions, if any, between athletic trainers' employment setting, experience level, previous health literacy training, and demographics with their knowledge of health literacy and health literacy intervention techniques. Additionally, the relationship between perceived knowledge of health literacy intervention techniques and measured knowledge of health literacy intervention techniques will be evaluated.

Research Design

This study was a mixed method, non-experimental, descriptive research design that utilized a researcher-generated survey to gather demographic information such as age, sex, state employed, certification year, employment setting, job title, years of AT work experience, previous training in health literacy, and highest level of education completed. The survey also collected information on AT's perception of their health literacy knowledge through five questions answered on a six-point Likert scale, as well as a measurement of AT's actual health literacy knowledge, measured through a series of 12 multiple choice health literacy content questions. Lastly, 18 ethnographic interviews were conducted to further explore the athletic trainers' awareness of health literacy.

Re-statement of Research Questions

1. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' employment setting? Research question 1 was answered by analyzing responses to questions 7 and 16-27 on the survey instrument.

2. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' experience level? Research question 2 was answered by analyzing responses to questions 3, 4 and 16-27 on the survey instrument.
3. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' previous health literacy training? Research question 3 was answered by analyzing responses to questions 10 and 16-27 on the survey instrument.
4. Is there a significant correlation between an athletic trainers' perceived knowledge of health literacy and the athletic trainers' measured knowledge of health literacy? Research question 4 was answered by analyzing responses to questions 11-15 and 16-27 on the survey instrument.
5. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' demographics? Research question 5 was answered by analyzing responses to questions 1, 2, 5, 6, 8, 9 and 16-27 on the survey instrument.

Population

The population (N) for the quantitative portion of this study was 5453 BOC athletic trainers in good standing from West Virginia (213) and five contiguous states: Kentucky (344), Maryland (467), Ohio (1631), Pennsylvania (1866), and Virginia (932). This study surveyed 100% of the defined population, in an effort to create a census. Participants were excluded if they were not in good standing with the BOC. To remain in good standing, athletic trainers are required to adhere to the "BOC Standard of Professional Practice," maintain continuous

certification in emergency cardiac care, complete a minimum of 50 continuing education units (CEUs) every two years (of which 10 must be evidence based practice CEUs), and submit payment and certification maintenance paperwork by stated due date (Board of Certification, Inc. [BOC], 2013).

The population (N) for the qualitative portion of this study was athletic trainers that were National Athletic Trainers' Association members, and listed in the online membership directory, from West Virginia, Kentucky, Maryland, Ohio, Pennsylvania, and Virginia. Athletic trainers were also from the Clinical, College, and High School employment setting.

Instrumentation

A researcher-generated survey was created to measure AT demographics, AT perception of health literacy knowledge, and AT measured health literacy knowledge. Validity and reliability measures for the survey were obtained by a pilot study. Content validity of the instrument was obtained by engaging three experts in a review process in August 2011. The experts were sent the author's survey via email for review. All experts met together the next day in person to discuss and all changes were electronically documented onto the survey using the comment feature in MS Word. Following the meeting, the survey was updated to reflect the expert panel's suggestions.

Demographic information included age, sex, state employed, certification year, employment setting, primary job title, secondary job title, years of AT work experience, and previous training in health literacy. The demographic data were collected using a combination of nominal, ordinal, and scale measurements of data.

AT perception of health literacy knowledge was measured over a series of five questions using a six-point Likert scale, ranging from strongly disagree to strongly agree. Participant

perception responses were scored from 5 (representing a response of strongly disagree to all questions) to 30 (representing a response of strongly agree to all questions).

Actual AT health literacy knowledge was measured by a numerical score (scale data) obtained through correct/incorrect responses on 12 multiple choice survey questions (Q16-27) and scored by the researcher. Possible scores ranged from 0-12 with zero representing no correct responses and 12 representing 100% correct responses. Each question answered accurately was counted as 1 correct response. The actual knowledge scores were also placed into a category such as 0-3 low, 4-6 limited, 7-9 functional, 10-12 high to describe athletic trainer knowledge of health literacy. This four-level scale was formulated by equally dividing scores, by three, into an ordinal classification system.

Eighteen ethnographic interviews were also utilized to gather data. The interview questions were developed by the researcher to explore the presence and incorporation of health literacy concepts and health literacy intervention techniques through participant responses. Questions asked during the interview were phrased in open-ended format and allowed for athletic trainers to respond with their personal experiences, practices, and opinions. Interview questions focused on the athletic trainer's communication with patients during provider/patient interactions. Follow-up questions were utilized if certain content was not mentioned initially by the athletic trainer being interviewed.

Each of the five interview questions were included to mirror the questions included on the researcher generated quantitative survey. The intent of the interviews was to gather qualitative data that would complement the quantitative data received and allow the researcher to better understand the awareness and role of health literacy in athletic training practice.

Data Collection

A pilot study, IRB #2 approval #580147-1, was conducted from March 10, 2014, through March 26, 2014, using SurveyMonkey.com. The survey contained 27 questions and included feedback prompts for participant comments. The pilot study utilized a convenience sample, excluding ATs in West Virginia, Virginia, Ohio, Kentucky, Pennsylvania, and Maryland, of 51 BOC athletic trainers. The survey return rate was 59%, n=30. Adjustments were made to the survey after evaluating the information gathered from the pilot study. Following IRB approval, IRB#2 approval # 628827-1, the revised survey was sent to all ATs in good BOC standing with a home address in West Virginia, Virginia, Ohio, Kentucky, Pennsylvania, and Maryland. An automated distribution service offered by the BOC was used to send an email containing the survey link. The survey was administered using SurveyMonkey.com and was distributed in July of 2014. ATs were given a total of five weeks to complete the survey. One reminder email was sent after three weeks of the allotted time period. Following the reminder, two weeks were given to collect any remaining surveys. At the end of the final week (five weeks total), the collection period was closed.

An approved amendment to the initial IRB approval was received (IRB #2 approval # 628827-2) for the qualitative interview component of the study. Following approval, eighteen interviews (9 male and 9 female) were conducted between October 26, 2014, and December 18, 2014. Participants were randomly selected using a random number generator. The random number was applied to a list of athletic trainers generated by the National Athletic Trainers' Association (NATA) online membership directory for random selection of participants. Members were sorted by each of six states in the study (WV, KY, MD, OH, PA, and VA) and by employment setting (College, Clinic, and High School). Selected potential participants were

subsequently called and asked if they would be willing to participate in the survey. If there was no answer the researcher moved on to the next potential participant as determined by the random member generator. All potential participants that were called and answered the call agreed to participate in the interview. All interviews were coordinated and conducted by the co-investigator of this study.

The interviews began with a brief introduction to the research study and investigators. Following an expressed interest to participate in the telephone interview an informed consent statement was read and each participant provided verbal consent by agreeing to answer the questions (See Appendix C). The interviews were audiotaped and transcribed for future use in data analysis.

Data Analysis

Quantitative data were entered in IBM's SPSS for statistical analysis. Descriptive statistics and frequencies were utilized to provide an overview of all data collected on the survey. The Pearson product-moment correlation coefficient was utilized to evaluate the relationship between perceived health literacy knowledge (represented by questions 10-14) and scored health literacy knowledge (represented by questions 15-26). An analysis of variance (ANOVA) was utilized to analyze differences between demographics (represented by questions 1-9) and scored AT health literacy knowledge scores (represented by questions 15-26).

Qualitative data were analyzed through an initial coding of each transcribed interview. Following the coding process, all codes were manually compiled into one document arranged by question and/or content area. The systematic code organization allowed the researcher to identify emerging trends/themes by how often or infrequently codes appeared. Overarching trends/themes were revealed through the coding process and placed into five main categories.

The categories were named with a descriptive title to represent the predominant trends/themes identified. Finally, quantitative and qualitative data were compared to each other via researcher evaluation to determine areas of alignment or discrepancy in the data collected.

Summary

This study examined the knowledge of health literacy among athletic trainers using a researcher-generated survey instrument and ethnographic interviews. The survey and interviews also collected information on the participants' employment setting, work experience, previous health literacy training, and demographic information such as sex, age, state employed, and job titles. The purpose of the study was to determine the interactions, if any, between athletic trainers' employment setting, experience level, previous health literacy training, and demographics and their knowledge of health literacy and health literacy intervention techniques. The survey was distributed by the BOC through an automated email system to ATs in West Virginia, Kentucky, Maryland, Ohio, Pennsylvania, and Virginia. The email included a link to the survey using SurveyMonkey.com. The data collection period spanned five weeks and included a reminder email in week three. The qualitative interview portion of the study was conducted over approximately a two month period. At the conclusion of the data collection period, quantitative data were entered into SPSS and analyzed using descriptive statistics, frequencies, one-way ANOVAs, and a Pearson product-moment correlation coefficient. Quantitative data were coded and analyzed for identifiable trends and themes. Finally, the two forms of data analyses were compared to evaluate consistency of the findings.

CHAPTER 4

PRESENTATION AND ANALYSIS OF FINDINGS

Introduction

This chapter provides a presentation of data gathered through the use of participant survey responses and interviews. Quantitative data for independent and dependent variables were examined to answer the research questions identified for this study. Additionally, qualitative data gathered from the analysis of participant interviews provided supplementary descriptive information to consider in conjunction with quantitative findings.

Data

Surveys were distributed electronically by the athletic training Board of Certification (BOC) to 5453 certified athletic trainers in good standing and with home addresses from West Virginia (WV), Kentucky (KY), Maryland (MD), Ohio (OH), Pennsylvania (PA), and Virginia (VA). The survey was open for five weeks and a total of 471 (8.6% return rate) surveys were returned prior to the close date. Of the 471 surveys returned 52 were excluded due to incomplete responses resulting in the inability to calculate a total measured health literacy knowledge score. Therefore, the total sample for the quantitative portion of this study is 419 leading to a 7.7% usable return rate. Table 1 outlines the frequency of distributed and returned surveys by state.

Table 1

Frequency of Distributed and Returned Surveys by State

State	Surveys Distributed	Percent Distributed	Surveys Returned	Percent Received
West Virginia	213	3.9	25	6.0
Kentucky	344	6.3	25	6.0
Maryland	467	8.6	45	10.7
Ohio	1631	29.9	84	20.0
Pennsylvania	1866	34.2	128	30.5
Virginia	932	17.1	80	19.1
Other	0.0	0.0	23	5.5
Not reported	0.0	0.0	9	2.1
Total	5453	100.0	419	100.0

Furthermore, demographic data were collected from each participant's survey such as sex, age category, experience level, and highest level of education completed. Table 2 provides frequency information on sex, age, experience level, and highest level of education completed.

Table 2

Descriptive Statistics for Sex, Age Category, Experience Level, and Highest Level of Education

Variable	*n*	Percent
Sex		
Male	169	40.3
Female	244	58.2
Total	413	98.6
Not reported	6	1.4
Cumulative	419	100.0
Age Category		
21-25	73	17.4
26-31	98	23.4
32-41	109	26.0
42 and older	139	33.2
Total	419	100.0
Experience Level		
0-3 yrs	100	23.9
4-9 yrs	107	25.5
10-19 yrs	116	27.7
20yrs and above	95	22.7
Total	418	99.8
Not reported	1	0.2
Cumulative	419	100.0
Highest Level of Educ.		
Bachelors	118	28.2
Entry Level Masters	32	7.6
Masters	211	50.4
Doctorate	57	13.6
Total	418	99.8
Not reported	1	0.2
Cumulative	419	100.0

Note. The variation in sample size represented by *Total* is due to participants not reporting information for particular variables.

Data on employment setting, primary job titles, and secondary job titles were also collected. Table 3 provides frequency information on participant employment setting, primary job titles, and secondary job titles.

Table 3

Descriptive Statistics for Employment Setting, Primary Job Title, and Secondary Job Title

Variable	*n*	Percent
Employment Setting		
College	106	25.3
Clinic	148	35.3
High School	58	13.8
Hospital	13	3.1
Health/Fitness	5	1.2
Independent Contract	16	3.8
Military	3	0.7
Industrial	6	1.4
Corporate	3	0.7
Unemployed	14	3.3
Other	44	10.5
Professional	2	0.5
Total	418	99.8
Not reported	1	0.2
Cumulative	419	100.0
Primary Job Title		
Clinical Supervisory	70	16.7
Academic	76	18.1
Other	55	13.1
Other Health Care Provider	23	5.5
Clinical AT	141	33.7
Clinical Under Supervision	44	10.5
Total	409	97.6
Not reported	10	2.4
Cumulative	419	100.0
Secondary Job Title		
Clinical	78	18.6
Academic	44	10.5
Other	35	8.4
No title	108	25.8
Other Health Care Provider	13	3.1
Total	278	66.3
Not reported	141	33.7
Cumulative	419	100.0

Note. The variation in sample size represented by *Total* is due to participants not reporting information for particular variables. The term *Clinical Supervisory* indicates that the job title implies that the job contains a supervisory role (i.e. director). The term *Clinical AT* is the category title for respondents that chose the title "Athletic Trainer" in the survey. The term *Clinical under supervision* indicates that the job title implies the presence of regular supervision (i.e. graduate assistant). The term *Other Health Care Provider* refers to participants that selected "Other" but wrote in a job title that was clearly health care related (i.e. physical therapist, chiropractor).

Data on previous training in health literacy were also collected. Table 4 provides frequency information on previous health literacy training scores.

Table 4

Descriptive Statistics for Previous Health Literacy Training Score

Variable	*N*	Percent
Training Score		
No previous training	78	18.6
One type	148	35.3
Two types	93	22.2
Three types	62	14.8
Four types	32	7.6
Five types	6	1.4
Total	419	100.0

Note. Previous training score represents the participant's self-reported responses regarding their participation in previous health literacy training. Participants were asked to choose from a list of possible training experiences and directed to select all that apply. Possible training experiences included training at the baccalaureate level, masters level, doctoral level, continuing education, or individual efforts (i.e. research, personal interest). The score is based on a 0-5 scale with 5 being the highest score.

Lastly, data were collected on age, years of experience, perception of health literacy knowledge, and measured knowledge of health literacy. Table 5 provides descriptive statistics on age, years of experience, perception of health literacy knowledge, and measured knowledge of health literacy.

Table 5

Descriptive Statistics for Age, Years of Experience, Perception Score, and Measured Knowledge of Health Literacy Score

Variable	*n*	*M*	*SD*	Var	Median	Min	Max	Skewness
Age	419	36.86	11.186	125.128	34	21	71	.641
Years of Experience	419	12.12	10.178	103.598	10	0	45	.894
Perception Score	419	23.17	4.519	20.417	24	5	30	-1.196
Measured Knowledge Score	419	8.46	1.933	3.737	9	3	12	-.539

Note. Var = Variance. The *perception score* represents the participant's self-evaluation of their communication skills and use of health literacy principles. The score is based on a 5-30 scale with 30 being the highest score. *Measured knowledge of health literacy score* represents the participant's correct responses to health literacy related questions. The score is based on a 0-12 scale with 12 being the highest score.

Qualitative data were gathered through the use of 18 ethnographic telephone interviews with athletic trainers. The intent of the interviews was to gather qualitative data that would allow the researcher to better understand the awareness and role of health literacy in athletic training practice, in turn, complementing the quantitative data received and allowing for the opportunity to strengthen findings of the study.

Participant Interviews

Participants were randomly selected and interviews were coordinated and conducted by the co-investigator of this study. Eighteen interviews (9 male and 9 female) were conducted between October 26, 2014, and December 18, 2014, and included three athletic trainers from each of the six states (WV, KY, MD, OH, PA, and VA). Additionally, participants represented the three most identified employment settings (Clinic, College, and High School) from the quantitative component of the study, completed varying levels of education (3 Bachelor degree,

11 Master degree, 3 Doctorate degrees, and 1 unknown), and had a mean of 11.35 years (*sd* = 7.08) of athletic training experience. Table 6 outlines the basic demographics of the interview participants.

Table 6

Demographics of Interviewed Athletic Trainers

Participant	State	Employment Setting	Sex	Years of Experience	Highest Level of Education
AT #1	WV	Clinic	Male	14	Master
AT #2	WV	High School	Female	14	Master
AT #3	KY	College	Male	28	Doctorate
AT #4	KY	High School	Female	7	Master
AT #5	PA	College	Male	13	Master
AT #6	WV	College	Male	3	Master
AT #7	KY	Clinic	Male	16	Doctorate
AT #8	OH	Clinic	Male	13	Doctorate
AT #9	MD	Clinic	Female	7	Bachelor
AT #10	PA	Clinic	Female	9	Bachelor
AT #11	MD	College	Female	4	unknown
AT #12	PA	High School	Male	22	Master
AT #13	MD	High School	Male	9	Master
AT #14	OH	College	Female	3	Master
AT #15	OH	High School	Female	17	Bachelor
AT #16	VA	High School	Female	19	Master
AT #17	VA	College	Female	10	Master
AT #18	VA	Clinic	Male	2	Master

Note. Unable to determine AT #11's highest level of education from available information

The interviews began with a brief introduction to the research study and investigators. Following an expressed interest to participate in the telephone interview an informed consent statement was read and each participant provided verbal consent by agreeing to answer the questions. The interviews were audiotaped and transcribed for future use in data analysis. Five interview questions, plus any necessary follow-up questions, were asked of each participant leading to an average interview length of 21 minutes and 21 seconds.

The interview questions were developed to explore the presence and incorporation of health literacy concepts as athletic trainers were asked to describe their previous education and personal patient interaction characteristics. Each of the five interview questions was included to mirror the questions included on the researcher generated quantitative survey. The data collected from the interview questions allowed the researcher to further explore the process in which athletic trainers interact and communicate with patients when providing health care.

The first interview question was asked to explore the athletic trainer's previous education on communication related principles, which aligned with the previous health literacy training score calculated from the survey. The second interview question was asked to evaluate the athletic trainer's perception of their own communication style, which corresponded with the perception score calculated from the survey and questions 9 and 12 from the survey that contributed to the measured health literacy knowledge score. The third interview question was very broad and comprehensive and asked respondents to describe how they typically interact with a patient during an evaluation, and supported questions 1-6 and 11 from the survey that contributed to the measured health literacy knowledge score. Interview question number four was asked in effort to gain insight into what each athletic trainer believed patients retain from their interaction and influences of retention which further aligned with questions 9 and 12 of the

survey. Finally, interview question five was asked to help identify the athletic trainer's exposure to health literacy concepts and their opinion on the prevalence and identification of patients with low/limited health literacy, which paralleled questions 7 – 11 from the survey that contributed to the measured health literacy knowledge score. See Appendices A and C to view full survey and list of interview questions.

Research Questions

Quantitative data collected from this study were analyzed to answer the following research questions:

1. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' employment setting?
2. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' experience level?
3. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' previous health literacy training?
4. Is there a significant correlation between an athletic trainers' perceived knowledge of health literacy and the athletic trainers' measured knowledge of health literacy?
5. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' demographics? These include:
    - Sex
    - State of employment
    - Primary Job Title
    - Secondary Job Title
    - Age

- Highest Level of Education Completed

Qualitative data were analyzed by identifying trends and themes that emerged from interview responses.

Quantitative Research Findings

Quantitative data collected from this study were analyzed using a variety of statistics. A code book was developed to define categorical variables. Table 7 provides an overview of codes used to define nominal and ordinal data. Descriptive statistics including frequencies, central measures of tendency, standard deviation, and variance were calculated to evaluate characteristics of data. Additionally, parametric tests such as the Pearson correlation coefficient, one-way analysis of variance (ANOVA), and independent t-test were utilized to evaluate the association between two variables or compare the means between two or more groups. A post-hoc Tukey's HSD test was used following any one-way ANOVA with a p value < .05 to determine specific place(s) of significant difference.

Table 7

Coding Description for Nominal and Ordinal Data

Variable	Value	Description of Group
State	1	West Virginia
	2	Kentucky
	3	Pennsylvania
	4	Virginia
	5	Maryland
	6	Ohio
	7	Other
Age Category	1	21-25
	2	26-31
	3	32-41
	4	42 and older
Experience Level	1	0-3 years
	2	4-9 years
	3	10-19 years
	4	20 or more years
Sex	1	Male
	2	Female
Highest Level of Education	1	Bachelors
	2	Entry Level Masters
	3	Masters
	4	Doctorate
Employment Setting	1	College
	2	Clinic
	3	Secondary/High School
	4	Hospital
	5	Health/Fitness
	6	Independent Contract
	7	Military
	8	Industrial
	9	Corporate
	10	Unemployed
	11	Other
	12	Professional

Table 7 Continued

Coding Description for Nominal and Ordinal Data

Variable	Value	Description of Group
Primary Job Title	1	Clinical Supervisory Role
	2	Academic
	3	Other
	4	Other Healthcare provider
	5	Clinical AT (selected Athletic Trainer)
	6	Clinical Under Supervision (i.e. Graduate Assistant)
Secondary Job Title	1	Clinical
	2	Academic
	3	Other
	4	No title
	5	Other Healthcare provider
Previous Health Literacy Training Score	0	No Previous Training
	1	One Type of Training
	2	Two Training Types
	3	Three Training Types
	4	Four Training Types
	5	Five Training Types

Note. The term *Clinical Supervisory* indicates that the job title implies that the job contains a supervisory role (i.e. director). The term *Clinical AT* is the category title for respondents that chose the title "Athletic Trainer" in the survey. The term *Clinical under supervision* indicates that the job title implies the presence of regular supervision (i.e. graduate assistant).

Table 8 outlines the frequency data for perceived knowledge scores.

Table 8

Scored AT Perceived Knowledge of Health Literacy

#	Question	Likert Scale	Percentage (*n*)
1	I know how to communicate with patients who have low/limited health literacy.	1 = strongly disagree	1.0 (4)
		2 = disagree	1.7 (7)
		3 = somewhat disagree	2.6 (11)
		4 = somewhat agree	21.0 (88)
		5= agree	50.4 (211)
		6= strongly agree	23.2 (97)
		Total	100.0 (419)
2	I am knowledgeable about the prevalence of low/limited health literacy in the United States.	1 = strongly disagree	1.7 (7)
		2 = disagree	4.8 (20)
		3 = somewhat disagree	8.6 (36)
		4 = somewhat agree	27.0 (113)
		5= agree	41.1 (172)
		6= strongly agree	16.9 (71)
		Total	100.0 (419)
3	I understand the impact of low/limited health literacy on health outcomes.	1 = strongly disagree	1.0 (4)
		2 = disagree	6.2 (26)
		3 = somewhat disagree	5.3 (22)
		4 = somewhat agree	19.1 (80)
		5= agree	45.6 (191)
		6= strongly agree	22.7 (95)
		Total	100.0 (419)
4	I am confident that I am able to identify people with low/limited health literacy.	1 = strongly disagree	1.2 (5)
		2 = disagree	4.8 (20)
		3 = somewhat disagree	8.4 (35)
		4 = somewhat agree	32.7 (137)
		5= agree	40.6 (170)
		6= strongly agree	12.2 (51)
		Total	98.2 (418)
		Not reported	1
		Cumulative	100.0 (419)
5	I understand when to consider health literacy levels when communicating with patients.	1 = strongly disagree	1.0 (4)
		2 = disagree	2.9 (12)
		3 = somewhat disagree	6.9 (29)
		4 = somewhat agree	23.9 (100)
		5= agree	49.2 (206)
		6= strongly agree	16.2 (68)
		Total	100.0 (419)

Note. The variation in sample size represented by *Total* is due to participants not reporting information for particular variables.

To calculate a measured knowledge of health literacy score 12 questions specific to health literacy knowledge were included on the survey. Descriptive statistics for questions 1-12

revealed that questions 1, 2, 5, 6, 7, 10, and 12 were answered correctly at least 70% of the time while questions 3, 4, 8, 9, and 11 were answered correctly below 70% of the time. See Table 9 for frequency of correct and incorrect responses per questions included in the measured knowledge of health literacy score.

Table 9

Participant's Measured Knowledge of Health Literacy

#	Question	Incorrect Response	Correct Response	Percent correct
1	A patient is seeing you one day following a visit to the emergency room. Following your evaluation you spend some time providing information about weight bearing guidelines for their hip injury, which of the following statements would be the most appropriate to say to the patient?	53	366	87.4
2	Which of the following questions would help you best assess whether the patient understood your take home instructions?	112	307	73.3
3	For a patient who just had out-patient knee surgery, which of the following sets of take home instructions has the highest chance of compliance prior to their one week post-operative follow-up with a healthcare provider?	191	228	54.4

Table 9 Continued

Participant's Measured Knowledge of Health Literacy

#	Question	Incorrect Response	Correct Response	Percent correct
4	Most patients are able to remember _____ key concepts (pieces of information) per visit?	186	233	55.6
5	The best way to assess a patient's understanding is to?	120	299	71.4
6	When communicating with patients about healthcare/medical related issues an athletic trainer should:	12	407	97.1
7	Health Literacy is….	37	382	91.2
8	Low/limited health literacy effects approximately _____ of adults in the United States	178	241	57.5
9	Which of the following can serve as reliable estimation of a patient's health literacy?	203	216	51.6
10	Patients with low/limited health literacy tend to _____.	14	405	96.7
11	Low/limited health literacy is/can _____	255	164	39.2
12	Health literacy levels and interaction principles should be considered in which of the following situations? (check all that apply)	121	298	71.3

Note. *n*= 419

Research Question One

Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainer employment setting?

A One-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and their self-reported employment setting. No significant difference was found ($F(11, 406) = 1.68$, $p > .05$). The athletic trainers' measured knowledge of health literacy from different employment settings did not differ significantly. Athletic trainers employed in the college setting had a mean score of 8.71 (*sd* = 1.87). Athletic trainers employed in the clinic setting had a mean score of 8.28 (*sd* = 1.88). Athletic trainers employed in the high school setting had a mean score of 8.28 (*sd* = 2.02). Athletic trainers employed in the hospital setting had a mean score of 9.00 (*sd* = 2.16). Athletic trainers employed in the health/fitness setting had a mean score of 6.4 (*sd* = 1.14). Athletic trainers employed in the independent contract setting had a mean score of 8.56 (*sd* = 1.99). Athletic trainers employed in the military setting had a mean score of 6.67 (*sd* = 3.22). Athletic trainers employed in the industrial setting had a mean score of 8.17 (*sd* = 1.94). Athletic trainers employed in the corporate setting had a mean score of 8.67 (*sd* = 1.16). Athletic trainers employed in the corporate setting had a mean score of 8.67 (*sd* = 1.16). Athletic trainers employed in the professional setting had a mean score of 6.5 (*sd* = 2.12). Athletic trainers that were unemployed had a mean score of 8.5 (*sd* = 2.175). Athletic trainers that indicated they were employed in a setting other than those previously listed had a mean score of 8.98 (*sd* = 1.81).

Research Question Two

Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' experience level?

A One-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and their athletic training experience level. No significant difference was found ($F(3, 414) = 2.11$, $p > .05$). The athletic trainers' measured knowledge of health literacy from different experience levels did not differ significantly. Athletic trainers with 0-3 years of experience had a mean score of 8.35 ($sd = 1.95$). Athletic trainers with 4-9 years of experience had a mean score of 8.41 ($sd = 1.82$). Athletic trainers with 10-19 years of experience had a mean score of 8.83 ($sd = 1.96$). Athletic trainers with 20 or more years of experience had a mean score of 8.46 ($sd = 1.94$).

Research Question Three

Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' previous health literacy training?

A One-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and their previous health literacy training. No significant difference was found ($F(5, 413) = .706$, $p > .05$). The athletic trainers' measured knowledge of health literacy did not differ significantly when comparing the participant's varying levels of previous health literacy training. Participants were asked to select all types of previous health literacy training they have experienced which resulted in a previous training score. The selection categories included 1) No previous training, 2) Training received at the bachelor level, 3) Training received at the master level, 4) Training received at the doctoral level, 5) Training received during continued education, and 6) Training from individual efforts (i.e. research).

Athletic trainers with no previous health literacy training had a mean score of 8.55 (*sd* = 1.87). Athletic trainers with one type of previous health literacy training had a mean score of 8.46 (*sd* = 1.93). Athletic trainers with two types of previous health literacy training had a mean score of 8.24 (*sd* = 1.99). Athletic trainers with three types of previous health literacy training had a mean score of 8.61 (*sd* = 2.02). Athletic trainers with four types of previous health literacy training had a mean score of 8.44 (*sd* = 1.87). Athletic trainers with five types of previous health literacy training had a mean score of 9.5 (*sd* = 2.074).

Research Question Four

Is there a significant correlation between an athletic trainers' perceived knowledge of health literacy principles and the athletic trainers' measured knowledge of health literacy?

A Pearson correlation was calculated to evaluate the relationship between athletic trainers' perceived knowledge of health literacy and their measured knowledge of health literacy. A very weak correlation that was not significant was identified (r (417) = .047, $p > .05$). The participant's perceived knowledge of health literacy was not related to measured knowledge of health literacy.

Research Question Five

Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' demographics: (a) sex; (b) age; (c) state of employment; (d) primary job title; (e) secondary job title; (f) highest level of education completed?

An independent-samples t test was calculated to compare athletic trainers' measured knowledge of health literacy between the mean score of males and females. A significant difference was found (t (411) = -3.08, $p < .05$). Table 10 outlines the associated measures of central tendency and effect size.

Table 10

Independent t-Test for Sex and Measured Knowledge of Health Literacy

Variable	*N*	*M*	*SD*	Var	*P*	Cohen's *d*
Sex						
Male	169	8.12	1.996	3.984	.002	.31[a]
Female	244	8.70	1.840	3.386		

Note. n = 413. *Var* = Variance. [a]Cohen's *d* measure for effect size indicates small relative importance because size of difference between means is small.

A One-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and state associated with the athletic trainers' home address. No significant difference was found ($F(3, 414) = 2.11$, $p > .05$). The athletic trainers' measured knowledge of health literacy did not differ significantly from the state associated with the athletic trainers' home address. Athletic trainers from WV had a mean score of 8.20 (*sd* = 2.12). Athletic trainers from KY had a mean score of 8.40 (*sd* = 2.02). Athletic trainers from KY had a mean score of 8.40 (*sd* = 2.02). Athletic trainers from MD had a mean score of 8.36 (*sd* = 1.98). Athletic trainers from OH had a mean score of 8.30 (*sd* = 1.87). Athletic trainers from PA had a mean score of 8.71 (*sd* = 1.75). Athletic trainers from VA had a mean score of 8.40 (*sd* = 1.93).

A one-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and their primary job title category. The athletic trainers' measured knowledge of health literacy differed significantly from the athletic trainers' primary job title category ($F(5, 403) = 3.5$, $p < .05$). To localize the place of significance between the six different primary job title categories Tukey's HSD post hoc test was performed. This analysis showed that athletic trainers that reported a primary job title within the academic category ($m = 8.93$, *sd* = 1.94) scored significantly higher than athletic trainers that reported a primary job title within the clinical (non-supervisory and/or non-supervised) category ($p < .05$), ($m = 8.02$, *sd* = 1.90). This particular primary job title category was comprised of participants that identified their

primary job title simply as athletic trainer. Eta squared measure for effect size indicated small relative importance because size of difference between means is small.

A one-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and their secondary job title category. The athletic trainers' measured knowledge of health literacy did not differ significantly from the athletic trainers' secondary job title category ($F(4, 273) = .738$, $p > .05$). Athletic trainers that identified a secondary job title within the academic category had a mean score of 8.18 ($sd = 1.57$). Athletic trainers that identified a secondary job title within the clinical category had a mean score of 8.64 ($sd = 1.91$). Athletic trainers that identified a secondary job title within the other health care professional category had a mean score of 8.69 ($sd = 2.36$). Athletic trainers that identified a secondary job title within the other category had a mean score of 8.40 ($sd = 1.85$). Athletic trainers that identified no secondary job title had a mean score of 8.56 ($sd = 1.96$).

A One-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and the athletic trainers' age. No significant difference was found ($F(3, 415) = .984$, $p > .05$). The athletic trainers' measured knowledge of health literacy when compared to the athletic trainers' age did not differ significantly. Athletic trainers within the age category 21-25 years of age had a mean score of 8.33 ($sd = 1.83$). Athletic trainers within the age category 26-31 years of age had a mean score of 8.32 ($sd = 1.99$). Athletic trainers within the age category 32-41 years of age had a mean score of 8.72 ($sd = 1.90$). Athletic trainers within the age category 42 years of age and older had a mean score of 8.43 ($sd = 1.98$).

A One-way ANOVA was calculated to compare the athletic trainers' measured knowledge of health literacy and the highest level of education completed. The athletic trainers' measured knowledge of health literacy differed significantly from the athletic trainers' highest

level of education completed ($F(3, 414) = 3.54$, $p < .05$). To understand the nature of the relationship between the four education categories Tukey's HSD post hoc test was performed. This analysis showed that athletic trainers that completed a bachelor degree ($m = 8.11$, $sd = 1.96$) scored significantly lower ($p = .009$) than athletic trainers that completed a doctorate degree ($m = 9.09$, $sd = 1.93$). Table 11 provides an overview of the One-way ANOVA data.

Table 11

One-way ANOVA for Highest Level of Education completed and Measured Knowledge of Health Literacy

Variable	*n*	*M*	*SD*	Var	*p*	Eta squared (η^2)[a]
Level of Education					.015	.025
Bachelor						
EL Master	118	8.11	1.96	3.84		
Master	32	8.25	2.23	4.97		
Doctorate	211	8.52	1.84	3.39		
Not reported	57	9.09	1.93	3.72		

Note. Var = Variance. [a]Eta squared measure for effect size indicates small relative importance because size of difference between means is small.

Qualitative Research Findings

Data analysis was conducted after interviews were completed and transcribed. In order to analyze, the descriptive data were coded using terms that represented what was heard during interviews. The data codes were then systematically sorted and organized by trends and themes into coding categories.

Five categories emerged from the data:

1. In the Field
2. Tell It Like It Is
3. Patient-Centered Care
4. Where the Rubber Hits the Road

5. Health Literacy

The first category, In the Field, symbolizes the athletic trainers' characterization of how they learned to communicate and interact with patients. Code words such as: (a) hands-on, (b) clinical setting, (c) observation, (d) no formal education, (d) only touched on in class, and (e) mostly during undergraduate degree, were included in this category. Additionally, when referring to classroom exposure the terms: (a) be professional, (b) use simple terms, (c) legal considerations, and (d) HIPAA were mentioned. When considering their continuing education experiences only one interviewee mentioned a vague memory of attending a lecture at a conference that focused on effective communication with coaches and parents. No athletic trainer recalled participating in continuing education as it related to communicating or interacting with patients.

The second category, Tell It Like It Is, encompasses descriptors athletic trainers used to define their personal communication style with patients. Code words such as: (a) honest, (b) direct, (c) just the facts, (d) professional, (e) get on their level, and (f) educate, were coupled with the phrases (a) relate on a personal level, (b) have a conversation, (c) listen, (d) get to know your patient, (e) build a relationship, (f) request not demand, (g) listen, (h) have patience, (i) be approachable, (j) encourage, (k) keeps things basic, and (l) use metaphors during explanations. Athletic trainers used the following terms to describe why they might want to vary their communication style. The reasons were coded as: (a) age, (b) personality, (c) culture, (d) previous science or medical education, (e) previous experience with injury/illness or treatment, (f) patient does not seem to understand, (g) established relationship with patient, and (h) emergency care vs. clinic care. The types of variation used were also coded as: (a) parent, (b) alter depth of information, (c) alter language used, and (d) include models or charts.

The third category, Patient-Centered Care, collectively represents the process, techniques, and strategies utilized and/or considered by athletic trainers as they interact with patients. The descriptions used by athletic trainers regarding the injury/illness evaluation process were coded using the words: (a) professional, (b) systematic, (c) give patients time to tell their story, (d) calm the patient, (e) explain what you are doing and why, (f) relate to the patient, (g) educate, (h) build trust, (i) empathy, (j) discuss findings, (k) discuss plan, (l) ask for feedback, (m) answer questions, (n) keep dialogue going, (o) use models and pictures, (p) monkey-see monkey-do, (q) keep patients focused, and (r) facilitate referrals. Specifically, athletic trainers responded to how they check for patient understanding. Their responses included the codes: (a) does this make sense, (b) do you have any questions, (c) do you understand, (d) look for body language cues, (e) blank stare, (f) confused look, (g) active listening by patient, (h) ask patient to repeat back instructions, (i) make sure an adult is involved, (j) types of questions they ask, and (k) can you show me the exercise.

Additionally, athletic trainers commented on the type of language they use when communicating with patients and their responses were coded as: (a) layperson terms, (b) simple language, (c) basic language, (d) plain language, (e) age appropriate, (f) limit big words, (g) 6^{th} grade reading level, (h) hybrid between medical terminology and layperson terms, (i) varies based on their understanding, (j) talk on their level, (k) use medical language to educate patients, and (l) use comparisons to common things. Lastly, athletic trainers replied to how they determine how much patient education to give during an interaction and responses were coded as: (a) cannot give enough, (b) outline start to finish of care, (c) use time to educate, (d) give more detail if more important, (e) varies by patient, (f) depends on patient questions; (g) depends on ability to understand; (h) depends on patient anxiety and pain, (i) less is more, (j) only the most

important information, (k) start with immediate need and add more with time, (l) do not overload the patient, and (m) always the same - simple.

The fourth category, Where the Rubber Hits the Road, included the code words used to describe how much information athletic trainers believed patients retained from their interactions and factors that may influence retention. Estimated retention was coded using the terms: (a) highly variable, (b) how we will be judged as providers, (c) essential for behavior change, (d) depends on provider, (e) depends on patient, (f) keep it simple, and (g) give them just enough information. Factors that could influence retention were categorized using the codes: (a) information overload, (b) attention span of patient, (c) interest of patient, (d) high stakes vs. low stakes, (e) pain level, (f) setting where information is being delivered, (g) severity of situation, (h) distractions, (i) language used by provider, (j) tone used by provider, (k) education level of patient, (l) disabilities of patient, (m) patient's previous experience with injury/illness, (n) patient is scared, (o) culture, (p) income level, (q) age, (r) presence of parents, (s) type of relationship between provider and patient, and (t) timing of conversation.

The fifth category, Health Literacy, represents how familiar athletic trainers were with the term and definition of health literacy and their opinions regarding the prevalence and identification of low or limited health literacy. Responses regarding familiarity with health literacy were coded as: (a) never heard of the term, (b) not familiar with terminology, (c) I can figure it out with context cues, (d) not sure but I am curious, (e) appreciation for health literacy, (f) develops with experience, (g) I think - patient understanding?, (h) seen term before, and (i) I can guess. The participants were then told the definition of health literacy and were asked to estimate the prevalence of low or limited health literacy. The responses were coded and include: (a) more prevalent than we think, (b) more prevalent in rural areas, (c) more prevalent among

international population, (d) more prevalent in urban/inner city areas, (e) more prevalent in lower socioeconomic areas, (f) internet makes things more confusing, (g) varies by region of US, (h) varies by education level, and (i) varies by type of education. Furthermore, codes were identified for participant identification of low/limited health literacy patients and include: (a) vocabulary used, (b) grammar used, and (c) level of engagement.

In the Field

During the interviews most of the athletic trainers indicated that they learned about communication, in general, at the undergraduate level, with some refinement at the master's level if they pursued a master's degree. They also felt that the communication they were taught in a classroom setting was not about communication strategies that foster good health care outcomes for the patient but more about what to communicate to a patient and the professional guidelines and rules surrounding communication of health care information. It was highlighted in the interviews that most of the education athletic trainers received on patient-provider interactions occurred during their clinical education. A majority of athletic trainers felt that there was not a purposeful emphasis on communication with patients, specifically in the classroom, but that they learned what they knew about interacting with patients by observing their preceptors in the clinical setting and practically through their own interactions with patients. This is demonstrated by the following quotes from athletic trainers (AT) #4 and AT #9:

> AT #4: "I don't really remember specifically being taught interaction other than being professional and more teaching us the code of ethics, like what to say and what not to say."

> AT #9: "I would say that it was integrated into my education through the clinical experiences that we had, whether it was in the athletic training room, out on the field at the college, or at various sites. We were sent to different high schools in the area, orthopedic offices, and general practitioner offices. Getting a variety of exposure really helped with talking to patients especially when we were in the out-patient offices… because you were dealing with a greater variety of patient populations than what you

were seeing at the college and also the physicians and surgeons had different experiences. We also saw how their office staff was communicating with patients. It showed me a variety of communication styles. It was really, more so, just the hands-on learning environment, I think, that provided me education on patient interaction."

Tell It Like It Is

When considering communication style with patients athletic trainers generally described their style as open and honest with a strong desire for patients to feel comfortable. However, terms like professional, direct, and factual had a strong presence as well. This is evidenced by an excerpt from the interviews with AT #2 and AT #8 below:

> AT #2: "I have a really good relationship with the majority of my patients so we are very straight forward with each other. I am very much a people person so I am comfortable getting to know people. That is a big part of being an athletic trainer, having people skills. For example, my patients are high school football players and I talk to them like they are my brothers. I don't have an issue explaining things to them. They are very open and honest with me and in return, I am with them."

> AT #8: "Factual, I guess is the best way I can describe it [in reference to communication style]. I lay out what they have going on regardless of if it is good or bad. I give them [referring to patients] the facts about their condition . . . . and tell them reasonable expectations; reasonable activity modifications."

Athletic trainers also mentioned that although they tend to have a consistent method for sharing information they may need to vary their communication style for a wide variety of reasons. Athletic trainers work with patients in an assortment of settings (high school, college, professional sports, hospital/clinic) and use a diverse skill set (i.e. on-site health care during athletic competition and/or practice, performance enhancement, rehabilitation). Therefore, a common theme that emerged was that athletic trainers need to alter the way they interact with patients regularly due to the environment, type of service they are providing, nature of the situation, patient demeanor, and patient demographics. The following quotes from AT #6 and AT #7 demonstrate a few of these variations:

> AT #6: "With the more life threatening injuries or the more severe traumatic injuries the style has to change a little bit. I guess I would become more forward with the patient or the athlete in that case. Focus is on calming her down or on her breathing. But, in general, I tend to still follow a pretty simple model and give them the chance to explain their subjective experience rather than just picking a couple of quick answers and jump to a conclusion."
>
> AT #7: "My vocabulary is probably a little more professional if they have an understanding some of the verbiage, the wording, versus maybe a teenager who may not understand some of that. As athletic trainers we're around athletes from different demographic populations. I just kind of talk the way they talk, the best I can."

Patient-Centered Care

Communicating with patients is just one aspect of the comprehensive goal of providing quality health care. Set within the framework of performing physical exams, athletic trainers were asked to describe how they interacted with patients from start to finish. Interestingly, athletic trainers commonly focused on how they performed an evaluation starting with fundamental aspects of performing a physical exam such as taking a history, performing observation, palpation, assessing of range of motion, and so on. Athletic trainers generally placed an emphasis on the functional method of the exam while mentioning some communication strategies they would employ during the evaluation. The athletic trainers approached this question in a professional tone and step by step manner, with what appeared to be a main objective of determining an accurate diagnosis and plan of care. The athletic trainers commonly mentioned trying to help the patient feel comfortable and the desire to conduct themselves in a way that established trust, such as providing factual and honest information. Additionally, communication techniques such as using basic language, demonstrating motions they needed the patient to perform, and explaining information with charts and models were commonly included. A quote from AT #17 demonstrates the typical athletic trainer's response which focused on the sequence and components of a physical exam.

> AT #17: "I would get a history . . . . trying to get all of the information. I would continue explaining the more I know . . . . the better chance we have of fixing the issue. I would continue communicating about what is going on as I perform the evaluation, asking if things bother them or asking the athletes how certain tests feel to gain more information. For example, with manual muscle testing giving clear instructions like, push, push, push, ok stop is helpful to both the clinician and athlete. I would then explain that I need to do a couple tests and then explain the results of the tests, evaluation, the differential diagnosis. . . . I would share my plan of action … starting with today and also let them know their goals from the get go."

Unique to the other respondents, the following quote from AT #18 explains some patient interaction techniques learned from a physician extender residency program.

> AT #18: "We were always taught to never sit between the patient and the door, it's called trapping. I will always sit on the opposite side of the patient and the door and I also sit lower or on the same level of the patient. I tend to not try to stand or sit on a higher chair than the patient so we are on equal level through the exam."

A key finding during this particular interview question was that although using basic language is mentioned earlier only about half of the respondents initially commented on that consideration. Interestingly, no participants mentioned how they would check for patient understanding or on the amount of patient education they normally provide. Therefore, follow-up questions were asked specifically to understand how athletic trainers address each of the following health literacy concerns: (a) language level, (b) patient understanding, and (c) how much information to provide patients.

Athletic trainers seemed very confident with their responses regarding the level of language they used. With a few exceptions, most athletic trainers stated that they communicate in basic terminology and try to use examples that resonate with patients. Some said they may use a little medical terminology if they know the patient has taken science and/or health courses or knows that they have medical training. Also mentioned was the presence of a language barrier when talking with international patients and the caveats involved in selecting words that can be

understood easily based on the patient's primary language. The use of plain language and metaphors is evidenced by the following quote by AT#1:

> AT #1: [in reference to a question from a patient about carpal tunnel syndrome symptoms] ""Well, that nerve has been asleep, and this has gone on for 4 or 5 years and now it is having to wake up," then you relate it to another part of the body, you've had your legs asleep? "It is the same kind of thing." "You constantly try to break down and try to relate it to something that they can understand because they have experienced something of a similar nature."

In another example, AT # 9's quote represents the opposite technique of using an explanation that is heavy in medical terminology when talking to a patient:

> AT #9: "For example, if I was testing their knee, I wouldn't just tell them you have a knee sprain. I would say you have a MCL sprain or I feel that your ACL may be compromised; you may have a full or partial thickness tear. If I was talking about fractures I wouldn't say I think you broke your ankle. I would say I think you broke your fibula. I wanted to be specific about what I was looking at and I felt it was important for the patient and the family to know what exactly I was looking at so that they felt more informed when they went for their orthopedic appointment. Or if they didn't have an orthopedic appointment that they felt knowledgeable about their injury."

Finally, the below quote from AT #6 highlights unique considerations for an athletic trainer when working with an international population:

> AT #6: "Most people know what inflammation is but instead of using the term inflammation the word swelling is usually understood a little bit better by the American population. However, the international population that I have worked with really understands inflammation because it's a similar word in Spanish, I believe it is "inflamación" in Spanish, and so they'll recognize that a little easier. So, I guess, being around different cultures helps more because you get familiar with words here and there. Sometimes "pain" won't cue somebody, but "hurt" will or "ouch" will."

How to determine patient understanding was an area that athletic trainers generally assessed by simply asking their patient if they understood. Other forms of checking for understanding came in the form of asking the patient if they had any questions or if the patient was making sense of what they were hearing. Athletic trainers also felt largely comfortable picking up on a patient's non-verbal cues such as facial expressions and body language regarding

confusion or frustration. A couple of athletic trainers mentioned that they would ask the patient to repeat back or demonstrate something so the athletic trainer could determine if the patient understood the information. The following quotes by AT #6 and AT#14 are examples of limited checks for understanding with the provider using direct questions and body language cues:

> AT #6: "I can tell by their responses [referring to the patient's understanding]; if it is just a lot of "yes" or "no" or even a 'lost in the headlight look" there are a lot of ways to follow up with similar questions to verify findings and see if they're tracking with you or not. A lot of times I deal with international athletes and so there is a language barrier. I guess my way of doing it is, "does that make sense?" or "do you understand?" and that will give them the opportunity to respond … I guess, that's my way of trying to see if they are following me; more of a verbal cue."

> AT #14: "I make sure that I always look at their face and eyes and watch their facial expressions. I'll ask if they understand, do you have any questions, and I make sure I ask them two or three time before they leave."

Although not mentioned by many of the participants, in this next example AT #1 discusses how a deeper probe into patient understanding is utilized:

> AT #1: [In reference to an athlete with a very minimal grade one ankle sprain that occurs Friday night but the athletic trainer will not see again until Monday afternoon] "I'll say, ice it all day Saturday, 20 minutes every hour and don't walk around very much, then on Sunday I want you to start light range of motion, just kind of pumping that ankle back and forth to keep the fluid out of it." I would show him the exercises that I want him to do and then I would have him show me with the foot that is not injured. Then I would have him repeat the instructions back to me ... "So, you are going to ice it on Saturday," and he would say, "Yeah, I'm going to ice it on Saturday," and then he would pick up from there and say, "I'm going to start my range of motion on Sunday." Then five minutes later I will ask him again and then again before he leaves. I constantly, constantly, constantly check in and remind them and then they repeat it back to me."

Determining how much information to give a patient was largely variable when talking with the athletic trainers. Generally athletic trainers felt it was important that the patients have an accurate and full understanding of their particular injury or illness. It appeared that athletic trainers generally preferred to provide more information than less, but depending on the situation or the patient, athletic trainers customized the amount of information shared. The below quote

from AT #8 is an example of the amount of patient education provided during a patient interaction with an athletic trainer:

> AT #8: I frontload it [in reference to patient education] to some degree. … I try to give them a lot of the information up front, as far as what their specific problem is and how it relates to the reason they came in. In the future, like their second visit, I try to go through a mini-report of that again so they maybe get a better understanding of what I covered in the first visit. Then on future visits, primarily just question and answer. I would provide clarification if they say something that might be inaccurate."

A few athletic trainers opted to deliver more focused patient education from the first encounter as demonstrated by the following quote from AT #3:

> AT #3: I always err on the side of trying to give them less than more [referring to information]. I try to give them two or three of the most important things that they need to be responsible for. I am a big believer that even if you have got it [referring to patient education] written down or even with pictures, if you take your information past two or three things, the likelihood of patient compliance or adherence is fairly limited."

The following excerpt from interview AT #4 represents some additional detail on why athletic trainers may need to vary how much patient education is given to a patient.

> AT #4: "A lot of it [in reference to variation] depends on if they have ever been hurt before. If they have never hurt before then you have to walk them [in reference to patients] through what is expected and what is not and what they need to do. With some of the athletes you have to tell them exactly how long to leave an ice bag on and how to cut off their tape and then some athletes understand it on their own. So, it is a matter of learning which athletes need specific instructions and which athletes are fine with letting them go on their own."

Where the Rubber Hits the Road

After being asked how much information patients retain following an interaction with athletic trainers, many of the interviewees chuckled or started their response with "Whew," or "Hmmm." Most of the athletic trainers believed that patients can get overwhelmed with too much information and that patients do not retain as much as is hoped they do after they leave an interaction with an athletic trainer. Still, many athletic trainers stated they thought patients remembered about half of what was discussed during their interaction. Also, athletic trainers

would generally try to educate the patient as much as possible on what was going on with their body. A few athletic trainers took the "less is more" approach, keeping shared information to a minimum by asking their patients to focus on a handful of immediate concerns at a time. Often, the use of follow-up visits was mentioned as a time to reinforce information. Athletic trainers as a whole indicated that this was an important factor to consider. Another consideration mentioned by athletic trainers, mostly working in the high school setting, was the need to inform a patient's parent/guardian of injuries or illnesses sustained by their child, which added another level to the importance of retention. The following quotes from AT #16, AT #8, and AT #5 are representative of the athletic trainer's feelings on how much information patients retain from their interactions with athletic trainers:

> AT #16: "A fair amount [referring to the amount of information patients retain]. I encourage them to come back the next day to let me know how they are doing, I don't want it to be a "one and done" sort of an exchange."
>
> AT #8: "Not nearly as much as I give them. I would say, depending on the patient, anywhere from maybe 25% up to 90%, it is really patient dependent.
>
> AT #5: "I don't know how to answer that question. I don't know if there is a good way to track that. I like to think they retain more, but who knows? It is different from person to person."

The following quote from AT #3 is a notable point regarding the importance of patient retention of health care information from their interactions with athletic trainers.

> AT #3: "Well, I think that's where the rubber hits the road. I think that is [in reference to how much information patients retain] the most important thing and I think it's highly variable. And, I think ultimately that is how we are going to be judged as health care providers. I think we are only as effective as what behavioral changes we can actually induce in that person."

Athletic trainers highlighted a host of reasons why they felt a patient's retention levels were extremely variable. Most of the reasons centered on characteristics of the patient or the surrounding situation/environment. Very little was mentioned regarding the role of the provider

in the patient's ability to retain the information received. The following quotes from AT #12 and AT #15 offers some insight into why athletic trainers generally feel patients may not recall the information shared with them during athletic trainer – patient interactions.

> AT #12: "There are athletes that just have trouble remembering information … for some athletes it is just hard to keep their attention. But if it is something they love to do they usually tend to pay attention more."

> AT #15: "Education level [of the patient] and if they [the patient] even understands what is being said, if they are truly listening, or if they are distracted when I am talking to them."

However, regarding variations in why a patient may or may not remember what is told to them during a provider-patient interaction, AT #2 deviated from the general feeling of the group stating the following:

> AT #2: "There are some providers that are really good at explaining things and getting it [referring to information] to a level where the average person can understand them. And there are some providers who do not communicate as well with the average person in terms of what is going wrong with their body."

Health Literacy

When asked directly about their familiarity with the term health literacy or principles of health literacy athletic trainers mostly responded as not being familiar with that exact terminology. Athletic trainers usually continued by stating they could probably figure out what was being referred to or that they could easily find the definition within a short amount of time. A couple of athletic trainers were familiar with and had a working understanding of health literacy. The following quotes by AT #10 and AT #13 provide support of these findings:

> AT #10: "I don't think I have ever heard the term health literacy."

> AT #13: "I have no idea what that is [in reference to health literacy or health literacy principles]. I could look it up on google real quick and give you an answer, but I will be honest with you, I have no idea."

After hearing a definition of health literacy provided by the co-investigator of the study, athletic trainers were asked to comment on the prevalence of low or limited health literacy in the United States (U.S.). Overall, many athletic trainers suspected a high rate of limited or low health literacy among the U.S. population but they felt factors such as socioeconomic status, age, education level, and land area classifications could influence prevalence rates. Athletic trainers also provided varying thoughts about how they could identify a patient with low or limited health literacy, which generally included how sophisticated or basic a patient's language was and if the patient was engaged and asking appropriate or expected questions during patient-provider interactions. The following quote from AT #18 provides some additional insight regarding the prevalence of low/limited health literacy:

> AT #18: "I would say it [referring to low/limited health literacy] is very prevalent in my area. Although, when I was doing my residency out West I would say it was much less prevalent out there. I would say it is more of a regional problem. I would say [long pause] maybe 60% of the national population has lower or below average health literacy."

Quantitative vs. Qualitative Data Collected

Qualitative and quantitative data analyses were compared. The following findings indicated alignment between both forms of data collected:

1. Athletic trainers received little to no previous education on health literacy.
2. Athletic trainers' perceived knowledge of health literacy showed that athletic trainers generally described themselves as having health literacy skills.
3. Athletic trainers recognized the importance of using plain language when interacting with patients.
4. Athletic trainers had an average to below-average awareness of the "teach back" health literacy method for assessing patient understanding.

5. Athletic trainers had a below-average awareness of the "limiting principles" health literacy method for enhancing patient retention of information.
6. Athletic trainers had a below-average awareness of patient characteristics that could be associated with lower or limited health literacy.

Interestingly, the largest disparity between data collected was related to the athletic trainers' familiarity with the terminology and associated definition of health literacy and the prevalence of health literacy in the United States. Frequency scores on the survey showed that athletic trainer participants answered the question related to the definition of health literacy correctly 91.2% of the time while interview respondents replied as not being familiar with the terminology "health literacy" a majority of time. Lastly, frequency scores on the survey found the participants answered the survey question related to the prevalence of lower or limited health literacy correctly 57.5% of the time while during the interview athletic trainers regularly estimated the prevalence of lower or limited health literacy correctly.

Summary

The purpose of this study was to evaluate athletic trainers' current knowledge level of health literacy through the use of a quantitative survey and a series of 18 interviews with athletic trainers. Quantitative data gathered from the survey responses were analyzed using descriptive and inferential statistics. Qualitative data were collected and evaluated by coding reoccurring responses in effort to identify common trends and themes. Together, the findings from all data collected provided an opportunity to comprehensively explore the current level of awareness and utilization of health literacy principles by athletic trainers in the six states studied.

Quantitative data were gathered on the following variables from the participating athletic trainer's survey responses: (a) employment setting, (b) experience level, (c) measured health

literacy knowledge, (d) previous health literacy training, (e) perceived knowledge of health literacy, (f) sex, (g) state, (h) primary job title, (i) secondary job title, (j) age, and (k) highest level of education completed. Frequency scores for questions three, four, eight, nine, and eleven of the measured knowledge of health literacy portion of the survey revealed that the participants answered question correctly less than 60% of the time. Significant differences ($p < .05$) were found between sex, primary job title, and highest level of education completed and measured knowledge of health literacy. However, each significant finding was accompanied by a small effect size.

Qualitative data were organized through the systematic review and coding of participant interview responses and placed into five main categories:

1. In the Field
2. Tell It Like It Is
3. Patient-Centered Care
4. Where the Rubber Hits the Road
5. Health Literacy

From these categories the following trends emerged:

1. Athletic trainers received little classroom instruction on health literacy related communication strategies but reported substantial exposure to patient-athletic trainer interactions during their clinical education.
2. Athletic trainers generally characterized their communication as open and honest with a strong desire for patients to feel comfortable. Athletic trainers were also inclined to customize patient interactions to their patient.

3. During physical examinations athletic trainers were likely to use plain language, focused on communication strategies that helped in the determination of the most accurate diagnosis, and provided patients with thorough information. Athletic trainers generally checked for patient understanding by asking the patient direct yes or no questions and through body language cues.
4. Athletics trainers believed that, due to various influences, their patients do not retain as much information as desired.
5. Athletic trainers are generally not familiar with the exact terminology "health literacy" or principles attached to the terminology "health literacy." Once defined, athletic trainers believed that there is a high prevalence of low/limited health literacy and that they might be able to identify such individuals by the language they used.

Finally, qualitative and quantitative data analyses were compared and it appeared that the athletic trainers' survey responses and interview responses were supportive of each other in a majority of the topics covered related to health literacy. However, athletic trainer awareness of the terminology or the definition of health literacy and the athletic trainers' estimated prevalence of lower or limited health literacy showed conflicting results between the two data collection methods.

CHAPTER 5

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to evaluate the awareness of health literacy and health literacy intervention techniques among athletic trainers. Additionally, participant characteristics and demographics were compared in order to determine if there were any significant interactions due to, or relationships between, select variables. Quantitative and qualitative data were gathered through the use of a researcher generated online survey and ethnographic interviews.

Summary of Population

The population (N) for the quantitative portion of this study was 5453 certified athletic trainers in good standing with addresses from West Virginia, Kentucky, Maryland, Ohio, Pennsylvania, and Virginia. This study surveyed 100% of the defined population, in effort to create a census. However, with a return rate of 7.7%, West Virginia (25), Kentucky (25), Maryland (45), Ohio (84), Pennsylvania (128), Virginia (80), Other (23), and State Not Reported (9), a census was not achieved. The resulting sample (n) was 419 fully completed surveys.

The mean age of the participants was 37 ± 5.5 years with 244 (58%) of the respondents being female and 169 (40%) male (6 participants did not report). Additionally, from the 419 respondents 312 (74%) were employed in one of three settings (a) College (106), (b) Clinic (148), (c) High School (58), and averaged 12 ± 5 years of athletic training work experience. The participants also noted primary job titles that were categorized as (a) Clinical Supervisory (70), (b) Academic (76), (c) Other (55), (d) Other Health Care Provider (23), (e) Clinical AT (141), and (f) Clinical Under Supervision (44). Secondary job titles reported were: (a) Clinical (78), (b) Academic (44), (c) Other (35), (d) No title (108), and (e) Other Health Care Provider (13). Lastly, 211 participants completed a non-entry level master's degree as their highest degree

earned, which represented 50% of the sample. The remaining participants indicated their highest degree earned as: (a) Bachelors (118), (b) Entry Level Masters (32), and (c) Doctorate (57).

To complement the quantitative responses, ethnographic interviews were also conducted. All individuals that agreed to participate completed the interview process. The total sample (n) was 18 and comprised nine male and nine female athletic trainers with three ATs being employed in each of the six states of focus (WV, KY, MD, OH, PA, VA). Additionally, within each state, there was one athletic trainer from each of the top three employment settings (College, Clinic, High School) represented in the quantitative portion of the study. The participants completed varying levels of education (3 Bachelor's degree, 11 Master's degree, 3 Doctorate degrees, and 1 unknown), and had a mean of 11 ± 3.5 years of athletic training work experience.

Summary of Methods

All athletic trainers with addresses provided to the BOC in the aforementioned six states were emailed a Survey Monkey link from the BOC that directed recipients to the quantitative survey. Recipients that chose to fully complete the survey represented the sample from which quantitative data were analyzed. After data were entered into SPSS, descriptive statistics, Independent T-tests, One-Way ANOVAs, and a Pearson Correlation Coefficient were run to determine the presence of any notable and/or significant findings.

Furthermore, the National Athletic Trainers' Association (NATA) online membership directory was utilized to randomly select interview participants. Members were sorted by each of six states in the study and by employment setting (College, Clinic, and High School). A random number generator was utilized to select potential participants who were subsequently called and asked if they would be willing to participate in the survey. Participants were read an opening

statement that included information about the study and an informed consent. All participants also gave permission for the interviews to be recorded for future data analysis purposes. The interview included five primary questions and a series of follow-up questions as needed. The mean interview length was 21 minutes and 21 seconds.

Restatement of Research Questions

There were five research questions that guided this study:

1. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' employment setting?
2. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' experience level?
3. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' previous health literacy training?
4. Is there a significant correlation between an athletic trainers' perceived knowledge of health literacy and the athletic trainers' measured knowledge of health literacy?
5. Is there a significant difference in an athletic trainers' measured knowledge of health literacy due to the athletic trainers' demographics? These include:
    - Sex
    - State of employment
    - Primary Job Title
    - Secondary Job Title
    - Age
    - Highest Level of Education Completed

Summary of Quantitative Findings

In order to answer the research questions quantitative data were analyzed with a series of descriptive and inferential statistics, while the qualitative data were evaluated for identifiable trends and themes. Data analysis revealed that there was no significant difference in the athletic trainers' measured knowledge of health literacy due to the athletic trainers' employment setting, experience level, previous health literacy training, state, secondary job title, or age. There was also a non-significant, weak relationship between athletic trainers' perceived knowledge of health literacy and measured knowledge of health literacy. The interviews generally supported these findings with no clear alignment in responses by participant's employment setting, experience level, previous health literacy training, or state. Interview participants were not asked directly to provide their age or secondary job title.

Statistical evaluation did identify three areas of significance. Significant differences were found in the athletic trainers' measured knowledge of health literacy due to sex, primary job title, and highest level of education completed. Data analysis indicated that: (a) female athletic trainers had a significantly higher mean knowledge of health literacy score (8.7 ± 0.92) than male athletic trainers (8.12 ± 1), (b) athletic trainers that reported a primary job title within the academic category scored significantly higher (8.93 ± 1) than athletic trainers that reported a primary job title within the clinical (non-supervisory and/or non-supervised) category (8.02 ± 0.95), and (c) and athletic trainers that completed a doctorate degree scored significantly higher (9.09 ± 0.97) than athletic trainers that completed a bachelor's degree (8.11 ± 0.98). Each of these significant differences were accompanied by a low effect size, indicating small relative importance due to the small numerical difference in mean score. However, it is important to consider these

differences using the percent conversion of the participant's numerical score (number correct out of 15) used to quantify measured knowledge of health literacy and a typical grading scale.

Many academic institutions utilize a typical 10% change in overall percent (100% represents the highest score and excellent performance, with any percentage below 60% representing a below average score or poor performance) to represent varying levels of mastery on a task. (Steen-Eibensteiner, 2006). When considering the measured knowledge of health literacy scale, with 12 being the highest score and zero being the lowest, the significant variables with lower mean scores had an average of 8.08 (67.4%) correct while the significant variables with higher mean scores averaged 8.91 (74.3%) correct. Although a small numerical value, this difference could be interpreted as a distinction between inadequate or below average overall scores and adequate or average overall scores.

Qualitative data gained from the interviews did not directly support the significant differences found between athletic trainers' sex from the quantitative data. However, it is notable that participants who had earned a doctorate degree (AT #3, 7, 8) or the participant that mentioned the completion of a physician extender athletic training residency program (AT #18) responded to interview questions in a way that reflected a general understanding and use of health literacy principles during their interactions with patients. Primary job titles were not specifically asked about during the interviews.

Summary of Ancillary Quantitative Findings

Frequency of accurate responses on questions included in the measured knowledge of health literacy section of the survey were calculated and reviewed. A clear distinction in accurate responses was visible based on the percentage of participants that answered each of the health literacy questions correctly or incorrectly. Participants answered questions 1, 2, 5, 6, 7, 10, and

12 correctly at least 70% of the time. However, within this group of questions, participants answered four (1, 6, 7, and 10) correctly over 87% of the time indicating above average to excellent knowledge on (a) the use of basic language during patient interactions; (b) the definition of health literacy; (c) the relationship between low health literacy and poor health outcomes. Three of the seven questions (2, 5, and 12) were only answered correctly, on average, 72% of the time, indicating knowledge levels on the lower end of acceptable for (a) assessing patient understanding and (b) considerations related to interacting with low or limited health literacy patients.

Furthermore, a key finding was that the remaining questions (3, 4, 8, 9, and 11) were answered correctly less than 58% of the time. Within this group, participants answered four questions (3, 4, 8, and 9) correctly, on average, 54.5% percent of time, indicating a poor knowledge level or awareness regarding: (a) the need for, and application of, limiting concepts when interacting with patients, (b) prevalence of health literacy in the U.S., and (c) accurate indicators that a patients may have low or limited health literacy. Finally, question 11 was answered incorrectly the most, with participants only providing a correct response 39% percent of time, indicating a poor knowledge level or awareness that low or limited health literacy is commonly found in patients that read at or below the sixth grade level.

Qualitative data generally supported the quantitative findings gleaned from the frequency of correct responses on health literacy knowledge questions. During the interviews athletic trainers regularly mentioned using basic language and occasionally mentioned that they checked for patient understanding by asking patients to repeat back what they heard from the provider. Additionally, interview participants rarely indicated that they would limit the information provided to patients to help with patient understanding and retention. Participants also did not

mention effective identifiers for spotting patients that may have low or limited health literacy. Interestingly, there was a discrepancy between the participant's responses when comparing the interview and quantitative survey on the prevalence of low or limited health literacy in the U.S. During the interviews participants commonly estimated that prevalence of low or limited health literacy at greater than 35%. However, survey data showed that 42% of the time participants thought that the prevalence of low or limited health literacy was less than 35%.

Summary of Qualitative Findings

Analysis of the 18 interviews was achieved through the systematic process of coding data in order to identify any emerging trends and themes. The qualitative data offered substantial insight into: (a) the participant's previous education on how to interact with patients, (b) their personal communication style, (c) typical process and considerations participants make during patient interactions, (d) patient retention of information, and (e) ATs' awareness of health literacy. Five coding categories and trends/themes emerged:

- In the Field - Athletic trainers received little classroom instruction on health literacy related communication strategies but reported substantial exposure to patient-athletic trainer interactions during their clinical education.
- Tell it like it is - Athletic trainers generally characterized their communication as open and honest with a strong desire for patients to feel comfortable. Athletic trainers were also inclined to customize interactions to their patient.
- Patient-Centered Care - During physical examinations athletic trainers were likely to use plain language, focus on communication strategies that helped in the determination of the most accurate diagnosis, and provide patients with thorough information. Athletic

Trainers generally checked for patient understanding by asking the patient direct yes or no questions about their understanding of information and through body language cues.

- Where the Rubber Hits the Road - Athletics trainers believed that, due to a number of various influences such as distractions, value of information, and so on, their patients do not retain as much information as desired.
- Health Literacy - Athletic trainers are generally not familiar with the exact terminology "health literacy" or principles attached to the terminology "health literacy." Once defined, athletic trainers believed that there is a high prevalence of low/limited health literacy and that they might be able to identify such individuals by the language they used.

Conclusions

The quantitative findings from this study showed significant differences in the athletic trainers' measured knowledge of health literacy score when analyzed by sex, primary job title, and highest level of education completed. However the qualitative results did not identify a clear alignment with the findings related to sex and did not address primary job title directly. Yet qualitative analysis indicated a slight connection in highest level of education completed (or specific training as a residency trained health care provider). Unfortunately, there is limited literature available on athletic trainers and health literacy making it difficult to compare results to of this study directly to previous research on the same population.

Devraj and Gupchup (2012) published the closest related research to the quantitative component of this study. The authors focused on health literacy awareness and barriers to health literacy within a sample of Illinois pharmacists. Interestingly, the frequency rates of accurate responses on the measured knowledge of health literacy scale among participating athletic trainers were similar to results found in pharmacists (Devraj and Gupchup, 2012). Although survey questions utilized in these studies were not the same, content areas did overlap. Athletic trainers had the highest rate of correct health literacy responses (≥87%) for: (a) the use of basic language during patient interactions, (b) the definition of health literacy, and (c) the relationship between low health literacy and poor health outcomes. Yet, participant responses to questions on: (a) assessing patient understanding and (b) interacting with low or limited health literacy patients, resulted in a mid-range rate of accurate responses (71-73%). Lastly, the athletic training participants had the lowest rate of correct responses (≤58%) on: (a) limiting concepts when interacting with patients, (b) prevalence of health literacy in the U.S., (c) indications of low or

limited health literacy, and (d) reading at or below the sixth grade level is attributed to low or limited health literacy.

Likewise, pharmacists surveyed by Devraj and Gupchup (2012) answered questions incorrectly most often regarding: (a) prevalence of low health literacy, (b) relationship of health literacy to the patient's years of schooling, and (c) relationship of health literacy to reading level. Also relatable were findings that pharmacists identified: (a) their lack of knowledge on how people with low health literacy hide their deficits and (b) difficulty communicating with non-English speaking patients as barriers in addressing low or limited health literacy (Devraj & Gupchup, 2012). A study conducted by Bass et al. (2002) revealed similar results, which found that medical residents were only successful at identifying 10% of the 32% of patients who had low health literacy.

Qualitative findings highlighted comparable results to the frequencies of accurate responses and previous research. Qualitative data indicated that although athletic trainers demonstrated strong interpersonal communication skills the inclusion of health literacy skills during their patient interactions were limited and inconsistent. Athletic trainers generally seemed to utilize plain language, which has been cited as a health literacy skill providers can employ during patient interactions to enhance patient understanding and compliance and set the stage for a positive health care experience (Dewalt et al., 2010; HHS, 2014a).

Two techniques not mentioned regularly during the interviews were teach back and limiting concepts. Research has indicated that teach back, or repeating back instructions, can be used to establish that patients accurately understand the information that has been shared by the provider (J. Johnson et al., 2013). Additionally, limiting concepts, or being concise in the delivery of information to include only three to five of the most essential pieces of information,

has been encouraged by authors in order to assist with patient recall and adherence to instructions (Gainor, 2013; Dewalt et al., 2010; The Joint Commission on Accreditation of Healthcare Organizations [JCAHO], 2007; HHS, 2014c).

Paradoxically, it seemed that there was a large disparity between the quantitative and qualitative data in two areas: (a) definition of health literacy and (b) prevalence of health literacy. It is likely that participants scored higher on the quantitative survey question related to the definition of health literacy because of the multiple choice format of the question which provided the opportunity for individual intuition to assist in answering that specific question correctly. It is believed that the qualitative interview data, which revealed little to no familiarity with the term health literacy, offered a more accurate assessment of athletic trainers' understanding of what the term health literacy means.

In contrast, the quantitative survey question on the prevalence of low or limited health literacy was often answered incorrectly by athletic trainers, indicating poor participant awareness. The survey question was asked without the addition of any new information on health literacy and respondents did not recognize how prevalent low or limited health literacy is in the U.S. However, during the interview, the prevalence question was asked immediately following the definition of health literacy question. After participants answered whether or not they were familiar with the terminology, the participants were offered a definition of health literacy by the researcher. Participants regularly assessed the prevalence more accurately. It is possible that the additional information better informed the participants and led to the increased accuracy of qualitative responses, accounting for the discrepancy between the data analyses.

Language barriers have been identified as a significant health literacy obstacle for athletic trainers (Strough et al, 2014). Although only briefly mentioned during participant interviews, this

topic represents the focus of the single publication found in the literature that studied athletic trainers and health literacy. Similar to a few comments heard during the interviews, Strough et al. (2014) identified that ATs need to make a conscious effort to build rapport with non-English speakers from the first interactions and the need to use teach back, visual aids, and generally assist in clarifying medical information for patients. Therefore, the importance of including health literacy strategies in AT clinical practice as the profession continues to evolve was further emphasized by Strough et al. (2014).

Finally, communication, although a component of health literacy, is a broad term that encompasses all aspects of verbal, non-verbal, and written communication. Interview participants were asked about communication during patient interactions as a way to encourage discussion of health literacy considerations. Subsequently, due to the wide scope of the term, participant responses included an extensive range of comments. Most participants were extremely comprehensive, offering a step by step account of how they usually interact with patients. Due to the thoroughness of these responses, additional insight into athletic trainer – patient interactions presented itself. Athletic trainers commonly reported interpersonal communication characteristics that were utilized to foster patient comfort and encourage sharing of information. Athletic trainer attention to communication is not an unusual finding. In fact, Raab et al. (2011) revealed that athletic trainers identified communication as one of the five constructs linked to quality athletic training and described communication as the key to quality care. Although not referred to as health literacy intervention techniques in the article, Raab et al (2011) also highlighted that the skills of an AT are rendered useless if the AT cannot communicate important information in a clear and concise manner while also doing so at an appropriate level for the individual to understand (Raab et al., 2011).

Over the past thirty years the topic of health literacy has gained attention and recognition as a public health concern (Berkman et al., 2010; Eadie, 2014; J. Johnson et al., 2013; Devraj & Gupchup, 2012). This study mirrors the statements of others that suggest that the infusion of health literacy principles into clinical practice has been slow and sporadic and that there has not been a consistent effort to introduce or train the varying levels of health care providers responsible for communicating with patients (Devraj & Gupchup, 2012). Health literacy considerations should be something all health care professionals are attentive to and skilled in utilizing (Parker & Ratzan, 2010).

Implications

Currently, there is little research or discussion on health literacy and/or health literacy intervention techniques occurring in the profession of athletic training. With a large emphasis presently being placed on evidenced based practice and patient centered-care by the profession, attention to the concept of health literacy is a natural fit. Furthermore, numerous studies have shown a connection between low or limited health literacy and poor health outcomes which have resulted in a concentrated effort to enhance communication preparedness of health care professionals. (Berkman et al., 2004; JCAHO, 2007; HHS, 2010b; Berkman et al., 2010).

The Professional Education Committee (PEC), a committee within the NATA, generated the current edition of the Athletic Training Education Competencies (ATEC) through a comprehensive and systematic feedback process that evaluated the current health care system and best practices in athletic training (NATA, 2011b). Although the ATEC does not refer to the term health literacy, the document does refer to communication and offers a place for potential inclusion in the following sections:

1. Foundational Behavior of Professional Practice stating, “Demonstrate effective interpersonal communication skills” (NATA, 2011b, p.9).
2. Psychosocial Strategies and Referral (PS) content area, specifically in competency PS-4, “Summarize and Demonstrate the basic processes of effective interpersonal and cross-cultural communication as it relates to interactions with patients and others involved in the heath care of the patient” (NATA, 2011b, p. 26).
3. Competency PS-5, “Summarize contemporary theory regarding educating patients of all ages and cultural backgrounds to effect behavior change” (NATA, 2011b, p. 26).

While these areas could provide a location to validate the instruction of health literacy to athletic training students, the vague nature of the competencies allows for much interpretation. Additionally, Clinical Integration Proficiencies (CIP) requires athletic training educators to assess athletic training students’ ability to communicate during real patient, or simulated patient, interactions (NATA, 2011b). Unfortunately, a complete and clear set of communication expectations for athletic trainers, with the goal of optimal patient understanding, retention of information, and ultimately improved health outcomes, was not obvious in the literature reviewed.

Moving forward, the athletic training profession should consider the inclusion of health literacy principles and intervention techniques when educating athletic training students and during continuing education opportunities. Understanding the role of health literacy and utilization of health literacy intervention techniques when interacting with patients should serve as a framework for athletic trainers to work within during every patient interaction.

Similar to many athletic training skills, health literacy content and skill development would ideally occur first during didactic instruction and guided practice and then purposefully

refined through various patient interaction opportunities in the clinical setting (Green et al., 2014). A slight expansion in what is currently presented for competency and proficiency in communication during athletic trainer - patient interactions to specifically include health literacy, would promote the teaching of and evaluation of health literacy communication techniques. Therefore, attention and awareness, not only to the accuracy of what is being communicated to patients but also the techniques used to communicate messages, would be heightened. This type of expanded awareness to include plain language, teach back, and limiting principles, could enhance the opportunity for patient understanding, recollection of key information, and ultimately improved health outcomes.

Recommendations for Further Study

In an effort to better understand the role of health literacy concepts in effective athletic trainer – patient interaction, more research specific to the athletic training profession is needed. Currently, only one published research study and one blog post, including the terms health literacy and athletic trainer, were found through internet and database searches (Strough et al., 2014; Tivener, 2013). Health literacy has been studied within the context other health care professions such as medicine, pharmacy, physical therapy, and nursing, etc. However, discipline-specific research would offer the opportunity to evaluate data concentrated on professional considerations related to athletic training.

Future studies in health literacy should include the exploration of effective teaching and reinforcement methods for the successful and efficient integration of health literacy principles into an athletic training student's education and post-graduate athletic trainers' continuing education (CE). This information could offer athletic training educators and CE organizers valuable, evidenced-based information to guide teaching and health literacy skill assessment

practices. It is also recommended that a strong research emphasis include the assessment of patient health care outcomes and ongoing patient satisfaction with the integration of health literacy principles. Specific to patient health care outcomes, the effect of health literacy intervention techniques on patient compliance rates, retention of information rates, and/or patient satisfaction would offer insight into effectiveness. Finally, a close look at any perceived barriers to health literacy integration and the various patient demographics and settings that athletics trainers encounter would provide further understanding related to the clinical practice of athletic training.

Concluding Thoughts

Although a census was not reached during quantitative efforts the data gathered from the qualitative interviews offered additional insight and support. A comparison of the information gained from both forms of data collection allowed for corroboration of findings and provided the opportunity to gain a deeper understanding of the current knowledge and awareness of health literacy principles among athletic trainers. It seems apparent from the findings of this study that there is a need for a focused and purposeful effort for athletic trainers to better understand and integrate health literacy and health literacy intervention techniques, in particular, teach back and limiting concepts, during patient interactions. Athletic trainers generally seemed to understand and utilize plain language, making this a health literacy concept that should be retained by athletic trainers and reinforced by athletic training educators.

The qualitative data also revealed that the participants made an overall effort to provide a positive, open, and comfortable environment during patient interactions. The athletic trainers in the study regularly mentioned that they communicate honestly, listen intently, and encourage ongoing dialogue when communicating with patients. Athletic trainers also displayed a strong

knowledge of fundamental physical exam techniques with a substantial emphasis on gathering as much information as possible in order to arrive at an appropriate differential diagnosis for the patient's chief complaint. The aforementioned traits and qualities reflect an effective use of interpersonal communication and should be maintained by athletic trainers as new health literacy skills are introduced and refined.

REFERENCES

Agency for Healthcare Research and Quality. (2011). *Health literacy interventions and outcomes: An updated systematic review*, Executive Summary Evidence Report/Technology Assessment: No. 199. AHRQ Publication No.11-E006-1. Retrieved from http://effectivehealthcare.ahrq.gov/ehc/products/151/671/Health_Literacy_Update_FinalTechBrief_20110502.pdf

Bass, P. F., Wilson, J. F., Griffith, C. H., & Barnett, D. R. (2002). Residents' ability to identify patients with poor literacy skills. *Academic Medicine, 77*(10), 1039-1041.

Baker, D. W., DeWalt, D. A., Schillinger, D., Hawk, V., Ruo, B., Bibbons-Domingo, K., ...Pignone, M. (2011). "Teach to goal": Theory and design principles of an intervention to improve heart failure self-management skills of patients with low health literacy. *Journal of Health Communication, 16*(S3), 73-88. doi:10.1080/10810730.2011.604379

Baker, D. W., Gazmararian, J. A., Williams, M. V., Scott, T., Parker, R. M., Green, D., ... Peel, J. (2002). Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *American Journal of Public Health, 92*(8), 1278-1283. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1447230/

Baker, D. W., Parker, R. M., Williams, M. V., & Clark, W. S. (1997). The relationship of patient reading ability to self-reported health and use of health services. *American Journal of Public Health, 87*(6), 1027-1030. Retrieved from Academic Search Premier http://ezproxy.marshall.edu:2058/login.aspx?direct=true&db=aph&AN=9708191872&site=ehost-live

Baker, D. W., Williams, M. V., Parker, R. M., Gazmararian, J. A., & Nurss, J. (1999). Development of a brief test to measure functional health literacy. *Patient Education and Counseling, 38*, 33-42.

Bennet, C. L., Ferreira, M. R., Davis, T. C., Kaplan, J., Weinberger, M., Kuzel T, ... Sartor, O. (1998). Relation between literacy, race, and stage of presentation among low-income patients with prostate cancer. *Journal of Clinical Oncology, 16*(9), 3101-3104.

Berkman, N. D., Davis, T. C., & McCormack, L. (2010). Health literacy: What is it? *Journal of Health Communication: International Perspectives, 15*(S2), 9-19. doi:10.1080/10810730.2010.499985

Berkman, N. D., DeWalt, D. A., Pignone, M. P., Sheridan, S. L., Lohr, K. N., Lux, L., . . . Bonito A. J. (2004). *Literacy and health outcomes.* (Evidence Report/Technology Assessment No. 87; AHRQ Publication No.04-E007-2), Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from http://archive.ahrq.gov/downloads/pub/evidence/pdf/literacy/literacy.pdf

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine, 155*(2), 97-107. doi:10.7326/0003-4819-155-2-201107190-00005

Bertoncino, T. K. (2010). *Linking rhetorical sensitivity with the ability of an athletic training student to successfully perform a patient medical interview* (doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Full Text. (3434591)

Board of Certification, Inc. (2013). *Certification Maintenance Requirements*. Retrieved from http://www.bocatc.org/ats/maintain-certification/continuing-education

Chu, C. & Tseng, C.A. (2013). A survey of how patient-perceived empathy affects the relationship between health literacy and the understanding of information by orthopedic patients? *BioMed Central Public Health, 13*(1), 1-6. Retrieved from http://ezproxy.marshall.edu:2058/login.aspx?direct=true&db=aph&AN=86870105&site=ehost-live

Commission on Accreditation of Athletic Training Education. (2012). *Standards for the accreditation of professional athletic training programs*. Retrieved from http://caate.net/wp-content/uploads/2014/07/2012-Professional-Standards.pdf

Davis, T. C., Wolf, M. S., Bass, P. F., Middlebrooks, M., Kennen, E., Baker D. W., … Parker, R. M. (2006a). Low literacy impairs comprehension of prescription drug warning labels. *Journal of General Internal Medicine, 21*, 847-851. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1831578/

Davis, T. C., Wolf, M. S., Bass, P. F., Thompson, J. A., Tilson, H. H., Neuberger, M., Parker, R. M. (2006b). Literacy and misunderstanding prescription drug labels. *Annals of Internal Medicine, 145*, 887-894. Retrieved from http://annals.org/article.aspx?articleid=731144

Devraj, R., & Gupchup, G. V. (2012). Knowledge of and barriers to health literacy in Illinois. *Journal of the American Pharmacists Association, 52*(6), e183-e193. doi:10.1331/JAPhA.2012.12011

DeWalt, D. A., Callahan, L. F., Hawk, V. H., Broucksou, K. A., Hink, A., Rudd, R., & Brach, C. (2010). *Health Literacy Universal Precautions Toolkit.* (AHRQ Publication No. 10-0046-EF), Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthliteracytoolkit.pdf

Diamond, C., Saintonge, S., August, P., & Azrack, A. (2011). The development of building wellness™, a youth health literacy program. *Journal of Health Communication, 16*(S3), 103-118. doi: 10.1080/10810730.2011.604385

Eadie, C. (2014). Health literacy: A conceptual review. *MEDSURG Nursing, 23*(1), 1-13. Retrieved from http://ezproxy.marshall.edu:2058/login.aspx?direct=true&db=aph&AN=94720083&site=ehost-live

Freedman, A. M., Miner, K. R., Echt, K. V., Parker, R., & Cooper, H. L. F. (2011). Amplifying diffusion of health information in low literate populations through adult education health literacy classes. *Journal of Health Communication, 16*(S3), 119-133. doi: 10.1080/10810730.2011.604706

Gainor, S. J. (2013). *Health literacy impact: Communication strategies to help patients understand* [PowerPoint slides]. Retrieved from http://www.qipa.org/getattachment/ea9901fd-764c-4a88-a697-9e85e357ff11/WVMI-Health-Literacy-Impact-Webinar2_Branded.aspx

Green, J. A., Gonzaga, A. M., Cohen, E. D., & Spagnoletti, C. L. (2014). Addressing health literacy through clear communication: A training program for internal medicine residents. *Patient Education and Counseling, 95(1),* 76-82. doi: 10.1016/j.pec.2014.01.004

Glassman, P. (2012). Health literacy. Retrieved from http://nnlm.gov/outreach/consumer/hlthlit.html

Howard, D. H., Gazmararian, J., Parker, R. M. (2005). The impact of low health literacy on the medical costs of Medicare managed care enrollees. *The American Journal of Medicine, 118*(4), 371-377. Retrieved from http://dx.doi.org/10.1016/j.amjmed.2005.01.010

Institute of Medicine (IOM). (2009). *Measures of health literacy: Workshop summary*. Washington, DC: The National Academies Press. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK45384/pdf/TOC.pdf

Johnson, J. L., Moser, L., & Garwood, C. L. (2013). Health literacy: A primer for pharmacists. *American Journal of Health-System Pharmacy, 70*(11), 949-955. Retrieved from http://ezproxy.marshall.edu:2058/login.aspx?direct=true&db=aph&AN=90005342&site=ehost-live

Johnson, S. E., Baur, C., Meissner, H. I. (2011). Back to basics: Why basic research is needed to create effective health literacy interventions. *Journal of Health Communication, 16*(S3), 22-29. doi:10.1080/10810730.2011.604707

The Joint Commission on Accreditation of Healthcare Organizations. (2007). *"What did the doctor say?": Improving health literacy to protect patient safety*. Oakbrook Terrace, Illinois. Retrieved from http://www.jointcommission.org/assets/1/18/improving_health_literacy.pdf

Kalichman, S. C., Benotsch, E., Suarez, T., Catz, S., Miller, J., & Rompa, D. (2000). Health literacy and health-related knowledge among persons living with HIV/AIDS. *American Journal of Preventive Medicine, 18*(4), 325-331. doi: 10.1016/S0749-3797(00)00121-5

Kandula, N. R., Malli, T., Zei, C. P., Larsen, E., & Baker, D. W. (2011). Literacy and retention of information after a multimedia diabetes education program and teach-back. *Journal of Health Communication, 16*(S3), 89-102. doi: 10.1080/10810730.2011.604382

Kirsch, I. S., Jungeblut, A., Jenkins, L., & Kolstad, A. (2002). *Adult literacy in America: A first look at the findings of the National Adult Literacy Survey*. Washington, DC: National Center of Education Statistics, U.S. Department of Education. Retrieved from https://nces.ed.gov/pubs93/93275.pdf

Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). *The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy* (NCES 2006-483). Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubs2006/2006483.pdf

Laurent, T. G., & Bradney, D. A. (2007). Leadership behaviors of athletic training leaders compared with leaders in other fields. *Journal of Athletic Training, 42*(1), 125-125. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1896069/

Littlejohn, S. W. (1996). *Theories of human communication* (5th ed.). New York, NY:

McCormack, L. A., Rush, S. R., Kandula, N. R., & Paasche-Orlow, M. K. (2011). Health literacy research: Looking forward. *Journal of Health Communication: International Perspectives, 16*(S3), 5-8. doi: 10.1080/10810730.2011.605823

National Athletic Trainers' Association. (September 2011a). *Profile of Athletic Trainers*. Retrieved from http://www.nata.org/sites/default/files/AT_Facts_revSept2011.pdf

National Athletic Trainers' Association. (2011b). *Athletic Training Education Competencies* (5th ed.). Retrieved from https://caate.net/wp-content/uploads/2014/06/5th-Edition-Competencies.pdf

National Athletic Trainers' Association. (2014). *Athletic Training.* Retrieved from http://www.nata.org/athletic-training

National Patient Safety Foundation. (2014, June 8). *Ask me 3*. Retrieved from http://www.npsf.org/?page=askme3

National Network of Libraries of Medicine. (2013). *Health literacy*. Retrieved from http://nnlm.gov/outreach/consumer/hlthlit.html

Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International, 15*(3), 259-267. Retrieved from http://heapro.oxfordjournals.org/content/15/3/259.full.pdf+html

Nutbeam, D. (2009). Defining and measuring health literacy: What can we learn from literacy studies? *International Journal of Public Health, 54*(5), 303-305. doi:10.1007/s00038-0050-x

Parikh, N. S., Parker, R. M., Nurss, J. R., Baker, D. W., & Williams, M.V. (1996). Shame and health literacy: The unspoken connection. *Patient Education and Counseling, 27*(1), 33-39.

Parker, R. M., & Ratzan, S. C. (2010). Health literacy: A second decade of distinction for Americans. *Journal of Health Communication: International Perspectives, 15*(S2), 20-33. http://dx.doi.org/10.1080/10810730.2010.501094

Parker, R. M., Baker, D. M., Williams, M. V., & Nurss, J. R. (1995). The test of functional health literacy in adults: A new instrument for measuring patients' literacy skills. *Journal of General Internal Medicine, 10*(10), 537-541.

Piccininni, J. J. (2010). *A qualitative examination of health care professionals' experience as patient educators: Cases from Canadian chiropractors* (doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Full Text. (NR73176)

Piccininni, J. J. & Drover, J. M. (2000). Perspectives in patient education. *Topics in Clinical Chiropractic, 7*(4), 43-50.

Pleasant, A., McKinney, J., & Rikard, R. V. (2011). Health literacy measurement: A proposed research agenda. *Journal of Health Communication, 16*(S3), 11-21. Retrieved from http://ezproxy.marshall.edu:2058/login.aspx?direct=true&db=aph&AN=65928154&site=ehost-live

Prentice, W. E. (2013). Focusing the direction of our profession: Athletic trainers in America's health care system. *Journal of Athletic Training, 48*(1), 7-8. doi: 10.4085/1062-6050-48.1.21

Raab, S., Wolfe, B. D., Gould, T. E., & Piland, S. G. (2011). Characterizations of a quality certified athletic trainer. *Journal of Athletic Training, 46*(6), 672-679. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418946/pdf/i1062-6050-46-6-672.pdf

Ratzan, S. C. (2001). Health literacy: Communication for the public good. *Health Promotion International*, *16*(2), 207-214. Retrieved from http://heapro.oxfordjournals.org/content/16/2/207.full.pdf+html

Ratzan, S. C., & Parker, R. M. (2000). Introduction. In *Current Bibliographies in Medicine*, 2000-1, Health Literacy, C. R. Selden, M. Zorn, S. C. Ratzan, & R. M. Parker. (Eds.). Retrieved from http://www.nlm.nih.gov/archive//20061214/pubs/cbm/hliteracy.html#15

Safeer, R. S., & Keenan, J. (2005). Health literacy: The gap between physicians and patients. *American Family Physician, 72*(3), 463-468. Retrieved from http://www.aafp.org/afp/2005/0801/p463.html

Schillinger, D., Piette, J., Grumbach, K., Wang, F., Wilson, C., Daher, C., ... Bindman, A. B. (2003). Closing the loop: Physician communication with diabetic patients who have low health literacy. *Archives of Internal Medicine, 163*(1), 83–90. Retrieved from http://archinte.jamanetwork.com/article.aspx?articleid=214905

Scott, T. L., Gazmararian, J. A., Williams, M. V., & Baker, D. W. (2002). Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Medical Care. 40*(5), 395-404.

Shah, L. C., West, P., Bremmeyr, K., & Savoy-Moore, R.T. (2010). Health literacy instrument in family medicine: The "newest vital sign" ease of use and correlates. *Journal of the American Board of Family Medicine, 23,* 195-203. Retrieved from http://www.jabfm.org/content/23/2/195.long

Smith, S. G., Curtis, L. M., Wardle, J., von Wagner, C., & Wolf, M. S. (2013). Skill set or mind set? Associations between health literacy, patient activation, and health. *PLos ONE, 8*(9), 1-7. doi:10.1371/journal.pone.0074373

Steen-Eibensteiner, J.L. (2006). *Conceptual and procedural knowledge community college students use when solving a complex science problem* (doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Full Text. (AAT 3235400)

Street, R.L., & De Haes, H.C. (2013). Designing a curriculum for communication skills training from a theory and evidence based perspective. *Patient Education & Counseling, 93*(1), 27-33. DOI: 10.1016/j.pec.2013.06.012.

Strough, H., Wimer, J., & Wapola, J. (2014). Health literacy: Implications for athletic trainers and therapists. *International Journal of Athletic Therapy and Training, 19*(1), 32-35. doi:10.1123/IJATT.2012-0099

Tebbe, K. (2012). *Collegiate student athlete perception of satisfaction and comfort with athletic training students* (doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Full Text. (AAT 1519214)

Tivener. K. (2013, October 3). October Health Literacy Month: Effective Communication [Web log post]. Retrieved from http://www.bocatc.org/blog/uncategorized/october-health-literacy-month-effective-communication/

U.S. Department of Health and Human Services. (2010a). *Healthy People 2020*. Retrieved from http://www.healthypeople.gov/2020/default.aspx

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2010b). *National action plan to improve health literacy*. Washington, DC. Retrieved from http://www.health.gov/communication/hlactionplan/pdf/Health_Literacy_Action_Plan.pdf

United States Department of Health and Human Resources. (2013, November 13). *Healthy People 2020*. Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=18

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2014a). *Health literacy basics*. Retrieved from http://health.gov/communication/literacy/quickguide/factsbasic.htm

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2014b). *Health literacy and health outcomes.* Retrieved from http://www.health.gov/communication/literacy/quickguide/factsliteracy.htm

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2014c). *Quick guide to health literacy: Improve the usability of health information*. Retrieved from http://www.health.gov/communication/literacy/quickguide/healthinfo.htm

Williams, M. V., Baker, D. W., Parker, R. M., & Nurss, J. R. (1998). Relationship of functional health literacy to patients' knowledge of their chronic disease: A study of patients with hypertension and diabetes. *Archives of Internal Medicine, 158*(2), 166-172. Retrieved from http://archinte.jamanetwork.com/article.aspx?articleid=191123

World Health Organization. (2014). *Health literacy and health behaviour*. Retrieved from http://www.who.int/healthpromotion/conferences/7gchp/track2/en/

APPENDICES

APPENDIX A: RESEARCHER-GENERATED QUANTITATIVE HEALTH LITERACY SURVEY

RESEARCHER-GENERATED QUANTITATIVE HEALTH LITERACY SURVEY

Dissertation: Knowledge of Health Literacy among Athletic Trainers

Thank you for agreeing to participate in this research study. Please respond to all questions honestly and without any outside assistance. Your compliance with this request will allow me to gather accurate information.

Demographics

Please respond to the following demographic questions

1. What is your age (in years)?

1

2. What is your sex?

- [ ] Male
- [ ] Female

3. What year did you receive your Athletic Training BOC certification?

1

4. How many years have you been employed as a certified athletic trainer or related position following BOC certification?

1

5. In which state do you work?

6. What is the highest level of education you completed?

- [ ] Bachelor Degree
- [ ] Entry-level Master Degree (earned bachelor degree in other major first, did not complete an undergraduate Athletic Training Education Program (ATEP) prior to graduate school)
- [ ] Master Degree (completed undergraduate Athletic Training Education Program (ATEP) and then graduate school)
- [ ] Doctorate Degree
- [ ] Other (please specify)

Employment Setting and Job Title(s)

Please respond to the following questions about your employment setting and job title(s).

Dissertation: Knowledge of Health Literacy among Athletic Trainers

7. What is your employment setting? Choose one.

- ◯ College/University
- ◯ Secondary School (Employed by secondary school. If you are employed by a clinic but work in a secondary school, go to Clinic category)
- ◯ Clinic (this includes Administration, Hospital-Based Clinic, Outpatient/Ambulatory/Rehabilitation Clinic, Physician Owned Clinic, Secondary School/Clinic, etc.)
- ◯ Health/Fitness/Sports/Performance Enhancement Clinics/Clubs (You work for a franchise, chain or independent club such as Bally's, YMCA, 24 Hour Fitness.)
- ◯ Hospital (This category is for ATs who work in the hospital setting but not in a hospital-based clinic. If you are employed by a hospital but work in a clinic, go to Clinic category, "Hospital-based clinic".)
- ◯ Professional Sports
- ◯ Industrial/Occupational (You work on site at an industrial or occupational facility that employs you.)
- ◯ Corporate (You are employed by a company that sells to the profession or employs an AT in a patient care, wellness or fitness capacity.)
- ◯ Amateur/Recreational/Youth Sports
- ◯ Military/Law Enforcement/Government (Employed full-time by the military, law enforcement or other government entity.)
- ◯ Independent Contractor (You are not an employee; you work for yourself as an individual and are classified as an independent contractor.)
- ◯ Unemployed
- ◯ Other (please specify)

Dissertation: Knowledge of Health Literacy among Athletic Trainers

8. Please select the one job title that is closest to your title or area of responsibility. Select your primary job title, the one you do more than half of the time:

- [ ] Admin Coordinator
- [ ] Admin Director
- [ ] Asst/Assoc AT Men's Sports
- [ ] Asst/Assoc Head AT Women's Sports
- [ ] Asst/Assoc Athletic Director
- [ ] Asst/Assoc Athletic Trainer
- [ ] Asst/Assoc Professor
- [ ] Asst/Assoc Department Chair
- [ ] Asst/Assoc Program Director
- [ ] Athletic Director
- [ ] Athletic Trainer
- [ ] Clinical Director/Coordinator/Specialist
- [ ] Consultant
- [ ] Counselor
- [ ] Director/Coordinator of AT Services
- [ ] Director/Coordinator Rehabilitation
- [ ] Director/Coordinator Sports Medicine
- [ ] Fitness Coordinator/Director
- [ ] Full Professor
- [ ] Full Professor/Department Chair
- [ ] Full Professor/Program Director
- [ ] Graduate Assistant – Clinical
- [ ] Graduate Assistant – Teaching/Research
- [ ] Graduate Student – no affiliated assistantship
- [ ] Head AT Men's Sports
- [ ] Head AT Women's Sports
- [ ] Head Athletic Trainer
- [ ] Lecturer/Instructor
- [ ] Manager
- [ ] Medical Office Staff
- [ ] Outreach Coordinator

Dissertation: Knowledge of Health Literacy among Athletic Trainers

- [ ] Owner/Partner
- [ ] Physician Extender
- [ ] Retired
- [ ] Sales/Marketing
- [ ] Supervisor
- [ ] Teacher
- [ ] Unemployed
- [ ] Wellness Program Coordinator/Director
- [ ] Other (please specify)

Dissertation: Knowledge of Health Literacy among Athletic Trainers

9. If you have a second title or area of responsibility that represents less than half of your job, please choose a title. Please DO NOT choose a secondary if your primary job title represents 100% of your workload

- [ ] No secondary job title
- [ ] Admin Coordinator
- [ ] Admin Director
- [ ] Asst/Assoc AT Men's Sports
- [ ] Asst/Assoc Head AT Women's Sports
- [ ] Asst/Assoc Athletic Director
- [ ] Asst/Assoc Athletic Trainer
- [ ] Asst/Assoc Professor
- [ ] Asst/Assoc Department Chair
- [ ] Asst/Assoc Program Director
- [ ] Athletic Director
- [ ] Athletic Trainer
- [ ] Clinical Director/Coordinator/Specialist
- [ ] Consultant
- [ ] Counselor
- [ ] Director/Coordinator of AT Services
- [ ] Director/Coordinator Rehabilitation
- [ ] Director/Coordinator Sports Medicine
- [ ] Fitness Coordinator/Director
- [ ] Full Professor
- [ ] Full Professor/Department Chair
- [ ] Full Professor/Program Director
- [ ] Graduate Assistant – Clinical
- [ ] Graduate Assistant – Teaching/Research
- [ ] Graduate Student – no affiliated assistantship
- [ ] Head AT Men's Sports
- [ ] Head AT Women's Sports
- [ ] Head Athletic Trainer
- [ ] Lecturer/Instructor
- [ ] Manager
- [ ]

Dissertation: Knowledge of Health Literacy among Athletic Trainers

- [ ] Medical Office Staff
- [ ] Outreach Coordinator
- [ ] Owner/Partner
- [ ] Physician Extender
- [ ] Retired
- [ ] Sales/Marketing
- [ ] Supervisor
- [ ] Teacher
- [ ] Unemployed
- [ ] Wellness Program Coordinator/Director
- [ ] Other (please specify)

Previous Health Literacy Training

***10. In what type of program have you received training/education related to health literacy? Please select ALL that apply.**

	I have not received training/education in health literacy	Undergraduate curriculum	Entry-level Master curriculum	Master (post ATEP) curriculum	Doctorate curriculum	Organized continuing education (i.e. conference, workshop, online training)	Individual research and/or experiences
Please select ALL that apply.	☐	☐	☐	☐	☐	☐	☐

Other (please specify)

Dissertation: Knowledge of Health Literacy among Athletic Trainers

***11. Please mark the box that best corresponds with your answer to each of the following statements**

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
I know how to communicate with patients who have low/limited health literacy.	◯	◯	◯	◯	◯	◯
I am knowledgeable about the prevalence of low/limited health literacy in the United States.	◯	◯	◯	◯	◯	◯
I understand the impact of low/limited health literacy on health outcomes.	◯	◯	◯	◯	◯	◯
I am confident that I am able to identify people with low/limited health literacy.	◯	◯	◯	◯	◯	◯
I understand when to consider health literacy levels when communicating with patients	◯	◯	◯	◯	◯	◯

Health Literacy Knowledge

Keeping health literacy communication principles in mind, please choose the best answer to the following questions:

***12. A patient is seeing you one day following a visit to the emergency room. Following your evaluation you spend some time providing information about weight bearing guidelines for their hip injury, which of the following statements would be the most appropriate to say to the patient?**

☐ During ambulation I would like you to reduce the stress placed on your hip joint by utilizing the assistive device you received at the emergency room. This will not only expedite your recovery but will help you maintain balance.

☐ In order to decrease the pressure placed on your iliofemoral joint and decrease healing time it would be best to utilize the walker/crutches that the emergency room provided you. Although you will need to accommodate for the size of the walker it will be better for you in long run.

☐ It is important to use the walker/crutches you were given at the emergency room. You should use them anytime you are walking or moving around. Even if walker/crutches are hard to use they will help your hip get better faster. And they will help keep you steady when moving.

☐ I would like you to utilize the walker/crutches you received at the conclusion of your emergency room visit. Although it can be cumbersome using it will improve your gait and stability leading to a quicker healing time and optimal outcomes for your hip injury.

Dissertation: Knowledge of Health Literacy among Athletic Trainers

***13. Which of the following questions would help you best assess whether the patient understood your take home instructions?**

- [ ] Do you have any questions about what we discussed?
- [ ] When you get home what are you are going to do for your injury?
- [ ] Do you understand everything I have told you about how to take care of your injury?
- [ ] Are you satisfied with your visit today?

***14. For a patient who just had out-patient knee surgery, which of the following sets of take home instructions has the highest chance of compliance prior to their one week post-operative follow-up with a healthcare provider?**

- [ ] 1) Wear compression stockings, 2) ice knee for 20 minutes 6-8 times per day, 3) change wound bandage on day three, 4) perform heel pump and range of motion exercise regularly, 5) move around your home throughout the day (do not lay on couch all week).
- [ ] 1) Wear compression stockings, 2) ice knee for 20 minutes 6-8 times per day, 3) change wound bandage on day three, 4) perform heel pump and range of motion exercise regularly, 5) move around your home, throughout the day (do not lay on couch all week), 6) take medication every four hours for 10 days, 7) perform 3 x 30 quad sets holding each contraction for 5 seconds at least 3 times a day.
- [ ] 1) Wear compression stockings, 2) ice knee for 20 minutes 6-8 times per day, 3) change wound bandage on day three, 4) perform heel pump and range of motion exercise regularly, 5) move around your home throughout the day (do not lay on couch all week), 6) take medication every four hours for 10 days, 7) perform 3 x 30 quad sets holding each contraction for 5 seconds at least 3 times a day, 8) begin straight leg raises in 5 days.
- [ ] 1) Wear compression stockings, 2) ice knee for 20 minutes 6-8 times per day, 3) change wound bandage on day three, 4) perform heel pump and range of motion exercise regularly, 5) move around your home throughout the day (do not lay on couch all week), 6) take medication every four hours for 10 days, 7) perform 3 x 30 quad sets holding each contraction for 5 seconds at least 3 times a day, 8) begin straight leg raises in 5 days, 9) call in to the aftercare helpline nightly to update progress.

***15. Most patients are able to remember _____ key concepts (pieces of information) per visit?**

- [ ] 1-2
- [ ] 3-5
- [ ] 6-9
- [ ] 10-12

Dissertation: Knowledge of Health Literacy among Athletic Trainers

***16. The best way to assess a patient's understanding is to?**

- [ ] Ask the patient if they have any questions before concluding the visit
- [ ] Give the patient time to process the information by asking them to stay in the room for at least 3 minutes before leaving
- [ ] Ask the patient to repeat back a summary of the things you covered with them
- [ ] Provide the patient with written instructions to take home with them for a reference

***17. When communicating with patients about healthcare/medical related issues an athletic trainer should:**

- [ ] use simple language to help with patient understanding
- [ ] use medical terminology so the patient understands that you know what you are talking about
- [ ] state at least 6 key concepts for the patient to remember
- [ ] limit time spent talking about injury/illness

***18. Health Literacy is?**

- [ ] the patient's ability to read, understand, and act on medical instructions and information
- [ ] the patient's ability to maintain a healthy lifestyle
- [ ] the patient's ability to communicate with healthcare providers
- [ ] the patient's ability to incorporate personal needs into the healthcare they receive

***19. Low/limited health literacy effects approximately _____ of adults in the United States.**

- [ ] Approximately 5%
- [ ] Approximately 15%
- [ ] Approximately 25%
- [ ] Approximately 35%

Dissertation: Knowledge of Health Literacy among Athletic Trainers

***20. Which of the following can serve as reliable estimation of a patient's health literacy?**

- [ ] Patient asks questions
- [ ] Incomplete or inaccurately matched responses on patient registration forms
- [ ] Years of Schooling
- [ ] Income level

***21. Patients with low/limited health literacy tend .....**

- [ ] to be compliant and follow directions
- [ ] to have below-level IQ levels
- [ ] to have worse health outcomes and more health complications that result in increased cost
- [ ] not to bring family members with them to their healthcare visits

***22. Low/limited health literacy.....**

- [ ] is found in patients that read at or below the sixth grade level
- [ ] can only be addressed when patients inform providers that they need assistance
- [ ] is not a cause of shame for patients
- [ ] is not found in all segments of society

Dissertation: Knowledge of Health Literacy among Athletic Trainers

***23. Health literacy levels and interaction principles should be considered in which of the following situations? Please respond to each statement**

	agree	disagree
1. Only when interacting with patients that appear to have low/limited health literacy	☐	☐
2. When speaking with patients about health care or related issues	☐	☐
3. In providing or posting health care or related information in writing for patients	☐	☐
4. Isolated to patients that state they have a difficult time understanding health related information	☐	☐
5. If discussing information about medication or nutritional supplements	☐	☐
6. When requesting that patients comply or act on health or medical directions	☐	☐
7. Solely when a patient has multiple problems following or fulfilling health/medical directions	☐	☐

Thank you for completing this survey.

APPENDIX B: OPENING EMAIL TO SURVEY RECIPIENTS

OPENING EMAIL TO SURVEY RECIPIENTS

Dear Board Certified Athletic Trainer,

I am seeking to survey board certified athletic trainers from the states of West Virginia, Virginia, Maryland, Pennsylvania, Ohio, and Kentucky via an online survey administered by surveymonkey.com. The purpose of this research is to evaluate athletic trainers' current knowledge levels of health literacy and health literacy intervention techniques. The survey contains 23 questions. It is anticipated that the survey will take approximately 10-15 minutes to complete. The completed surveys will not include participant names, email addresses, or identifying codes, and there are no foreseeable risks, discomforts, or benefits associated with participation in this study. Participation in this research is completely voluntary and there is no penalty for refusal to participate or discontinuation of participation. The completed surveys will be reviewed, analyzed, and results will be generated. This research is being completed through Marshall University, IRB approval # 628827-1, as part of the Educational Leadership Program doctoral degree requirements. If you have any questions concerning your rights as a research participant you can contact the Marshall University Office of Research Integrity at (304) 696-4303. If you have any questions regarding this research project you may contact Dennis M. Anderson, primary investigator, at (304)746-8989, andersond@marshall.edu, or Janet Rorrer, co-investigator, at 304-357-4902, janetrorrer@ucwv.edu.

To participate please follow the below link which will take you directly to the online survey. Please note: Your decision to complete the online survey will serves as your informed consent. Please answer all questions honestly and without any outside or additional assistance.

CLICK THIS LINK TO TAKE YOU TO SURVEY

https://www.surveymonkey.com/s/Healthliteracydissertation

The survey will remain open for five weeks. If you choose to participate, please complete the survey at your earliest convenience.

Thank you for your time,

Janet Rorrer
Marshall University
Educational Leadership Studies
Doctoral Candidate

APPENDIX C: QUALITATIVE INTERVIEW OPENING STATEMENT AND QUESTIONS

QUALITATIVE INTERVIEW OPENING STATEMENT AND QUESTIONS

Knowledge of Health Literacy among Athletic Trainers
Opening, Verbal Consent, and Interview Questions: Qualitative Research Portion

Hi, my name is Janet Rorrer and I am an athletic trainer (AT) in West Virginia and a doctoral student at Marshall University in the Educational Leadership Program. I am in the process of conducting the second portion of my dissertation and you have been chosen at random to be in this research study. The study includes a short qualitative interview of ATs regarding interactions and communication between athletic trainers and their patients when providing health care services.

The interview will take about 10-15 minutes to complete. May I continue, or is there a time I can call you back that is more convenient?

If allowed to continue: Great. There are no foreseeable risks or benefits to you for participating in this study. There is no cost or payment to you. If you have questions while taking part, please stop me and ask. This interview is confidential and you will remain anonymous. The only individuals that will have access to this conversation and transcript will be my doctoral chairperson, Dennis Anderson, and I. Participants will be coded using a number and referred to in the results as AT#___. I will analyze the descriptive data from the interviews by organizing identified trends and themes into coded categories. Direct quotes may also be used in the results but your name will not be included.

This research is being completed through Marshall University, IRB approval # 628827-2. If you have any questions concerning your rights as a research participant you can contact the Marshall University Office of Research Integrity at (304) 696-4303. If you have any questions regarding this research project you may contact Dennis M. Anderson, primary investigator, at (304)746-8989, andersond@marshall.edu, or Janet Rorrer, co-investigator, at 304-357-4902, janetrorrer@ucwv.edu

Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to stop. May I continue providing you with some additional information and ask you the interview questions?

Wonderful. Thank you very much for taking time out of your day to do this interview. I am interested in learning more about athletic trainer/patient interactions. Today's interview has five questions and I am looking to understand how you feel you were trained in or received additional education on interacting with patients, your perception of your communication techniques with patients when discussing health care information, and your perspective on your medical interactions with patients.

In order for me to transcribe this interview accurately and document your consent to participate, I would like to record this interview, if that is OK with you?

(If yes, start recording) Great. Thank you for allowing me to record this interview. Your decision to answer the interview questions will serve as your consent to participate in this study.

Are you ready to get started?

Interview Questions:

1. How was interacting with patients and communication considerations integrated into your athletic training education?
    a. If not mentioned: How about continuing education?
    b. Additional follow-up as needed
2. What is your perception of your communication with patients during a medical visit?
    a. If not mentioned: Please describe your communication style with patients?
    b. If not mentioned: Please describe any variations in communication styles you may employ during a medical visit.
    c. Additional follow-up as needed
3. Can you take me through a patient medical visit and describe how you typically interact with a patient?
    a. Follow-up as needed
        i. If not mentioned: How do you check that patients understand the information discussed during your interaction with them?
        ii. If not mentioned: How would you describe the type of language you use when discussing health care information with your patient?
        iii. If not mentioned: How do you determine how much patient education or instruction you need to give to a patient regarding their medical condition, plan of care, or take home instructions?
        iv. Additional follow-up as needed
4. How much information do you feel your patients retain from your medical visits/interactions?
    a. If not mentioned: What influences differences between patient's retention of information?
    b. Additional follow-up as needed

5. How familiar are you with health literacy and integrating health literacy principles into your patient interactions?
    a. If not mentioned: Please explain.
    b. If not mentioned: How do you identify individuals with low or limited health literacy?
    c. If not mentioned: How prevalent do you think low or limited health literacy is?
    d. Follow-up as needed

That concludes the interview. Thank you very much for your time!

APPENDIX D: INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTERS

PILOT STUDY IRB APPROVAL LETTER

INITIAL IRB APPROVAL LETTER

AMENDMENT TO INITIAL IRB APPROVAL LETTER

CONTINUING REVIEW IRB APPROVAL LETTER

PILOT STUDY IRB APPROVAL LETTER

Office of Research Integrity
Institutional Review Board
401 11th St., Suite 1300
Huntington, WV 25701

FWA 00002704

IRB1 #00002205
IRB2 #00003206

March 5, 2014

Dennis Anderson, Ed.D.
Leadership Studies, MUGC

RE: IRBNet ID# 580147-1
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Anderson:

Protocol Title:	[580147-1] Pilot Study: Knowledge of Health Literacy among Athletic Trainers
Expiration Date:	March 5, 2015
Site Location:	MUGC
Submission Type:	New Project APPROVED
Review Type:	Exempt Review

In accordance with 45CFR46.101(b)(2), the above study and informed consent were granted Exempted approval today by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee for the period of 12 months. The approval will expire March 5, 2015. A continuing review request for this study must be submitted no later than 30 days prior to the expiration date.

This study is for student Janet Rorrer.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/Behavioral) Coordinator Bruce Day, ThD, CIP at 304-696-4303 or day50@marshall.edu. Please include your study title and reference number in all correspondence with this office.

INITIAL IRB APPROVAL LETTER

Office of Research Integrity
Institutional Review Board
401 11th St., Suite 1300
Huntington, WV 25701

FWA 00002704

IRB1 #00002205
IRB2 #00003206

July 9, 2014

Dennis Anderson, EdD
Leadership Studies, MUGC

RE: IRBNet ID# 628827-1
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Anderson:

Protocol Title:	[628827-1] Knowledge of Health Literacy Among Athletic Trainers	
Expiration Date:	July 9, 2015	
Site Location:	MUGC	
Submission Type:	New Project	APPROVED
Review Type:	Exempt Review	

In accordance with 45CFR46.101(b)(2), the above study and informed consent were granted Exempted approval today by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee for the period of 12 months. The approval will expire July 9, 2015. A continuing review request for this study must be submitted no later than 30 days prior to the expiration date.

This study is for student Janet Rorrer.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/Behavioral) Coordinator Bruce Day, ThD, CIP at 304-696-4303 or day50@marshall.edu. Please include your study title and reference number in all correspondence with this office.

AMENDMENT TO INITIAL IRB APPROVAL LETTER

Office of Research Integrity
Institutional Review Board
401 11th St., Suite 1300
Huntington, WV 25701

FWA 00002704

IRB1 #00002205
IRB2 #00003206

August 13, 2014

Dennis Anderson, EdD
Leadership Studies, MUGC

RE: IRBNet ID# 628827-2
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Anderson:

Protocol Title:	[628827-2] Knowledge of Health Literacy Among Athletic Trainers	
Expiration Date:	July 9, 2015	
Site Location:	MUGC	
Submission Type:	Amendment/Modification	APPROVED
Review Type:	Exempt Review	

The amendment to the above listed study was approved today by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee. This amendment is the addition of an interview. A new consent form has been submitted and also approved.

This study is for student Janet Rorrer.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/Behavioral) Coordinator Bruce Day, ThD, CIP at 304-696-4303 or day50@marshall.edu. Please include your study title and reference number in all correspondence with this office.

CONTINUING REVIEW IRB APPROVAL LETTER

Office of Research Integrity
Institutional Review Board
One John Marshall Drive
Huntington, WV 25755

FWA 00002704

IRB1 #00002205
IRB2 #00003206

June 12, 2015

Dennis Anderson, EdD
Leadership Studies, MUGC

RE: IRBNet ID# 628827-3
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Anderson:

Protocol Title:	[628827-3] Knowledge of Health Literacy Among Athletic Trainers
Expiration Date:	July 9, 2016
Site Location:	MUGC
Submission Type:	Continuing Review/Progress Report APPROVED
Review Type:	Exempt Review

The above study and informed consent were approved for an additional 12 months by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee. The approval will expire July 9, 2016. Since this approval is within 30 days of the expiration date, the fixed anniversary date of 07/09 was maintained. Continuing review materials should be submitted no later than 30 days prior to the expiration date.

This study is for student Janet Rorrer.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/Behavioral) Coordinator Bruce Day, ThD, CIP at 304-696-4303 or day50@marshall.edu. Please include your study title and reference number in all correspondence with this office.

CURRICULUM VITA

JANET MARIE RORRER

EDUCATION

Doctor of Education in Educational Leadership, Marshall University, 2015

Master of Science in Kinesiology/Sports Medicine, Georgia Southern University, 1999

Bachelor of Science in Athletic Training, Western Illinois University, 1997

PROFESSIONAL CERTIFICATIONS & LICENSURE

National Athletic Trainers' Association Board of Certification, 1997

American Red Cross, Professional Rescuer

Registered Athletic Trainer, West Virginia Physical Therapy Board

PROFFESIONAL EXPERIENCE

2006 – Present	**University of Charleston, Charleston, WV**
2015-Present	Department Chair, Department of Natural Sciences and Mathematics
2011-Present	Assistant Professor of Biology
2013-2015	Acting Program Director, Health Promotion
2006-2011	Coordinator of Clinical Education / Assistant Professor of AT
Summer 2011	**West Virginia Geriatric Education Center**
	Doctoral Internship, Health Literacy
2001 – 2006	**Olivet College, Olivet, MI**
2003-2006	Department Chair, Health, Physical Education, Recreation, and Sport
2001-2006	Assistant Professor
2005-2006	Associate Athletic Trainer
2001-2005	Head Athletic Trainer
1999-2001	**Joyner Sports Medicine Institute, State College, PA.**
1999-2001	Certified Athletic Trainer
2000-2001	Wellness Program Coordinator
1999-2001	Clinical Instructor for The Pennsylvania State University
1997-1999	**Georgia Southern University, Statesboro, GA**
1997-1999	Graduate Assistant, Athletic Trainer
1997-1999	Graduate Assistant, Teaching Assistant
1998-1999	Clinical Instructor, Sports Medicine Program
1998-1999	Summer Camp Athletic Trainer

PROFFESSIONAL LEADERSHIP & INVOLVEMENT

- **Executive Council and Board Member ,** West Virginia Athletic Trainers' Association
  Positions held: Chairperson (Governmental Affairs), March 2013- present
  Treasurer, February 2009 – March 2013

- **Annual Meeting/Clinical Symposia Abstract Reviewer,** National Athletic Trainers' Assoc.
  May 2009 – Present

JOURNAL PUBLICATION

- Tsang (Rorrer), J, Gillespie, J, Tsang, K. **"Abstract of case study: Tethered Cord Syndrome and Conversion Disorder in a Jr. High Football Player."** *Journal of Athletic Training*. 2001: Supplement

NATIONAL & STATE PRESENTATIONS

- "**Corporatization of Higher Education"** Southern Regional Council on Educational Administration, St. Louis, MO. (November 2012)

- "**Ergogenic Aids; Trends, Fads, and Implications**" National Athletic Trainers' Association Symposia, St. Louis, MO. (June 2003)

- "**Communicating with Potential Employers**" Michigan Athletic Trainers' Society Professional Education Conference, East Lansing, MI. (May 2003)

- "**Tethered Cord Syndrome and Conversion Disorder in a Jr. High Football Player: A case report**" National Athletic Trainers' Association Symposia, Los Angeles, CA. (June, 2001) Abstract printed in Journal of Athletic Training

- "**Recognition and Treatment of Proximal Contributions to Patellofemoral Pain**" National Athletic Trainers' Association Symposia, Los Angeles, CA. (June 2001) co-presented (Earl, J.)

GRANTS & DONATIONS

- Doctoral Student Grant, Marshall University, **$500.00 (funded)**
  Spring 2015

- National Athletic Trainers' Association Governmental Affairs Committee, Legislative Discretionary Grant for West Virginia Athletic Trainers' Association, 2010-2013
  Total:
  $89,000.00 (funded)
  - $18,000 (funded: September 2012)
  - $15,000 (funded: September 2011)
  - $16,000 (funded: September 2010)
  - $40,000 (funded: December 2009)

HONORS & AWARDS

- Educator of the Year Award, West Virginia Athletic Trainers' Association
  February 2011

- Golden Key International Honor Society, Marshall University
  January 2011 - Present

- "Who's Who Among America's Teachers" Award
  May 2005

- Founding Advisor, Phi Epsilon Kappa Professional Fraternity, Zeta Alpha Chapter, Olivet College
  May 2004

- National Honors Society, Phi Kappa Phi, Georgia Southern University
  March 1999 – Present

- Graduate Scholarship recipient, Georgia Athletic Trainers' Association
  January 1999

- Outstanding Graduate Teaching Asst., Dept. of Health and Kinesiology, Georgia Southern University
  May 1999

GOVERNMENTAL ADVOCACY

- Meeting with House Delegates Bob Ashley & Jim Morgan, attorney, WVPTA President and Lobbyist, and WVATA lobbyist, AT Scope of Practice and Licensure, in relation to HB 4413, (February 2014)

- Testified on AT qualifications and role in concussion management, House Judiciary Committee, West Virginia Concussion Bill (February 2012)

- Presentation and meeting with Women's Caucus (February 2011), Medical safety in secondary schools, Emergency Action Plans (resulted in study resolution summer 2011 and school safety bill introduction in 2012 Session. In collaboration with NATA governmental affairs committee liaison and WVATA lobbyist.

- Testified on AT education and qualifications, Senate Judiciary Committee, West Virginia AT Registration Bill (February 2010)