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Methodological Orientations of Articles Appearing in Allied Health's Top Journals: Who Publishes What and Where

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**METHODOLOGICAL ORIENTATIONS OF ARTICLES
APPEARING IN ALLIED HEALTH'S TOP JOURNALS:
WHO PUBLISHES WHAT AND WHERE**

Pamela Lea McCloud Alderman

**Marshall University
Graduate School of Education
and Professional Development**

**Dissertation submitted to the Faculty of the
Graduate College of Marshall University
in partial fulfillment of the
requirements for the degree of**

**Doctor of Education
in
Educational Leadership**

**Committee Chair, Dennis M. Anderson, Ed.D.
Steven Banks, Ed.D.
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South Charleston, West Virginia, 25303

Keywords: Allied Health, Gender, Rank, Research Methodology

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PAMELA LEA MCCLOUD ALDERMAN

DEDICATION

I dedicate this dissertation to my family without whom this dream would not have become a reality. Their understanding, patience, and support have kept me grounded. Thank you to my son and daughter-in-law, Will and Julie, who were there for me from the beginning to the end, providing me encouragement and guidance. Julie, thank you for your patience, as well as providing me with the technical support I needed to finalize this document. To my grandchildren Jorja, Ashtyn, and Jackson whom I adore, dare to dream and reach for the stars. Always remember, you can achieve anything you aspire to, no matter the obstacles put in front of you. I hope I will always be an inspiration to you.

To my mother Evelyn, thank you for instilling in me the value of higher education, giving me support, and pushing me along the way. How I wish my daddy, Neil, were here with me to share this accomplishment. You always had faith in me. To my sister Shawn thank you for all of your encouragement, and to my grandmother Glenna who taught me to work hard for the things in life you want you have been my role model throughout life.

Most importantly I dedicate this to my daughter Whitlea Shae', who has provided me a solid foundation and given me a reason to persevere. You have been by my side from the beginning and your sacrifices have not gone unnoticed. I love you very much and you will never know how grateful I am that you stood by me. This accomplishment I share with you because you are the one that sacrificed the most. Thank you from the bottom of my heart.

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ABSTRACT

This study examined articles published in the major peer-reviewed journals, either hard copy, web, or both formats, in five allied health professions from January 2006 to December 2010. Research journals used in this study includes *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. These journals were chosen after reviewing the professional organizations' of each discipline, as well as the professional honor societies, and the recommendations by the discipline-specific national accreditation agencies found on the organizations' websites. All research articles published in these journals, 1469, were reviewed to determine the type and frequency of research published in each allied health discipline. These factors were evaluated against the gender and academic rank of the lead author. A descriptive, non-experimental research design was used in this study. Chi-square tests were used for frequency analyses.

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CHAPTER ONE: INTRODUCTION

The term “allied health” encompasses a broad range of health professions (TATC Consulting, Inc., 2010). According to the Health Professions Network; (2011), “Allied health professionals are health-care practitioners with formal education and clinical training who are credentialed through certification, registration and/or licensure. They collaborate with physicians and other members of the health-care team to deliver high quality patient care services for the identification, prevention, and treatment of diseases, disabilities and disorders.” The Patient Protection and Affordable Care Act (P.L. 111-148), which became law in March 2010, defines allied health professionals as follows:

The term “allied health professional” means an allied health professional as defined in section 799B (5) of the Public Health Service Act (42 U.S.C. 295p (5) who—(A) has graduated and received an allied health professions degree or certificate from an institution of higher education; and (B) is employed with a Federal, State, local or tribal public health agency, or in a setting where patients might require health care services, including acute care facilities, ambulatory care facilities, personal residences, and other settings located in health professional shortage areas, medically underserved areas, or medically underserved populations, as recognized by the Secretary of Health and Human Services.

The number of allied health professions increased significantly during the last half of the twentieth century.

In addition to the increase in the number of allied health disciplines, the number of allied health journals has also increased. Journals range from those which contain professional/industry related news and articles to those which are determined to be scholarly. According to *Mosby's Medical Dictionary* (2009 p. 1), scholarly journals are “professional or literary journals in which articles or papers are selected for publication by a panel of referees who are experts in the field. They read and evaluate each of the articles submitted for publication. The important national professional journals in medicine and nursing are refereed.” Scholarly journals present in-depth research which is original and specific to the discipline. Articles published in scholarly journals add to the body of scientific knowledge, providing reliability and validity to the profession they serve.

Bem (1987, p. 3) states, “Scientific journals are published for specialized audiences who share a common background of substantive knowledge and methodological expertise.” These journals are scholarly publications related to a specific discipline. They serve as a forum to introduce primary research, critique existing research, and verify all aspects of an academic field of study. Depending on the academic discipline, research may occur in various forms, including qualitative, quantitative, and mixed methods.

Peer-reviewed journals exist for most allied health disciplines. Allied health represents approximately 40 different professions (The Health Professions Network,

2011). From the 40 different allied health professions five were chosen for this study: Dental Hygiene, Dietetics, Nursing, Physical Therapy, and Radiologic Technology. All research articles which have appeared in the top peer-reviewed journals during the past five years, 2006-2010, for each of the five disciplines listed were reviewed.

Hard copy journals were the norm until the last half of the twentieth century. Until the advent of the Internet it was almost impossible to compile information written in numerous research journals spanning different allied health disciplines. Not only was the process tedious and time consuming, it was also expensive. According to Standler (2004), prior to the mid-1960s researchers had to sort through the annual index of journal abstracts. Beginning in the mid-1960s journal abstracts were made available via proprietary databases.

The Internet changed the publishing world. Many allied health journals that were formerly published in hard copy are now only published on the web. Although some new allied health journals may be found both in print and on the web, many new journals only publish in web format.

Problem Statement

Review and analysis of allied health research is an essential component of the integration of health-care disciplines as well as the collaboration among health care workers. Given the absence of analysis and comparison of published research in allied health journals, there appears to be a serious disconnect among professions that interact, as well as intersect, continuously. Little evidence of interdisciplinary practice and research among health care professions and research publications is found in the

literature. To date, there has been no systematic analysis of the type of research published in allied health journals related to the influence, if any, of the gender and academic rank of the lead author.

Statement of Purpose

The purpose of this study was to determine the type and frequency of research method utilized in selected peer-reviewed allied health research journals from January 2006 to December 2010. Methodological orientation based on the gender and academic rank of the lead authors was analyzed. Allied health professions chosen for the purpose of this study include Dental Hygiene, Dietetics, Nursing, Physical Therapy, and Radiologic Technology.

Little to no research has been conducted on the articles published in various allied health journals. Specifically, after extensive review of the literature within five allied health disciplines, an analysis of what is published, how often it is published, and by whom a research article is published as well as the methods used to conduct the study, could not be found. Other disciplines have conducted this type of research. According to Gillam (2004), studies of the body of knowledge and research published in journals have been conducted in disciplines which include Criminal Justice, Psychology, and Higher Education. In the complex healthcare arena there is frequent interaction among healthcare professionals. For many years healthcare professionals have worked in isolation, not in collaboration with other healthcare providers. Not much has changed in the current healthcare environment. Interprofessional collaboration among disciplines is rarely found. Rigid professional standards coupled with complex organizational and

hierarchical structures may be one of the reasons allied health professionals do not collaborate more with each other (Freshman, 2010).

In 2001 the Institute of Medicine released the report *To Err is Human* (Jewell & McGiffert, 2009). This report was released in the hopes that patient safety and outcomes would be improved. Little progress has been made over the last ten years in the improvement of patient care and safety. “Some of this lack of progress may be attributable to the persistence of medical ethos, institutionalized in the hierarchical structure of academic medicine and healthcare organizations, which discourages teamwork and transparency and undermines the establishment of clear systems of accountability for safe care” (Leape, 2009, p. 1). Healthcare professionals in all disciplines have attempted to address these problems over the past ten years, but little progress has been made.

In 2009 the Consumer Union released a report that gave the United States healthcare system a failing grade. The lack of collaboration and teamwork among disciplines was cited as one aspect responsible for the low rating. It is believed that through collaboration and teamwork, not only at the bedside but also in the research arena, the quality of healthcare may improve (McGiffert, 2009).

One major step forward in the quest for interdisciplinary collaboration was the establishment of the Lucian Leape Institute at the National Patient Safety Foundation, which was formed in 2007. Named for Lucian Leape, MD, a member of the Institute of Medicine’s Quality of Care in American Committee which published *To Err is Human: Building a Safer Health System* (1999), the primary purpose of the institute is to provide a strategic vision for improving patient safety (The National Patient Safety Foundation,

2011). Functioning as a think tank composed of national healthcare leaders, the Institute encourages stakeholders to assume roles in the advancement of patient safety. Additionally, members are encouraged to identify new methods to improve safety, expedite work, and create innovative approaches to improve the culture, process, and outcomes in the healthcare environment. The Institute envisions a culture that is open, transparent, supportive, and committed to learning. It is believed that doctors, nurses, and all healthcare professionals should work collaboratively in teams, treating each other with respect (Leape, 2009). The ultimate goal of the healthcare professional is to achieve unprecedented levels of safety, effectiveness, and patient satisfaction in the healthcare environment. Interdisciplinary collaboration and research will improve patient safety and outcomes, thus creating a culture of respect among all healthcare disciplines.

In order to impact health policy, allied health professionals must be prepared to not only participate in the political arena but also to stay abreast of research being conducted by other allied health disciplines (White, 2010). Remaining current may be accomplished by networking with colleagues, navigating the complex Health Reform Act and searching for relevant information on the Internet. If this is accomplished allied health professionals may have the opportunity to impact health-care reform.

Research Questions

1. How frequently are quantitative research methods used in the allied health journals identified in this study?
2. How frequently are qualitative research methods used in the allied health journals identified in this study?

3. How frequently does mixed methods research appear in the allied health journals identified in this study?
4. To what extent, if any, does gender influence the type of research methods used by the lead author?
5. To what extent, if any, does academic rank influence the type of research methods employed by the lead author?

Methods

This study examined articles published in the major peer-reviewed journals, either hard copy, web, or both formats, in the five chosen allied health professions from January 2006 to December 2010. Research journals used in this study include *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. These journals were chosen after reviewing the professional organizations of each discipline, as well as the professional honor societies, and the recommendations by the discipline-specific national accreditation agencies found on the organizations' websites.

The most significant research journal in each of the five chosen allied health disciplines was identified and included in this study. Content and characteristics of the articles were reviewed. An analysis of the research method utilized in each article was conducted using a descriptive, non-experimental, quantitative research design.

Operational Definitions

For the purpose of this study the following definitions are included:

Allied Health – “All those professional, technical, and supportive workers in the field of patient care, community health, public health, environmental health and related research who engage in activities that support, complement, or supplement the profession of administrators and practitioners” (National Institute of Health U.S. Division of Allied Health Manpower, 1969, p. 1).

Descriptive Statistics – Evaluation of data across time; repeated measurement of variables over different periods; also known as longitudinal research (Menard, 2002).

Meta-Analysis – The collection of systematic techniques used to resolve contradictions in research findings; translation of results from similar studies with common metrics and statistical relationships between characteristics and findings (Rudner, 1991).

Mixed Methods - “Research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches and methods in a single study or program of inquiry” (Tashakkori & Creswe, 2007).

Qualitative Research - Research involving the observation of behavior and the interpretation of actions. In general terms, scientific research consists of an investigation that seeks answers to a question; systematically uses a predefined set of procedures to answer the question; collects evidence; produces findings that were not determined in advance; and produces findings that are applicable beyond the immediate boundaries of the study (Qualitative Methods in Public Health: A Field Guide for Applied Research).

Quantitative Research – A means for testing objective theories by examining the relationship among variables; research based on traditional scientific methods, which generates numerical data and usually seeks to establish causal relationships between two

or more variables, using statistical methods to test the strength and significance of the relationships (Creswell, 2009).

Limitations of the Study

The study used descriptive, non-experimental, quantitative research methods. The use of only five allied health professions may be viewed as insufficient. Increasing the number of professions, as well as journal articles, may reveal more information and provide greater knowledge to the professions.

It may be argued that utilization of this type of research may overlook significant qualitative information that cannot be extrapolated when looking at simple numerical representations. Data may be unique to this study and may not be widely used across disciplines. In addition, there may be a perceived bias of the researcher that could influence the results of the study.

Significance of the Study

This study adds to the body of scientific knowledge within the allied health professions through an analysis of the type of research published, the gender of the lead author, as well as the academic rank of the lead author. Additionally, this study identifies the most frequent research methods used in published allied health studies over a five-year period 2006-2010 and relates these to the gender, academic rank, and qualifications of the lead author.

Patterns and trends were identified in an attempt to ascertain the various methods used in each research article. This process provided a basis for collating research among

various allied health disciplines, synthesis of data, analysis of research traditions and practices, as well as identification of research that transcends allied health disciplines.

Results of this study may be used to influence policy makers and stakeholders at the local, state, and national level. With the implementation of health-care reform there is a new level of urgency for allied health professionals to cooperate as multidisciplinary teams in order to deliver and impact patient care. This research identifies and clarifies areas of potential interdisciplinary cooperation among the allied health professions. It provides insights into the body of scientific knowledge contained in the professions' top journals. The conclusions of this study may be used to impact health-care decisions at many levels.

Summary

The number of allied health professions increased significantly during the last half of the twentieth century. In addition to the increase in the number of allied health disciplines the number of research journals has increased. The five professions chosen for this study include Dental Hygiene, Dietetics, Nursing, Physical Therapy, and Radiologic Technology. These five allied health professions all have peer-reviewed, refereed journals specific to the discipline. Various types of studies, as well as research methodologies, may be found in the journals. One glaring omission is the collaboration in research among the various allied health professions.

Collaborative research among various allied health disciplines is being emphasized from within and outside the professions (Geyman, 2010). Working collaboratively, interdisciplinary teams help reduce errors, improve patient satisfaction, increase patient

and family confidence, and improve safety. Ultimately, interdisciplinary teams help increase the quality of patient care. By networking with colleagues, conducting collaborative research, and participating in the political arena, allied health professionals have the opportunity to influence, as well as impact, healthcare reform and policy (White, 2010).

Chapter One included the introduction, problem statement, purpose, research questions, research methods, operational definitions, limitations, and significance of this study. Review of the literature and types of research utilized in the study as well as a historical perspective on the five allied health disciplines may be found in Chapter Two. Chapter Three includes methods, research design, data collection and analysis, and restatement of the research questions. Presentation of the research findings of the study is found in Chapter Four. Final discussion of the study, conclusions, recommendations, and summary are found in Chapter Five.

CHAPTER TWO: REVIEW OF LITERATURE

Allied Health Disciplines

Dental Hygiene

The practice of dental hygiene was first discussed by an unknown author in 1871. During the next three decades, several dentists advocated for a new profession, many referring to those who would eventually practice dental hygiene as “dental nurses.” Several papers and articles were written in the professional journal of dentists, *The American Journal of Dental Science*, advocating for this new profession. In 1903 Dr. F.W. Low believed women should become active in a new profession called “odontocure.” Dr. Low proposed training women to clean teeth with orangewood sticks, pumice, and a flannel rag. Those who practiced odontocure would go house to house every two weeks polishing people’s teeth in order to prevent tooth decay (Motley, 1976).

From the early 1900s until the first formal schools of dental hygiene were established in 1913, several iterations of the profession were proposed. Dr. Cyrus Mansfield Wright, of Cincinnati, Ohio advocated for all dental offices to employ dental nurses. Between 1900 and 1910 Dr. Myer L. Rhein proposed to several dentists the concept of employing women in the role of dental nurse. Dental nurses would provide minimal dental services to patients both in and outside the dental office. Dr. Rhein believed dental nurses should be academically trained, just as registered nurses were trained. Upon completion of training, the dental nurse would take a state board exam. Once the exam was passed, the dental nurse could clean, polish, and treat certain dental problems under the direct supervision of a dentist (Motley, 1976).

In 1890 Dr. Alfred Civilion Fones graduated from the New York College of Dentistry. Almost from the start, Dr. Fones was certain there was a need for an auxiliary person to work in the dental office. Prior to Dr. Fones, most dental treatment consisted of tooth extractions, and prevention of dental disease was completely unheard of (University of Bridgeport, 2011). In 1913 Dr. Fones established the first dental hygiene program in the United States. The first class of dental hygienists was admitted in November 1913 at the University of Bridgeport with \$46,000 in funds and donations. Dr. Fones developed a university curriculum that consisted of courses in Tooth Anatomy, Histology, and Clinical Practice. The program consisted not only of didactic instruction in the classroom but also hands-on instruction in the clinical laboratory. Didactic instruction was delivered by local dentists as well as professors from Yale and Columbia Universities. Eventually, Dr. Fones suspended the program in order to travel the country educating others on the profession of dental hygiene. Dr. Fones died in 1938, and in 1949 the Fones School of Dental Hygiene reopened at the University of Bridgeport where it continues today (University of Bridgeport, 2011).

In 1917 the first dental hygienists were licensed in Connecticut. Other states soon followed. In 1923 the American Association of Dental Hygiene was formed, and in 1927 the *Journal of American Dental Hygienists* was created (Motley, 1976), which was the precursor of the association's current journal, the *Journal of Dental Hygiene*.

For most of the twentieth century dental hygiene was not considered a profession. Dental hygienists assisted dentists in the practice of dentistry. Most of the literature published during this time related to dentistry and little research was relevant to the profession of dental hygiene (Charles & Cugini, 2006). The professional organization for

dental hygienists, the American Dental Hygienists' Association (ADHA), defined six specific roles for the dental hygienist in 1987. According to Charles (2006), research was one of those roles. The ADHA established a research initiative designed to enhance and strengthen the profession (American Dental Hygiene Association, 2011). According to the ADHA website, the mission of the Division of Research is to broaden ADHA's involvement in a variety of oral health research initiatives, support internal association-related endeavors that rely on research or statistical expertise, further the association by providing access to dental care, develop public and governmental policies related to oral health, establish educational standards for dental hygiene programs, and develop new clinical treatments, procedures, and modalities.

Research courses may be found in dental hygiene curriculum throughout the nation. Dental hygienists are uniquely prepared in the educational programs to carry out and publish research (Charles & Cugini, 2006). Students are taught statistical analysis and interpretation of results as well as writing research articles. Dental hygienists have evolved from dental laborers to professionals during the last century. Through educational preparation that is immersed in science, dental hygienists continue to advance the profession utilizing research (Nathe, 2011).

In 1993 the U.S. Department of Health and Human Services issued grants through the Bureau of Health Professions. A three-year grant was awarded to develop the National Center for Dental Hygiene Research (National Center for Dental Hygiene Research and Practice, 2011). The Center was developed as a collaborative model with the goal of bringing clinicians, educators, and researchers together in order to conduct research related to national dental hygiene research priorities. Over the years the Center

has evolved and today the major focus is on translational research that is designed to enhance clinical practice.

The mission of the National Center for Dental Hygiene Research and Practice is to “promote the health of the public by fostering the development, implementation and dissemination of oral health research; establish an infrastructure to support dental hygiene research; and strengthen the scientific foundation for the discipline of dental hygiene.” (National Center for Dental Hygiene Research and Practice, 2011 p. 1). Goals of the Center are to increase awareness of dental hygienists’ contributions to multidisciplinary healthcare research, serve as an authoritative source on dental hygiene practice and outcomes research, create and facilitate opportunities that promote leadership and scholarship, foster research efforts that address the objectives of oral health research agendas, and promote the translation of research evidence so that it is meaningful and useful in dental hygiene education and practice.

The *Journal of Dental Hygiene* is the research journal of the profession. Articles must be unpublished works that promote scholarship, education, and evidence-based practice (The American Dental Hygienists' Association, 2011). The primary goal of the journal is to promote scientific inquiry in basic, behavioral, clinical, and translational research. Specific categories of articles published in the journal include Research, Critical Issues in Dental Hygiene, Innovations in Education and Technology, Literature Reviews, and Short Reports. Original research reports are limited to 4,000 words and include basic, behavioral, clinical, and translation studies that provides new information, applications, or theoretical developments (American Dental Hygiene Association, 2011). Beginning with the summer 2004 issue, the journal is only published online.

Dietetics

According to Hwalla (2004) reference to dietetics may be found in the early writings of Hippocrates and Plato. Galen, the personal physician to the Roman emperor Pius during the second century A.D., wrote extensively about health and diet (Lyons, 2011). For more than twelve centuries the medical practices of Galen were followed as law. Galen believed in diet, the therapeutic aspects of fresh air, as well as the value of milk to treat disease (Hwalla & Koleilat, 2004).

Studies and writings regarding food and nutrition continued through the centuries. During the late 1700s, Antoine Laurent Lavoisier wrote about the concepts of metabolism, nutrition, and exercise physiology (Katch, 1998). One of Lavoisier's most significant findings was the relationship between human nutritional needs and work. Lavoisier found that more nutrition was necessary as an individual labored than was required at rest.

The first American dietitian was Sarah Tyson Rorer, who founded the Philadelphia Cooking School in 1881 (Chambers, 1978). Not only did Rorer teach students the art of cooking, Rorer also established the first "diet kitchen." The diet kitchen was designed as a place where physicians would send prescriptions related to the diets of patients. Special food was prepared for the patients related to the specific disease or diagnosis. In addition to teaching students how to cook, Rorer also lectured to physicians and medical students about the impact of diet on disease.

In 1917 the American Dietetic Association (ADA) was founded in Cleveland, Ohio by Lenna Cooper and the ADA's first president, Lulu Graves. Ms. Cooper and Ms.

Graves were dedicated to helping the government conserve food and improve the public's health and nutrition during World War I (Eatright.org, 2011). The association's first order of business was to define the profession, establish professional standards, and set guidelines for the training of dietitians (Chambers, 1978). The profession dedicated itself to helping the United States government during World War I in establishing nutritional standards not only for the soldiers but also for the improvement of public health.

Diet therapy, dietetics, and other versions of the current profession were taught throughout the United States during the late nineteenth century and into the mid-twentieth century; however, it was not until 1961 that the first coordinated program in dietetics was established. The Ohio State University created the Medical Dietetics program within the Department of Preventative Medicine. This program combined the theoretical classroom with supervised clinical practice. The first students graduated from this program in 1964 (The Ohio State University, 2011).

According to Eatright.org (2011), the American Dietetic Association is the largest professional organization of food and nutrition. The organization's goal is to advance the profession of dietetics through education, advocacy, and research. A foundation was established by the profession in order to make resources available for research activities by registered dietitians.

The *Journal of the American Dietetic Association* was first published in 1925. This is the recognized research journal of the American Dietetic Association. According to the American Dietetic Association, it is "the premier peer-reviewed journal in the field of

food, nutrition, and dietetics” (Eatright.org, 2011). Original, evidence-based research, in the areas of diet and nutrition, medical nutritional therapy, practice related to the discipline, public health, epidemiology, and related areas are considered for publication in the journal. The journal is published monthly with at least one research-based article included in each publication (Winterfeldt, 2005).

Nursing

Nursing, in one form or another, has been around since the beginning of time (Shaw, 1993); however, the profession of nursing did not come into existence until the middle part of the nineteenth century. In many societies, the role of the nurse was traditionally assigned to women because it was believed the natural nurturing of mothers toward infants would be passed along to the sick, injured and infirm. In other societies, healers were usually men, known as medicine men or shamans. In some cultures, the role of healer was connected to something other than gender; for example, among the Zuni, if an infant was born with part of the placenta covering the face, the child was often believed to have healing powers (Roux, 2009). For most of history, care of the sick was not learned in a formal setting. Individuals learned the art of healing from traditions passed along from one generation to another in the form of apprenticeships, oral traditions and storytelling.

During the dark ages, care of the sick was often performed by monks and nuns (Shaw, 1993). With the advent of the Protestant Reformation, the care of the sick was passed on to women from the lower classes; some who provided nursing care were also prostitutes. During this time, conditions for the sick in hospitals, as well as in the home, were horrendous, unsanitary, and the care was substandard at best.

In 1820 Florence Nightingale was born to wealthy parents. Nightingale was provided with an excellent education and was brought up to live among the socialites in England. At that time, career opportunities for women were scarce. Looking for opportunities to do more with her education, Nightingale began to visit the hospitals around England (Shaw, 1993). Florence Nightingale is generally recognized as the first modern day nurse and the founder of the nursing profession (Nightingale, 1898). Prior to Nightingale, formal education and training for nurses did not exist.

Few realize that Nightingale was also the founder of the dietetic profession (Hwalla & Koleilat, 2004). Nightingale is widely known for the practices of proper sanitation, light, fresh air, and nutrition related to health and overall well-being. In 1854, six months after the start of the Crimean War, Nightingale took thirty-eight nurses to the battlefields. There the nurses began to care for the sick using the concepts taught by Nightingale, including nutrition, sanitation, light, fresh air, and teamwork (Nightingale, 1898). Within the first few days of arrival, Nightingale began to increase the food provisions of the wounded. Most of the soldiers were in a confused state, many from starvation (Hwalla & Koleilat, 2004). Nightingale (1898, p. 41) wrote “You cannot diet a patient from a book; you cannot make up the human body as you would a prescription.”

Florence Nightingale's Notes on Nursing, the first nursing textbook, was published in 1859. Nightingale provided a skillful analysis of observations related to the soldiers' mortality and morbidity during the Crimean War. During the war Nightingale met a famous French chef, Alexis Soyer. While in service, Soyer taught the soldiers how to cook nutritious foods. At the end of the war, Soyer returned to England where, at the

request of Florence Nightingale, the first book on how to prepare food for sick soldiers was adopted by the military (Hwalla & Koleilat, 2004).

The first school of nursing, located in London at St. Thomas's Hospital, was established by Nightingale in 1860 (Dossey, 1999). Eleven students were enrolled in Nightingale's first class. A radical transformation in the education of nurses was evident within the Nightingale School of Nursing. No longer were students indentured "slaves" to the hospitals, working long hours for little pay. Instead the students found themselves in an educational environment where learning took place both in the classroom and in the hospital setting (Nightingale, 1898). Nightingale believed that nurses should deliver patient care, not just perform housekeeping duties (Dossey, 1999). Within thirteen years of the founding of the first formal school of nursing in England, three schools opened in the United States based on the philosophy and teachings of Nightingale. These first three programs were the Bellevue Hospital School of Nursing in New York, the Connecticut Training School at New Haven and the Boston Training School in Massachusetts.

The Rockefeller Foundation commissioned a study of nursing education in 1920. Three prominent nurses were hired to conduct research and write a report of findings related to the state of nursing education in the United States (The Yale School of Nursing: A Yale Tercentennial Exhibit, 2001). These nurses included Annie W. Goodrich, M. Adelaide Nutting, and Lillian Wald. The Goldmark Report was published in 1923 based on the findings of the study.

Based upon the recommendations of the Goldmark Report, the Rockefeller Foundation funded a new type of nursing education in the United States. Yale University

School of Nursing was established as an experiment based upon the research and findings of the commission. A school of nursing with a dean, faculty, and budget, as well as educational standards that led to a college degree started during the academic year of 1923-24.

Around the same time, in 1922, six nursing students at the Indiana University Training School for Nurses founded Sigma Theta Tau, an honor society for nurses trained at the bachelor's degree level. The students founded the organization with the primary purpose of conducting nursing research (Sigma Theta Tau, 2011). According to its website, members of Sigma Theta Tau are nursing scholars who are committed to the pursuit of excellence in clinical practice, education, research, and leadership. In 1985 the organization went global with the mission to support nursing scholars around the world in the pursuit of increasing the scientific base of nursing practice. Today the society is known as Sigma Theta Tau, International, Inc.

Several schools of nursing were established in colleges and universities across the nation; however, by 1948 the majority remained as hospital-based programs. In 1948 the Carnegie Foundation provided funding for the Brown Report, which was commissioned to determine society's need for nursing (LaRue, 2011). The report recommended that nursing should be housed in colleges and universities, and advocated recruitment of men and minorities into the profession.

During World War II the cadet nursing program was established. Representative Frances Payne Bolton of Ohio introduced a bill in 1942 that established the Cadet Nurse Corps (Willever, 1994). Passing the House and the Senate, the Bolton Act became Public

Law 74 on July 1, 1943, with an appropriation the first year of \$65 million. This bill provided funding to schools of nursing, as well as stipends for students who met specific criteria in exchange for military or other government services. Cadet Nurses were expected to graduate in 30 months, six months less than students enrolled in traditional hospital nursing programs, and eighteen months less than students enrolled in university programs (Willever, 1994).

Cadet Nurses were found to be as qualified as students who had been educated in three year hospital-based programs and four year college and university programs (LaRue, 2011). Based on these findings, and influenced by a national nursing shortage, Mildred Montag of Columbia University published a dissertation in 1951 titled *The Education of Nursing Technicians*. The study found that nurses could be adequately educated in community colleges across the nation (Hanink, 2011). After War World II the nursing shortage was severe. Montag proposed a two-tiered education system which included technical nurses trained in community colleges for two years and professional nurses educated in universities for four years. The impetus for Montag's proposal was to proactively address the nursing shortage. Montag believed that if nurses did not address the situation and develop a solution to ease the nursing shortage, someone outside the profession would establish guidelines that might have been detrimental to the profession.

Within the dissertation Montag established educational standards for technical nurses. In the beginning Montag envisioned technical nurses assisting baccalaureate degree nurses. Additionally, Montag believed that offering students the option of qualification as a technical nurse would increase enrollment in the programs, attracting

men, older students, minorities, and married individuals (LaRue, 2011). In 1952 the W.K. Kellogg Foundation provided funding to establish seven pilot programs located in community colleges in four states. Upon completion of the pilot programs a final report was published, entitled *Community College Education for Nursing* (Hanink, 2011). This report demonstrated that students sought admission to the technical nursing programs at a higher rate than to bachelor's degree programs. The programs were integrated into the community colleges and became departments, equivalent to other collegiate programs.

From the very beginning, and continuing today, associate degree nurses pass the national licensing exam at rates comparable to, or better than, nurses educated in hospital-based programs or at four year colleges and universities (LaRue, 2011). Associate degree nursing (ADN) programs were established based on proven research. Today the ADN program remains grounded in research (Hanink, 2011).

In 1970 the Lysaught Report was published. This report established three priorities for nursing programs in America: (1) Increased research both in the classroom and in clinical practice; (2) Enhancement of education practices with curricula based on research; and (3) Increased financial support for nursing programs, as well as for nurses in the profession (Christy, 1980 p. 495). The Lysaught Report was very similar to the Brown Report of 1948. Both reports looked at nursing as a whole, from the past, present, and into the future. Additionally, the both provided a road map for the future of the nursing profession (Christy, 1980 p. 495).

The *Journal of Nursing Scholarship* was first printed in 1966 as the official journal of the Honor Society of Nursing, Sigma Theta Tau International. Advancing knowledge

to improve the health of the people of the world is the mission of the *Journal of Nursing Scholarship* (Sigma Theta Tau, 2011). Authors are encouraged to submit original manuscripts to the journal. The journal is published quarterly and is a peer-reviewed research publication. Scholarly works are invited in the areas of clinical scholarship, health policy and systems, and profession and society.

Physical Therapy

Physical therapy is believed to have been started by physicians as early as 460 B.C. (PT Connect, 2011). Both Hippocrates and Galen developed and used various forms of physical therapy including massage therapy and hydrotherapy as well as manual therapy techniques. These techniques and practices have been carried on through the ages, and many are still utilized by physical therapists today.

Exercises to treat bone and muscle disorders were used from the 1500s to the 1700s in Europe (NPTA.Org, 2011). The Royal Central Institute of Gymnastics was founded by Per Henrik Ling in Sweden in 1813. Ling offered massage therapy, manipulation, and exercise to clients visiting the facility. The first school of modern physical therapy in America, the Sargent School, was found in 1881 in Boston. In 1894 a group of nurses in Great Britain formed the Chartered Society of Physiotherapy (PT Connect, 2011). The University of Otago in New Zealand started the first School of Physiotherapy in 1913.

During the polio epidemic of 1916 in the United States, there arose an urgent need for individuals who were trained in muscle testing and muscle re-education. When the United States entered World War I in 1917, the Army identified the need to treat and

rehabilitate soldiers returning from the war. The Division of Special Hospitals and Physical Reconstruction were developed as a unit of the Army Medical Division. Fifteen training programs were established by the Army in order to respond to the need for workers (NPTA.Org, 2011). Nurses with a background in physical education were recruited to obtain further education in order to become reconstruction aides (PT Connect, 2011). The origins of physical therapy education were established in 1917 at Reed College and Walter Reed Hospital.

The need for physical therapists grew throughout the twentieth century. In the 1920s, physical therapists partnered with the medical surgical community in order to gain respect, recognition, and validation of the profession (NPTA.Org, 2011). Polio became an epidemic during the 1930s that continued through the 1950s. This situation, coupled with the United States' entrance into World War II, continued to increase the need for physical therapists. The United States Congress passed the Hill Burton Act in 1946, which provided funding to build hospitals across the country, giving citizens increased access to health care and increasing the need for qualified, trained healthcare providers.

Thirty-one schools of physical therapy existed in 1950, 19 of which offered a bachelor's degree and eight that offered a master's degree. Today there are more than 200 programs across the United States that offer physical therapy education, with 111 offering terminal degrees in physical therapy (PT Connect, 2011). Physical therapists have served individuals with poliomyelitis and war wounds, as well as sports, workplace, and physical injuries for almost 100 years (Moffat, 2003). The practice of physical therapy is deeply rooted in scientific and technological research.

Physical Therapy Journal is the official publication of the American Physical Therapy Association. The journal is the leading research publication in physical therapy and physical therapy-related disciplines. Articles published in the journal are innovative and relevant for both scientists and clinicians. The primary purpose of the journal is to communicate content of which the expressed intent is to improve patient care (NPTA.Org, 2011)

Radiologic Technology

On November 8, 1895, German physicists Wilhelm Roentgen accidentally discovered x-rays while doing an experiment late one evening in a basement laboratory, and the profession of radiologic technology was born (Henderson, 2003). Roentgen was in the process of repeating an experiment that had already been carried out using a cathode ray. Suddenly Roentgen saw fluorescent spots on a specialized piece of paper across the room. Although he realized something new and interesting had been created, Roentgen did not know what it was at the time. Therefore, the new discovery was called x-rays, because “X” is the algebraic symbol for anything unknown (Harris, 1995).

Within the first few days of the discovery of x-rays, Mrs. Roentgen agreed to be a test subject. Roentgen, during one marathon experiment, subjected Mrs. Roentgen to fifteen minutes of exposure on the hand. After fifteen minutes a skeletal image of the hand appeared. It is reported that Mrs. Roentgen shuddered and stated she had a “vague premonition of death” (Harris, 1995).

On January 23, 1896 Roentgen presented a discussion x-rays. During the presentation Roentgen produced an image of the hand of an anatomist, Albert Von

Kolliken. Those who attended the presentation immediately saw the benefit of the x-ray. The medical community was thrilled with the discovery, embracing the x-ray as a miracle of science (Harris, 1995). In 1901 Roentgen won the Nobel Prize for Physics (Nobel Prize, 1967).

Physicians began to purchase x-ray equipment for use in the office by 1910. In the beginning the physician would operate the equipment and develop the film. This soon became a barrier for physicians. In order to be more effective in the practice of medicine many physicians began to train the office staff, mostly women, to take the x-rays, develop the film, and perform maintenance on the equipment. Most of these individuals had no medical background or even a rudimentary understanding of human anatomy or the disease process (ASRT.org, 2011). Nurses who worked for physicians, in clinics, or hospitals were soon recruited to work as x-ray technicians, which appeared to be an ideal situation given the nurses' background in medicine.

In the early days of the profession, work with x-rays was mostly trial and error. Education was on-the-job training and there were no manuals, textbooks, or regulations for x-ray technicians (Dewing, 1962). Until the 1920s x-rays technicians did not have a voice because they were women. Most were overworked and ignored by the medical community. Eddy C. Jerman began the crusade for education and exposure techniques related to x-rays in the second decade of the twentieth century. Jerman traveled across the country meeting with physicians, hospitals, technicians, and others espousing the need for education and standardized exposure techniques (Harris, 1995). The first formal x-ray program was established in 1917 by the Victor X-Ray Corporation (Dewing, 1962). Jerman was employed as the first instructor in the program.

The American Society of Radiologic Technicians was formally established in October 1920 when Jerman and thirteen x-ray technicians, half of whom were women, met in Chicago (ASRT.org, 2011). This society was established “for the purpose of affording technicians an opportunity for the interchange of thoughts and ideas concerned with radiologic technique” (ASRT.org, 2011). Until the 1950s, training programs for radiologic technicians were not regulated. The curriculum and requirements varied from program to program. In 1952 the first standardized curriculum was developed. It was one year in length and included subjects in anatomy, physics, and positioning, as well as darkroom techniques (Dewing, 1962). Today the mission of the ASRT is to assist with the continuing refinement and development of a body of knowledge that is both unique and crucial to the growth of the profession (ASRT.org, 2011).

In 1929 *Radiologic Technology*, the first official scholarly journal of the American Society of Radiologic Technicians was established. This journal has continuously been in circulation since that time (ASRT.org, 2011). The journal is published bimonthly online and focuses on peer-reviewed research articles specific to the field of radiologic technology, which includes medical imaging, nuclear medicine imaging, sonography, and cardiovascular-interventional radiography.

Research

Scientific research is described as a systematic and objective attempt to provide answers to certify development of empirically supported new ideas and theories, and answer questions (Shaw, 1993). Healthcare research is conducted in order to discover and develop a body of knowledge that is accepted by healthcare practitioners, as well as individuals from other disciplines.

Healthcare research employs the use of systematic, controlled, empirical, and critical investigation. It is defined as the application of scientific inquiry as it relates to healthcare. Research in healthcare disciplines is rooted in a formal, systematic, and rigorous process of inquiry that is used to generate and test theories about health-related experiences of individuals and about the actions and processes used in the various healthcare disciplines (Fawcett & Garrity, 2009). Research in healthcare is conducted to describe, explore, and/or predict phenomena. The purpose of research in healthcare includes building a body of knowledge specific to healthcare, validating improvements in the practice of healthcare, and making healthcare more efficient, protecting the public, and ultimately reducing the cost of healthcare.

Qualitative Research

Qualitative research is defined as a systematic empirical inquiry into meaning (Ospina, 2004). The research is planned, orderly, and open following a specific set of rules that have been established by members of the research community. It is described as a field of research that transcends disciplines, fields, and subject matter (Denzin & Lincoln, 2000). Qualitative research places an emphasis on qualities, processes, and meaning. Researchers who utilize qualitative research try to make sense of the experiences of others, as well as the researchers' own experiences.

Qualitative research “seeks out the why, not the how, through the analysis of unstructured information” (Ereaut, 2011, p. 1). This type of research does not rely on numbers or statistics. It is used to acquire insight into the attitudes, behaviors, values, culture, and/or lifestyle of others. According to Denzin (2000), “Qualitative research, as

a set of interpretive activities, privileges no single methodological practice over another...it has no theory or paradigm that is distinctly its own.”

In order to conduct qualitative research, individuals need to be familiar with the terminology associated with this type of research. Pope and Mays (2006) lists the following five theoretical perspectives related to qualitative research: ethnography; symbolic interactionism; constructionism; ethnomethodology; and phenomenology. The major characteristics of qualitative research, according to Johnson and Onwegbuzie (2004), include discovery, exploration, induction, qualitative analysis, data collection, and theory/hypothesis generation.

The terminology of qualitative research, such as *constructivism*, *emancipatory*, *interpretive*, and *naturalistic* (Brookes 2007) can be confusing to healthcare professionals who are studying and/or conducting qualitative research. Emergence of qualitative research has been slow to take hold in the healthcare arena; however, those who use this type of research have found it to be extremely valuable (Brookes, 2007). Qualitative research has increased in the frequency and the number of articles found in healthcare research journals over the last twenty-five years.

Researchers have found numerous advantages of doing qualitative research (Ospina, 2004), which include the flexibility to follow unexpected ideas during research and the exploration of the research process. Qualitative research includes social meaning, in-depth longitudinal explorations of phenomena, and relevance. Researchers should have an interest in the subject, the ability to study symbolic dimensions, and be open to the development of empirically supported ideas and theories. Qualitative researchers have a

tendency to embrace post-positivism and they utilize research to complement or extend quantitative findings (Ospina, 2004). Many use qualitative research to gather data that cannot be obtained using quantitative research methods. There are common characteristics of qualitative research. The majority of qualitative research studies include the following elements (Pope and Mays, 2006): the data have primacy; the theoretical framework is not predetermined but derives directly from the data; qualitative research is context-bound, and researchers must be context sensitive; researchers immerse themselves in the natural settings of the people whose thoughts and feelings they wish to explore; qualitative researchers focus on the *emic* perspective, the views of the people involved in the research and their perceptions, meanings and interpretations; qualitative researchers use “thick description”: they describe, analyze and interpret; the relationship between the researchers and the researched is close and based on a position of equality as human beings; and data collection and data analysis generally proceed together, and in some forms of qualitative research they interact.

Proponents of qualitative research believe that this method helps scientists understand the meaning of processes, thus generating new theories by the examination of experiences that have been recorded through focus groups, record reviews, and interviews (Creswell, 2011). Healthcare researchers have vigorously debated the validity of qualitative research over recent years (Brookes, 2007). Most healthcare researchers prefer to use quantitative research in order to collect valuable information.

Quantitative Research

Burns (2005) defines quantitative research as a formal, objective systematic process which involves numerical data used to obtain information about the world. Quantitative

research is used to describe variables; examine relationships among variables; and determine cause-and-effect interactions between variables. Quantitative research examines relationships among variables that may come from randomized clinical trials, experiments and surveys (Creswell, 2011).

Quantitative research in the social sciences employs empirical methods and statements (Cohen & Manion, 1980). According to Cohen (1980, p. 10), “An empirical statement is defined as a descriptive statement about what is the case in the real world rather than what ‘ought’ to be the case.” Quantitative research is rooted in positivism. Theoretical perspectives associated with quantitative research are drawn from natural and biological sciences (Risjord, 2001). Quantitative techniques include statistical analysis, procedural outcomes, biological markers, and questionnaires. The data for quantitative research are collected by some form of measurement and is then reported in a numerical equation. The research examines relationships between concepts and variables. Quantitative research produces generalized findings through randomization and sampling (Burns & Groves, 2005).

Major characteristics of quantitative research, according to Johnson (2004), include deduction, confirmation, theory/hypothesis testing, explanation, prediction, standardized data collection, and statistical analysis. The lexicon of terminology used in quantitative research is large; however, the terminology must be understood in order to critically understand and evaluate research (Dirks, 2005).

Use of quantitative research is an excellent way to finalize, prove, or disprove a hypothesis (Shuttleworth, 2008). Quantitative research methods have not changed for

many years. Standardization in the methodology is found across various disciplines. Quantitative research allows researchers to deal with large numbers of individuals and work with generalizations, thus allowing for statistical analysis.

Mixed Methods Research

Fidel (2008, p. 265) states, “Mixed methods research employs a combination of qualitative and quantitative methods. It has been used as a distinct approach in the social and behavioral sciences for more than three decades.”

According to Borkan (2004 p. 2), mixed methods research “refers to those studies or lines of inquiry that integrate one or more qualitative and quantitative techniques for data collection and/or analysis.” Johnson (2008) states that proponents of mixed method research tend to espouse two philosophical paradigms: compatibility and pragmatism. Compatibility refers to the notion that quantitative and qualitative methods may both be used in a given research study. According to Johnson (2008), “The philosophy of pragmatism says that researchers should use the approach or mixture of approaches that works the best in a real world situation.” Those who espouse the mixed methods research paradigm believe researchers should utilize a combination of methods that have complementary strengths, and weaknesses that do not overlap. It is the third major research paradigm, which may add an attractive alternative (when appropriate) to quantitative and qualitative research.

Collins & O’Cathain, (2011) states that “mixed methods research is a rapidly emerging research paradigm.” Researchers should be aware of ten specific points, categorized into three specific phases, when formulating, planning, and implementing

mixed methods research. Research Formulation is the first phase in the process. This phase includes the importance of a definition and a mental model for mixing, the utilization of typologies of designs, the selection of the reason, rationale, and purpose for mixing, and determining the research question. The second phase is Research Planning which includes selecting a mixed-methods research design and determining the sampling design. Research Implementation is phase three and includes collecting data, conducting data analysis, legitimating inferences, and formulating generalizations. Use of the ten points will facilitate the formulation, planning, and implementation of a rigorous mixed methods research study (Collins & O'Cathain, 2011).

According to the National Institutes of Health (2011), mixed methods research in health sciences combines the strengths of both quantitative and qualitative research. Specific guidance has been provided by the National Institute of Health (NIH) in order to assist researchers working on specific healthcare problems. Mixed methods research provides an understanding and clarity for the researcher when collecting data relevant to the realms of both social and health practices. Creswell (2011) states, "Social inquiry is targeted toward various sources and many levels that influence a given problem." Currently teams of scientists from various healthcare disciplines are using mixed-methods research to address the healthcare problems of the United States (Creswell, 2011).

Collaborative Research

The word "collaboration" is derived from Latin, co-, and laborare, meaning working together. Collaboration is a partnership which is characterized by setting mutual goals and commitments. It involves two or more partners who agree to become involved in a

project and willingly participate in the decision making process (Henneman, 1995).

According to Henneman (1995, p. 21), collaboration “is a process by which members of various disciplines (or agencies) share their expertise. Accomplishing this requires these individuals understand and appreciate what it is that they contribute to the whole.”

Collaboration is often used interchangeably with the term teamwork (Garrett, 2005).

Scholars in healthcare disciplines believe interprofessional collaboration may be traced back to the ancient Greeks; however, collaboration among disciplines emerged as an overarching theme beginning in the 1970s (Lattuca, 2001). Fullan (1993) describes the phases of collaboration as the examination of existing practices, seeking out alternative solutions, working together to bring about improvement, and assessing the worth of the project.

Many allied health disciplines are working collaboratively on interprofessional projects and research (Alberto & Herth, 2009). In interprofessional collaboration, discipline-specific boundaries are pushed aside and replaced with mutually agreed-upon roles and responsibilities woven together to achieve a common goal. Through collaboration allied health professionals can assist in minimizing overuse, underuse, and misuse of precious health-care resources (Kumar, 2010). Interprofessional collaboration between allied health disciplines is a process that includes communication and decision-making which enables synergistic group knowledge and skills to emerge (Bridges, 2011). Participants agree to share knowledge and decision-making for the best outcome of the patient.

Through collaboration each must provide the other with mutual trust, respect, and recognition of the uniqueness of each discipline's contributions to the health-care system. Bridges (2011) lists nine elements that must be present in collaborative practice. These elements include responsibility, accountability, coordination, communication, cooperation, assertiveness, autonomy, respect, and mutual trust. Lecca (2003) has identified six strategies that may be used to break down barriers when working collaboratively. These strategies include:

1. Legitimizing all work completed in the partnership as a group product.
2. Relying on the giftedness of each individual in the collaborative effort and assigning work accordingly.
3. Communicating regularly as a group (by telephone, e-mail, text, meetings, etc.)
4. Meeting at the residences of members to gain an appreciation for their life outside of work.
5. Taking time at every other meeting to utilize an evaluative framework that openly allows discussion about the nature of care, reflection, and social support between members.
6. Asking often, "Is this a real partnership or do we just think it is?"

For more than forty years, studies and publications have been released advocating for interdisciplinary collaboration among allied health professionals (Hughes, 2008). One consistent theme has emerged from each of the reports released: the coordinated care of allied health practitioners from a variety of disciplines provides the best outcomes

for the patients. According to Hughes (2008, p. 1), “The need to improve the quality and safety of care is the responsibility of all clinicians, all health-care providers, and all health-care leaders and managers.” In order to transform health care, allied health professionals must work together. Allied health professionals must work collaboratively and interdependently while carrying out discipline-specific roles. Collaboration between allied health professions requires mutual trust and respect. Further, interdisciplinary collaboration requires each specific profession know what is being researched and written about in other allied health research journals.

Summary

Allied health professionals and disciplines are essential components of the healthcare delivery system. Throughout the years allied health professions, with differing levels of expertise, have matured and developed making each discipline unique with diverse scientific and theoretical principles. There has been a recent movement to establish and promote evidence-based practice and research among allied health professions in order to support quality, effectiveness, and efficiency of clinical practice (Aboelela, 2007). Interdisciplinary collaboration in the areas of research and practice has become an emerging theme throughout the nation. Within the Patient Protection and Affordability Care Act (Office of the Legislative Counsel, 2010) there is a common thread of interdisciplinary collaboration of health-care professions both in practice and research. Currently, interdisciplinary collaboration may be sparse at best due to a dearth of research published across disciplines (Arena, 2011).

A historical review of the five allied health disciplines selected for the purpose of this study has been provided in this chapter. The most significant research journal for

each of the disciplines was identified, as well as the most significant research studies published in 2010 and 2011. A history of qualitative, quantitative, mixed-methods, and collaborative research was presented. Finally, the need for interdisciplinary, collaborative research among allied health professionals was presented. Chapter Three presents the research methods and designs used in this study. Research questions are restated, the sample, sample size, and data collection instrument are described, and data analysis is presented.

CHAPTER THREE: RESEARCH METHODS AND DESIGN

Methods

The purpose of this study was to determine the type and frequency of research methods utilized in selected peer-reviewed allied health research journals published from January 2006 to December 2010. Methodological orientation based on the gender and academic rank of the lead authors was analyzed. Allied health professions chosen for the purpose of this study include dental hygiene, dietetics, nursing, physical therapy and radiologic technology.

Restatement of Research Questions

1. How frequently are quantitative research methods used in the allied health journals identified in this study?
2. How frequently are qualitative research methods used in the allied health journals identified in this study?
3. How frequently does mixed methods research appear in the allied health journals identified in this study?
4. To what extent, if any, does gender influence the type of research methods used by the lead author?
5. To what extent, if any, does academic rank influence the type of research methods employed by the lead author?

Research Design

This study used a quantitative, non-experimental, descriptive research design methodology that relied upon data collection from five allied health research journals published from January 2006 through December 2010. Allied health journals used in the study included the *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. These journals were chosen after reviewing the professional organizations and honor societies of each discipline, as well as the recommendations by the discipline-specific national accreditation agencies found on the organizations' websites. One research journal in each discipline was identified through the discipline's professional association or the program's national accrediting agency for use in this study.

Sample

All research articles published during the five year period from January 2006 to December 2010 for the following allied health journals were reviewed: *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. The journals used in this study were identified as the top research journal for each discipline by the professional association or honor society for the profession. Journals used in the study have a peer review panel with clearly stated processes and procedures to be followed prior to an article being published. A total of 1,469 research articles were reviewed for this study.

According to the American Dental Hygiene website (2012, p. 1), the *Journal of Dental Hygiene* is “the refereed, scientific publication of the American Dental Hygienists’ Association. It promotes the publication of original creative work related to dental hygiene research, education and evidence-based practice.” The journal is published quarterly. Found within the journal are original scientific investigation, literature reviews, theoretical articles, reports, and special features relevant to the practice of dental hygiene. Manuscripts submitted for publication are evaluated, based on a set of criteria, by the editor and three reviewers who are members of the Editorial Review Board. Prior to review the manuscript is assigned a log number and all identifying references removed. The review process is 10 to 12 weeks from submission to publication of the article (American Dental Hygiene Association, 2011).

Elsevier is the publisher for the *Journal of the American Dietetic Association* professional research journal that is published monthly for the American Dietetic Association. Unsolicited manuscripts may be submitted for a double-blind review by a team of peer-review editors. The webpage states “The *Journal* conforms to guidelines of peer review as promulgated by the International Committee on Medical Journal Editors.” A list of peer review editors is published annually within the journal. Articles selected for publication meet specific criteria and must be evidence-based contributions which advance knowledge across a wide range of research and practice issues in dietetics and nutrition. There are thirteen categories for which an author may submit a manuscript which includes the areas of research and practice (Sigma Theta Tau, 2011).

The *Journal of Nursing Scholarship* is the peer-reviewed journal which is published quarterly for members of Sigma Theta Tau International Honor Society for Nursing. This

journal reaches health professionals, faculty, and students in 103 countries around the world and features thought-provoking, peer-reviewed articles by the world's leading nursing researchers. Manuscripts likely to be accepted for publication; are relevant to all nurses and provides new knowledge that can be used to improve nursing practice around the globe. Authors can expect two to three months from submission of the manuscript to a decision regarding publication by the editorial review board. All manuscripts undergo a double-blind peer review process (Sigma Theta Tau, 2012).

Physical Therapy Journal of the American Physical Therapy Association is the official research journal for physical therapists. This journal is published monthly and the editorial board accepts manuscripts that have the potential to make an impact on the practice of physical therapy. Published solely online, the journal has a turnaround time from submission to publication, of about 62 days. All manuscripts are prescreened by the editor and/or the Editorial Board, who reserves the right to reject without full review any manuscript that does not meet the journal's criteria. Once accepted for review the manuscripts are reviewed by at least two content experts, a statistical consultant if appropriate, and an editorial board member.

The professional research journal of the American Society of Radiologic Technologists (ASRT) is *Radiologic Technology*. It is the mission of ASRT to promote and support scholarly inquiry and dissemination of knowledge which contributes to the body of knowledge in the field of radiologic technology. The journal is published bimonthly and includes articles in two major categories: quantitative research and literature review. All articles submitted are reviewed by at least two members of the Editorial Review Board who uses specific criteria and a double-blind peer-review

process. Members of the Editorial Review Board are required to have prior experience in scholarly publishing and a background in one of the specialties within the radiologic technology discipline. The process from submission of an article to publication in the journal takes approximately eight weeks.

Instrument

A code book to identify the variables, along with a corresponding spread sheet, was developed for this study because an instrument that included all of the identified pieces of information needed for this study could not be found. The code book may be found in Appendix A. Data were collected from all research articles published from January 2006 to December 2010 for each of the allied health disciplines identified for inclusion in this study: Dental Hygiene, Dietetics, Nursing, Physical Therapy, and Radiologic Technology.

Data Collection

Data were collected from all research articles published in five major peer-reviewed journals from January 2006 to December 2010. Research articles appearing in hard copy and online journals were analyzed by hand for inclusion in this study. The journals reviewed included the *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. A total of 1,469 research articles published from January 2006 to December 2010 were analyzed for the purpose of this study.

Journals in print were obtained from healthcare professionals in dental hygiene, nursing, and radiologic technology and from the library stacks of Southern West Virginia Community and Technical College. Online journals for dietetics and physical therapy were accessed through Marshall University's online database which includes EBSCOhost, Medline, and PubMed.

Specific information related to each journal selected for inclusion in this study may be found in Appendix B including the name of the journal, number of times the journal is published per year, the publisher, publication method, and review process. Found in Appendix C is a representation of the form which was used for data collection. This form includes the following information name of the journal, number of times per year the journal was published, year the journal was published, research design, the gender of the lead author, and the academic rank of the lead author.

An evaluation of all research articles printed in five peer-reviewed allied health journals was conducted from a five year period, 2006-2010. Each of the articles was evaluated for the following four variables: type of research, frequency of the research methods used, gender of the lead author, and academic rank of the lead author.

Journals from the disciplines of dental hygiene, dietetics, nursing, physical therapy, and radiologic technology were categorized into separate tables, and placed in a spreadsheet, in order to extract data in a logical format. These data were stored in a spreadsheet format (Appendix C).

Data Analysis

IBM's statistical package SPSS (Windows version 19.0) was used to perform statistical analysis on the data collected across the five allied health journals used in this study. SPSS was used to perform statistical analysis as well as to determine the frequency with which each type of research method appeared in each journal in relationship to the research design, gender and rank of the lead author. The SPSS statistical package is used to obtain frequencies and percentages when using multiple data sources and different types of statistical analysis. Use of a multiple response procedures in a study produces descriptive analysis which will not permit the testing of inferential hypotheses. This method is a limitation of using this type of statistical analysis.

The chi-square method was used to test and analyze the data. It is the most common test of significance between categorical variables (Howell, 2000). Karl Pearson developed the chi-square in the early 1900's, first introducing basic graphical methods, and then expanding to statistical quantitative methods (Porter, 2011). The intended use of Pearson chi-square is to test the likelihood an observed observation is due to chance (Foster, 2006). Also known as "goodness of fit" Pearson chi-square measures how observed distribution of data fits with what is expected (Uys & Basson, 2005), as well as categorization across two or more dimensions (Howell, 2000).

Quantitative data were used to analyze and interpret the frequency of articles published during the past five years, the research methods used, the gender of the lead author, and the academic rank of the lead author. Descriptive statistical methods were used in order to present the quantitative descriptions in a logical, manageable format. According to Black (1999 p. 306), "Statistical analyses are typically used when

performing a quantitative research study.” Descriptive research is a valid, scientific tool used to gather data (Shuttleworth, 2008). According to Johnson (2000), researchers conducting a descriptive, non-experimental study describe and document the various characteristics of phenomena. In describing mixed methods research Johnson (2008 p. 15), states “Today’s research world is becoming increasingly interdisciplinary, complex, and dynamic; therefore, many researchers need to complement one method with another and all researchers need a solid understanding of multiple methods used by other scholars to facilitate communication, to promote collaboration, and to provide superior research.”

Summary

This study surveyed the major peer reviewed journals of five allied health disciplines: dental hygiene, dietetics, nursing, physical therapy, and radiologic technology from January 2006 to December 2010. The purpose of the study was to determine the type and frequency of research published in each allied health discipline. These factors were evaluated against the gender and academic rank of the lead author. A descriptive, non-experimental research design was used in this study. Chi-square tests were used for frequency analyses.

In Chapter Three research methods used in this study were presented. The research questions were restated and the research design was presented. Sample and sample size, instrument used and data collection as well as data analysis were discussed. Findings of this study are presented in Chapter Four.

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF FINDINGS

Introduction

The purpose of this study was to determine the type and frequency of research methods utilized in selected peer-reviewed allied health research journals from January 2006 to December 2010. Methodological orientation based on the gender and academic rank of the lead authors was analyzed. Allied health professions chosen for the purpose of this study include dental hygiene, dietetics, nursing, physical therapy, and radiologic technology. This study used a quantitative, non-experimental, descriptive research design methodology that relied upon data collected from five allied health research journals.

Data

Data were collected from all research articles published in the five major peer-reviewed journals identified for the purpose of this study: *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. A total of 1,469 research articles appearing in hard copy and online journals, published from January 2006 to December 2010, were analyzed for inclusion in this study. A detailed statistical analysis of the research data gathered from this study is found in this chapter.

A code book, along with a corresponding spreadsheet, was developed by the author because an instrument that included all of the identified pieces of information needed for this study could not be found. The code book and form included the following

information name of the journal, number of times per year the journal was published, year the journal was published, research design, gender of the lead author, and academic rank of the lead author.

Descriptive Research Data

There is a close connection between theory and research. Without one the other would not exist according to Brown (1977). The initial impetus for theory relies on research. Theory development relies on research and research relies on theory. Simply, theory determines the data that are to be collected and the research findings challenge accepted theories (Fawcett & Garrity, 1986). The most basic type of research is descriptive (Clark, 2000). Descriptive research is very straight forward and easy to understand. This type of research states “what is” (Fawcett & Garrity 1986).

Descriptive, non-experimental, quantitative research was used for this study. The use of a descriptive research design depends on the questions being asked in the study, as well as the current state of theory development (Fawcett & Garrity 1986). According to Fawcett (1986), descriptive theory-generating research is used if little is known about the phenomena that are being investigated. Descriptive research studies provides a way of discovering new meaning, describes what exists, and determines the frequency of occurrence as well as allowing the categorization of information (Burns & Groves, 2005).

Data Collection

In an extensive review of the literature, research providing metadata in allied health publishing could not be found. Specifically, an analysis of what is published, how often it is published, and by whom a research article is published, as well as the methods used

in the studies, has not been conducted. Data were collected from all research articles published in these journals from January 2006 to December 2010. Research articles appearing in hard copy and online journals were analyzed by hand for inclusion in this study. A total of 1,469 research articles were reviewed. The research articles reviewed were evaluated for the following variables: type of research, frequency of the research methods used, gender of the lead author, and academic rank of the lead author. There has been little to no research published in allied health journals that address these variables.

Research Questions

Research findings of this study are directly related to the questions utilized to guide and direct it. This study was designed to answer the following five research questions:

1. How frequently are quantitative research methods used in the allied health journals identified in this study?
2. How frequently are qualitative research methods used in the allied health journals identified in this study?
3. How frequently does mixed methods research appear in the allied health journals identified in this study?
4. To what extent, if any, does gender influence the type of research methods used by the lead author?
5. To what extent, if any, does academic rank influence the type of research methods employed by the lead author?

Analysis, as well as findings for the five research questions used in this study, are addressed in the next section of this chapter.

Research Findings

The chi-square method was used to test and analyze the data in this study. It is designed to analyze categorical data that have been counted and divided into categories. The calculation of degrees of freedom is found within the chi-square test. Degrees of freedom (df) are used to identify the probability of independence (Foster, 2006). Calculation of the chi-square value is then used with the degrees of freedom to obtain the probability (p-value) of independence (Howell, 2000). It should be noted that chi-square tests can be used to analyze different types of frequencies or percentages. For example, in the present study comparison of just gender would find significant differences in the frequency of gender in nearly every case. There were 1,145 lead authors who were female. Males totaled 324 individuals. The researcher used chi-square to examine proportional differences in the dependent variables.

Data collected for this study describe the following publishing frequency of selected journals, frequency of research articles published per year, frequencies of type of research published, gender of the lead author, and academic rank of the lead author. Frequencies are used to analyze categorical data in one-way ANOVA tables. This is the simplest method used to review the differences in categories of values which are distributed in the sample (StatSoft, Inc., 2011).

A code book was developed and used to collect data for this study. Numerical values were assigned to each category. Table 1 includes the categories and numerical values which were used. Table 1 is a direct representation of the code book.

Table 1
Coding Description

Category	Numerical Value Assigned
Journal	1 <i>Journal of Dental Hygiene</i>
	2 <i>Journal of the American Dietetic Association</i>
	3 <i>Journal of Nursing scholarship</i>
	4 <i>Physical Therapy Journal of the American Physical Therapy Association</i>
	5 <i>Radiologic Technology</i>
Publishing Frequency Per Year	1 Monthly
	2 Bimonthly
	3 Quarterly
Publication Year	1 2006
	2 2007
	3 2008
	4 2009
	5 2010
Gender of Lead Author	1 Male
	2 Female
Academic Rank of Lead Author	1 Instructor
	2 Assistant Professor
	3 Associate Professor
	4 Professor
	5 Administrator/Other

Table 2 provides a statistical overview of each of the categories reviewed in this study. For each category 1,469 journal articles were reviewed. There were no missing journals for any of the categories. The standard error of the mean, the median, the mode, standard deviation, minimum and maximum are found in the following table.

Table 2
Statistical Overview of Categories

		Total Number of Journal	Times Per Year Published	Year Published	Type of Research	Gender of Lead Author	Rank of Lead Author
N	Valid	1,469	1,469	1,469	1,469	1,469	1,469
	Missing	0	0	0	0	0	0
Median		2.00	1.00	3.00	1.00	2.00	4.00
Mode		2	1	4	1	2	5
Minimum		1	1	1	1	1	1
Maximum		5	3	5	3	2	5

n=1,469

The first three categories in this study are general; however, they provide the foundation for the research questions. Table 3 provides the finding of the total number of journal articles that were published from January 2006 to December 2010. A total of 1,469 articles were included in the study. The most frequently published research articles in all journals included in this study, 47.2% of all the research articles, were published in the *Journal of the American Dietetic Association* which published a total of 693 research articles from January 2006 to December 2010. Journals with the least frequent publication of research articles included in this study were the *Journal of Dental Hygiene*, which published 63 articles, 4.3% of the total, from January 2006 to December 2010 and *Radiologic Technology*, which published 61 research articles, 4.2% of the total, over the same five-year span.

Table 3
Frequency and Prevalence of Research Articles by Journal

Journal	Frequency	Percent	Valid Percent	Cumulative Percent
<i>Journal of Dental Hygiene</i>	63	4.3	4.3	4.3
<i>Journal of the American Dietetic Association</i>	693	47.2	47.2	51.5
<i>Journal of Nursing Scholarship</i>	243	16.5	16.5	68.0
<i>Physical Therapy Journal of the American Physical Therapy Association</i>	409	27.8	27.8	95.8
<i>Radiologic Technology</i>	61	4.2	4.2	100.0
Total	1,469	100.0	100.0	

n=1,469

Table 4 provides an analysis of the frequency of research articles published. Journals used in this study were published monthly, bimonthly, or quarterly. The majority of research articles were found in journals that were published monthly, 1,102 or 75.0% of the research articles published from January 2006 to December 2010. This finding was expected due to the frequency of publication of the journals. Journals that are published monthly are more likely to have a greater number of total research articles than journals that are published less often. Surprisingly, the fewest articles published for the same five year period, 61 or 4.2% of all articles were in journals that were published

bimonthly. Two research articles are chosen for publication in *Radiologic Technology*, which is published bimonthly. This finding may account for the low number of research articles published in bimonthly journals.

Table 4
Prevalence of Research Articles by Publication Frequency

Publication Frequency	Number of Research Articles	Research Articles as Percentage of Total
Monthly	1,102	75
Bimonthly	61	4.2
Quarterly	306	20.8
Total	1,469	100.0

n=1,469

There was no significant difference found in the frequency of articles published per year from January 2006 through December 2010. In 2009 the maximum number of research articles was published, 305 or 20.8% of all articles published that year. Both 2007 and 2008 had the fewest research articles published, 287 or 19.5% of all articles.

Table 5 provides a summary of these data.

Table 5
Prevalence of Research Articles by Year Published

Year Published	Frequency of Articles Published	Percent of Total Articles Published	Valid Percent of Articles Published	Cumulative Percent
2006	293	19.9	19.9	19.9
2007	287	19.5	19.5	39.5
2008	287	19.5	19.5	59.0
2009	305	20.8	20.8	79.8
2010	298	20.2	20.2	100.0
Total	1,469	100.0	100.0	

n=1,469

Table 6 provides statistical analysis of the study's first three research questions which deal with the frequency of the three research methods in published articles. Each research question was analyzed independently. Tables 7 through 14 show the data used

to analyze research questions four and five, which deal with the gender and academic rank of the lead authors. Cross-tabulation of the research, as well as chi-square tests, were used to analyze data. Cross-tabulation combines two or more frequency tables resulting in a unique combination of specified values that allows examination of frequencies of observations that belong to specific categories (StatSoft, Inc., 2011). Examination of frequencies identifies relationships between cross-tabulated variables.

Research Questions 1 – 3: Research Methods in Allied Health Journals

All research articles published in the five identified allied health journals from January 2006 to December 2010 (n=1,469) were analyzed as to the frequency and type of research conducted. Specific types of research methods found include quantitative, qualitative, and mixed methods. Table 6 shows the data related to type of research. Quantitative research comprised 93.2% of the studies; qualitative research made up 5.0%, and the remaining 1.8% was mixed methods studies.

Table 6
Frequency and Type of Research Published

	Frequency	Percent	Valid Percent	Cumulative Percent
Quantitative	1,369	93.2	93.2	93.2
Qualitative	73	5.0	5.0	98.2
Mixed Methods	27	1.8	1.8	100.0
Total	1,469	100.0	100.0	

n=1,469

Research Question 1: How frequently are quantitative research methods used in the allied health journals identified in this study?

Quantitative research methods were dominant in the articles published in the five identified allied health journals from January 2006 to December 2010. A total of 1,469

articles were analyzed and 1,369, or 93.2%, used a quantitative research design. Allied health research is relatively new with many of the disciplines less than one hundred years old. Until recently allied health professionals have been theoretically based with little emphasis on discipline-specific research (Arena, 2011). The majority of research published until recently transcended the experiences of allied health professionals into similar practice disciplines that included medicine, basic science, and education. According to Arena (2011), limitations to conducting discipline specific research may be due to the immaturity of the professions, the preponderance of clinicians as opposed to researchers, and the lack of preparation of allied health professionals to conduct research studies.

Research Question 2: How frequently are qualitative research methods used in the allied health journals identified in this study?

Frequency of qualitative research design found in the selected five allied health journals that were published in the identified research journals from January 2006 to December 2010 was 73 or 5.0% of the articles. The majority of qualitative research was published in the *Journal of Nursing Scholarship*.

Research Question 3: How frequently does mixed-methods research appear in the allied health journals identified in this study?

Of the three methods, mixed-methods research was published the least over the five year period from January 2006 to December 2010. Of the total number of articles published only 27, or 1.8%, used mixed-methods research.

Research Questions 4 – 5: How do the gender and academic rank of the lead author affect the type of research methods used in the articles?

Data found in Tables 7 through 14 are related to research questions 4 and 5. Data related to gender and academic rank were analyzed in all 1,469 research articles used in this study. Data used to answer research questions four and five are found in Tables 7 through 14.

The percentage of females is greater than the percentage of males who were lead authors of research articles published in the allied health journals used in this study. Females were identified as the lead author in 1,145, or 77.9% of the research articles. Male lead authors totaled 324 individuals, or 22.1%.

Table 7
Frequency of Publication by Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	324	22.1	22.1	22.1
Female	1,145	77.9	77.9	100.0
Total	1,469	100.0	100.0	

n=1,469

Five categories related to academic rank were included in the data. Academic ranks for the purpose of this study included: instructor, assistant professor, associate professor, professor, and other. The academic rank classified as “Other” included administrators, lecturers, adjunct faculty, researchers, and individuals outside academia. “Other” is the predominate rank of the lead author in the 1,469 research articles reviewed for this study. Almost 50% of all lead authors, 733 individuals, were categorized as “Other.” The next most frequently occurring category of academic rank was assistant professor with a

frequency of 296 individuals, or 20.1%. Individuals holding the academic rank of instructor were least likely to be lead authors.

Table 8
Frequency of Publication by Academic Rank

Rank of Lead Author	Frequency	Percent	Valid Percent	Cumulative Percent
Instructor	62	4.2	4.2	4.2
Assistant Professor	296	20.1	20.1	24.4
Associate Professor	211	14.4	14.4	38.7
Professor	167	11.4	11.4	50.1
Administrator/Other	733	49.9	49.9	100.0
Total	1,469	100.0	100.0	

n=1,469

The results of a chi-square test of data related to gender and type of research is found in Table 10. There were a total of 324 males and 1,145 females who were identified as lead author in this study.

Table 9
Frequency of Gender of Lead Author and Type of Research Published

Gender		Quantitative	Qualitative	Mixed Methods	Total
Male	Count	313	6	5	324
	Expected	301.9	16.1	6.0	324.0
Female	Count	1056	67	22	1,145
	Expected	1,067.1	56.9	21.0	1,145.0
Total	Count	1,369	73	27	1,469
	Expected	1,369.0	73.0	27.0	1,469.0

n=1,469

Table 10
Chi-Square Tests for Gender and Research

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.846 ^a	2	.012
Likelihood Ratio	10.771	2	.005
Linear-by-Linear Association	4.932	1	.026
N of valid Cases	1,469		

^a0 cells (.0%) have expected count less than 5. The minimum expected count is 5.96. Values of chi-square tests are found in Table 10, which provides a chi-square of gender.

of authors and the research methods used in the articles published in the identified allied health journals. There were no significant differences in the expected versus actual count except for qualitative research. There were significant differences between the expected and actual counts for gender by qualitative research; female lead authors were significantly more likely to engage in qualitative research than were male lead authors.

The frequency of males publishing in *Radiologic Technology* is significantly greater than males publishing in the *Journal of Dental Hygiene*. Of the 324 male lead authors, 160 were published in *Radiologic Technology*, only 13 male lead authors published in the *Journal of Dental Hygiene*.

The majority of females published research articles in the *Journal of American Dietetics*. There were 586 articles published by female lead authors in this journal from January 2006 to December 2010. The fewest female lead authors, 35, were found in *Radiologic Technology*.

Table 11*Frequency of Gender of Lead Author and the Journal the Research was Published*

			<i>Dental Hygiene</i>	<i>Dietetics</i>	<i>Nursing</i>	<i>Physical Therapy</i>	<i>Radiologic Technology</i>	<i>Total</i>
Gender	Male	Count	13	107	18	160	26	324
		Expected	13.9	152.8	53.6	90.2	13.6	324
	Female	Count	50	586	225	249	35	1145
		Expected	49.1	540.2	189.4	318.8	47.5	1145.0
Total		Count	63	693	243	409	61	1469
		Expected	63.0	693.0	243.0	409.0	61.0	1469.0

n=1,469

Table 12*Chi-Square Tests for Gender and Journal*

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	132.333 ^a	4	.000
Likelihood Ratio	130.601	4	.000
Linear-by-Linear Association	76.595	1	.000
N of Valid Cases	1,469		

⁰ cells (.0%) have expected count less than 5. The minimum expected count is 13.45.

There are significant proportional gender differences in authorship in the *Journal of the American Dietetic Association*, the *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*.

There were no significant proportional gender differences in the *Journal of Dental Hygiene*.

Research Question 4: To what extent, if any, does gender influence the type of research methods employed by the lead author?

In this study, it was found that both male and female lead authors conducted quantitative research at a significantly higher rate than any other type of research. A total of 324 male lead authors were included in this study with 313 (96.6%) conducting

quantitative research. Six males (1.9%) were lead authors of qualitative research articles. Mixed methods research was represented by 5 male lead authors, or 1.5% of males.

Females significantly outnumbered males in numbers of lead authors in the research journals used for this study. A total of 1,145 lead authors were females. The majority of research conducted by female lead authors was quantitative with 1,056 studies (92.2%). Qualitative research was conducted by 67 female lead authors (5.9%) and mixed methods research was conducted by 22 female lead authors (1.9%).

The findings of this study indicate that there is not a significant gender difference as related to quantitative and mixed methods research; men and women are equally likely to use these methods. Although there is a large numeric gender difference in quantitative and mixed-methods research types, it is not proportionally different. Significant gender differences related to type of research published were found in the qualitative research type; women were significantly more likely than men to publish qualitative research.

Research Question 5: To what extent, if any, does academic rank influence the type of research methods employed by the lead author?

There was no significant correlation found in this study between academic rank of the lead author and type of research conducted. Of the 1,469 articles used for this study, 1,369 articles utilized quantitative research methods (93.2%). The highest frequency of qualitative research articles, 30 (2.0%), were conducted by individuals with the title of “Other” (administrators, non-academics, researchers, adjunct faculty, and lecturers). Instructors conducted the fewest published research articles with 60 studies (4.1%). A total of 27 mixed methods research articles (1.8%) were found in this study. The

majority of lead authors conducting mixed methods research were found to have the academic rank of “Other.” An interesting but non-significant finding was that no lead authors with the academic rank of instructor conducted mixed-methods research.

Table 13
Frequency of Rank of Lead Author and Type of Research Method Utilized

Rank of Lead Author		Count	Type of Research			Total
			Quantitative	Qualitative	Mixed-Methods	
Instructor	Count	60	2	0	62	
	Expected Count	57.8	3.1	1.1	62.0	
Assistant Professor	Count	271	19	6	296	
	Expected Count	275.9	14.7	5.4	296.0	
Associate Professor	Count	193	13	5	211	
	Expected Count	196.6	10.5	3.9	211.0	
Professor	Count	154	9	4	167	
	Expected Count	155.6	8.3	3.1	167.0	
Other	Count	691	30	12	733	
	Expected Count	683.1	36.4	13.5	733.0	
Total	Count	1369	73	27	1469	
	Expected Count	1,369.0	73.0	27.0	1,469.0	

n=1,469

Table 14
Chi-Square Tests Rank and Type of Research Method

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.738 ^a	8	.677
Likelihood Ratio	6.805	8	.558
Linear-by-Linear Association	.723	1	.395
N of Valid Cases	1,469		

^a cells (26.7%) have expected count less than 5. The minimum expected count is 1.14.

There were no significant differences in the rank of the lead author and the type of research published in selected allied health journals from January 2006 to December 2010. The majority of articles published, 1,360, were quantitative. Academic rank of Administrative/Other conducted the majority of research, 691 studies.

Summary

In this study, the frequency and type of research methods used in articles published in five selected allied health journals were analyzed. Methodological orientation based on the gender and academic rank of the lead authors was analyzed. Allied health professions chosen for the purpose of this study include dental hygiene, dietetics, nursing, physical therapy, and radiologic technology.

A total of 1,469 research articles published from January 2006 to December 2010 were analyzed to examine relationships between gender, academic rank, and research methodology used in the studies. The majority of articles published (93.2%) were quantitative; 5.0% were qualitative, and 1.8% utilized mixed methods. Academic rank of the lead author was most frequently (50.0% of the time) found to be “Other” (administrators, non-academics, researchers, adjunct faculty, and lecturers).

Neither gender nor academic rank was found to have an impact on the likelihood that lead authors would conduct quantitative or mixed methods research; however, a significant gender difference was found in the qualitative research studies. Females were significantly more likely to engage in qualitative research than males.

A final summary and conclusions of the study are presented in the next chapter. Implications, limitations, and recommendations for further research and study are

presented along with an analysis of research methods related to gender and academic rank of lead authors for the research articles examined in this study.

CHAPTER FIVE: CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary of Purpose

The purpose of this study was to determine the type and frequency of research methods utilized in selected peer reviewed allied health research journals from January 2006 to December 2010. Methodological orientation based on the gender and academic rank of the lead authors was analyzed. Allied health professions chosen for the purpose of this study include dental hygiene, dietetics, nursing, radiologic technology, and physical therapy.

This study examined articles published in the major peer-reviewed journals, either hard copy, web, or both formats, in the five chosen allied health professions from January 2006 to December 2010. The following journals were included in this study: *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy Journal of the American Physical Therapy Association*, and *Radiologic Technology*. Little to no research has been conducted on the articles published in various allied health journals.

Restatement of Research Questions and Summary of Results

Five research questions were addressed in this study. The five research questions were used to guide and direct this study. Each question is restated along with the results and finding for each specific question.

Research Question 1: How frequently are quantitative research methods used in allied health journals identified in this study?

All research articles, 1,469, published in the five identified allied health journals from January 2006 to December 2010 were reviewed. The majority of research articles published was quantitative, 93.7%. The high number of quantitative research articles published, 1,369, was expected and did not affect the conclusions of the study.

Research Question 2: How frequently are qualitative research methods used in the allied health journals identified in this study?

Frequency of qualitative research design found in the selected five allied health journals that were published from January 2006 to December 2010 were 73, or 5.0%. The majority of qualitative research articles were published in the *Journal of Nursing Scholarship*.

Research Question 3: How frequently does mixed-methods research appear in the allied health journals identified in this study?

Mixed-methods research was published the least over the five year period, January 2006 to December 2010. Of the total number of articles published only 27, or 1.8%, were mixed-methods research design.

Research Question 4: To what extent, if any, does gender influence the type of research methods employed by the lead author?

Gender did not have a significant relationship to the type of research methods employed by the lead author. Quantitative research was conducted at a significantly higher rate by both male and female lead authors than any other type of research. Of the 1,469 research articles reviewed, males were lead author on 22% (324 articles). Six

males (1.9% of male authors) were lead authors on qualitative research methods employed in the articles submitted and accepted for publication. Mixed-methods research design was employed by five male lead authors (1.5%).

Females significantly outnumbered males in numbers of lead authors publishing research articles included in the journals used for this study. A total of 1,145 lead authors were females. The majority of research conducted by female lead authors (92%) was quantitative (1,056 studies). Qualitative research was conducted by 5.9% of female lead authors, and mixed methods research was conducted by 1.9% of female lead authors.

Research Question 5: To what extent, if any, does academic rank influence the type of research methods employed by the lead author?

There was no significant relationship found in this study between academic rank of the lead author and type of research conducted. A total of 1,469 articles were reviewed for the purpose of this study. A total of 1,369 articles, or 93.2%, were conducted utilizing quantitative research methods. The highest frequency of qualitative research articles were conducted by individuals with the title of “Other.” Instructors conducted the fewest research articles published accounting for 4.1%. A total of 27 mixed-methods research articles was found in this study, which make up 1.8% of the articles reviewed. The majority of lead authors conducting mixed-methods research were found to have the academic rank of administrator “Other.” An interesting but non-significant finding was that no lead authors with the academic rank of instructor conducted mixed-methods research.

Sample, Methods, and Findings

Sample

This study examined 1,469 research articles published in five the major peer-reviewed allied health journals, either hard copy, web, or both formats, from January 2006 to December 2010. Allied health professions chosen for the purpose of this study include dental hygiene, dietetics, nursing, physical therapy, and radiologic technology. Research journals used in this study include: *Journal of Dental Hygiene*, *Journal of the American Dietetic Association*, *Journal of Nursing Scholarship*, *Physical Therapy* *Journal of the American Physical Therapy Association*, and *Radiologic Technology*. These journals were chosen after reviewing the professional organizations of each discipline as well as the professional honor societies, and the recommendations by the discipline-specific national accreditation agencies found on the organizations' websites.

Methods

All articles published in the selected allied health journals from January 2006 to December 2010 were reviewed in this study. The research articles were analyzed to determine the type and frequency of research methods utilized in each study as well as the relationships between gender, academic rank, and research methodology. A descriptive, non-experimental research design was used in this study. Chi-square tests were used to conduct frequency analysis.

Findings

This study examined 1,469 research articles published in identified allied health journals which were published January 2006 to December 2010. All research articles

were analyzed in order to determine if there were relationships between gender, academic rank, and the research methodology used in the studies.

Overwhelmingly, quantitative research methods were used in the majority of the studies published. More than 93% of articles published in all identified allied health journals were quantitative. Qualitative and mixed methods research made up the remaining methods used in studies published in the five identified allied health journals. Lead authors with the rank of “Other” (administrators, non-academics, researchers, adjunct faculty, and lecturers) published the greatest number of articles during the defined period of time. Researchers holding the rank of Instructor published the fewest articles from January 2006 to December 2010 in identified allied health journals.

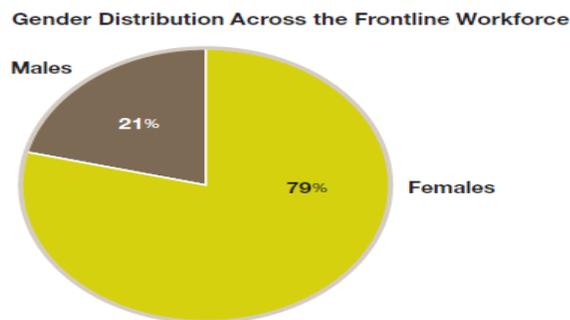
Neither gender nor academic rank was found to have an impact on the likelihood that lead authors would conduct quantitative or mixed methods research; however, a significant gender difference was found in the qualitative research studies. Individuals who published in the *Journal of Nursing Scholarship* conducted more qualitative studies than any other journal. Females who published research studies in this journal were significantly more likely to engage in qualitative research than males. This finding may be due in part to the significant difference in the number of lead authors publishing research studies who were female, 93%. Males comprised 7% of the lead authors publishing research articles in the same journal.

Females overall published more research articles in the identified allied health journals than males who published research articles in the same journals and over the same period of time. More than two-thirds of the lead authors who published studies in

the identified allied health journals from January 2006 to December 2010 were female. This finding was expected due to the fact the majority of allied health workers in American are female.

In 2006 the Robert Woods Johnson Foundation published a report that provided a graphical overview of healthcare workers throughout the nation. Figure 2 provides a graphical representation of females and males employed in the allied health work force.

Figure 1
Gender Distribution of Allied Health Workforce



Robert Wood Johnson Foundation (2006, p. 5)

As seen in the above graph, more than twelve million individuals are employed in the health-care sector in the United States in 2006 (Robert Wood Johnson Foundation, 2006). Almost eighty percent of all allied health workers are female. In six years the number of health-care workers increased by more than six million people (Centers for Disease Control and Prevention, 2012).

Implications

Allied health professionals work closely with one another providing safe, effective care for clients of all ages. According to Arena (2011 p. 161), "These professionals represent many and varied allied health disciplines...that bring theoretically-sound and

evidenced-based approaches to problem-solving in healthcare delivery”. The number of research articles published, as well as the variety of types of research methods used, varies greatly among allied health disciplines. Research in allied health is in its infancy, however, the breadth and depth of the research conducted may be under-recognized, especially by individuals whose professions have been conducting research for a significantly longer period of time (Arena, 2011).

Interdisciplinary research among allied health professionals is an emerging trend that is not only relevant, but necessary, in an ever-changing health care environment. According to the Institute of Medicine, the time has come for allied health practitioners to work together to provide safe care that is theoretically sound and based on scientific principles that have been published in relevant research journals (Bridges, 2011). Recognizing the need for interdisciplinary research, the National Institutes of Health (NIH) has established funding opportunities for individuals desiring to work together collaboratively conducting research that is relevant to a variety of allied health professions (Mundell, 2011). Although interdisciplinary research was not one of the categories included in this study, the lack of research being conducted across allied health disciplines was evident.

Few research articles have been published that include more than one allied health discipline. A concerted effort to conduct collaborative, interdisciplinary research must be considered a priority by all allied health professionals. Without collaborative, interdisciplinary research allied health professionals will not be able to keep pace with other health care providers (Arena, 2011). Additionally, teaching faculty at colleges and

universities should continue to pursue interdisciplinary research as a way to enrich courses taught and more meaningful engagement with colleagues.

Recommendations

There are more than five million allied health workers across America working in eighty different professions (American Dental Education Association, 2008). Of these, five million allied health professionals approximately 60% are direct care providers. This study included only five allied health disciplines. Further research will provide definitive evidence of what is being published, how often it is published, and who conducted the research that was published in top allied health journals. Three recommendations for further research have been identified.

The first recommendation is to replicate this study using the same allied health disciplines and journals or using a different group of allied health disciplines and journals. Replication of the study will provide a greater understanding of the type of research being conducted by allied health professionals. There needs to be greater depth and breathe of the subcategories used in this study. Particularly, the academic rank subcategory “Other” could be clarified and defined as to the individual’s job title and classification. Individuals who are non-academics conducting research need to be identified, as well as the number and types of research articles published. Knowledge gleaned from this information would be extremely beneficial. One question that should be asked is, “What is the frequency of the same type of research published by non-academic and academic allied health professionals?” Specifically, is there a significant difference in the number of quantitative, qualitative, and mixed methods studies published by non-academic and academic researchers?

The second recommendation is to explore the reasons qualitative research is published by a greater number of females than males across allied health disciplines. In this study the greatest number of researchers publishing qualitative studies were female. Additionally, the majority of qualitative studies published were in the *Journal of Nursing Scholarship*. Is this because the majority of nurses are female? Perhaps it could be concluded that nurses conduct qualitative research in order to gain a deeper understanding of actual or perceived health care problems (Burns & Groves, 2005). Additionally, qualitative research may provide a greater understanding of the human response to illness.

Of the five allied health disciplines included in this study, nursing was the first to establish professional and educational standards. Most allied health disciplines focus on the bio-medical or bio-psycho-social approach to healthcare (Pope & Mays, *Qualitative methods in health professions*, 2006). Over the last fifty years, new nursing theories and new methods of delivering care have evolved. Most nursing programs no longer teach students to look at illness one dimensionally. Nurses are now taught to look at the individual as a whole, the sum equal to the parts. These new theories and ways of caring for individuals have laid the groundwork for qualitative research. Further research will confirm or refute the question, “Are allied health professionals who are female more likely to conduct qualitative research or are allied health professionals who are nurses more likely to conduct qualitative research?”

Finally, it is recommended that interdisciplinary research among allied health professions be explored. This study did not address research studies published by more than one allied health discipline. Future studies should include a category that identifies

allied health disciplines as well as multiple allied health professionals who contributed to the research. This information could be gained by identifying not only the rank of the lead author but the rank and academic discipline of the lead author and co-authors of research articles published.

This study provided a basis for further research in allied health disciplines and the research methodology of articles appearing in the top journals. It also provided an overview of who is publishing allied health research, what is being published, and where the articles are published.

APPENDIX A

Code Book

**METHODOLOGICAL ORIENTATIONS OF ARTICLES APPEARING
IN ALLIED HEALTH'S TOP JOURNALS:
WHO PUBLISHES WHAT AND WHERE**

CODE BOOK

- | | |
|--------------------------------|--|
| A. Journal | 1 <i>Journal of Dental Hygiene</i> |
| | 2 <i>Journal of the American Dietetic Association</i> |
| | 3 <i>Journal of Nursing Scholarship</i> |
| | 4 <i>Physical Therapy Journal of the American Physical Therapy Association</i> |
| | 5 <i>Radiologic Technology</i> |
| B. Times Published
Per Year | 1 Monthly |
| | 2 Bi-Monthly |
| | 3 Quarterly |
| C. Year Published | 1 2006 |
| | 2 2007 |
| | 3 2008 |
| | 4 2009 |
| | 5 2010 |
| D. Type of Research | 1 Quantitative |
| | 2 Qualitative |
| | 3 Mixed Methods |
| E. Gender | 1 Male |
| | 2 Female |
| F. Rank of Lead Author | 1 Instructor/Lecturer |
| | 2 Assistant Professor |
| | 3 Associate Professor |
| | 4 Professor |
| | 5 Administrator/Other |

APPENDIX B
Information for Selected
Allied Health Journals

Journal	Number of Times Published Per Year	Publisher	Publication Method	Review
<i>Journal of Dental Hygiene</i>	Quarterly	American Dental Hygienist's Association	Online	Refereed
<i>Journal of the American Dietetic Association</i>	Monthly	Elsevier	Online	Peer Reviewed
<i>Journal of Nursing Scholarship</i>	Quarterly	Wiley-Blackwell	Print Online	Peer Reviewed
<i>Physical Therapy Journal of the American Physical Therapy Association</i>	Monthly	American Physical Therapy Association	Print Online	Peer Reviewed
<i>Radiologic Technology</i>	Bimonthly	American Society of Radiologic Technologists	Online	Peer Reviewed

APPENDIX C

Representation of Spreadsheet

Used for Data Collection

Name of Journal	Times Per Year Published	Year Published	Type of Research	Gender of Lead Author	Rank of Lead Author
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CURRICULUM VITAE

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April 2012

CURRICULM VITAE

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EDUCATION

Marshall University
Graduate School of Education and Professional Development

Leadership Studies – Educational Leadership –
Higher Education Administration

Ed. D.

August 2007 - Present

West Virginia University

Master of Science in Nursing Administration

MSN

May 13, 1990

Bachelor of Science in Nursing

BSN

May 19, 1987

Southern West Virginia Community College

Associate of Science in Nursing

ASN

Associate of Arts in General Studies

AA

May 22, 1977

Chapmanville High School

May 31, 1974

PROFESSIONAL EXPERIENCE

1987 – Present

Southern West Virginia Community and Technical College
Mount Gay, West Virginia

*Dean for Career and Technical Programs (7/1/07)

*Administrative Vice President and Dean of Allied
Health and Nursing (7/1/03)

*Associate Vice President for Academic Affairs and Dean of
Allied

Health and Nursing (8/1/98)

*Director of Allied Health and Nursing (9/16/91)

*Instructor Nursing (8/24/87)

Academic Promotions

*Associate Professor of Nursing (95)

*Tenure (93)

*Assistant Professor of Nursing (91)

2010-2012

West Virginia Board of Examiners for
Registered Professional Nurses
Charleston, WV
Education Consultant

1994 – 2002

Marshall University School of Nursing
Huntington, WV
Field Professor

1990 - 1995

Logan Medical Foundation
Logan, WV
Staff Nurse-Emergency Department

1985 - 1987

Mountaineer Pharmacy
Chapmanville, WV
Client Manager

1981 - 1985

Holden Hospital, Inc.
Holden, WV
House Supervisor
Quality Assurance Coordinator

1979 - 1981

West Virginia Medical Institute
Charleston, WV
Peer Reviewer

1979 - 1979

Dr. S. V. Patel
Chapmanville, WV
Staff/Office Nurse

1977 - 1978

Logan Medical Foundation
Logan, WV
Nursing Assistant/Staff Nurse/Emergency Department/
Outpatient Clinic

LICENSURE

Registered Professional Nurse
West Virginia Board of Examiners for
Registered Professional Nurses

AREAS OF EXPERTISE

Primary Care Specialist
Medical Rehabilitation Consultant
Curriculum Consultant
Allied Health and Nursing Consultant

STATE and NATIONAL MEMBERSHIPS

2011-Present	Statewide Associate Degree Nursing Task Force – Chair
2010-Present	West Virginia Association of Academic Administrators
2010-Present	Chief Logan Recreation Center Board of Directors – Member
2010	West Virginia Long-Term Workforce Partnership – Member
2009-Present	West Virginia League for Nursing - Member
2007-Present	West Virginia Organization for Associate Degree Nursing – Member
2006-Present	West Virginia Center for Nursing Board of Directors – Board Chair; Chair Statewide Nursing Articulation Committee; Member Recruitment and Retention Committee
1999-Present	National Organization of Associate Degree Nurses –Member; Past Nominations Committee
1999-Present	Southern Mountains Regional Educational Partnership Consortium - Institutional Representative
1999-Present	National Career Pathways Network (NCPN) – Member
1999-Present	National Council of Instructional Administrators (NCIA) – Member
1999-2010	West Virginia Board of Examiners for Registered Professional Nurses – Member; Past President 2003-2010
1995-Present	Southern Regional Educational Board – Council on Collegiate Education for Nurses – Member
1994-1999	Logan County Board of Health - Member
1992-Present	American Nurses Association – Member

- 1992-Present** West Virginia Nurses Association – Member; Past Chair Health Policy and Legislation Committee; Continuing Education Committee
- 1992-Present** National League for Nursing – Member
- 1991-Present** Nursing Education Foundation of West Virginia (ADDNE) – President Elect; Past Chair Legislative Committee; Program Committee Member

HONORS and RECOGNITIONS

- 2009** White House Meeting with President Obama (One of fifty nurses nationwide chosen to attend).
- 2009** West Virginia Higher Education Representative to the National Nursing Education Summit Baltimore, MD
- 2009** Golden Key International Honor Society
- 2007** Southern West Virginia Community and Technical College President’s Award
- 1990** Sigma Theta Tau International Honor Society for Nurses

AREAS of EXPERTISE

- Accreditation
- Associate Degree Nursing
- Conflict Resolution
- Curriculum Design and Implementation
- Ethical Dilemmas
- Higher Education
- Grants Writing
- Leadership
- Licensure and Regulation
- Stress Management