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# EVIDENCE-BASED PRACTICE IN

# CLINICAL ATHLETIC TRAINING EDUCATION

By

Dorice A. Hankemeier, ATC
Bachelor of Arts in Exercise Science, 2001, Central College
Master of Science in Education, Athletic Training, 2003, Old Dominion University

A Dissertation Submitted to the Faculty of
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May 2011

Approved by:

Bonnie L. Van Lunen (Director)

Stacy E. Walker (Member)

Shana L. Pribesh (Member)

Beth E. Jamali (Member)

# ABSTRACT

EVIDENCE-BASED PRACTICE IN
CLINICAL ATHLETIC TRAINING EDUCATION

by

Dorice A. Hankemeier, ATC
Old Dominion University, 2011
Director: Dr. Bonnie Van Lunen

Evidence-Based Practice (EBP) concepts are becoming more prevalent in the educational curricula of nursing, medicine, physical therapy, and athletic training. The infusion of EBP in the clinical education experience of students has been slow especially in athletic training. The aim of Project I was to investigate approved clinical instructors (ACIs) experience and implementation of EBP with students through emergent design qualitative interviews. Project II was designed to develop and establish the reliability of the Evidence-Based Concepts Assessment (EBCA) to assess athletic trainers' perceived importance, attitudes & beliefs, knowledge, confidence, accessibility, and barriers of EBP. Project III investigated the importance, knowledge, and confidence of athletic trainers in EBP concepts using the EBCA.

The sixteen approved clinical instructors (ACIs) interviewed identified strategies of discovery, promotion of critical thinking, and sharing of information in how they implemented EBP with students. ACIs also expressed the need to model the EBP behavior for students to appreciate and implement in their clinical practice. Barriers of limited resources, personnel, academic program constraints, and personal knowledge were reported. Strategies to integrate didactic and clinical collaboration of EBP were identified.

Project II demonstrated that each of the sub-scales of the EBCA were reliable. In addition, factors within each sub-scale were established to allow for further analysis of the data. The EBCA was utilized to assess the perceived importance, attitudes & beliefs, knowledge, confidence, accessibility, and barriers to EBP in individuals with a variety of athletic training roles. Athletic training clinicians, undergraduate athletic training education program directors, approved clinical instructors, post-professional educators, and post-professional students were contacted to participate in completing the EBCA. Overall participants demonstrated a high level (3.49/4.0 ± .41) of perceived importance for EBP. Despite the high level of importance, participants' overall total knowledge scores were low (64.2% ± 1.29) and they reported that they were only mildly to moderately confident in their knowledge (2.71/4.0 ± .55). Athletic training clinicians demonstrated significantly lower knowledge and confidence scores than all other participants. Individuals with a terminal degree demonstrated significantly higher knowledge scores and confidence in knowledge than all other participants.

# ACKNOWLEDGEMENTS

Throughout this process of my doctoral studies and dissertation I have learned more than I would have ever imagined. In fact, I never thought I would be here in the first place, but I am grateful for the opportunity and excited for the challenges that are ahead.

First, I would like to thank Bonnie for allowing me to return to ODU for the PhD program. Bonnie, you always provided a calm voice of reason in my times of panic and frustration. You knew when to push harder, when to back off, and you knew what I needed to hear when I didn't know it myself. I could not have asked for a better mentor, colleague, and friend. You provide a quiet example of how to be a successful strong woman of faith who balances your career and family; for that I am extremely grateful.

I wouldn't be here today without my parents. You guys have been so supportive of me being a "student" again. Although the distance between us has been great, you have always been there for me and have encouraged me to continue through. I thank you providing me with a great foundation, a level head, and an example of what hard work can bring. I am a product of my parents and I couldn't be any happier about that!

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Sara, who would have thought that we would have ended up in the same place again? I completely "blame" you for this whole thing, but I thank you for it at the same

time. You have been an awesome colleague, friend, and travel buddy. I can't wait to see what adventures are in store for us next.

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Josh and Shannon, you have provided me with some amazing memories and experiences. I am so blessed to have been able to know you and become friends with you. Josh, you are a true inspiration of what determination, hard work, and positive attitude can do for a person. Shannon, you are a rock. Your unwavering strength and positive outlook has been so refreshing to me. Many days when I struggled to keep going or wanted complain I was brought back to all that you two have been through. You guys helped me put this all in perspective and I thank you.

There are so many other people that I need to thank, but I think I'll just sum it up with this quote by Albert Schweitzer, "In everyone's life, at some time, our inner fire goes out. It is then burst into flame by an encounter with another human being. We should all be thankful for those people who rekindle the inner spirit."

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Hankemeier DA, Van Lunen BL (2011). Perceptions of Approved Clinical Instructors: Strategies for Overcoming Barriers in the Implementation of Evidence-Based Practice. *J Athl Train.* In review

Hankemeier DA, Welch CE, Walter JM, Van Lunen BL, Manspeaker SA (2011). The Development and Reliability of the Evidence-Based Concepts Assessment: An Instrument to Assess Athletic Trainers' Perceived Importance, Knowledge, Attitudes & Beliefs, Barriers, and Accessibility to Evidence-Based Practice Information. To be submitted to *J Athl Train.*

Hankemeier DA, Welch CE, Walter JM, Van Lunen BL, Newton EJ, Walker S, Pribesh S, Jamali B (2011). Perceived Importance, Knowledge, and Confidence of Evidence-Based Practice Concepts in Athletic Training Educators, Clinicians, and Students. To be submitted to *J Athl Train.*

# CHAPTER I

## INTRODUCTION

Evidence-based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). This evidence comes from using patient-centered, clinically relevant research found in the medical literature (Steves & Hootman, 2004). Evidence-based practice (EBP) allows clinicians to research information, critically appraise that information, and apply it appropriately to clinically based problems (Wanvarie et al., 2006). The introduction of EBP has permeated many health care professions such as nursing (Burns & Foley, 2005; Fineout-Overholt & Johnston, 2005), physical therapy (Jette et al., 2003), and medicine (Wanvarie et al., 2006). Research suggests that EBP provides real-time dynamic approaches to individualized health care (Khan & Coomarasamy, 2006).

Evidence-based practice marks a shift among many health care professions from a traditional emphasis based on professional opinion to a guided clinical practice based on current research (Jette et al., 2003). However, the use of EBP in athletic training is sporadic. Without implementing EBP throughout the profession, athletic trainers run the risk of being labeled as a group that does not regard the evidence of effectiveness and deems critical thinking skills as unimportant (Steves & Hootman, 2004). In order to understand how to push the utilization of EBP into the forefront of the profession, research showing the current state of EBP in the athletic training profession is necessary. By understanding athletic trainers current attitudes and knowledge towards EBP along with their current practices, the profession can work towards further developing the skills

of athletics trainers through workshops, conferences, and infusing EBP into the academic preparation of athletic training students.

An important component of the educational process of an athletic training student comes from the approved clinical instructors or clinical instructors. An approved clinical instructor (ACI) can function as clinical instructor in the field or can serve in a dual role as a teacher in the classroom along with teaching clinically. In addition, approved clinical instructors are also able to assess a student's clinical proficiency of athletic training specific skills. A clinical instructor (CI) is an individual who is able to supervise and mentor students in their clinical experience (CAATE, 2008). According to the current Commission on Accreditation of Athletic Training Education (CAATE) accreditation standards, the preparation of an athletic training student must include a minimum of four varied clinical experiences, under the supervision of an ACI or CI, to compliment the knowledge gained in the classroom (CAATE, 2008). Training approved clinical instructors (ACIs) to understand the best practices for teaching EBP clinically is important. Straus and Jones (2004) suggest that a collaborative effort is needed by those individuals who teach EBP in various fields to share educational materials and to evaluate educational interventions.

Since it has been documented that athletic training is behind in its use of EBP concepts (Hertel, 2005; Steves & Hootman, 2004), it is likely that many Athletic Training Education Programs (ATEPs) are not teaching EBP. Each ATEP must maintain accreditation through CAATE, but the CAATE accreditation guidelines and the National Athletic Trainers' Association (NATA) competencies are void of any requirements for implementing and utilizing EBP concepts (CAATE, 2008; NATA, 2006). Due to the

large number of professional athletic training programs (n = 367), it is doubtful that there are a majority of ATEPs voluntarily implementing these principles into their curriculum. Educators need to ensure that students have the necessary skills to consume, critique, and decipher research findings so they can be lifelong learners who use new findings to enhance their clinical practice (Hertel, 2005). In order to advance EBP within the profession and athletic training education, research is needed to evaluate the knowledge and attitudes of the educators and ACIs who are teaching and mentoring athletic training students. For those ACIs who are incorporating EBP with their students, understanding the strategies used for implementation and the challenges they face are important to the future direct of EBP in athletic training education.

Implementing EBP into curricula for professional athletic training students may be the best way to get EBP to permeate the clinical athletic training world by educating students how to best critically analyze the evidence and make clinical decisions based on that evidence. As Martin (2003) states, "Today's athletic training students are tomorrow's contributors to the profession's body of knowledge" (p. 52). The research on implementing EBP into didactic and clinical education has largely come from the nursing and medical fields and is still lacking significantly in the athletic training profession. Current research in athletic training has not looked at how to best alleviate the gap of knowledge that exists in terms of EBP implementation into athletic training education, but instead has focused largely on how to complete the steps of EBP (Hertel, 2005; Sauers, 2009; Steves & Hootman, 2004). The limited research in the area of EBP in clinical athletic training education has provided a wide opportunity for future research. Before further studies can investigate the potential best methods to improve

implementation, the current EBP knowledge base of athletic training educators needs to be established. Clinically, understanding the strategies used for EBP implementation of students will help guide future practice and research. Understanding the knowledge, attitudes, and beliefs, and perceived barriers of athletic training educators and clinicians will also help identify the current state of EBP within athletic training education.

**Project IA**

*Statement of the Problem*

The purpose of this study was to examine ACIs involved in CAATE accredited professional undergraduate athletic training education in regards to their experiences of evidence-based practice in order to understand effective strategies for encouraging the use of EBP concepts clinically.

*Aims of Research*

We aim to investigate the importance of utilizing EBP concepts in clinical practice, clinical EBP implementation strategies for students, and challenges of implementing EBP into clinical practice while mentoring and teaching athletic training students.

*Assumptions*

1. The approved clinical instructors will be honest about their use of evidence-based practice concepts.
2. The approved clinical instructors answered all questions in the interview honestly.

*Limitations*

1. The use of evidence-based practice concepts will be based on self report data which cannot be controlled.

2. Not all participants were solely clinical in their role, as some individuals also taught courses within the didactic curriculum.

*Delimitations*

1. Participants were approved clinical instructors within a CAATE program who utilized evidence-based practice concepts within their own clinical practice and with athletic training students.
2. Participants must have been an approved clinical instructor for at least one year prior to participation.

**Project IB**

*Statement of the Problem*

The purpose of this study was to examine the perceived barriers associated with implementation of evidence-based practice concepts of ACIs involved in CAATE accredited professional undergraduate athletic training education in order to understand how to better improve an ACIs' ability to implement EBP.

*Aim of Research*

We aim to describe the perceived barriers associated with implementation of evidence-based practice concepts with students while serving as an approved clinical instructor for a CAATE accredited professional undergraduate athletic training program and also aim to discover the ACIs' associated strategies and recommendations for overcoming those barriers.

*Assumptions*

1. The approved clinical instructors will be honest about their use of evidence-based practice concepts.

2. The approved clinical instructors answered all questions in the interview honestly.

*Limitations*

1. The use of evidence-based practice concepts will be based on self report data which cannot be controlled.
2. Not all participants were solely clinical in their role, as some individuals also taught courses within the didactic curriculum.
3. Not all participants fully understood what was included in the didactic curriculum, so their ability to discuss the EBP components taught in the classroom was limited.

*Delimitations*

1. Participants were approved clinical instructors within a CAATE program who utilized evidence-based practice concepts within their own clinical practice and with athletic training students.
2. Participants must have been an approved clinical instructor for at least one year prior to participation.

**Project II**

*Statement of the Problem*

The purpose of this study was to create and assess the reliability and validity of the Evidence Based Concept Assessment (EBCA) survey instrument for the evaluation of athletic training clinicians, educators, and students. More specifically the instrument assesses perceived importance, knowledge, attitudes and beliefs, and perceived barriers of evidence-based practice concepts as well as accessibility to resource information.

*Null Hypotheses*

1. The EBCA survey instrument will not be reliable in assessing athletic training clinicians, educators, and students' perceived importance, knowledge, attitudes and beliefs, and perceived barriers of evidence-based practice concepts.

*Research Hypotheses*

2. The EBCA survey instrument is reliable for assessing athletic training clinicians, educators, and students' perceived importance, knowledge, attitudes and beliefs, and perceived barriers of evidence-based practice concepts.

*Assumptions*

1. Percent agreement is an appropriate method for determining reliability of knowledge questions.
2. Principal components analysis is an appropriate method for assessing the internal consistency of scale items in each section of the survery.
3. Cronbach's alpha is an appropriate method for determining reliability of the Likert-scale items.

*Limitations*

1. Participants were recruited using differing methods in order to get reach all of the intended roles of athletic training clinicians, educators, and students.

*Delimitations*

1. Participants were delimited to a purposeful sample of athletic trainers from: undergraduate athletic training education program directors, faculty, and approved clinical instructors; athletic training clinicians not associated with education

programs; post-professional athletic training educators; post-professional athletic training students

**Project III**

*Statement of the Problem*

The purpose of this study is to determine the perceived importance, knowledge, and confidence of evidence-based concepts in the various athletic training roles of CAATE accredited professional undergraduate athletic training program directors, approved clinical instructors, clinicians not affiliated with CAATE programs, post-professional athletic training educators, and students enrolled in a post-professional athletic training program.

*Null and Research Hypotheses*

1. There will be no statistically significant difference in perceived composite importance score, total knowledge score, or composite confidence in knowledge score between the various athletic training roles.
    a. There will be a statistically significant difference in perceived composite importance score with clinicians not affiliated with an ATEP demonstrating a lower perceived composite importance score than all other participants.
    b. There will be a statistically significant difference in total knowledge score with post-professional educators demonstrating higher total knowledge scores than all other participant. (Jette et al., 2003)
    c. There will be a statistically significant difference in composite confidence in knowledge score with post-professional educators demonstrating higher

composite confidence in knowledge score than all other participants. (Jette et al., 2003)

2. There will be no statistically significant difference in the composite confidence in knowledge score, perceived composite importance score, or total knowledge score between individuals with a bachelors, masters, or terminal degree.
    a. There will be a statistically significant difference in the composite confidence in knowledge score with individuals who have earned a terminal degree demonstrating a larger composite confidence in knowledge score than individuals with a bachelors or masters degree. (Jette et al., 2003)
    b. There will be a statistically significant difference in perceived composite importance score with individuals who have earned a terminal degree demonstrating a higher perceived composite importance score than individuals with a bachelors or masters degree. (Jette et al., 2003)
    c. There will be a statistically significant difference in total knowledge score with individuals who have earned a terminal degree demonstrating a higher total knowledge score than individuals with a bachelors or masters degree. (Jette et al., 2003)
3. There will be no statistically significant relationship between the perceived composite importance score, composite confidence in knowledge score, or years of athletic training experience and the total knowledge score of all participants.
    a. There will be a statistically significant moderate to strong positive relationship between the perceived composite importance score and total knowledge score of all participants.

b. There will be a statistically significant moderate to strong negative relationship between years of athletic training experience and total knowledge score of all participants. (Jette et al., 2003)

c. There will be a statistically significant moderate to strong positive relationship between composite confidence in knowledge score and total knowledge score of all participants.

4. There will be no statistically significant relationship between the perceived composite importance score or the years of athletic training experience and the composite confidence in knowledge score of all participants.

   a. There will be a statistically significant moderate to strong positive relationship between the years of athletic training experience and the composite confidence in knowledge score of all participants. (Jette et al., 2003)

   b. There will be a statistically significant moderate to strong negative relationship between the years of athletic training experience and the perceived composite importance score of all participants. (Jette et al., 2003)

6. There will be no statistically significant difference in total knowledge score between approved clinical instructors' who have had evidence-based practice within their ACI training and those who have had no EBP within their ACI training.

   a. There will be a statistically significant difference in total knowledge score with approved clinical instructors' who have had evidence-based practice within their ACI training demonstrating a higher total knowledge score than

those approved clinical instructors who have not had evidence-base practice within their ACI training. (Coomarasamy & Khan, 2004)

7. There will be no statistically significant difference in the perceived composite importance score or total knowledge score between program directors and ACIs who had evidence-based practice as part of their educational preparation and those who have not had evidence-based practice as part of their educational preparation.
    a. There will be a statistically significant difference in the perceived composite importance score with program directors and ACIs who had evidence-based practice as part of their educational preparation demonstrating a higher perceived composite importance score than those who have not had evidence-based practice as part of their educational preparation.
    b. There will be a statistically significant difference in total knowledge score with program directors and ACIs who had evidence-based practice as part of their educational preparation demonstrating a higher total knowledge score than those who have not had evidence-based practice as part of their educational preparation. (Yousefi-Nooraie, Rashidian, Keating, & Schonstein, 2007)
8. There will be no statistically significant difference in total knowledge score between program directors and ACIs who have participated in an evidence-based workshop, course, or tutorial in the past year and those who have not participated in an evidence-based workshop, course, or tutorial.

a. There will be a statistically significant difference in total knowledge score with program directors and ACIs who have participated in an evidence-based workshop, course, or tutorial in the past year demonstrating a higher total knowledge score than those who have not participated in an evidence-based workshop, course, or tutorial. (Yousefi-Nooraie et al., 2007)

*Independent Variables*

1. Athletic training role (ATEP program director, approved clinical instructor, clinician not affiliated with ATEP, post-professional educator, post-professional student)
2. Degree earned (terminal, masters, bachelors)
3. Years of athletic training experience
4. Inclusion of EBP in ACI training (EBP included, EBP not included)
5. EBP within educational preparation (had EBP within educational preparation, did not have EBP within education preparation)
6. Attendance at an EBP workshop, seminar, or tutorial (attended, not attended).

*Dependent Variables*

1. Perceived composite importance score on Likert scale (not important (1), minimally important (2), moderately important (3), and very important (4))
2. Perceived composite confidence in knowledge score on Likert scale (not at all (1), mildly (2), moderately (3), extremely (4))
3. Total knowledge score (6 points) from multiple choice EBP knowledge questions.

*Assumptions*

1. The participants took the survey seriously and answered the questions honestly.

2. The EBCA survey answer options were applicable to all participants.
3. The EBCA survey was both reliable and valid.
4. Answers to the knowledge questions were based on personal experience and not external sources.
5. Athletic training education program directors disseminated the request for participation emails to the rest of the athletic training faculty and approved clinical instructors associated with their program.
6. Post-professional program directors disseminated the request for participation emails to the rest of the educational faculty and post-professional students associated with their program.
7. The NATA list is an accurate distribution list to use to identify clinicians not associated with educational programs.
8. Clinicians associated with educational programs did not fill out the EBCA if they received a request inadvertently.

*Limitations*

1. Direct access to approved clinical instructors and athletic training faculty was not available, so athletic training program directors were asked to disseminate the EBCA to these populations.
2. Direct access to the students and post-professional educators were not available, so post-professional program directors were asked to disseminate the EBCA to these populations.
3. The environment in which the EBCA was completed was not controlled across participants.

4. The number of people each program director sent the EBCA to was self-reported and was not delineated by role.
5. The number of people the EBCA was distributed was not verified through the undergraduate athletic training program director or the post-professional educators and students.
6. There was no verification that follow-up request for participation emails were sent to all additional undergraduate athletic training educators or the post-professional educators and students.
7. The number of participants represented by each role varied significantly.

*Delimitations*

1. All CAATE accredited professional undergraduate athletic training education program directors were contacted for participation.
2. Consenting program directors sent survey to the additional educational program faculty and approved clinical instructors.
3. All post-professional athletic training educators were contacted for participation.
4. All students in a post-professional athletic training education program during the Spring 2010 semester were contacted to participate.
5. Athletic training clinicians from the NATA membership who did not work in the collegiate, high school, or business setting were contacted to participate.

*Operational Definitions*

- Approved Clinical Instructor: An appropriately credentialed professional identified and trained by the athletic training education programs' clinical

instructor educator to provide instruction and evaluation of the Athletic Training Educational Competencies and/or Clinical Proficiencies (CAATE, 2008).

- Approved Clinical Instructor Training: Workshop conducted every three years minimally to train ACIs on learning styles, instructional skills, competencies, program administration, communication, legal behaviors, and other specific policies and procedures for the institution (CAATE, 2008).
- Athletic Training Educator: Any instructor that participates in formal didactic or clinical instruction of athletic training students.
- Athletic Training Education Program Director: A full-time faculty member of the host institution who is responsible for the administration and oversight of implementation of the athletic training education program (CAATE, 2008).
- Athletic Training Student: A student who is in the pre- or professional phase of a CAATE accredited athletic training education program.
- Clinical Coordinator: An individual designated by the athletic training education program to coordinate the clinical experiences and activities of athletic training students (CAATE, 2008)
- Clinical Education: The application of knowledge and skills, learned in classroom and laboratory settings, to actual patients and clinical practice under the supervision of an approved clinical instructor or clinical instructor (CAATE, 2008).
- The Commission on Accreditation of Athletic Training Education (CAATE): The governing board responsible for development, maintenance, and promotion of minimum standards of quality entry level athletic training education programs.

Institutions must meet and comply with all guidelines in order to receive CAATE accreditation (CAATE, 2008).

- Evidence-Based Practice: The integration and use of the best available research evidence, patient values, and clinician expertise to make guided clinical decisions (Sackett et al., 1996; Steves & Hootman, 2004).
- Evidence Based Concepts Assessment: A survey instrument with six Likert scale importance items, 15 Likert scale attitudes and beliefs items, six knowledge questions with associated comfort level Likert-scale, 16 Likert scale barrier items, and a section assessing the accessibility of resources for the participant.
- NATA Accredited Post-Professional Program: A graduate athletic training education program designed is to expand the depth and breadth of the applied, experiential, and propositional knowledge and skills of entry-level certified athletic trainers, expand the athletic training body of knowledge, and to disseminate new knowledge in the discipline. (NATA, 2002)
- Perceived Composite Confidence in Knowledge Score: The score achieved based on the confidence in the correct response for each of the six multiple choice questions on the EBCA. The total possible score is a four and can be related to the Likert 1-4 scale of not at all confident, mildly confident, moderately confident, and extremely confident.
- Perceived Composite Importance Score: The score achieved based on the five importance questions related to the steps of EBP. The total possible score is a four and can be related to the Likert 1-4 scale of not important, mildly important, moderately important, and very important.

- Previous Education in Evidence-Based Practice: Self reported demographic addressing the whether or not the participants' educational preparation included a course with the majority of content in evidence-based concepts.
- Previous Evidence-Based Practice Information in ACI Training: Self reported demographic addressing whether or not the ACI has had EBP as a component of their previous ACI training.
- Previous Evidence-Based Workshop: Self reported demographic addressing whether or not the participant attended/participated in an evidence-based workshop, seminar, or tutorial in the past year.
- Professional Undergraduate Athletic Training Education Programs (ATEP): Competency-based programs encompassing both didactic and clinical education. Educational content is based on cognitive, psychomotor, and affective competencies and clinical proficiencies (NATA, 2010).
- Terminal Degree: Earning a Phd, EdD, or MD degree.
- Total Knowledge Score: The total score achieved by the number of correct answers given on the knowledge section of the EBCA. Scores could range from zero to six.
- Years of Athletic Training Experience: The total number of years the individual has been practicing as a certified athletic trainer.

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# Chapter II

# REVIEW OF LITERATURE

The following review of literature will explain evidence-based practice and the role of evidence-based practice in education. There is significant literature established in the health care professions of nursing, medicine, and physical therapy, but there is still a significant need for athletic training research and information in evidence-based practice. This chapter will discuss the steps of evidence-based practice, review the role of evidence based practice in didactic and clinical education, provide an overview of athletic training education, and establish the need for further research in athletic training.

## Evidence-Based Practice

Evidence based practice (EBP) is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Care of the patient should involve the integration of the clinician's individual expertise with the best external evidence that can be found. In addition to taking clinician expertise into account, the patient's values and circumstances must also be addressed (Straus, Richardson, Glasziou, & Haynes, 2005). Considering all of these factors allows the clinician to deliver care that is individualized to the patient. In order to ensure that a clinician is using their expertise, they need to be taught how to utilize the steps of evidence based practice (Sackett et al., 1996; Straus et al., 2005). To find this evidence, patient-centered clinically relevant research found in the medical literature on diagnostic tests, treatment techniques, preventative programs, and prognostic markers should be investigated (Steves & Hootman, 2004). Looking into

the evidence may prove or disprove previously accepted methods or demonstrate new ways of caring for patients that is more accurate and effective and less harmful.

Clinicians should look to use EBP to move their long considered art form of treating patients to a more evidence-based science (Reilly, 2004). As a society, we have become accustomed to readily accessible information that provides instant gratification. This need of immediacy has increased the need for clinicians to know how to access and utilize validated, up-to-date information that can be applied to specific clinical cases (Straus et al., 2005). The practice of utilizing EBP will improve the care delivered to our patients (Sauers, 2009; Steves & Hootman, 2004) and it improves the critical thinking of clinicians (Steves & Hootman, 2004).

***Evidence-Based Practice Steps***

A five step process was developed that that aided in making a clinical decisions more of a sequential process (Del Mar, Glaszziou, & Mayer, 2004; Sackett et al., 1996; Steves & Hootman, 2004; Straus et al., 2005). In addition to the "five-steps" Del Mar et al (2004) also introduced the 5-A's as elements that can be broken down to help with teaching the process of evidence based learning. In theory and concept, the "five-steps" and "5-A's" are very similar in the fact that they are used to guide a clinicians' search and use of current evidence to assist in patient care. Each of five key elements of these processes is described in further detail below.

*Step 1: Defining a Clinically Relevant Question*

Many times athletic trainers are presented with unique cases or instances where they need more information to provide patient care (Sackett et al., 1996; Steves & Hootman, 2004). Sometimes this information is easy to find, but much of the time this

information is not easily accessible. This is the point in the clinical decision-making process when answerable questions are formulated and the opportunity to initiate the EBP learning process presents itself. Writing a clinical question should result in a question worded in a way that will lead to relevant helpful results. This process is seen as the most important aspect of the EBP process because it ultimately guides the information that will be received (Straus et al., 2005).

Many times the structure of the clinical question is driven by the need to provide knowledge in a specific area, or even by the patient themselves. Questions that arise often center around clinical findings, etiology, clinical manifestation, differential diagnosis, diagnostic tests, prognosis, therapy, prevention, shared experience, or improvement of health care delivery (Straus et al., 2005). Each of these areas can be driven by the patients' need for information or the clinicians' call for validation. In writing a clinical question, clinician time is saved because the topic being searched has already been narrowed. In addition to saving time, writing clinical questions care improves communication throughout the healthcare team. Lastly the use of clinical questions helps to increase the knowledge base of the clinician which leads to better, more efficient patient care (Straus et al., 2005).

The "PICO" format is a commonly used tool to help define a relevant and answerable question (Fineout-Overholt & Johnston, 2005; B. Melnyk & Fineout-Overholt, 2004; Nicholson, Warde, & Boker, 2007; Raina, Massfeller, & Mcacarthur, 2004; Steves & Hootman, 2004). The acronym PICO refers to (P) patient, (I) intervention, (C) comparison, and (O) outcome. A good answerable question should include each of the PICO components.

In creating a clinical question it is imperative to start with the patient (P) of interest. Understanding the individual allows for better patient-centered care; this understanding comes from knowing the patients' complaint, previous history, current activity level, age, gender, etc (Sackett et al., 1996; Sauers, 2009). A 21 year old ballet dancer with pain and limited range of motion in the great toe should be viewed differently than a 16 year old football punter with the same ailment due to the demands of their daily activity.

In addressing the (I) intervention portion of the question, the clinician should identify particular treatments or comparisons that would be beneficial. When determining an intervention, it should be based on the goals of the patient, the clinical presentation, and the available treatment options. Researching the best possible treatments provides little utility if the clinician does not have the capability or necessary tools to carry out the particular treatment. While intervention is typical, not all clinical questions will have an intervention component (Straus et al., 2005). In the case of the ballet dancer with pain and limited great toe range of motion, a clinician may be interested in which protective great toe taping technique is best to limit metatarsophalangeal extension.

To best determine the course of action for a patient, a comparison (C) must be made to the intervention chosen. The comparison allows the clinician to evaluate other intervention options. An additional modality, the use of a new skill or technique, or no treatment at all could all become part of the comparison component of a clinical question. When there is an absence of a viable comparison or if a control group is not warranted there is often no comparison to be included in the clinical question development (Forrest

& Miller, 2002). When examining possibilities to limit great toe extension in a ballet dancer, you may choose to compare a taping technique to a shoe insert.

The final aspect of clinical question development is the (O) outcome. The goals of the patient are taken into account when determining the desired measureable outcome. Desired outcomes such as increased success with daily activities, decreased pain, increased range of motion, or better functional capabilities are potential measures (Forrest & Miller, 2002; Johnston & Fineout-Overholt, 2006). Limiting painful range of motion would be the desired outcome in the case of the ballet dancer discussed previously.

The PICO format utilizes a step by step process to clinical question development. These steps are similar to the first "A" of "Ask" in the 5-As discussed by Del Mar (2004). While "Ask" does not break down the question into the four steps of PICO, it still challenges the clinician to convert the clinical puzzle into an answerable question. In the case of our 21 year old ballet dancer with increased pain and limited range of motion in the great toe, an appropriate clinical question might be, "Is great toe taping more effective than shoe inserts at reducing painful range of motion and increasing functionality in ballet dancers?" The question is specific and allows the clinician to narrow the focus and search for evidence better than if only looking for information on great toe taping. This more focused, answerable question leads the clinician into the next step of finding the answer through literature searching (Steves & Hootman, 2004).

*Step 2: Searching for the Best Evidence*

Developing a strong clinical question allows the clinician to perform a more thorough search for evidence. Searching for the best evidence, or "accessing" from the 5-As, involves looking for support to answer the clinical question (Del Mar et al., 2004;

Sackett et al., 1996; Steves & Hootman, 2004). A targeted clinical question allows a more time efficient search process and allows the clinician to obtain applicable results (Fineout-Overholt, Rona, & Mazurek-Melnyk, 2004; Steves & Hootman, 2004). Achieving access to the literature is a key component is searching for research evidence. Farmer & Richardson (1997) stated, "Perhaps the single most important thing policy makers could do to encourage evidence-based practice among health professionals would be to provide good access to information professionals and information resources." (Farmer & Richardson, 1997, p. 98) Students and clinicians should be equipped to search for and recognize the best evidence (Fell & Burnham, 2004).

The rapid emergence of the web including free accessibility to MEDLINE, PubMed, and other internet databases as well as free-text electronic journals has significantly impacted the access and use of medical literature (Kronenfeld et al., 2007). The list of available online EBP resources is growing at a rapid rate. Sources such as the Cochrane Database of Systematic Reviews provide full text systematic reviews of various health care topics (Fell & Burnham, 2004). These systematic reviews allow the clinician to search for answers to their clinical question in a more succinct manner (Sackett et al., 1996; Steves & Hootman, 2004). Other databases such as CINAHL from the *British Medical Journal* or Evidence-Based Practice from the *American Academy of Family Physicians,* MEDLINE from the National Library of Medicine, or Hooked on Evidence from the *American Physical Therapy Association* all include articles and summaries of evidence specific topics for that profession. While these other health professions have online resources for the acquisition of research evidence, the athletic training profession is lacking in a database specific to our clientele. This lack of online system could be a

byproduct of the fact that there is limited research in our body of knowledge (Kronenfeld et al., 2007).

In addition to having access to the literature, it is imperative to also understand how to search and locate appropriate information. Understanding how to take components of the clinical question and implement them into a search is just as valuable as writing the clinical question itself. Feld & Burnham (2004) discuss five steps that should be used to optimize a search for literature: 1) specify the clinical question and key concept, 2) conduct individual search for each key concept of the clinical question, 3) focus the search by combining initial searches through using Boolean connectors (AND, OR), 4) narrow the search through limitations (language, years of publication, age, gender, etc.), 5) review each individual citation to determine its applicability to the question. These steps allow for a thorough process to develop which hopefully will result in a solid foundation of evidence-based literature.

*Step 3: Critically Appraising the Evidence*

Once information has been retrieved, one needs to determine the validity and usefulness of the information (Sackett et al., 1996). In the 5-As this includes "appraising" the literature for its level of reliability and robustness (Del Mar et al., 2004). This often becomes the most difficult step in the process for athletic trainers because they lack the necessary analytical research skills to appraise the literature (Steves & Hootman, 2004). Understanding statistical terms such as numbers needed to treat, absolute risk, and confidence intervals will help an athletic trainer dramatically increase their understanding of the research and improve their clinical decision skills.

Critically Appraised Topics (CATs) and Patient Oriented Evidence that Matters (POEMs) are tools that have been primarily used in medicine to help digest and apply the growing volume of new literature (Fell & Burnham, 2004; Welch, Yakuboff, & Madden, 2008a). Critically Appraised Papers (CAPs) provide an additional method to appraise current literature. CAPs are generally one page analyses of a published research paper (Bennett, McCluskey, & Wallen, 2003). These papers summarize the key evidence of the research study, discuss the internal, external, and statistical validity, and then include a clinical bottom and clinical applications component. In addition, each research article is ranked based in the Oxford Centre of Evidence-Based Medicine (CEBM) levels of evidence scale (B. Phillips et al., 2008; Welch et al., 2008a) In contrast, a CAT is a synthesis of numerous studies reviewing the same general topic interest while including tables and chart that identify specific information from each study being appraised (Welch et al., 2008a). POEMs are typically developed by physicians and address common clinical problems, report outcomes and meet three criteria: 1) addresses a question faced by clinicians, 2) measures outcomes such as morbidity and mortality, and 3) has potential to change methods of practice (Fell & Burnham, 2004).

In addition to these appraisal tools, significant attention has been focused on grading a research studies' level of evidence. Two of the most common rating scales are the CEBM and the American Academy of Family Physicians' strength of recommendation taxonomy (SORT) (Medina, McKeon, & Hertel, 2006) It is important for clinicians to understand that not all evidence is of equal value. The use of levels of evidence and grades for recommendation help to demonstrate how each article is rated differently. In the CEBM, the levels of evidence are rated from 1 (highest) to 5 (lowest)

(CEBM, 2010). Level 1 evidence represents the most unbiased information derived from systematic reviews, well-designed randomized controlled trials (RCTs), and prospective or diagnostic studies. Systematic reviews are considered to be the most beneficial type of evidence in medical literature (CEBM, 2010; Straus et al., 2005). Randomized controlled trials are typically considered the "gold standard" for determining causal relationships (Arnold, Gansneder, & Perrin, 2005). Level 2 evidence comes from nonrandomized cohort studies or poorly designed RCTs. Case-control studies make up the majority of evidence in Level 3. Level 4 generally consists of case series, and poorly designed cohort or case-control studies while Level 5 consists of anecdotal evidence, animal research, and bench research. Along with the levels of evidence, the CEBM also has a method of recommendation for grading the evidence. The recommendation can be graded as A, B, C, D, or I based on the quality, quantity, and consistency of available evidence (Medina et al., 2006). The CEBM has been adopted by the NATA Pronouncements Committee and position statements utilize the grading scale to identify the strength of evidence and will guide future research and clinical practice (Kronenfeld et al., 2007).

The SORT is another classification and grading system used to evaluate the level of evidence. The SORT is similar to the CEBM, and can be used to evaluate studies that focus on the diagnosis, treatment, prevention, screening, or prognosis (Medina et al., 2006). The SORT was developed so authors with varying degrees of expertise in EBP and clinical epidemiology could apply the scale with little to no formal training (Ebell et al., 2004). The SORT uses three levels and aims to separate patient and disease oriented evidence. Levels 1 and 2 are specific to patient oriented evidence with level 1 for high

quality and level 2 for lower quality patient oriented evidence (Ebell et al., 2004; Medina et al., 2006). Level 3 is then derived from disease oriented research, bench research, or anecdotal reports. The strength of recommendation of the SORT comes from grading each article as an A, B, or C. A grade of A represents a strong recommendation, whereas a B is moderate and a C is a weak recommendation (Ebell et al., 2004; Medina et al., 2006). While the CEBM and SORT are the most commonly used scales to assess the level of evidence of an article, there are several others that could be used such as the PEDro, Jadad, Quadas, and Quorum. Each scale has a particular focus that separates it from the others, but in the end the clinician needs to understand the scale that best suits the needs of their inquiry.

*Step 4: Applying the Evidence*

When a clinician combines their past knowledge with the best evidence available to improve patient care they are applying the evidence (Sackett et al., 1996). By extracting the necessary information and addressing the ability to generalize the information to a patient population, appraisal is occurring (Del Mar et al., 2004). Personal clinical experience is an important factor to consider when applying the evidence even though it is considered to be low level evidence (Youngblut & Brooten, 2001). Clinical experience often times is the only form of evidence a clinician has for a particular case, so this needs to evaluated and assessed when applying evidence that was found through the literature searching process. Incorporating the evidence does not mean that all athletic trainers will treat all patients the same, but instead they can find the best way to practice in order to help their patient (Steves & Hootman, 2004). Combining personal experience with research experience allows the clinician to take aspects from all

areas to apply to their patient, thus making a more strong foundation for answering the clinical question.

*Step 5: Evaluating the Performance of EBP*

Evaluating the performance of EBP requires the clinician to look critically at the process and determine if the patient was helped and how much time was involved in incorporating the evidence (Sackett et al., 1996). Assessing the outcomes of EBP allows the clinician to determine how the process of EBP plays into the patients' improvement cycle (Del Mar et al., 2004). By looking back at the process, the clinician can continually work towards determining the best practice. EBP is a confluence of three essences: 1) Epochal scientific hypothesis, 2) ever evolving body of evidence, and 3) idealized professional process (Reilly, 2004). Bringing these three areas together will allow the clinician to best serve their patients. Critically thinking comes in to play when evaluating the evidence because there must be a period of reflection to determine if the evaluation or treatment method worked and if the intended outcome was achieved (Steves & Hootman, 2004). If clinicians miss the evaluation process, then they miss the opportunity to expand their clinical practice.

In addition to evaluating the outcomes of EBP, outcomes of the patient should also be assessed. Data relating to the patients' outcome (function, pain, range of motion, etc.) should be gathered to determine the true effectiveness of a treatment. This data includes the satisfaction of the patient with the treatment procedure, its outcome, and ability to meet the selected goals. Understanding how the EBP process affected the outcome for a particular patient will provide a better picture of the entire process. Historically, athletic trainers have been ones to shy away from measuring clinical

outcomes largely because of their lack of understanding (Streator & Buckley, 2000). We must challenge ourselves to worked past the time, cost, and lack of interest barriers to meet the need for outcomes-based research (Streator & Buckley, 2000).

***Clinical Benefits of Evidence-Based Practice***

The benefit of EBP, first and foremost, should be to help improve care delivered to patients (Sauers, 2009). As clinicians and health care providers, athletic trainers need to remember that the patient is the primary responsibility. This requires that patient-centered variables such as patient satisfaction and health related quality of life to be measured on a regular basis (Wade, 2003). In nursing, practicing in an evidence-based manner has been shown to improve patient care as well as improve the cost effectiveness of treatment in the profession by finding the most relevant treatments to use (Fineout-Overholt et al., 2004). Unfortunately athletic training still lacks quality evidence to show that treatments are improving care (Raina et al., 2004). Continued development of the scientific body of knowledge is needed in order to fully understand the role of EBP in patient care for athletic training.

Hertel (2005) believes that EBP is crucial to strengthen third-party reimbursement in athletic training. Without documented evidence showing the effectiveness of clinical interventions by athletic trainers, reimbursement for services is a long way from reality (Denegar & Hertel, 2002; Sauers, 2009). Outcomes research is here to stay, and documenting outcomes can help identify weaknesses in the structure of our profession and patient care (Streator & Buckley, 2000). Evidence-based practice in athletic training will help bring the profession in line with other health care professions such as physical therapy, nursing, and occupational therapy who are already implementing EBP.

Without implementing EBP, athletic trainers run the risk as being labeled as group the does not regard the use of evidence as effective or important (Steves & Hootman, 2004). With these kinds of results, the athletic training community needs to find the best ways to encourage the utilization of EBP within the profession.

In addition to improving patient care and assessing outcomes, evidence-based practice provides tools for finding evidence and analyzing the quality of that evidence. The use of EBP also promotes critical thinking and requires clinicians to have open minds while looking for new methods to help treat patients (Steves & Hootman, 2004). Application of rigorous standards to scientific data will determine whether the information has merit and applicability and would eliminate the use of practice due only to someone's anecdotal evidence. We are at time where we require more from clinicians than just believing what they are doing will benefit the patient. Clinicians should be able to offer evidence that shows the recommendations and interventions provided are most likely to achieve the patients' goals (Denegar, 2008). In order for all of this to occur, athletic training needs to focus on more scholarship within the profession and outcomes that are relevant to our patients (Winterstein & McGuine, 2006).

***Knowledge of Evidence-Based Practice***

The assessment of evidence-based knowledge has become increasingly more prevalent across health care professions and educational settings. This increased need to evaluate a practitioners' knowledge has come with the increased emphasis on clinicians practicing in an evidence-based manner. As educators begin to teach and implement EBP into curriculums, valid instruments are necessary to assess the competence of these newly trained evidence-based clinicians. Shaneyfelt et al (2006) conducted a systematic review

aimed to appraise, summarize and describe the current available EPB evaluation instruments. Of the instruments located (n=104) only 53% included one form of validity based on either content, internal structure, or relationship to other variables, and only 10% had established validity in all three areas (Shaneyfelt et al., 2006). Many EBP instruments are constructed to assess a particular set of skills, profession, or are used to assess an intervention such as a curricular emphasis, course, or specialized instruction thus limiting the ability to utilize these instruments across disciplines.

The *Berlin Questionnaire* (Fritsche, Greenhalgh, Falck-Ytter, Neumayer, & Kunz, 2002) and *Fresno Test* (Ramos, Schafer, & Tracz, 2003) are validated instruments commonly used to assess EBP knowledge. These assessments consist of multiple choice, open-ended, fill-in-the-blank, and scenario based questions (Shaneyfelt et al., 2006). The *Berlin Questionnaire* was developed to assess the effect of short courses in EBP on physicians' knowledge and skills (Fritsche et al., 2002). The *Fresno Test* was developed to assess the effectiveness of a comprehensive evidenced-based curriculum that was centered on the EBP process described by Sackett et al (Ramos et al., 2003). The *Fresno Test* was used to evaluate health care clinical educators' knowledge and they demonstrated a low knowledge with average scores of 57.9% (Nicholson et al., 2007). Both of the aforementioned instruments used to determine knowledge of health care professionals concerning EBP were initial knowledge assessments that happened several years ago. Since that time, workshops, educational courses, and programs have been implemented to improve knowledge. These interventions have shown a 57% (Fritsche et al., 2002) and a 20.5% (Nicholson et al., 2007) increase in knowledge on the *Berlin Questionnaire* and *Fresno Test,* respectively.

In addition to the validated assessments discussed above, there has been several more subjective assessment of EBP knowledge among health care professionals (Brown, Wickline, Ecoff, & Glaser, 2009; Hart et al., 2008; Jette et al., 2003; Koehn & Lehman, 2008; Melnyk BM et al., 2004). Many of these studies used Likert scale items to assess an individuals' knowledge of a particular concept by asking the participant to rate their knowledge on the scale. While these assessments provide an overview of an individuals' perceived knowledge or lack thereof, they do not provide a true assessment of knowledge. It is important to assess whether or not knowledge is being correctly applied in addition to understanding an individuals' perceived knowledge. The use of instruments such as the *Berlin Questionnaire* and *Fresno Test* will help to establish more reliable measures of knowledge. In athletic training there are few valid instruments that assess knowledge. The Evidence-Based Concepts for Clinical Practice Assessment was established to assess the knowledge, comfort, and importance of EBP concepts in athletic training educators after an EBP intensive workshop (Welch et al., In Review). This instrument, modeled after the *Berlin Questionnaire* and *Fresno Test*, is a step towards being able to fully evaluate the EBP in athletic training, but the validity of the instrument has come into question. Further established validity and investigation into instruments suited for the athletic training profession is warranted due to the lack of relevant instruments.

***Attitudes & Beliefs towards Evidence-Based Practice***

In addition to assessing knowledge of EBP concepts, there have been several instruments developed to assess the clinicians' attitudes toward EBP (Brown et al., 2009; Hart et al., 2008; Jette et al., 2003; Koehn & Lehman, 2008; B. M. Melnyk, Fineout-

Overholt, Feinstein, Sadler, & Green-Hernandez, 2008; O'Donnell, 2004; Stevenson, Lewis, & Hay, 2004). The attitudes towards EBP of physical therapists were changed after an educational intervention and the participants reported more confidence in their ability to use EBP six months after the intervention (Stevenson et al., 2004). These changes and increase attitudes and confidence are important to assess because attitude often affects behavior. In a study by Jette et al (2003) it was determined that younger and more recently licensed physical therapists demonstrated a more positive attitude towards EBP which would suggest that the more recent emphasis on EBP in education programs is affecting positive change in students. Younger therapists were more likely to agree that EBP is necessary, improves patient care, and improves reimbursement rates. Even though a greater number of younger therapists agreed that EBP was necessary, 84% of all physical therapists indicated that they needed to increase the use of evidence in their daily practice (Jette et al., 2003). This is similar to the findings of Stevenson et al (2004) who found that majority of respondents stated that they should change their clinical practice when there is supporting evidence.

In nursing, researchers cite attitudes as one of the most important factors in implementing EBP (Hart et al., 2008; Upton & Upton, 2005). Often times nurses have more positive attitudes towards EBP than their associated knowledge (Brown et al., 2009; Hart et al., 2008). Positive attitudes are associated with willingness to want to make change, but nurses are often limited by their own knowledge and institutional barriers. The value of EBP is present in nursing which can be linked to the educational emphasis of EBP within the field (Bilsker & Goldner, 2004; Fineout-Overholt & Johnston, 2005; Fineout-Overholt et al., 2004). Nurses have expressed reservations in the ability of

research evidence to guide clinical practice and improve patient outcomes (Melnyk BM et al., 2004). These findings suggest that there is still a lack of research supporting the use of EBP to improve patient outcomes as measuring outcomes is often one of last steps of the EBP process to be implemented. A systematic review by Coomarasamy & Khan (2004) showed that integrated teaching in the didactic and clinical setting improved attitudes, knowledge, and skills while attitudes were not increased in stand along teaching groups. Consideration to advance both knowledge and attitudes should investigate the methods of teaching integration that have been shown to promote positive attitudes in clinicians.

### *Barriers to Clinical Evidence-Based Practice Implementation*

Implementation of EBP is not always well received or easy to do as many barriers exist that limit clinicians from utilizing EBP concepts. While little research exists on the barriers specific to athletic training, several health care professions have examined the most prevalent barriers associated with implementing EBP.

#### *Time*

Time is one of the larger barriers identified when it comes to incorporating EBP. In a survey of physical therapists, 46% of respondents indicated that insufficient time was the most prevalent barrier to the use of EBP (Jette et al., 2003). The time necessary to ask and then answer a clinical question involves selecting effective search strategies, determining the relevant information, and then synthesizing multiple resources. All of these steps can be time consuming especially in the early stages of EPB implementation. In nursing, time is not always the number one barrier, but several studies have indicated that lack of time to implement EBP is a significant barrier (Brown et al., 2009; Koehn &

Lehman, 2008; Nolan et al., 1998). Similarly to the results of Jette et al, Koehn & Lehman (2008) reported that 39.4% of nurses felt that lack of time was a barrier to EBP. Nurses expressed their inability to manage time at their job with responsibilities at home, and also indicated that time was extremely limited within their scheduled working hours (Brown et al., 2009). Using the *Barriers Scale* (Funk, Champagne, Weise, & Tornquist, 1991, 1991b), Nolan et al (1998) determined that two of the top ten barriers of nurses in the United Kingdom were having an "insufficient time at work to implement ideas" and "not having enough time to read research". Regardless of physical location, or discipline time has become a significant barrier to the implementation of EBP.

*Available Resources*

While time limits a clinicians' ability to implement and use EBP, lack of available and relevant resources adds to the challenge for clinicians. Nurses indicated that resources were inadequate for implementation and that relevant research was not available in one place (Nolan et al., 1998). Lack of search engines and databases in the work place can also be a barrier with nurses trying to implement EBP (Ciliska, 2006). Due to the lack of computer resources, the knowledge and skills associated with evaluating the research is scarce. Thirty percent of physical therapists cited a lack of research findings that could be generalized to specific patient populations and the inability to apply findings to patients as a barrier (Jette et al., 2003). Craik (2008) also editorialized that in order to adopt EBP framework into the curriculum of physical therapy, there needs to be more adequate literature to generate a discussion that leads to a choice of one intervention over another. The medical profession also cites limited or poor access to the best evidence and research guidelines (Haynes & Haines, 1998).

Access to resources and applicable findings within the profession will go a long was to addressing this common barrier.

*Personnel & Administrative Support*

Support from administration and a sound organizational structure can lead to great success in the implementation of EBP. Unfortunately in the nursing and medical professions, lack of institutional support has been documented as a significant barrier (Brown et al., 2009; Haynes & Haines, 1998; Koehn & Lehman, 2008). Nurses indicated that they received inadequate support from their organization to be involved in the EBP process (Brown et al., 2009). Nurses also felt significant barriers due to the lack of support or understanding for new research and findings by the physicians they work with (Brown et al., 2009; Nolan et al., 1998). In many cases, nurses felt like they were not seen as equals by physicians and that limited their ability to promote and implement EBP. Finally, 9% of nurses reported that the lack of a nurse with research knowledge in their setting was a barrier, while 4.7% said the barrier to implementing was having a nursing leader that was not interested in implementing EBP (Koehn & Lehman, 2008). Nurses who perceive that they have the support of administrators and peers are more likely to engage in research activities and translate research findings into practice (Champion & Leach, 1989). Nursing is a profession that significantly relies on the team work of a nursing unit, physician, and organizational support. If the culture and current structure in nursing does not hold EBP in high regard, then there are continued stumbling blocks for both physicians and nurses.

*Personal Knowledge & Confidence*

Another prevalent barrier is a clinicians' lack of perceived knowledge. Nurses (23.4 %) reported that they had limited or no research knowledge to implement EBP (Koehn & Lehman, 2008). Understanding what to read and how to appraise the evidence limits a clinician in what they feel comfortable implementing (Brown et al., 2009). Resistance to incorporating new ways of practice even though new medical knowledge does exist was one of the more common barriers. In many cases, current practice is based on experience, tradition, and institution rather than scientific validation (Koehn & Lehman, 2008). Nurses also indicated that a lack of knowledge and formal computer training limited their comfort with implementing EBP (Melnyk BM et al., 2004). A study by Koehn & Lehman (2008) found that many nurses did not have a good understanding of what EBP was, and while they completed the survey questions, they reported that they did not always know what was being asked. This indicates that there still needs to be a push to educate not only nurses but other health care professionals on what EBP actually entails.

*Addressing the Barriers*

The barriers faced by clinicians have been shown to be similar across disciplines and international boundaries (Brown et al., 2009). Time has been identified as a significant barrier to EBP implementation (Ciliska, 2006; Jette et al., 2003; Koehn & Lehman, 2008). Sackett et al (1996) discussed that a clinician's lack of keeping up with the recent literature is a barrier to knowing the best evidence. There is a significant amount of research available in the health care field. The need for dissemination of the information in a user-friendly format could help decrease the amount of time necessary to

keep up with the literature. The inclusion of systematic reviews, critically appraised papers and topics, or an articles' level of evidence in professional journal sources has been suggested as the first step to alleviating the heavy time burden of sorting through the literature (Sauers, 2009; Welch et al., 2008a; Welch, Yakuboff, & Madden, 2008b). Sackett et al (1996) also discusses the need to keep EBP away from a "cook book" approach to care because some clinicians will only incorporate the evidence and not their past knowledge. Understanding that EBP is a combination of research evidence, patient preferences, and clinician expertise is often lost when individuals begin practicing in an evidence-based manner (Sauers, 2009). Promoting an organizational culture that emphasizes EBP will help to address the barriers, promote change and ultimately could improve patient care. Formal research on the barriers of athletic training has not been completed, so further investigation is warranted to see if similarities exist between these health professions and athletic training.

## Evidence-Base Practice in the Educational Setting

### *Evidence-Based Practice in Didactic Education*

Implementing EBP into curriculums for athletic training would help to educate students how to best critically analyze the evidence and then make patient decisions based on the evidence. The research on implementing EBP into didactic and clinical education has largely come from the nursing, medicine, and physical therapy and is still lacking significantly in the athletic training profession. There are many methods in which EBP has been incorporated into health care educational curricula (Del Mar et al., 2004; Fineout-Overholt et al., 2004; Levin & Feldman, 2006; Manspeaker et al., In Review; Shlonsky & Gibbs, 2004; Shlonsky & Stern, 2007; Straus et al., 2004; Straus et

al., 2005; Yousefi-Nooraie, Rashidian, Keating, & Schonstein, 2007). It is suggested that the incorporation of EBP should not be a single-semester endeavor as there is far too much information to process and practice adequately in such a small amount of time (Shlonsky & Stern, 2007). Education of medical students in EBP ranges from a passing mention in one course to multi-year courses over 100 credit hours (Del Mar et al., 2004). While adding a single EBP class or EBP concept may be the easiest method to implement these ideas, it may not be the most effective way to promote change. Shlonsky & Stern (2007) indicated that they implemented an introductory EBP course in place of the standard research course and then integrated many of the EBP methods into other advanced courses. The EBP class touched on various elements of research but was geared more toward systematically searching, understanding, appraising, and using the literature (Shlonsky & Stern, 2007). Yousefi-Nooraie et al (2007), determined that the basics of question formulation, literature searching, and critical appraisal are considered introductory topics and should be covered earlier in the teaching process (Yousefi-Nooraie et al., 2007). These basic EBP research components can be carried with the student as they progress through the curriculum and move on to more advanced courses and concepts. In contrast, critical appraisal techniques and quantitative decision making seem more complicated and should be taught in more advanced courses as the inclusion of statistical measures (likelihood ratios, numbers needed to treat, global rating of change, etc.) in an introductory course will often be too complex for a novice in EBP concepts (Yousefi-Nooraie et al., 2007).

Every step in the process of EBP requires healthy doses of curiosity, skepticism, and a passion for finding the best possible knowledge in the service of helping, and these

qualities must be brought out and supported in our students (Shlonsky & Stern, 2007). Gaining student attention is imperative if implementing EBP into practice is the ultimate goal. Educators must be able to challenge learners to incorporate valid scientific evidence; their own expertise; and their patients' choices, concerns, and values when making clinical decisions (Fineout-Overholt & Johnston, 2005). Instead of just teaching the mechanics of EBP we must teach students how to think critically and conceptually about the information to which they are exposed and how to integrate this thinking into practice and policy decisions (Shlonsky & Stern, 2007). This culture of inquiry must be instilled and encouraged from the very first day of class. Inquiry must be maintained throughout the course, and this can often be accomplished by creating controversy; there are plenty of research examples that, if presented well, can foster impassioned debate among students (Shlonsky & Stern, 2007).

It takes a great deal of clinical skill to successfully integrate current best evidence with patient preferences, clinical circumstances, and the practice context. It has been found that taking students through several examples, from initial question development, search and appraisal, and then back to the clinical question, is one of the more helpful exercises for student learning of EBP (Shlonsky & Stern, 2007). In addition to promoting EBP, curricula needs to promote critical analysis of the research literature for application to clinical practice, development of professional writing abilities, and acquisition of the knowledge and skills to contribute to collaborative clinical research (Martin, Myer, Kreiswirth, & Kahanov, 2009). Promoting professional writing and skills related to research will help students with critical thinking which ties to the application of evidence-based processes.

Critical thinking and practical application of skills related to EBP can be achieved through specific assignment focused on problem solving and appraisal of research evidence. Problem-based modules for integrating information-literacy activities within athletic training practice have been utilized with students to promote critical thinking (Romanello & Martin, 2006). Development of case studies modules can be integrated into various athletic training courses. The students retrieve information about appropriate methods for injury evaluation, rehabilitation, reconditioning, and return to play based on their clinical question (Romanello & Martin, 2006). Similar to problem-based modules, critically appraised papers and topics allow students to analyze and summarize the research literature of a particular topic (Welch et al., 2008a, 2008b). The module process requires students to outline their literature-search process, describe their research findings, determine relevant aspects to their injury case, and integrate the information to develop an effective evaluation and treatment program that would return the athlete to play (Romanello & Martin, 2006). The inclusion of a critically appraised paper in the module process, allows the student to incorporate a structured format to the description of the research findings. Using an all encompassing model like this helps the student not only be comfortable with the EBP search and appraisal process, but also links the information they obtain directly to clinical practice. This approach also allows students to explore the information and knowledge available while discovering new ways to solve problems in injury management (Romanello & Martin, 2006). Athletic training courses often build upon each other and it seems as if the module approach could best suit the athletic training educational curricula.

### *Evidence-Based Practice in Clinical Education*

In the clinical setting, a practitioner with a strong foundation in EBP will possess enhanced reasoning and decision making abilities, thus improving the approach to patient care (Burns & Foley, 2005). The clinical education experience has a goal to integrate theory and practice in a controlled learning environment by providing students with opportunities to practice the skills and behaviors necessary to be clinician in professional practice (Laurent & Weidner, 2001). While implementing EBP into the didactic portion of a curriculum is a necessary first step, it is somewhat futile if never addressed in a clinical setting. Many nursing programs have an isolated evidence-based practice course, with little or no expectation or requirement that the knowledge and skills are to be used in clinical practice or other courses (Ciliska, 2006). It is important to require students to collaborate with their clinical instructor when designing their clinical question or designing their search techniques. The instructor should be able to help guide them to a searchable clinical question that would be relevant to the patient population they face on a regular basis. Clinical education experiences should be a time when students develop their abilities to seek knowledge that they can use in the management of patients (Rothstein, 2002). EBP teaching should be integrated into routine clinical practice and be considered a real-time continuous and flexible process (Yousefi-Nooraie et al., 2007). It is imperative to teach learners to quickly find valid evidence that can answer clinical questions while also determining study strengths and weaknesses (Hertel, 2005; Nicholson et al., 2007). Students should then be guided to apply the evidence to their given patient situation. If students aren't able to bridge their knowledge to a clinical patient, the use of evidence based practice really does not include the "practice"

component. Since students are often resistant to the quantitative data of EBP, teaching from the perspective of a human problem helps them understand that EBP can be implemented practically (Bilsker & Goldner, 2004). It is also important to understand a students' clinical competence along with their classroom knowledge to ensure that a student is able to deliver an effective treatment plan (Craik, 2008).

Evidence-based clinical decision making is becoming an expectation of students graduating from physical therapy education programs (Ross & Anderson, 2004). There is an expectation that students in these programs are adept at applying the five steps of evidence in their clinical decision making. Programs included small group discussions, culminating clinical projects, and presentations to clinical staff into the educational assignments of clinical courses (Ross & Anderson, 2004; Sabus, 2008). The inclusions of these types of projects in the academic and clinical setting help to not only improve student knowledge but also become an educational opportunity for the clinical instructor. Sabus (2008) investigated the impact of an EBP student project and in-service designed to tie classroom knowledge to clinical application. Students were asked to identify a clinical problem, pose a clinical question, search the literature, critically appraise the articles, and then formulate a decision while also reflecting on the outcome. Once this process was complete, students were asked to present their findings to the clinical staff in a one hour in-service. Both the students and physical therapists improved their EBP competency scores from pre- project intervention to post-intervention (Sabus, 2008). Even though the physical therapists were not directly involved in the EBP process the information gained in the in-service was enough improve their competency in the area of the five steps of EBP. Ross & Anderson (2004) used clinician led small group

discussions about potential intervention and management strategies to promote the use of EBP in clinical decision making. Students expressed that the discussions allowed them to understand how to better implement research findings into clinical practice (Ross & Anderson, 2004). Assignments and projects similar to those used in these studies could be applied to athletic training to foster the relationship between the didactic and clinical settings. Structuring EBP student clinical assignments to bridge didactic and clinical instruction indirectly communicates to the clinical instructors the goals and philosophies of the educational program as clinicians may be aware of program objectives and goals, but unsure of how to best understand their implications on clinical education (Sabus, 2008).

The clinical instructor plays a large role in the application of EBP concepts in the clinical setting. As students begin their clinical experiences, they look to the clinical instructor for guidance mentorship. Unfortunately the clinical instructor is often lacking the skills and experience in evidence-based decision making. Consistent application of EBP is needed in clinical instruction to advance students' knowledge and skills. Even though competency and attitudes towards EBP can increase through interventions with students and student assignments, there has not been a subsequent change or improvement in evidence-based behaviors (Sabus, 2008; Schreiber, Downey, & Traister, 2009). Until clinicians feel comfortable with the ability to change their behaviors of practice, students will be limited in their ability to effectively see their clinical instructors modeling evidence-based decision making. Further investigation in how best to educate clinical instructors in EBP is warranted.

*Clinical Instructor Education*

Clinical education is the environment created to foster the application of knowledge (Radtke, 2008). Students spend more time in a clinical setting with small student-to-faculty ratios than in the didactic setting, yet many clinical faculty have little exposure to evidence-based teaching strategies and learning theories (Krautscheid, Kaakinen, & Warner, 2008). Shlonsky & Stern (2007) suggest a good instructor should be adept at applying systematic search techniques and rigorous evaluation procedures to all forms of questions. Due to this suggestion, teaching EBP may need to focus as much on teachers as it does on students. While ideally this may be best, it is unrealistic that we can expect all clinical instructors who are teaching EBP principles to be at a level to feel comfortable with all the EBP techniques unless they have had formal training in such concepts. There is still a significant gap in the knowledge of faculty who instruct EBP concepts because they lack the knowledge, skill, and practice in the technique themselves (Fritsche et al., 2002; Nicholson et al., 2007).

Some research has been completed on other health care professions in terms of educating clinicians and educators within the EBP area. Yousefi-Nooraie et al (2007) found that when conducting introductory workshops on EBP they should focus mainly on changing attitudes toward EBP rather than educating evidence-based practictioners. It has been shown that educating of evidence-based practioners is not attained in short courses and many individuals do not change their usual practice after their participation in these courses (Coomarasamy & Khan, 2004). Nicholson et al (2007) required clinician educators to attend nine, 90-minute evening workshops geared towards the 5 A's for practicing evidence-based medicine (EBM). They found that self-reported and actual use

of provided online EBM resources increased with this course format and there was a decrease in the use of printed texts (Nicholson et al., 2007). While Coomarasamy & Khan (2004) stated that one time workshops were ineffective for instigating change, Nicholson et al (2007) showed that a case based longitudinal course could improve and affect the current practices of clinicians and educators.

Krautscheid et al (2008) described a simulation technique used to improve the clinical teaching of instructors. They implemented a 3-hour program that provided theory on clinical teaching through didactic material, pre-recorded clinical simulations, and reflection on teaching strategies prior to participation in a simulation. The pre-recorded teaching simulations were developed to help faculty analyze and reflect on clinical teaching strategies that either facilitate or hinder student learning; while the clinical teaching simulation allowed faculty to practice teaching and receive immediate feedback from master teachers and student volunteers. Participants explained that these sessions highlighted the importance of thoughtful conscious decisions in their teaching behaviors (Krautscheid et al., 2008). Through this process it was found that even a short 3 hour workshop and practice session can improve clinical instructor perceptions of their teaching techniques. Further investigation is needed on increasing EBP knowledge and usage through various educational models. Regardless of the teaching method employed the need for clinical instructor education in evident and important. As with students, it is probable that just one introduction of the EBP process will not increase clinician knowledge and application, but instead clinical instructors should have EBP instuction and training over a period of time. In athletic training, approved clinical instructor (ACI)

workshops could include longitudinal education in EBP that would help ACIs change their current practice and effect the patient care being administered.

*Clinical Learning Strategies*

Due to the lack of formal training in teaching, clinical instructors often teach intuitively in a manner which is similar to the ways they were taught (Krautscheid et al., 2008). New clinical instructors focus on the volume of content that needs to be taught rather than on what students need to learn or critical concepts required for understanding (Krautscheid et al., 2008). It is hopeful that the more experienced clinical faculty could aid in helping the new clinical instructor tailor their strengths into becoming a better teacher.

Information in the area of clinical education models in athletic training is lacking as most research discusses the clinical instructors themselves or the clinical setting and not on the mode of learning for the student (Radtke, 2008). There are several different types of clinical teaching models that are used in healthcare fields (Strohschein, 2002). Each model has its own unique focus, but ultimately affords the student a distinctive experience. While there are several clinical teaching models available, very little research has been performed to validate any one specific model. In fact, many of the models are only discussed by one or two authors, so comparison between researchers is lacking.

*One Minute Preceptor*

The One Minute Preceptor (OMP) model was developed to effectively and efficiently teach learners while simultaneously addressing patient needs (Neher, Gordon, Meyer, & Stevens, 1992; Teherani, O'Sullivan, Aagaard, Morrison, & Irby, 2007). The

OMP model proposes five microskills that should be addressed by the clinical instructor. The skills include: 1) getting a commitment from the learner about what they think is going on with the case and have them articulate their diagnosis or plan, 2) probing for underlying reasoning to explore the learner's understanding, 3) teaching general rules pertaining to the case, by giving the learner "take-home" points that can be used in future cases, 4) providing positive feedback for what the learner did correctly, and 5) correcting learner's errors and making recommendations for improvement (Furney et al., 2001; Neher et al., 1992; Teherani et al., 2007). The OMP provides a good opportunity to include evidence-based decision making because the first two steps require the student to come up with a plan and reasoning for providing care. Clinical instructors could require students to support their decisions and plan with evidence.

*Personally Perceived Problem Technique*

The personally perceived problem technique (PPPT) is commonly used in clinical nursing education. The PPPT involves helping students think carefully about their personal learning needs in a given situation and then providing support and guidance as they derive solutions. PPPT consists of four steps: exploration, idea generation, solution validation, and evaluation (Russaw, 1997). In exploration, the instructor helps the student identify problems or learning needs that are relevant and important to the student. The student has the opportunity in this step to determine their own needs that are relevant to the particular case. The idea generation stage encourages the student to consider as many approaches as possible that address the problem or learning need of the student (Russaw, 1997). This is when students will search and seek out various options of addressing their needs. Students can incorporate the EBP searching and appraisal steps

during this time as it will help them gain information and ideas related to the problem. The instructor guides the student in using the information and principles obtained in idea generation to address the perceived problem. Finally, similar to the last step of EBP, there is an evaluation and critique of the students' performance to identify self-corrective actions.

While the PPPT allows the students to identify personal problems or limitations they may have in a particular case, it may not be as applicable in athletic training clinical education. Nursing education uses the PPPT by giving the nursing student the patient case prior to the actual interaction with the patient. By doing this, it allows the student to formulate steps one and two prior to seeing the patient. In the traditional athletic training clinical setting, patients are not always known from day to day thus eliminating the ability to identify their potential problems and go through the idea generation process prior to seeing the patient.

*Levels of Questioning*

Questioning as a method of teaching is widely used and accepted in both clinical experiences and in the classroom (N. Phillips & Duke, 2001). Many teachers mainly focus on factual and lower level questions, and this level of questioning does not promote critical thinking as it relies mainly on simple recall of information. In contrast, higher level questioning facilitates the development of critical thinking as it is aimed at a higher cognitive level which involves application, analysis, synthesis, and evaluation. Athletic training clinical instructors typical ask students to defend why they are using a particular technique, but often are not expected to provide an analysis of the outcomes. Phillips & Duke (2001) examined the level of questions used by clinical teachers and preceptors

when supervising nursing students. Clinical teachers asked a statistically significant greater number of overall questions than the preceptors. In the clinical teacher group, 65.1% of questions asked were from the lower level and 34.9% were from the higher level. The preceptors only had 12.6% of questions from the higher level while 87.4% came from the lower level. This indicates that asking higher level questions of understanding and application does not occur frequently. It is apparent that another type of teaching model would need to be employed along with the questioning technique to address the critical thinking aspect of learning.

A systematic review of clinical education models by Lekkas et al (2007) showed that there is no "gold standard" for clinical education and models of "superiority" are largely based on anecdotes and historical precedence rather than meaningful, robust, comparative studies. The models included in the systematic review were all based on the ratio of the number of students to number of instructors or peer assisted learning models. The systematic review found a range of variable designs and methodological quality examining six broad models of undergraduate/entry level clinical education supervision in allied health disciplines internationally. However, this research failed to identify convincing evidence of effectiveness for any one model.

Even though the variety of clinical teaching models is extensive, there still needs to be further research on the best models for the promotion of EBP. The OMP model is the only one that has been shown to be utilized in a variety of different disciplines. The lack of a "gold standard" indicates that there is a large amount of variability in clinical education and many of the clinical education modes are determined by the individual institution and clinical instructor, but research in the area of athletic training education is

limited. Student reflection and analysis appears to be a key component from moving the student from a dependent learner to self-directed learner (Cole & Wessel, 2008; Radtke, 2008; Russaw, 1997). Most research from the health-care field in these models shows that clinical instructor feedback is held in the highest regard in the eyes of a student (Cole & Wessel, 2008; Furney et al., 2001; Radtke, 2008; Russaw, 1997; Teherani et al., 2007). The incorporation of EBP in to the clinical education of students in health care professions will need to come from a directed and focused effort. In addition to evidence-based content, teaching methods should also be backed by evidence (Weidner, 2010).

***Educational Competencies in Evidence-Based Practice***

In 2003, the Institute of Medicine released a report entitled *Health Professions Education: a Bridge to Quality* that cited evidence-based practice (EBP) as one of five essential competencies all health care professionals should possess (Institute of Medicine, 2003; Sauers, 2005). In addition to EBP, this report suggested competencies in providing patient-centered care, working in interdisciplinary teams, applying quality improvement, and utilizing informatics (Institute of Medicine, 2003). While the Institute of Medicine was not mandating these competencies in the education of all health professionals, their recommendations suggested that all health care professionals should be competent in these areas.

The need for educational programs to prepare students for a culture of EBP has become increasingly important. Students should be proficient in the use of best evidence, understand patient values, and integrate their own clinical expertise when treating patients (Denegar & Hertel, 2002; Sauers, 2009). As curricula changes and more focus

are placed on EBP, there will be a need for clinical practice to follow suit. Nursing, occupational therapy, and physical therapy educational programs all have formalized education plans that require students to demonstrate aptitude in literature searching, critical appraisal, skills essential to EBP (Lusardi, Levangie, & Fein, 2002). Evidence-based competencies have also be proposed for programs offering master's level nursing degrees (Kring, 2008) The current fourth edition of the National Athletic Trainers' Association (NATA) Educational Competencies require critical thinking, and some research components, but they are void of any EBP specific competencies (NATA, 2006). The fifth edition the educational competencies is set to be released in the spring of 2011 and will include a focus on EBP threaded throughout the competencies (Sauers, 2009).

Whenever curriculum changes are implemented, there is a challenge of ensuring that the changes are followed across a variety of instructors and classes. This is even a greater challenge given the fact that curriculum change is generally a slow, deliberative process, involving many stakeholders (Levin & Feldman, 2006). Creating change within one part of the curriculum may leave an inherent gap with other aspects of the educational process (Ciliska, 2006; Shlonsky & Stern, 2007). Levin & Feldman (2006) suggest that using EBP as a framework for critical learning and providing evidence based teaching are two ways to promote the change in curriculum for all instructors. Often, letting go of previous methods and ideas cause the biggest resistance to change. Program directors, faculty, and clinical staff should all work together to promote a culture that favors the use of evidence. Integration of EBP within the curricula should be demonstrated by faculty that are dedicated to leading by example (Petrisor & Bhandari,

2006). Working towards building this educational culture will help to address the administrative resistance some individuals have reported and promote EBP to students (Jette et al., 2003; Koehn & Lehman, 2008; Levin & Feldman, 2006; Sauers, 2009)

## Athletic Training Education

### *History of Athletic Training Education*

Over the last several decades athletic training education has gone through significant reform in order to assure that the professional preparation of athletic trainers evolved with the ever changing scope of health care (Delforge & Behnke, 1999; Denegar & Hertel, 2002; Weidner & Henning, 2002b). The first athletic training curriculum model was approved by the Committee on Gaining Recognition in 1959 and closely matched physical education curriculum offered at the time (Delforge & Behnke, 1999). This curriculum, although basic in its origin, continued to develop over several decades. Ten years later in 1969, the professional education committee recommended NATA recognition of the first undergraduate athletic training education program (Delforge & Behnke, 1999). These education programs led to the first certification exam being offered in 1970 (Grace, 1999).

Educational reform, formal recognition, and professional growth led to the formal accreditation of athletic training education programs by the American Medical Association Committee on Allied Health Education and Accreditation (CAHEA) (Delforge & Behnke, 1999; Grace, 1999). Since the initial accreditation was achieved, athletic training education programs have been accredited by the Commission on Accreditation of Allied Health Education Program (CAAHEP) and currently are accredited by the Commission on Accreditation of Athletic Training Education

(CAATE). Athletic training education has since become its own distinct academic major at the undergraduate and graduate levels (Hertel, West, Buckley, & Denegar, 2001). The competency based approach of athletic training education has provided students with clinical proficiency requirements in order to enhance the cognitive and psychomotor based concepts (Laurent & Weidner, 2002; NATA, 2006). The clinical education component is essential to enhance the preparation of an athletic training professional (Denegar & Hertel, 2002; Laurent & Weidner, 2002; Weidner & Henning, 2002b).

***Evidence-Based Practice in Athletic Training Clinical Education***

As discussed earlier, there is often disconnect between the didactic and clinical implementation of EBP in educational programs. Understanding that an inherent gap between these two areas can exist is important when considering the implementation of EBP into the athletic training education curriculum. The NATA Education Council's clinical proficiencies are inclusive and facilitate student critical thinking and problem solving in the clinical setting (NATA, 2006). As clinical educators, the focus needs to move toward inclusive problem solving and critical thinking and move away from developing skill-based technicians (Radtke, 2008). Theory also suggests that clinical educators and students should engage in an intentional, structured process of changing roles during the course of the clinical education experience and that the non-technical competencies of communication, collaboration and reflection are also crucial for effective practice (Strohschein, 2002). The use of specific clinical teaching models such as the one-minute preceptor or other techniques will help structure the clinical learning experience. A recent article by Jutte & Walker (2010) discussed the steps they took to

thread EBP concepts throughout the didactical curriculum, but there was no mention of how these concepts could also be tied with the clinical education of athletic training students. By omission this article highlights the all too often lack of collaboration between the didactic and clinical educational settings. While examples of curricular plans are a step in the right direction, athletic training education needs to follow suit of programs in nursing and physical therapy in making a concerted effort to include and promote educational assignments and activities that tie the classroom and clinical experiences together. By promoting EBP across the full curriculum, athletic training programs can foster change in faculty, clinical staff, and students.

Unless students see their role models use EBP in their clinical practice, they are unlikely to value it as clinically important. The goal should be to start with the faculty as a learner, and to get all stakeholders on board to implement a curricular change (Levin & Feldman, 2006). Orientation for clinical faculty, whether new or experienced teachers, typically focuses on the details of running the clinical experience and not on teaching and learning (Krautscheid et al., 2008). Approved clinical instructors (ACIs) are a necessary component of the clinical educational process of an athletic training student. The ACI serves as a mentor and instructor who assess athletic training students in the proficiency of the required clinical skills (CAATE, 2008). As part of the accreditation standards for athletic training education, ACI workshops are only required to include information on learning styles, instructional skills, educational competencies, evaluation and feedback, program policies, clinical education policies, communication styles, and legal and ethical behaviors (CAATE, 2008). This emphasis on programmatic information does not include instruction in clinical teaching or the use of EBP with students. Since the clinical

education component of athletic training education is critical to student development, there needs to be an increased emphasis on EBP for students and ACIs (Ciliska, 2006; Weidner & Henning, 2002a). In order to promote a structured clinical learning experience, ACIs need to be instructed on the best instructional strategies (Krautscheid et al., 2008). It is also important to understand the current state of knowledge in EBP processes of ACIs. By understanding the knowledge level of ACIs and other athletic training educators, opportunities can be tailored to fit the current level of understanding. Approved clinical instructor workshops would be an appropriate place to work toward improving ACI knowledge if necessary. Although the current knowledge level of athletic trainers in EBP has not been investigated, it could be hypothesized that the knowledge of athletic trainers would be similar to these other health care professionals and educators, but further investigation is needed.

Jutte & Walker (2009) provide teaching strategies for ACIs to use when introducing EBP to students in their clinical experience as well as methods to asses student EBP skills in their book chapter entitled "Incorporating and Teaching Evidence-Base Practice". Concepts discussed in this chapter provide ACIs with applicable techniques that would be helpful when teaching students. However, there is no research evidence available that discusses how best to educate ACIs on implementing EBP as part of an athletic training students' clinical experience. Determining the best strategies for ACI education and implementation could be beneficial in progressing clinical teaching of EBP concepts.

A paradigm shift from researching the evidence to understanding and teaching the scholarly applications in current curricula is desperately needed within the profession

(Winterstein & McGuine, 2006). Moving forward in implementing and investigating the possibilities of EBP in athletic training also requires athletic training educators to create ways for students to not only learn EBP, but also practice EBP. As movement occurs towards developing a clinical education model for clinical instructor education, the research by Coomarasamy & Khan (2004) and Nicholson et al (2007) needs to be taken into account. The best way to address the need for multiple exposures to EBP may be to continually address EBP concepts and teaching opportunities throughout the didactic and clinical curriculum for students. If athletic training students are being encouraged to use EBP in every aspect of their educational experience, they will be more likely to continue to use EBP when they are completed with their education. Mutliple exposures and longitudinal education for ACIs could be achieved through changing the current structure of ACIs workshops. Prior to determing the most effective educational strategy for ACIs, the current knowledge level of clinical and didactic athletic training educators need to be determined. In addition to understanding the current knowledge level, implementation strategies of EBP for ACIs need to be investigated as well. Understanding the current state of EBP in athletic training education with help to determine the most appropriate strategies for further education of ACIs not currently utilizing EBP concepts.

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# Chapter III

## Project IA

## Approved Clinical Instructors' Perspectives on Evidence-Based Practice Implementation Strategies for Students

Title: Approved clinical instructors' perspectives on evidence-based practice implementation strategies for students.

Authors: Dorice Hankemeier, Bonnie Van Lunen

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## INTRODUCTION

The clinical educational component of the athletic training educational experience is critical to student development (Laurent & Weidner, 2001; Weidner & Henning, 2002). Entry-level certified athletic trainers attribute 53% of their professional development to the clinical education experience while they were a student (Laurent & Weidner, 2002). These experiences should be a time when students develop skills and search for knowledge in how to improve their patient care (Laurent & Weidner, 2001; Rothstein, 2002). Clinical instructors and students believe that modeling professional behavior is one of the most helpful clinical instructor characteristics in student learning while knowledge and research are deemed the least helpful (Laurent & Weidner, 2001). As evidence-based practice (EBP) becomes more prevalent in the athletic training profession, (Hertel, 2005; Sauers, 2009; Steves & Hootman, 2004; Winterstein & McGuine, 2006) the need to incorporate and model evidence-based practice with students in their clinical experiences will also increase (Ciliska, 2006).

Currently the National Athletic Trainers' Association (NATA) fourth edition of the educational competencies are void of any requirements specific to EBP (NATA, 2006). However, the NATA Executive Committee for Education has indicated that there will be a focus on evidence-based practice, clinical outcomes, and clinical decision making incorporated into the fifth edition of the competencies when they are released (Sauers, 2009). This inclusion of EBP will bring athletic training up to levels of physical therapy (Jette et al., 2003), nursing (Burns & Foley, 2005; Fineout-Overholt & Johnston, 2005; Johnston & Fineout-Overholt, 2006), and medicine (Hatala & Guyatt, 2002; Wanvarie et al., 2006) who already have incorporated EBP into their educational

curriculums. Currently there are no competencies for the specific inclusion of EBP processes within professional programs, athletic training educators and clinical instructors are left to their own devices as to how to incorporate EBP with students. Athletic training educators have addressed how incorporating EBP through a curricular emphasis, specific teaching strategies, and student activities has enhanced the didactic curriculum of their athletic training education programs (Manspeaker & Van Lunen, 2010). The integration of clinician expertise, best evidence, and patient values is one of the hardest concepts to teach students in regards to EBP (Shlonsky & Stern, 2007). In the clinical setting the question isn't about how to teach EBP, but instead as Denegar and Hertel (2002) stated, "How do we best prepare students in the art and science of evidence-based clinical practice?" (p. 127).

Approved clinical instructors have the opportunity to play a vital role in preparing students and future clinicians who understand both the art and the science of evidence-based practice. Medical research has shown that residents who learn about evidence-based practice in didactic coursework failed to incorporate EBP in their clinical skills without directed clinical implementation (Yew & Reid, 2008). Therefore as educators implement EBP concepts into didactic coursework, it will be essential to ensure that clinical education encompasses and fosters these concepts. Integrating EBP into the clinical experience of athletic training students will further enhance their abilities and willingness to include EBP in their future clinical practice (Coomarasamy & Khan, 2004). Approved clinical instructors should be able to encourage students to create meaningful clinical questions, find valid literature, and apply the evidence to their patient while also considering the patient's goals and values. If students aren't adept at applying

their knowledge of evidence-base practice in the clinical setting, the care they provide the patient remains the same and they are not performing the "practice" component of EBP.

Understanding how to provide a quality clinical education experience that integrates evidence-base practice will be helpful to both current and future approved clinical instructors. Athletic training education program directors and approved clinical instructors need to determine the best methods for evidence-based practice implementation not only in the classroom, but also in the clinical setting. The purpose of this study was to examine ACIs involved in professional undergraduate athletic training education in regards to their experiences with EBP. Specifically, the aim of this query was to investigate the importance of utilizing EBP concepts in clinical practice, clinical EBP implementation strategies for students, and challenges of implementing EBP into clinical practice while mentoring and teaching athletic training students.

## METHODS

### Participants

A combination of criterion and snowball sampling strategies were used for this inquiry. Participants needed to meet three inclusionary criteria in order to be included in the sample: serve as an ACI for a professional undergraduate athletic training education program, serve as an ACI for at least one full year, and be self-identified as utilizing EBP within their own clinical practice and instruction of students. Utilization of EBP was determined by participants' self described adherence to of the definition from Sackett et al (1996), who stated that EBP is the "integration of the best research evidence with clinical expertise and patient values to make clinical decisions" and by the use of the five steps of EBP also described by Sackett et al (1997). Those steps are: 1) defining a

clinically relevant question, 2) searching the literature for the best evidence, 3) critically appraising the evidence, 4) applying the evidence, and 5) evaluating the performance evidence based practice. Sixteen participants (11 males, 5 females) with mean years of certified AT experience 10 ± 4.7 years and 6.8 ± 3.9 years of experience as an ACI participated. All participants were given last name pseudonyms to ensure anonymity during the research study (Table III.1). The study was approved by the Institutional Review Board for exempt research prior to the start of data collection.

**Procedures**

Qualitative inquiry was used to explore the experiences of ACIs in regards to EBP implementation with students due to the ability to obtain information rich responses (Patton, 2002; Pitney & Parker, 2009). The program director of athletic training education programs known to teach evidence-based practice concepts in the curriculum were initially contacted by the researcher. These programs were contacted as a starting point of the snowball sampling process. The program directors of these programs were asked to provide names or forward a request for participation to ACIs within their academic program who met the inclusionary criteria listed above. Once the name of an ACI was received, an email was sent to the ACI which asked about their specific clinical EBP process to ensure that they met the inclusionary criteria of the investigation. Individuals who met all of the criteria for inclusion were then scheduled to participate in a phone interview during spring and fall 2009 academic semesters. While interviewing participants identified by the initial criterion sampling, they were asked to identify other potential ACIs to contact that they believed met the criteria for inclusion. This snowball/chain sampling method allowed to obtain more information rich cases in

regards to the use of EBP in the clinical setting (Patton, 2002). The recommended individuals that worked in the same clinical setting or were ACIs for the same athletic training education program as other participants were not utilized for this inquiry to reduce any undue influence or bias that the clinical or program setting might have had. Names received from other participants were then contacted in the manner described above to investigate their potential interest in participating in the study.

**Data Collection**

Semi-structured phone interviews were conducted with an emergent design strategy as it allowed the interview to transpire with each of the ACIs (Patton, 2002). Each participant was interviewed by one researcher (DH) via phone following the semi-structured interview protocol. The protocol was developed by the researchers and structured in a manner to obtain information about the ACIs own clinical EBP process and experiences along with how they incorporated the EBP process with their students in a clinical setting (Table III.2). The semi-structured nature of the interview led to the development of an interview protocol that included a battery of questions that addressed the investigations' research questions and purpose. The protocol was reviewed by other qualitative researchers in the field and pilot tested on other athletic training clinicians prior to data collection. The review and pilot testing were done to ensure that the interview questions were not biased towards a particular outcome. During the interview process, participants were encouraged to elaborate and/or clarify their responses by the researcher and the researcher was allowed to deviate from the interview protocol when deemed necessary as is consistent with an emergent design strategy. The phone interviews were digitally recorded using an Olympus PN-2100VC digital voice recorder

(Olympus America Inc., Center Valley, PA) that connected via a recorder telephone pickup (RadioShack Corp., Fort Worth, TX) to a Cisco 7970IP telephone (Cisco Inc., San Jose, CA). This pickup device captured both sides of the conversation through the phone receiver. Each participant was interviewed during one instance that lasted between 30 and 60 minutes. All interviews were transcribed by a professional transcriptionist to ensure accuracy. Interviews were conducted until saturation occurred, meaning that new themes or information are not emerging from the data (Guest, Bunce, & Johnson, 2006; Patton, 2002).

**Data Analysis**

This emergent design study utilized a phenomenological perspective (Patton, 2002; Pitney & Parker, 2009) with elements of modified-grounded theory (Patton, 2002) to complete the investigation. The phenomenological perspective allowed us to understand the real life experience of the ACIs as they relate to incorporating EBP into their clinical work with students (Patton, 2002; Pitney & Parker, 2009). NVivo 8 (QSR International, Melbourne, Australia) qualitative software was used to organize and code the data once the transcriptions were completed. The data analysis included a series of steps: 1) reading each full transcript to understand the common experiences, perceptions and strategies of the participants, 2) coding each participants' responses for common themes and patterns, 3) reading each transcript again to evaluate the themes and codes, 4) dividing responses of each main theme into sub-themes, and 5) conducting verification of themes with select participants and other qualitative researchers in the field. Themes emerged from the participant responses and there were no specific criteria required to become a theme or sub-theme. Themes and sub-themes were created until saturated or

exhausted. Common themes emerged throughout the participants, thus creating a structure to the shared experiences of ACIs in regards to implementation of EBP with students in the clinical setting (Patton, 2002).

Peer checking, triangulation, and member checking were conducted to ensure research bias was not a factor and to confirm the findings (Patton, 2002; Pitney & Parker, 2001, 2009). Peer checking (Pitney & Parker, 2001, 2009) was utilized to examine the themes and sub-themes created. The peer had experience with qualitative research and determined that the themes and sub-themes created were consistent with the material and significant to the research problem. Triangulation (Pitney & Parker, 2009) occurred through researcher evaluation as the research team analyzed the emergent themes and to determine if information was interpreted appropriately. Member checking (Pitney & Parker, 2009) occurred through transcript verification with all participants being asked to review the recorded transcripts for accuracy. Interpretive verification (Pitney & Parker, 2009), another form of member checking, was conducted with five of the 16 participants. The five participants were randomly selected to evaluate the established themes and sub-themes via email. Themes were described to the participant via email, and then they were asked to confirm the themes based on their own responses and perceptions of the theme. All themes and sub-themes were verified and agreed upon by the participants.

## RESULTS

Three themes emerged through the data analysis and coding process with respect to the ACIs' use of evidence-based practice with students in the clinical setting. The themes that emerged were the ACIs' EBP implementation strategies, challenges for students using the EBP process, and strategies to encourage student use of EBP beyond

the clinical education setting. In addition to these three themes related to the ACIs' use of EBP, importance of evidence-based practice in the clinical setting also emerged as a theme The emergence of "importance" provided a framework for the need of evidence-based practice within the athletic training profession. The conceptual framework of the themes and sub-themes that emerged can be found Figure III.1.

**Importance**

All participants believed that practicing in an evidence-based manner was important for several reasons. Responses about importance all contributed to four sub-themes of 1) validation of the profession, 2) changing paradigm shift, 3) improving patient care, and 4) improving a students' educational experience.

*Validation of the Profession*

Many ACIs commented that the use of evidence-based practice is directly related to justifying the worth of the work athletic trainers perform to other healthcare professions and to insurance companies. Athletic training being regarded as highly as other healthcare professions became a common theme for all ACIs as they hoped it would increase respect, reimbursement, and compensation.

> *Unfortunately I think with athletic trainers, one of the problems, why athletic training hasn't been regarded as highly as physical therapy, physicians, or physician extenders is because there has always been this lack of evidence So I think it's important for athletic trainers and the profession to use evidence and really the only means to allow them (athletic trainers) to be regarded in the same light as other health care professionals (Kleeman)*

> *I think that it's paramount to the success of the profession, especially the way the economy is today and the way the healthcare profession is our worth is in the healthcare profession I think that if we can show that what we do works, I think that's how we are going to increase our pay and increase our importance in the medical field (Vint)*

> *I think that it's paramount to increase the body of knowledge that we have and to show that there is a standard of care for any one condition trying to improve that from a healthcare standpoint (Bozzell)*

> *I think one thing that I think is coming into full circle right now is being able to justify our services to the insurance carriers You know as well as I do I mean there is all this talk about healthcare reform, and healthcare everything I think what we have to do is show ourselves capable of doing what we do and showing that we should be reimbursed for our services but also we've got to show that we can provide good service to the patient while trying to keep the cost of the insurance low I think if we can justify it, it gives us more credible evidence and more credible backing because we can take this and say, "hey look, this is what we can do", and we can show it and show it based on good studies, like outcome studies we do in our own clinic (Balanos)*

*Changing Paradigm Shift*

One of the more common themes from participants was that the profession of athletic training has evolved and the manner in which treatments and other services were performed many years ago has changed. Participants believe that evidence-based practice is an avenue to change the thinking of "this is how it has always been done".

> *I think there is, given the field that we are in, I think there is a lot of "it's always been done this way" and "this is how we do it" There is this sort of learning that goes on regardless of whether or not it's supported by current standards, current literature, or current research (Hamby)*

> *I have found that there is an "Institution X" way of doing things, there is an "Institution X" way to tape an ankle, an "Institution X" way to treat every ankle sprain the same way I think we look at what are we doing and say, "Does it work?" or are we doing it just because that's the way everybody else that works here has done it? I think we need to shift away from that (Vint)*

> *"This is what I was taught, so this is the way we do it and it's worked in the past, so why doesn't it work now " I think people need to get out that mind frame and just think in order to prove to people that we are an allied health medical health profession, then we need to be able to show what we are doing works, just like any other medical profession (McPherson)*

*Improving Patient Care*

Understanding how evidence-based practice improves patient outcomes emerged as an important aspect for the ACIs. Improved time and efficiency was stated as a benefit to utilizing evidence-based practice; clinicians believe that using evidence not only improves outcomes, but also decreases the amount of time treating a patient.

> *I think that for the benefit of the patient, especially, you owe it to them to try to keep up with the latest research and try and keep up with the latest treatments that have been proven to be successful That's why I think it's very important I mean it's important to keep up with that and to implement that into your therapy and your treatment (Fontes)*

> *I think the biggest thing is outcomes I want to find the way that's going to get my athlete back to playing pain free as quick as possible, so I will develop my own theory, but I want to see what else is out there That's kind of the important thing, you want to find the quickest options I think the most important thing is getting that quick outcome (Myrman)*

> *I think once you get to a point where you are comfortable with the literature in any one given area, I think that you save yourself a lot of time when you are treating patients because you have a plan and you know how to execute it (Bozzell)*

*Improving Student Educational Experience*

Approved clinical instructors believed that incorporating and using evidence-based practice concepts was important since they were serving as an instructor for students. The use of EBP improved their ability to explain and teach the athletic training students while encouraging students to also use evidence to support their own clinical decisions.

> *I think with students and their participation, I've really picked it up because I think that we need to explain to our students that it is important to be able to justify the things we do and I think that EBP helps with that (Gatti)*

> *The students have a tendency to grasp it (EBP) more I think If you can show them not only that it works, but why it works then they can logic their way though saying, "well research says this and this is why we are going to try it this way" If it doesn't work, it doesn't work, but we've got solid evidence behind it to say that chances are it's going to work (Hamby)*

**EBP Implementation Strategies**

The second main theme to emerge from the data was that of implementation strategies used by the ACIs to incorporate EBP concepts in their teaching with students. ACIs differed on the strategies used, but three sub-themes were common among ACIs: self discovery, promoting critical thinking, and sharing of information.

*Self Discovery*

Approved clinical instructors identified discovery activities as methods in which they encourage students to incorporate evidence-based practice into their clinical

experience. The discovery techniques centered on requiring students to search for research on a particular topic and then presenting the findings to their ACI.

> *Our students have actually done a fair amount of research to find out what the treatment patterns are, what work best, what doesn't work best, and the pros and cons of each different sort of treatment parameters Then they follow those (cases) through to the full healing, to return to activity, and the steps in between as far as treatments and rehabilitation (Hamby)*

> *When a problem arises, I challenge them to identify articles or the most recent research regarding that injury Then we discuss it, whether it's at practice or clinic, and then we talk about how it's applicable or maybe not applicable in that certain situation We'll have a discussion and then we apply it (Kleeman)*

> *One example, I think was early this year, we got a Hivamat machine I gave everyone an assignment that for their homework, saying "everyone needs to bring me one article on this machine that they can find" Which is very difficult considering that there is not much out there, but that was one good way to say, "Hey, we have a new machine in our usage and we have one of our people who are using it just constantly, why? What do we have that is to say that this is going to work? We have maybe some rationale of theory, but come bring some more information " So we will give them an assignment and they seek out some information on it That is one way we do it (Kopicko)*

Hamby indicated that she encourages students to work together in research and in finding evidence. She believes that making the research process game-like helps to promote engagement with the student. She explains,

> *When we find something that's unusual we send them off in a group We say, "You go find this part of the treatment, you go find possible contraindications, you go do this and get together and come back and present a plan of attack " That is kind of the only way we get to do those sorts of things and if we challenge them with it, it's almost like we turn it into a game, you know who can come up with the right answer first That's really the only way that I have found that I can get them actively involved in any evidence based anything (Hamby)*

*Promoting Critical Thinking*

Approved Clinical Instructors reported that they expected students to be able to answer the question of "why" they were performing a particular treatment or technique. The ACIs wanted to promote this idea with their students, and the methods they used centered on the concept of being able to defend a particular choice. In doing so, they encourage students to think critically about what they have learned in the classroom and then apply that knowledge clinically.

*I won't let anybody do anything unless they understand why That's kind of one of the big things Yeah, you can see that" x treatment" is going to solve for "y" 99% of the time, but do you understand why? (Myrman)*

*We do a lot of questioning The students will come in and we may be doing a particular treatment on someone and we may ask them before they can ask us, "Why are you doing it?" A lot of times I will know what they are doing in class or I will ask them, "what are you doing in class today?" It may be well, "we are looking at a knee special test " So I'll say, "Ok well, let's look at the validity and reliability of these particular tests, what do we know about that?" The student will say, "Well I don't normally talk about that in class " I encourage them, "Well let's go figure that out What is that? What does that mean?" You know it just brings up question after question and not in any way to bring them down I think that all of the students have kind of figure out that's the way I work I like to challenge you (Kukler)*

*I think there's a real skill in separating out some skill stuff here, you know you can learn "XYZ" in the classroom but that critical thinking piece is really what I'm trying to get out of my kids out of my students That's why I think that using this approach this evidence based practice teaches them critical thinking I think that really can be done quite well in the clinical setting and clinical experiences (Holzman)*

Sharing of Information

Participants also shared EBP information with their students during the clinical experience. Sharing articles, inviting students to staff meetings, and having central information hubs are all methods in which the ACIs used to provide students with EBP information.

*I have a binder that's called "interesting articles" that the students always make fun of me about But obviously in athletic training there is a lot of "go- go-go"! But, there's also some down time with certain sports and so when that happens, I'm always like, "could you take a look at this article?" Or, I just got this and we kind of pass it along The exchange of information is there, and then we kind of look at what we are doing based on what they are learning (Towle)*

*As I take on a new student every semester I ask them to start an evidence based binder that will define their practice I work specifically with men's basketball, so some of the articles I will provide for them up front and I expect them to read them because it defines my practice of why I do certain things So I'll provide kind of a "hit list" of articles that I follow and that support why I do certain things As the season goes on, every year kind of brings up a new thing, whether it is MRSA, etc , and then we add to that binder In return, they add to my binder as well (Kleeman)*

*We have set up a Google account which we use a Google calendar and gmail so we have them sort of log into that and that sort of becomes the "central hub" so we've actually thrown articles up onto Google docs that all the students can access there Or I will have say to the student, "when you have an article, throw it into there so everyone else can access it " So we try to create essential hubs, probably not as in-depth as I envision it yet, but I think it is one good way to say, "ok everyone can access it and share it " And the one other last thing we do a lot is we involve our students with our*

*education session, our staff continuing education things, we include our students with (Kopicko)*

**Challenges in EBP Implementation**

Although participants had several examples of EBP implementation strategies, the incorporation of EBP does not come without challenges. Many of the challenges discussed by the participants centered around defining a clinical question, literature searching, appraisal steps of the EBP process (Sackett et al., 1996). These challenges then provide the opportunity for the ACI to help the student grow in their own EBP process. The responses below indicate the participants' responses to the question "What parts of the EBP process do you find yourself helping students with the most?"

*Defining a clinical question*

*I think as of right now it's still really defining the problem You know it's a starting point and hopefully we will get to the point so that when they come in, they can already say, "this is a problem and how do I address that?" But, right now I still think we are in the early stages so we are still at you need to define the problem (McPherson)*

*I think that we stress so much about them being into the literature and really trying to read and understand how to interpret scholarly journal articles I don't know if we missed the boat on it, or they missed the boat on it I don't know where the disconnect is, but I think their ability to actually form the clinical question is probably where they struggle the most (Bozzell)*

*Literature searching*

*When I have them do that (a search) they go straight to Google instead of looking at a book or trying to go the Journal of Athletic Training on-line, or something else like that They go right to Google, so I'm trying to tell them that the stuff off Google it isn't really right, and to look at more of the peer reviewed journals (Gathers)*

*It's amazing to me how students have no clue how to get on and find an article You know I can say, "ok, well let's go and find out about osteochondral defects of the talus or talar dome" and they, 95% of them, and I don't know if this a programmatic thing or what it is, but they don't know where to go They don't know where the library site on the computer is They don't know how to search for things They say "well I went on to Google and I can't access this article" You have access to pretty much everything You've got to use the library web sites Once I teach them that, then they just run with it You know they're like, "oh I have access to all of these different journals, this is great!" At first that's the biggest thing that I'm helping them with (Kukler)*

*Appraising the literature*

*I think appraising the evidence and looking to see if it's a good study I feel like a lot of times students will read a study and say, "ok well this is what we have to do or this is what the study says is right " We all know that if you find one study, you can probably find two that say the opposite Looking at it and trying to assess is this a good study, is this applicable? (Towle)*

*I'd say identifying whether it's a good study or not I'd say looking at that research article and saying "alright where are the flaws?" Is there a Type I error or a Type II error? What's wrong with this research? That's probably the biggest challenge for them (Kleeman)*

**Strategies to promote student use of EBP**

Invoking change in personal practice for a student was a sentiment many ACIs discussed. The ability for students to see their ACIs utilizing the process of EBP was reported to being a key strategy of encouraging students to also incorporate EBP into their own clinical practice. Through modeling, the ACIs hoped to encourage students to make EBP a foundational component in their clinical practice.

*If we show that it is important to us I think they would follow suit as well and not just look at it as "oh my, this an assignment for class" but look at it as a way to make me better and make my clinical skill better and more efficient (Magee)*

*Do you want to hit them over the head with a club? I don't know I guess you model it (EBP) and people see it I guess the best way is stop talking about how you see it modeled and then you see the clinical outcomes that go along with it, so how can you not use it? I think that whole modeling piece would actually be the best way (Holzman)*

Kopicko stated that encouraging questions helps create a culture of questioning and that often clinical staff and ACIs can be used as both good and bad examples for students.

*We make great examples of ourselves (staff) constantly both good and bad You know we sort of sometimes make a joke of it, sort of keep it light around here, but also really make it a point of "hey, well why are you doing that? What is the point of that?" Or we point to other staff, "hey, do you understand why you are doing that?" Or we encourage the students to go "ask why even have me do this?" So it's more like getting that culture out there that asks the proper questions and asks the critical questions in the end, "hey, am I doing the right thing?"*

Each of the implementation strategies and challenges discussed by the ACIs show a devotion to helping students become better evidence-based clinicians.

## DISCUSSION

The importance of utilizing evidence-based practice and implementing evidence-based practice concepts with athletic training students in the clinical setting emerged as paramount ideas when speaking with approved clinical instructors. The themes of importance, methods of EBP implementation, challenges in EBP implementation, and the strategies to promote student use of EBP emerged from the ACIs. Understanding these themes can assist approved clinical instructors with the integration of evidence-based practice processes with athletic training students.

*Importance*

The importance of using evidence-based practice in the clinical setting discussed by the ACIs is supported by several individuals (Hertel, 2005; Rothstein, 2002; Steves & Hootman, 2004; Winterstein & McGuine, 2006). Hertel (2005) discusses the need for athletic trainers to document evidence and show effectiveness in treatments. In doing so, the profession of athletic training will move closer to reimbursement for athletic training services and thus stand along other professions in the health care industry (Hertel, 2005; Sauers, 2009; Steves & Hootman, 2004). A paradigm shift in thinking was introduced by Winterstein (2006) as he discussed that the move towards EBP for clinicians would entail a new point of view when critiquing research and developing a scholarship of clinical practice. As we move away from "it's always been done this way" to evidence-based clinical decisions, there will need to be a shift in thinking and a new culture of evidence-based practice created. Approved Clinical Instructors have the opportunity to teach students how to critique research and make clinical decisions based on evidence which would help create this new culture of EBP.

In addition to the benefits of evidence-based practice from a professional validation standpoint, teaching students to use EBP in the clinical setting helps to promote critical thinking and allows students to understand reasoning behind clinical decisions (Burns & Foley, 2005; Medicine, 2003). Rothstein (2002) suggests that the clinical education experience focuses largely around the components of evidence-based practice without labeling it as such. As ACIs teach and incorporate the steps of EBP with their students, they are promoting enhanced critical thinking skills and clinical decision making to the students (Burns & Foley, 2005; Winterstein & McGuine, 2006). In addition, teaching EBP involves more than just a transfer of knowledge, but it can also convey professional value (Bilsker & Goldner, 2004). The final importance sub-theme of improving patient care is one of the main tenets evidence-based practice is built upon. Patient care is often overlooked when clinicians talk about evidence-based practice even though it is a fundamental component (Sauers, 2009). Many of the ACIs specifically mentioned that they did not track clinical outcomes of patients in their own EBP process, but that they believed EBP was important to improving patient care. Understanding that the integration of the best research evidence, clinician expertise, and patient values is the true meaning of evidence-based practice often gets lost in the process (Sackett et al., 1996; Sauers, 2009; Steves & Hootman, 2004). Approved clinical instructors should work to ensure that they are practicing all the components of the EBP process while also integrating the evidence, their expertise, and patient values when treating patients. A shift to scholarly clinical practice by the ACIs and education of athletic training students will help to move the athletic training profession towards improved patient care (Sauers, 2005).

*EBP Implementation Strategies*

The implementation strategies discussed by the participants did not meet specific teaching strategies or methodological principles found in educational literature. Prince and Felder (2006) discussed the idea of active and passive learning strategies. The themes of self-discovery and promotion of critical thinking would be considered active learning strategies (Prince & Felder, 2006), whereas the sharing of information would be considered more of a passive learning strategy. ACIs who used implementation strategies of self-discovery asked students to locate information related to a particular case or treatment without giving guidance as to what they should be expected to find. Self-discovery requires the student to decide what information is pertinent and then come to an appropriate conclusion (Prince & Felder, 2006). Some of the discovery examples used by participants had components of problem based learning, but the individual nature of the ACI student relationship did not meet the criteria for true problem-based learning (Heinrichs, 2002). The difficulty with self-discovery is that the ACI is not a vital part of the process guiding the student to a specific point. Depending on the EBP foundation that the student receives in the classroom, younger students may not have the knowledge to be able to find pertinent information from the start. ACIs should be instructed on how to utilize specific teaching strategies such as problem-based learning or self-discovery in order to utilize all of the key components of these teaching strategies.

Sharing of information by the ACI to the student allows the ACI to fulfill the role of mentor and teacher. In sharing information with their students, the ACIs in this study were able to give information on how utilization of evidence-based practice contributed to their own clinical practice. Both Towle and Kleeman (participants in the study)

discussed how they share the articles that guide their own clinical practice with the students and then encourage the student to begin their own notebook as well. This allowed the students to see their ACI as a role-model for the behavior and also to understand the question of "why" their ACI practices in a certain manner. Role modeling has been documented as an effective technique which increases student behavior in the clinical setting (Coomarasamy & Khan, 2004).

As with any teaching strategy, there is no specific right or wrong way to implement evidence-based practice into the clinical setting. Factors such as student level, experience with EBP, clinical experience and ACI comfort will often determine which implementation strategy will best serve the student. The individual ACIs in this study used a combination of methods to encourage student use of EBP. Understanding the student and their learning style will be important for ACIs when finding the best strategy for each student. In addition to understanding the students' learning style, ACIs must also be educated in EBP and various teaching strategies. In ACI should be targeted as a learner first which will help to increase their willingness to utilize these clinical instruction strategies (Krautscheid, Kaakinen, & Warner, 2008; Levin & Feldman, 2006).

*Strategies to promote student use of EBP*

While the implementation strategies of self-discovery, promotion of critical-thinking, and sharing of EBP information were utilized by the participants in this study, role-modeling (Ciliska, 2006; Coomarasamy & Khan, 2004) has been shown to also be an effective strategy to encourage the use of EBP with students. The use of role modeling is a common strategy for clinical education throughout various health professions (Ciliska, 2006; Coomarasamy & Khan, 2004; Del Mar, Glaszziou, & Mayer,

2004; Reuler & Nardone, 1994; Straus, Richardson, Glasziou, & Haynes, 2005). ACIs need to become proficient in the processes of EBP and should be comfortable with directing students on how to incorporate the three tenets of EBP into their own clinical practice. As clinical instructors model behavior, the student is able to see how clinical skills should be incorporated into practice. In regards to evidence-based practice in the medical profession, clinical instructors who model behavior of evidence-based practice allow students to see the integration of evidence into decisions as well as see how evidence results in good patient care (Straus et al., 2005).

In order to encourage and model the use of evidence-base practice in the athletic training setting, there is a need for ACIs to utilize and understand the evidence-based process themselves (Del Mar et al., 2004; Krautscheid et al., 2008; Levin & Feldman, 2006). As the fifth edition of the NATA educational competencies are adopted, athletic training education program personnel are going to be required to learn evidence-based practice concepts. A programmatic tie between the classroom and clinical components of the athletic training education process will help to improve continuity not only for students, but also for ACIs. If learning EBP skills is solely taught in the didactic classroom, there will be an inherent gap between classroom and clinical knowledge if EBP is not also mandated clinically (Ciliska, 2006; Del Mar et al., 2004; Shlonsky & Stern, 2007). Education of both the athletic training students and the ACIs will be necessary to continue the promotion of student use in EBP.

*Challenges in EBP Implementation*

The challenges ACIs discussed in terms of EBP implementation with their students focused on completing steps of the evidence-based practice process which is

essential in practicing as an evidence-based clinician. The ACIs reported helping students most with the steps of 1) defining the clinical question, 2) searching the literature, and 3) appraising the literature. In order to find relevant literature to the patient, the student must be able to define a clinically relevant question. Using the PICO format (Raina, Massfeller, & Mcacarthur, 2004; Straus et al., 2005) of clinical questions would help ACIs direct students to a more searchable question and provide a more formal structure to the questions students are already asking ACIs in the clinical setting (Jutte & Walker, 2009). The utilization of tutorials (Jutte & Walker, 2009) for literature searching (e.g. PubMed Tutorial; UNC Health Science Library: Medical Searching tutorial) and critical appraisal (e.g. Center for Evidence Base Medicine; UNC Health Science Library: Evaluating the Evidence tutorial) may also be helpful due to these two steps being identified as challenges for students. Incorporating these tutorials in the didactic portion of the educational experience would allow the ACI to teach the student more about applying the evidence to clinical patients.

It should be noted that the final two steps of applying the evidence and evaluating the outcome of the evidence-based process were not discussed as challenges by the ACIs. It could be possible that the students were not actually applying the evidence or evaluating the outcomes of their patients, as they were having difficulty with the first three steps. It is difficult to conclude that there are not challenges with these steps even though they were not specifically identified as challenges. The participants in this study served as ACIs for a variety of level of students, therefore, the challenges faced were most likely associated with the student's level in the athletic training education program. ACIs indicated that younger, less experienced students, would be expected to have more

difficulty with the earlier steps of the EBP process. The challenges of student level and additional barriers to student use of EBP will be reported in future reports.

## CONCLUSIONS AND IMPLICATIONS

The implementation of evidence-based practice processes in the clinical setting is necessary to invoke change within athletic training, therefore translating to more effective and meaningful patient care (Sauers, 2009; Winterstein & McGuine, 2006). The ACIs provide a critical link to encouraging student use of EBP. Approved Clinical Instructors use self discovery, critical thinking, and sharing as strategies to implement EBP with students in the clinical setting. Completing the steps of the EBP process provided the biggest challenges to the ACIs in terms of implementation with students. Students require help in finding appropriate information and appraising the literature. As mentors, ACIs believe that modeling and demonstrating EBP processes in their own clinical practice will help to promote the use of EBP with students. For this to occur, athletic training education programs need to work towards educating their ACIs in the five steps of the EBP process and associated terminology as well as in teaching strategies for clinical education.

Future research should continue to assess the most effective clinical teaching methods in regards to evidence-based practice. Educators and researchers should investigate how the combination of didactic and clinical instruction affects student knowledge and use of evidence-based practice. Additionally, research should address the current knowledge level of EBP athletic training educators in order to establish better educational mediums for promoting evidence-based practice throughout the profession.

### Limitations

The approved clinical instructors that participated in this study were selected from a specific, non-randomized sample of the population. The ability to identify ACIs is limited to what can be obtained through the athletic training education program director, so all potential participants were not identified. Although, the saturation of the data indicates that the small sample size may not have affected the responses. Two of the ACIs who participated in this study did not work in a collegiate setting. While these individuals differed in their clinical work environment from the other collegiate ACIs, all sixteen participants provide patient care on a regular basis, and the methods in which they are provide patient care would be similar regardless of clinical setting. The self-report nature of the clinicians' use of EBP could also be a limitation since there was not a measure to see if they were accurately and consistently utilizing EBP, but it is assumed that all individuals were contributing truthful information during the interview. Some of the participants were in dual positions that included teaching in the didactic curriculum, so the methods used for EBP implementation could have differed with those who taught in the classroom vs. those who were just in the clinical setting. Future research would be necessary to determine if differences existed between these individuals.

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**Table III.1. Demographic Information by Participant**

| Participant Pseudonym | Sex | Years of Experience as an Athletic Trainer | Years of Experience as an Approved Clinical Instructor | Clinical Setting |
|---|---|---|---|---|
| Balanos | Male | 16 | 4 | Clinic |
| Bozzell | Male | 5 | 3 | Collegiate |
| Fontes | Female | 19 | 17 | Collegiate |
| Gathers | Male | 5 | 4 | Collegiate |
| Gatti | Male | 8 | 6 | Collegiate |
| Hamby | Female | 16 | 10 | Collegiate |
| Holzman | Male | 8 | 3 | High School |
| Kleeman | Male | 9 | 8 | Collegiate |
| Kopicko | Male | 12 | 10 | Collegiate |
| Kukler | Male | 7 | 3 | Collegiate |
| Magee | Female | 8 | 6 | Collegiate |
| McPherson | Female | 14 | 10 | Collegiate |
| Myrman | Male | 3 | 2 | Collegiate |
| Stanlet | Male | 14 | 9 | Collegiate |
| Towle | Female | 10 | 9 | Collegiate |
| Vint | Male | 6 | 5 | Collegiate |

**Table III.2. Semi-structured Interview Protocol**

1. Please explain your EBP process. What elements and degree do you use the five-steps of EBP?
   Probe: What specific EBP skills do you personally utilize?

2. Can you discuss why you chose to implement EBP into you clinical practice and when you started doing so?

3. Please discuss the importance of ATCs using EBP concepts in their clinical practice.
   Probe: Why do you believe EBP is important or not important?

4. What barriers do you encounter when trying to utilize EBP concepts in your clinical practice?

5. Discuss the emphasis, if any that is placed on utilizing EBP concepts in your work environment.

6. How long have you been incorporating EBP when working as an ACI with your students?

7. How do you incorporate EBP in teaching your ATS clinically?

8. Does the academic program you serve as an ACI for teach EBP in the classroom?

   Can you discuss how you were made aware of the EBP skills students are learning?

   Do you feel like these communications are enough?
   Probe: What would be more helpful?

   Is there a programmatic effort to tie the EBP skills learned in the classroom into the students' clinical practice? What does entail?

   If EBP is not taught in the classroom, why have you decided to incorporate EBP when teaching students clinically?

9. When was your last ACI training and was EBP a part of the curriculum?

10. What EBP skills do you find yourself helping students with the most?

11. What do you feel is the best way to get students to utilize EBP clinically?

12. Please discuss which part or parts of the EBP process are most difficult for students to apply clinically.

13. Please discuss any barriers you encounter when teaching EBP to your students.

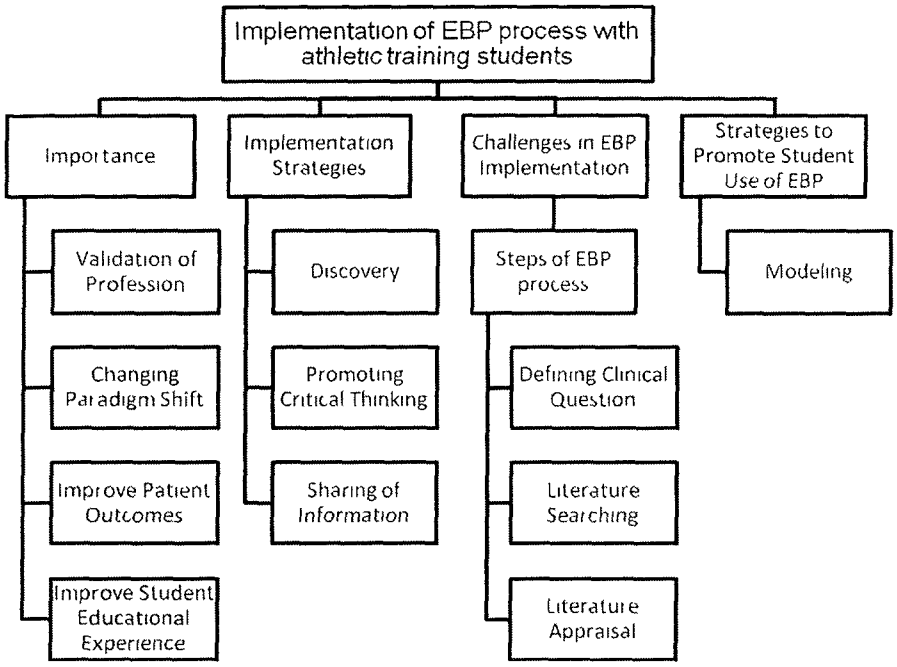
14. Does the level of athletic training student you are working with affect the EBP skills you use with that student?

    Probe: What skills do you find appropriate with lower level students?

    Probe: What skills do you find appropriate with higher level students?

15. As a clinician, how do you feel EBP could be expanded to other athletic trainers not currently using it?

**Figure III.1. Conceptual Framework of Themes and Sub-Themes**



# Chapter IV

## Project IB

## Perceptions of Approved Clinical Instructors: Strategies for Overcoming Barriers in the Implementation of Evidence-Based Practice

Title: Perceptions of Approved Clinical Instructors: Strategies for Overcoming Barriers in Implementation of Evidence-Based Practice.

Authors: Dorice Hankemeier, Bonnie Van Lunen

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## INTRODUCTION

The emphasis on evidence-based practice (EBP) within the curricula of health care professions has become increasingly prevalent (Ciliska, 2005; Kring, 2008; Sauers, 2009; Slavin, 2004). The need to combine the best research evidence, clinical expertise, and patient values has also begun to enter the field of athletic training (Manspeaker & Van Lunen, 2010; Sauers, 2005, 2009; Steves & Hootman, 2004; Winterstein & McGuine, 2006). In athletic training education, the fifth edition of the National Athletic Trainers' Association (NATA) Educational Competencies, set to be published in the spring of 2011, include a large emphasis on EBP related skills and concepts that aimed to improve patient care. The inclusion of EBP in educational competencies, the increased continuing education opportunities in EBP (Hertel, 2005), and inclusion of Cochrane evidence-based grading of NATA position statements (Kronenfeld et al., 2007) have continued to move the athletic training profession in the direction of greater emphasis within this area.

A move towards greater EBP emphasis is often met with challenges and resistance. Across health care professions, clinicians cite time (Brown, Wickline, Ecoff, & Glaser, 2009; Jette et al., 2003; Koehn & Lehman, 2008; Manspeaker & Van Lunen, In Press; O'Donnell, 2004), personnel support (Brown et al., 2009; Jette et al., 2003; Koehn & Lehman, 2008), perceived lack of knowledge (Brown et al., 2009; Jette et al., 2003; Koehn & Lehman, 2008; Manspeaker & Van Lunen, In Press), and insufficient or inappropriate resources (Jette et al., 2003; O'Donnell, 2004) as barriers to their engaging in EBP. As an increased emphasis on EBP in athletic training education develops, ACIs are going to need to be able to demonstrate their own use of EBP while facing the same

challenges as physical therapists (Jette et al., 2003), nurses (Brown et al., 2009; Granger, 2008; Koehn & Lehman, 2008; Melnyk BM et al., 2004; Nolan et al., 1998), physicians (O'Donnell, 2004), and athletic training educators (Manspeaker & Van Lunen, In Press). An approved clinical instructor's (ACIs) role in clinical practice and the mentorship of athletic training students provide several instances in which implementation of EBP could be met with resistance.

Understanding the barriers that ACIs encounter when providing mentorship to athletic training students will be helpful to ACIs and athletic training education program faculty. Program administration, faculty, and ACIs need to determine the best methods for evidence-based practice implementation not only in the classroom, but also in the clinical setting. Research and educational strategies for implementation of EBP have been developed for athletic training education, but much of this focuses on the inclusion of EBP in portions of the didactic curriculum (Jutte & Walker, 2010; Manspeaker & Van Lunen, 2010; Martin, Myer, Kreiswirth, & Kahanov, 2009; Romanello & Martin, 2006). Medical research has shown that residents who learn about evidence-based practice in didactic coursework fail to incorporate EBP in their clinical skills without directed clinical implementation (Yew & Reid, 2008). Students must see the integration of didactic and clinical skills by their ACI modeling behavior in order to effectively change their own clinical practice (Laurent & Weidner, 2001).

Athletic training program directors have identified a gap between what is taught in the classroom and what happens in the clinical educational setting as a significant barrier to total programmatic implementation of EBP (Manspeaker & Van Lunen, In Press). Although the athletic training education program director is responsible for the

oversight and administration of the athletic training program, (CAATE, 2008) the introduction of new educational competencies will require oversight and encouragement of all faculty and clinical instructors to teach and practice in an evidence-based manner. Understanding the needs and barriers of ACIs could help to improve overall athletic training programmatic emphasis on EBP.

The purpose of this study was to investigate the barriers ACIs faced when incorporating EBP into their own clinical practice and to identify the level of educational emphasis placed on EBP within the athletic training education program. Specifically, the researchers aimed to understand the common barriers encountered by ACIs and their potential strategies for improving the educational programmatic emphasis on EBP.

## METHODS

### Participants

Sixteen participants (11 males, 5 females) (Table IV.1) identified through criterion and snowball sampling strategies were interviewed for this inquiry. Criteria for participation in the study included: served as an ACI for a professional undergraduate athletic training education program, served as an ACI for at least one full year, and self-identified as utilizing EBP within their own clinical practice and instruction of students. The ACIs' use of EBP was determined by their self-described adherence to the definition from Sackett et al (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996), who stated that EBP is the "integration of the best research evidence with clinical expertise and patient values to make clinical decisions". ACIs also needed to report their use of the five steps of EBP also described by Sackett et al (Sackett, Richardson, Rosenberg, & Haynes, 1997). Those steps are: 1) defining a clinically relevant question, 2) searching

the literature for the best evidence, 3) critically appraising the evidence, 4) applying the evidence, and 5) evaluating the performance evidence based practice. The study was approved by the Institutional Review Board for exempt research prior to the start of data collection.

**Procedures**

Qualitative inquiry was used to explore the perceived barriers to EBP implementation and the ACIs' recommendations for improving the clinical EBP experience for the student due to the ability to obtain information rich responses (Patton, 2002; Pitney & Parker, 2009). In order to identify potential ACIs, the program director of athletic training education programs known to teach evidence-based practice concepts in the curriculum were initially contacted by the researcher. These programs were contacted as a starting point of the snowball sampling process. The program directors of these programs were asked to provide names or forward a request for participation to ACIs within their academic program who met the inclusionary criteria listed above. When an ACI was identified, the researcher sent an email to the ACI asking about their specific clinical EBP process to ensure that they met the inclusionary criteria of the investigation. ACIs who identified they used the five steps of EBP and also practiced with an integration of clinical expertise, patient values, and best research evidence were then scheduled to participate in a phone interview during the spring and fall 2009 academic semesters. During the interview process, ACIs were asked to identify other ACIs they believed met the criteria for inclusion. As consistent with snowball sampling, these newly identified ACIs were contacted to determine their potential interest in participating. The snowball sampling method allowed more information rich cases to be

identified in regards to the use of EBP in the clinical setting.(Patton, 2002) Recommended individuals who practiced clinically in the same setting or who were ACIs for the same athletic training education program as other participants were not utilized for this inquiry to reduce any influence or bias.

**Data Collection**

An emergent design strategy was used during each semi-structured phone interview as it allowed the interview to transpire with each of the ACIs.(Patton, 2002) A semi-structured interview protocol was used by the researcher (DH) during each phone interview. The interview protocol containing open-ended questions was created to obtain information about the barriers ACIs encounter when incorporating EBP into their clinical practice and with their students. In addition, the interview questions were created to attain suggestions for the incorporation of EBP within the clinical and didactic curriculum of athletic training education. Additional questions about the ACIs use of EBP were included in the interview, but responses to those questions were not included in this study. The protocol was reviewed by other qualitative researchers in the field and pilot tested on other athletic training clinicians prior to data collection to ensure that questions were not biased towards a particular outcome. The semi-structured nature of the interview led to the development of an interview protocol that included a battery of questions that addressed the investigations' research questions and purpose (Table IV.2). As is consistent with an emergent design strategy, participants were encouraged to elaborate and/or clarify their responses by the researcher and the researcher was allowed to deviate from the interview protocol when deemed necessary.

The phone interviews were digitally recorded using an Olympus PN-2100VC digital voice recorder (Olympus America Inc., Center Valley, PA) that connected via a recorder telephone pickup (RadioShack Corp., Fort Worth, TX) to a Cisco 7970IP telephone (Cisco Inc., San Jose, CA). This pickup device captured both sides of the conversation through the phone receiver. Each participant was interviewed during one instance that lasted between 30 and 60 minutes. All interviews were transcribed by a professional transcriptionist to ensure accuracy. Interviews were conducted until saturation occurred, meaning that new themes or information were not emerging from the data (Guest, Bunce, & Johnson, 2006; Patton, 2002). Saturation of the data in regards to the barriers was achieved after eight interviews; due to other themes and other research questions in the interview protocol, an additional eight interviews were conducted to obtain rich information for all research questions.

**Data Analysis**

A phenomenological perspective (Patton, 2002; Pitney & Parker, 2009) with elements of modified-grounded theory (Patton, 2002) was used in this emergent design study. A phenomenological perspective allowed us to understand the real life experience and barriers faced by the ACIs while working towards incorporating EBP with their students. NVivo 8 (QSR International, Melbourne, Australia) qualitative software was used to organize and code the data once the transcriptions had been completed. Data analysis included a series of steps: 1) reading each full transcript to understand the common barriers, perceptions and ideas of the participants, 2) coding each participants' responses for common themes and patterns, 3) reading each transcript again to evaluate the themes and codes, 4) dividing responses of each main theme into sub-themes, and 5)

conducting verification of themes with select participants and other qualitative researchers in the field. No specific criteria were used to determine the themes and sub-themes; each theme emerged from the participant responses (Figure IV.1). Common themes emerged throughout the participants, thus creating a structure to the shared experiences of ACIs in regards to the barriers faced and the educational emphasis improvement strategies recommended.

Peer checking, triangulation, and member checking were conducted to ensure findings and to decrease researcher bias (Patton, 2002; Pitney & Parker, 2001, 2009). A peer with qualitative research experience analyzed the themes and sub-themes to determine if they were consistent with the material and significant to the research problem (Pitney & Parker, 2001, 2009). Triangulation occurred through researcher evaluation as the research team analyzed the emergent themes and to determine if information was interpreted appropriately. Transcript verification (Pitney & Parker, 2009), a form of member checking, was completed with all participants. Each ACI was asked to review the completed transcript of their interview for accuracy. Five of the sixteen participants were asked to complete an interpretive verification (Pitney & Parker, 2009) , which is another form of member checking. The five participants were randomly selected to evaluate the established themes and sub-themes of the research. After the themes were described to the participant via email, they were asked to confirm the themes based on their own responses and perceptions of the theme. All themes and sub-themes were verified and agreed upon by the participants.

## RESULTS

Two main themes emerged through the data analysis and coding process with respect to barriers ACIs faced in implementing EBP in their own clinical practice and with athletic training students. These themes consisted of 1) barriers to EBP incorporation and 2) the educational emphasis placed on EBP. Multiple sub-themes for each theme emerged from interviews, which helped to further explain the shared experiences of the ACIs.

### Barriers to Evidence-Based Practice Incorporation

The perceived barriers of resources, personnel, and student characteristics were all identified by the ACIs as barriers they face towards EBP incorporation within their own clinical practice and with students.

#### *Resource Restrictions*

Approved Clinical Instructors addressed the lack of necessary resources as their largest barrier to EBP incorporation. Time, financial restrictions, availability of relevant information, and lack of knowledge were discussed as resource barriers that ACIs felt prevented them from incorporating EBP in their clinical practice and with their students the way they would like. Lack of time to complete the EBP process and other job responsibilities was the most significant barrier discussed.

> *Well I think it's' just, you know, it's time consuming Obviously as a clinical athletic trainer I work with students, but my primary responsibility here is to be the staff athletic trainer for the men's lacrosse and the distance team Their health care is what I need to focus most of my daily attention on and when you are doing lit searches and you're reading articles and you are going through stuff like that, sometimes that gets put on the back burner So I think it's a time thing You have to make a commitment to consistently try to learn more and when you get home at 10 00 at night, opening up a journal is not going to be the number one thing that's on your mind (Towle)*

> *It is trying to balance my normal job functions, balancing a class load, balancing taking care of athletes, and then having the time to actually search for the articles and look for the literature out there I don't have the time I feel to dedicate towards looking at the literature (Magee)*

For some of the ACIs they agreed that time was a barrier, but they also understood the benefits that could come from the time spent in the implementation of EBP.

> *I think once you get to a point where you are comfortable with the literature in any one given area, I think that you save yourself a lot of time when you are treating patients because you have a plan and you know how to execute it But, for someone that's not there yet, I think that time becomes a barrier in trying to implement that (research findings) because it's work and it takes a lot of time to get into the research and to understand how to critically appraise it, how to review it, and how to filter out what you should do and what you shouldn't do I think that idea is kind of a double edged sword where once you get over that hill you can save yourself a lot of time and you can improve patient outcomes, but before you are there, I think that mountain looks pretty high for people that aren't used to and don't understand maybe the need to why we do evidence based practice (Bozzell)*

> *I just think time in general You get busy at times and you would really like to go and read some more about that particular thing or there has got to be something else that I can do to help this particular athlete and you just run out of time I think that you can always do a quick search just to see what's out there I'm also a big proponent of you make time for the things that are important, and if it's important and it's something that's interesting I think you are going to make time to find it (Kukler)*

In addition to time as a barrier, ACIs also reported that financial resources restrict their ability to utilize some of the best evidence. Budget restrictions and limitations in equipment provide ACIs with restrictions that are often beyond their control.

> *Some of it is definitely funding as being one (a barrier) as far as budget goes There are definitely some supplies that have been shown to have worked in evidence but you know we just don't have that supply here or we don't have the budget to get that The quickest example off the top of my head is the Game Ready, you know intermittent compression is shown to be pretty effective, we don't have one here Hopefully, eventually we will get one I think that is probably one of the biggest factors (Myrman)*

> *We don't have the resources to go ahead and get some of the stuff in that we would like to try that the evidence and the research indicate may work a little better Like, we can't for lack of a better example-we can't just go out and get certain pieces of rehab equipment because they are the latest and greatest and we want to try it and play with them We are sort of "jerry rigging" some stuff, and it's not a matter of not wanting to do it the way that the research and everything has indicated, it's just a matter of the resources aren't there (Hamby)*

Another prevalent barrier discussed by the ACIs was the ability to access relevant information. Approved Clinical Instructors were either unable to access information, or

were unable to find specific information that related to the clinical question they were trying to answer.

> *I think clinically I don't really think too many of our other off campus ACIs, especially those in the high school, know how to access the information They know there are databases and things to do that, but I would guess that if I asked any one of our other off-campus ACIs they would be hard pressed to know where to look other than going to a hard copy of the Journal of Athletic Training I don't think they would know where to look for evidence based information (Vint)*

> *I think another barrier for our profession is just resources in general and not that people are against evidence-base practice, but often times being able to access certain things is difficult (Bozzell)*

> *Another barrier in applying it (the evidence) is just that some of the evidence—I think a lot of the evidence still lags behind the practice We see a lot of patients that don't fit into what the evidence is showing, but we still have to help the patient So I think that is another barrier to say hey I want to apply this evidence but I don't have the evidence yet, it's not there yet (Kopicko)*

The final resource barrier the ACIs discussed was their own knowledge and comfort with the steps of EBP. Each ACI had a different level of previous education in EBP, but several shared what they felt their personal limitations were in terms of EBP implementation.

> *From my personal standpoint, critically appraising the evidence is difficult I am a little bit removed from some of the statistical analysis and things like that, so critically looking at both things are, I think, the hardest part (Kopicko)*

> *I'm not as comfortable with our library system of trying to find the literature and really how to expand So journals that I really do use are limited to JAT and JOSPT, and I started getting Athletic Training and Sports Health Care So my resources are limited (Magee)*

> *I think I'm kind of like I don't want to say not good at it (EBP), but I've never been formally trained to say, "here is how you incorporate this" (Gatti)*

### *Personnel Challenges*

In addition to the resource barriers discussed by the ACIs, several ACIs reported barriers that existed through the working relationships of other athletic training staff, coaches, and even team physicians. ACIs reported that these other personnel within the

sports medicine team limited their ability to effectively practice EBP with their patients and they also limited the ability of the ACI to teach students how to incorporate EBP.

> *I think the biggest barrier was at "Institution X" Working with individuals that had always done it a certain way and that it wasn't necessarily up to date or reflective of the most current research I think that was the biggest challenge (Kleeman)*

> *I think the barrier that we encounter mostly here is communication We have some ACIs both on-campus and off-campus that are stuck in their ways They are saying, "well, I was taught to put pads on, hit pre-mod, and away you go " You see that they kind of accept that this is the easiest way to do it, so they do it for everything Then you try to introduce something new and say, "well, instead of just slapping some pads on and hitting pre-mod, let's think about their goals, let's think about when they want to get back, what can we do to make it better?" (Vint)*

> *Sometimes getting a coach on board is (a barrier) because evidence says you need to sit them (an athlete) for a week or two before they can come back. A coach doesn't like the sound of that and wants to challenge you or push them to get back sooner than they should be That's got to be the worst barrier (Myrman)*

> *In our setting you still have coaches saying, "I was to do this because I've done it for thirty years, or I want to do this because so and so is doing it " It doesn't really fly especially here where we have to cater to so many student athletes, what it really boils down to is that we are going to do what you need, and we are going to have some rationale for it not just because you want it (Kopicko)*

> *The guidelines that our team physicians have laid down for standard of care and treatment protocols also sort of limit what we are able to do It (EBP) is not something at least on a clinical end that's really actively encouraged (Hamby)*

*Student Characteristics*

The ACIs in this investigation were trying to encourage students to engage in the steps of EBP, but they faced barriers in trying to do so. The experience level of the students the ACIs were mentoring was reported to be the largest barrier to EBP implementation. Several ACIs believe that student level played a significant part in the students' ability to understand and implement EBP concepts, with older students better able to utilize EBP. Some ACIs felt that the use of EBP and the steps associated with EBP should be used with junior and senior level students.

> *I think sophomore level students especially in the first term don't have the capacity to grasp the abstract concept of EBP that it takes at that point They are still going through their anatomy, their basic level science, and they pretty much want to get through that and get into the program They are just not ready to get to that level of abstract thought I think the junior level is the ideal term for us (Vint)*

*I think in talking with students who are at the undergraduate level, it is tough because they are not all that savvy when it comes to discussing the research and talking about it They are still kind of developing a lot of those skills I think it works much better when you are talking with an upper level student, a senior student, or someone in graduate school where they've been really exposed to this stuff (EBP) I think it is a lot easier to take something in an EBP format with a senior student than a sophomore because at least the senior had some clinical opportunity It may still be very limited, but at least they've had more than the other student With a sophomore they need to know what ultrasound even is They need to understand the theory of how this even works in the first place (Gatti)*

*Personally, I probably would not encourage evidence-based practice techniques until their senior year At the sophomore level, to add evidence-based would overwhelm them "Here you can just barely get through how to do a knee evaluation, now let's bombard you with evidence-based research articles on the validity of these tests " Like teaching the validity of the posterior drawer test for the PCL when the kid just figured out what a PCL was not too long ago That's why the first year and second year students, I think we should lay off a little bit on that Maybe the third year students we could start on that and push things like that (EBP) (Stanlet)*

*The freshman comes in and they are wide eyed and they're like "wow, it's a whole big world " A lot of times we don't want to overwhelm them, we just want to introduce them to things (Balanos)*

While some ACIs felt student level played a part in understanding EBP implementation, Kukler believed that implementation of EBP concepts should begin early within a students' educational career, so they can continue to build upon their EBP knowledge as they progress through the athletic training education program.

*I think that EBP, it's, I mean anybody can understand a question or define a question They can search the literature and then critically examine it, apply it, and evaluate it I think that goes across the board, and if we are teaching it to them young as sophomores or second semester freshman coming into the program then they are just going to continue to build on it So that in time I'm teaching them this is where you find articles I'm not doing that any more when they are juniors and seniors and they understand it I don't really see a difference (in student level) I know I had a sophomore and a senior this past rotation and my sophomore was better than my senior (Kukler)*

The clinical experiences the students had with other ACIs were also seen as barriers to EBP implementation by the ACIs who participated in this investigation ACIs expressed frustration in trying to encourage student EBP implementation after the student had been with other ACIs who may not have encouraged them to develop their EBP skills.

*"Institution X" students end up going to other clinical sites and spend a semester at another place in "City Y" that they become accustomed to that ACI's way of doing things, and it may or may not be evidence based That ACI may have preached evidence based research, but only used it in certain situations, so the student assumes that they've done evidence-based with everything That experience may not necessarily be in the best interest of their (student's) educational process, but because it was fun or they were able to do all these things, they (the students) viewed it as a good experience And then now they are at "Institution X" under my supervision, some of the challenges like "why are you doing that?" don't necessarily appeal to them right away Breaking down that barrier and trying to have them interested in the whole process of learning, just not applying something, but actually understanding why you are applying it becomes a barrier (Kleeman)*

*I think the greatest barrier is the idea of modeling behavior If they come from having an experience with an ACI that doesn't stress evidence based practice maybe as much as I do myself, I think that becomes a barrier I think it is something, as students, where they are kind sponges and they soak up whatever is around them, and if they are not used to that, if they haven't seen that behavior, I think that becomes a barrier (Bozzell)*

*I think the biggest barrier would be if they (the student) worked with an ACI and saw them do something one way that had a positive outcome, and I try to introduce something different I think that might be a little difficult for them to understand (Fontes)*

The final student characteristic ACIs reported as a barrier was the students' ability to think critically. Many ACIs felt the students' ability to think critically affected their ability to understand the full spectrum of EBP.

*I think it's just for them (students) to be open to the idea (of EBP) and that not everything you're taught could be correct, and that you need to question A lot of students now I guess are not used to questions You know it's like being taught with the whole No Child Left Behind all these standardized tests they are just used to being taught the material and memorizing it and not questioning it I think that is the biggest road block we run into is that students don't want to question what we teach It's a matter of trying to get these students to ask that question "why" and to critically think (McPherson)*

*You preach EBP so much that they (students) don't understand the clinical experience component to it, and they don't want to do anything unless there is evidence behind it They will encounter a patient where they'll know the evidence behind or the evidence doesn't exist behind whatever they should or shouldn't do, and then they freeze I think they lack that final step of being able to say, "Ok well, there is nothing that I've read or there is nothing directly behind what we are currently working with Can we take a step back and try and draw from something else?" I think there is a little bit of a disconnect there when we stress EPB so much that when they don't have an option, they do nothing rather than doing something (Bozzell)*

*Some students are very motivated and want to soak up everything and other ones are just stubborn Sometimes we bring students over and it is almost breaking their mold of thinking a little bit and actually opening their thinking a little bit more (Kopicko)*

## Educational Emphasis on Evidence-Based Practice

Each ACI was asked about the emphasis that was placed on teaching EBP to athletic training students in the didactic classroom as well as in the clinical setting. Of the sixteen ACIs, 63% (n=10) indicated that EBP was taught in the didactic classroom in some capacity. Four ACIs indicated that they were unsure if EBP was taught, and two ACIs indicated that EBP was not taught within the academic coursework of athletic training students. In contrast, only 19% (n=3) of ACIs have had any form of EBP within their ACI training for the athletic training education program (Table IV.1).

*Programmatic Improvement*

Since the emphasis on evidence-based practice within the athletic training education programs was moderate across the ACIs who participated in this study, the theme of improving the programmatic emphasis emerged. A connection between the clinical setting and the didactic classroom was discussed by the ACIs. While some ACIs felt as if there was a strong relationship between the two educational settings, other ACIs hoped to improve the clinical component in hopes of creating a more unified educational experience for the student. Hamby suggested that ACIs should be more involved in the didactic educational process.

> *I think if the ACIs in the clinical end, if we had more opportunity to help in the teaching end of things, I think the crossover between the educational and clinical end would be a little bit easier The students are getting a lot of information and the carryover of that information is not good a lot of the times I think if the ACIs had more of an opportunity to be teaching those courses (modalities or therapeutic exercise) or at least involved in the lab end of those courses in the educational setting, I think that would make things a little bit better But, I don't think that is going to happen, because they have actually moved away from involving ACIs in the educational end of things because there is a dedicated staff just for the educational end (Hamby)*

Several ACIs commented that they knew EBP was being taught didactically, but they were not aware of an emphasis to include the same information in the clinical education of students. Many ACIs integrated EBP with their students because they felt it

was important for students to practice in an evidence-based manner. ACIs felt that there needed to be a better connection between the faculty and clinical instructors.

> *I think that there has got to be a connection between the faculty and the staff that everybody's on the same page "This is what we're doing, and that's what I've done" kind of thing There hasn't been a formal meeting that says we're teaching evidence-based practice and we expect you guys to teach, or incorporate that into your particular practice Not everybody's going to do that I do and I think that the majority of our staff is on board (Kukler)*

> *We're definitely looking at evidence-based principles, but it definitely is more on the academic side and I'd say it is in its infancy on the clinical side It's definitely something that we could do to get better (Stanlet)*

> *I don't really see a programmatic approach (to teach EBP), but at the same time, from the team MDs perspective, the athletic trainers perspective, there is always a lot of pressure on the ACIs to use evidence-based practice As far as integrating that with students, that is kind of at the ACIs discretion more or less I obviously incorporate more because my students seem to be a little more interested in it, but that's it in terms of emphasis (Myrman)*

### *Communication Improvement*

Several ACIs discussed that improving the use of EBP among the clinical staff could be driven by specific communication and emphasis across the clinical and educational staff. ACIs shared ways in which various communication means were or could be used to disseminate EBP information. In addition, the inclusion of EBP within the ACI workshop was mentioned as a potential method to improve that connection.

> *I think using the web and the Blackboard site is the best way of doing it (communicating) They (ATEP) try to be of service to the ACIs as well as the students They try to provide continuing education opportunities and they provide information that goes out to the ACIs and in the context that they filter out "hey, here is what we are doing with our students" (Kopicko)*

> *We're trying to, and this is more of a long range project, of getting some modules on line for ACIs Hopefully, those modules have more of an evidence-based section and we can incorporate what the students were going over, and just to try and keep us all up to date because with everything that is coming out it is so hard to stay on top of every new bit of evidence that is coming out That would hopefully create more of a forum for all of the not only our off-campus ACIs but that would allow our on-campus ACIs to pretty much facilitate on line discussions based on particular articles and particular topics (McPherson)*

> *Do I think that it (EBP) can be emphasized? Maybe, maybe that would be something that we emphasize at the beginning of the year at our ACI workshops (Kukler)*

The themes and sub-themes that emerged showed not only the barriers ACIs faced, but also a desire to improve the programmatic emphasis on evidence-based practice from both the clinical and didactic realm.

## DISCUSSION

Understanding the barriers that ACIs face while implementing EBP within their clinical practice, and ultimately with students, can help athletic training educational programs better prepare ACIs to incorporate EBP in the future. ACIs believe EBP is important and want to better the educational experience for the student, but clinical and educational barriers hinder their ability to be continually successful. Strategies that could be useful to address the ACIs' perceived barriers are provided within the following discussion.

### Barriers to Evidence-Based Practice Incorporation

*Resource Restrictions*

The barriers to EBP implementation for clinicians have been well documented by several health care professions (Bilsker & Goldner, 2004; Brown et al., 2009; Granger, 2008; Haynes & Haines, 1998; Jette et al., 2003; Melnyk BM et al., 2004; Nolan et al., 1998). As athletic training continues to focus on the need for more evidence-based practice, the barriers for athletic training clinicians will increase. ACIs indicated time as their most prevalent barrier when trying to incorporate EBP within their practice. This finding is in agreement with nursing, physical therapy, and physicians as one of the most prevalent perceived barriers (Brown et al., 2009; Jette et al., 2003; Koehn & Lehman, 2008; O'Donnell, 2004). Approved clinical instructors often have many roles to fulfill in addition to being an ACI; this role strain (Manspeaker & Van Lunen, In Press) in addition

demonstrates that the emphasis on EBP may often be too overwhelming for an ACI. Program faculty should closely evaluate the ACIs ability to function in their various required capacities before asking an ACI to take on the role of EBP implementation especially if the ACI has limited knowledge of the EBP process. The current knowledge level of an ACI should be established early, so that programs can identify the needs to supplement their current knowledge level. By understanding the knowledge level, programs will then also be able to identify the next steps for advancing knowledge after the ACI becomes familiar with the foundational concepts.

Students spend more time in a clinical setting with small student-to-faculty ratios than in the didactic setting, yet many clinical instructors have little exposure to evidence-based teaching strategies and learning theories (Berry, 2010; Krautscheid, Kaakinen, & Warner, 2008; Weidner, 2010) Shlonsky & Stern (2007) suggest a good instructor should be adept at applying systematic search techniques and rigorous evaluation procedures to all forms of questions. Due to this suggestion, teaching EBP in the clinical setting may need to focus more on the clinical instructor as a student in the early stages of EBP implementation. It is unrealistic to expect all clinical instructors who are reinforcing EBP principles to be at a level at which they feel comfortable with all EBP techniques unless they have had formal training in such concepts. However, there is still a significant gap in the knowledge of faculty and instructors who teach EBP concepts because they lack the knowledge, skill, and practice in the process themselves (Fritsche, Greenhalgh, Falck-Ytter, Neumayer, & Kunz, 2002; Nicholson, Warde, & Boker, 2007).

Our findings demonstrate that 63% of the athletic training education programs taught evidence-based concepts within the didactic curriculum while only 19% of ACIs

had ever had any educational information on EBP as part of an ACI workshop or training. A lack of perceived knowledge in EBP concepts has been shown to be a large stumbling block for clinicians and educators when it comes to EBP implementation (Brown et al., 2009; Jette et al., 2003; Koehn & Lehman, 2008; Manspeaker & Van Lunen, In Press). There has been a didactic to clinical education EBP gap that has been identified in athletic training (Manspeaker & Van Lunen, In Press), nursing (Ciliska, 2006; Del Mar, Glaszziou, & Mayer, 2004), and social work (Shlonsky & Stern, 2007). Athletic training education programs have the opportunity to address this gap and an ACIs lack of knowledge and comfort level by introducing and teaching EBP concepts as part of the ACI workshop. While a one-time workshop will not remedy either of these problems, it could aid in the ACIs comfort level with EBP concepts (Yousefi-Nooraie, Rashidian, Keating, & Schonstein, 2007). Program directors and faculty within the education program often have a greater understanding and access to the literature and current research available thus making them a great resource for ACIs. Better dissemination of current practice information to ACIs could benefit the overall programmatic EBP implementation plan.

Athletic training programs should also look to provide access to literature sources through use of their institutions' library system. Farmer and Richardson (Farmer & Richardson, 1997) stated "Perhaps the single most important thing policy makers could do to encourage evidence based practice among health professionals would be to provide good access to information professionals and information resources" (Farmer & Richardson, 1997)[p98]. ACIs identified a lack of applicable and readily available resources as barriers which has been shown in previous studies as well.(Jette et al., 2003;

O'Donnell, 2004) Access to evidence-based literature is a foundational prerequisite for the application of EBP (Fell & Burnham, 2004). Providing ACIs with access to literature outside of the *Journal of Athletic Training* or an online database like PubMed will allow them to expand their search strategies and gather a wider variety of evidence which eventually leads to more optimal clinical outcomes. Access to online databases such as CINAHL, MEDLINE, or the Cochrane Database of Systematic Reviews would allow ACIs the ability to efficiently search for relevant research to support their clinical practice.

*Personnel Challenges*

In many cases, current practice is based on experience, tradition, and institution rather than scientific validation (Koehn & Lehman, 2008). Resistance to incorporating new ways of practice even though new knowledge exists was a barrier expressed by many of the ACIs. While the ACIs themselves wanted to use more evidence to make decisions on patient care, often other clinicians within their facility did not share the same interest or value in EBP. In order for EBP to be truly successful, a culture must exist that supports the integration of best research evidence, clinical expertise, and patient values (Sauers, 2009). In the athletic training education setting clinicians, educators, and patients all need to buy into the culture and support the need for an evidence-based approach. In order for this culture to exist and thrive, further knowledge and a better understanding of EBP is needed by all parties (Sauers, 2009).

In the athletic setting, ACIs stated that coaches and team physicians were often resistant to change and new treatment protocols. In this setting, both the coach and physician must become part of the culture that understands and embraces the use of

evidence. It provides the clinician an opportunity to show that the methods being used are supported by the best evidence. In order to do that, the profession needs to continue to use and produce high levels of research evidence that can be used to support patient care (Hertel, 2005; Sauers, 2009; Winterstein & McGuine, 2006). Evidence should be accessible and put together in a manner that allows the ACIs the ability to easily implement and disseminate the information to the appropriate parties. This needs to occur through an interdisciplinary approach that emphasizes EBP (Institute of Medicine, 2003). Before athletic training can move further down the road of a truly evidence-based profession a paradigm shift is needed within the culture of athletic training. Working towards building this culture will help to address the administrative resistance some clinicians have reported as a barrier to EBP implementation (Jette et al., 2003; Koehn & Lehman, 2008; Levin & Feldman, 2006).

*Student Characteristics*

The final barrier ACIs discussed was that of the students in which they mentored. ACIs not only are trying to implement EBP into their own practice, but also trying to model and encourage students to act as an evidence-based practitioner (Sauers, 2009). All of the ACIs interviewed for this study were part of an undergraduate professional athletic training education program. ACIs were divided in what level of student they believed would be best suited to learn and fully understand aspects of EBP. The nursing (Burns & Foley, 2005; Ciliska, 2005; Levin & Feldman, 2006), medicine (Del Mar et al., 2004; Yousefi-Nooraie et al., 2007), and social work (Shlonsky & Stern, 2007) fields all discuss the need for implementation of EBP early in the curriculum and then thread it through the remainder of the didactic and clinical program. While little research exists as

to what strategy is best, there is support for an entire curricular approach as opposed to one EBP focused course (Del Mar et al., 2004; Yousefi-Nooraie et al., 2007). This supports those ACIs who felt students should be taught EBP concepts at an earlier stage in their academic career.

In addition to student level, ACIs expressed challenges in getting students to see the differences in clinical instructors and the students' ability to think critically. Educators must be able to challenge learners to incorporate valid scientific evidence; their own expertise; and their patients' choices, concerns, and values when making clinical decisions (Fineout-Overholt & Johnston, 2005). Instead of just teaching the mechanics of EBP we must teach students how to think critically and conceptually about the information to which they are exposed and how to integrate this thinking into practice and policy decisions (Shlonsky & Stern, 2007). This becomes difficult when students also have experience with ACIs who don't fully embrace EBP. This again highlights the need for a full curricular approach to EBP for didactic and clinical education that is driven by the program director.

**Educational Emphasis on Evidence-Based Practice**

*Programmatic Improvement*

As part of the accreditation standards for athletic training education, ACI workshops are only required to include information on learning styles, instructional skills, educational competencies, evaluation and feedback, program policies, clinical education policies, communication styles, and legal and ethical behaviors (CAATE, 2008). This emphasis on programmatic information does not include instruction in clinical teaching or the use of EBP with students. Since the clinical education component

of athletic training education is critical to student development, there needs to be an increased emphasis on EBP for students and ACIs (Ciliska, 2006; Weidner & Henning, 2002). Jutte & Walker (2009) provide teaching strategies for ACIs to use when introducing EBP to students in their clinical experience as well as methods to assess student EBP skills in their book chapter entitled "Incorporating and Teaching Evidence-Base Practice". Concepts discussed in this chapter provide ACIs with applicable techniques that would be helpful when teaching students. However, there is no research evidence available that discusses how best to educate ACIs on implementing EBP as part of an athletic training students' clinical experience. Determining the best strategies for ACI education and implementation could be beneficial in progressing clinical teaching of EBP concepts.

In addition to better educating the ACI on teaching strategies for EBP implementation, ACIs expressed interest in having more of a role in didactic teaching. They believed that this would help bridge the gap that they perceived from didactic to clinical setting. This perceived gap by ACIs was also expressed by athletic training education program directors (Manspeaker & Van Lunen, In Press). While both sides of this issue have identified that there is an inherent problem between didactic and clinical education, there is little research to support the best way address the issue. We believe that suggestions provided to increase EBP knowledge, awareness, and accessibility of the ACIs is the athletic training programs' first step in improving this perceived divide. Showing value for EBP and the development of ACIs knowledge could help foster a culture that promotes collaboration and communication. This will also help to address the disparity among clinical instructors who may not use EBP as much with students.

*Communication Improvement*

The indication of ACIs was that they felt communication between the academic program and clinical staff could be an avenue to increase the continuity of EBP concepts between the clinical and didactic settings. The use of online course management systems, discussion boards, and face-to-face sessions have all been used to facilitate instruction and information sharing for ACIs (Vanguri & Konin, 2008). Athletic training programs should be direct and purposeful when communicating with clinical instructors. An overall programmatic plan that included regular communication through monthly meetings, an increased accessibility to resources, a focus on furthering the education of ACIs through educational sessions, and the integration of ACIs into students EBP assignments would go a long way in addressing some of the major barriers expressed by these individuals. Without regular communication between academic faculty and clinical instructors students will be left to negotiate the differences between the two settings (Sabus, 2008).

**Limitations**

The number of ACIs who participated in this study was limited due to the ability to identify potential participants through the athletic training education program director. The participants were selected from a specific, non-randomized sample of the population and therefore resulted in a small sample. Through data saturation that occurred we feel that the sample size, although small, was adequate to support the findings. The self-report nature of the ACIs knowledge of EBP use and implementation within the athletic training educational curriculum could have skewed the results as not all ACIs had the same level of knowledge of the curriculum of the athletic training education program.

Some of the ACIs served in dual academic and clinical roles within the athletic training program, so that may have resulted in different barriers and methods for improvement than other ACIs. Future research would be needed to determine if dual responsibility or curriculum knowledge adversely affected the findings of this study.

## CONCLUSIONS AND IMPLICATIONS

Approved clinical instructors want to utilize evidence based concepts with their students and in their own clinical practice, but they encounter stumbling blocks that limit their ability to be successful. As a part of the instructional staff of an athletic training education program, further resources, opportunities, and integration should be provided to help create an educational program that is focused on valuing the best evidence, patient values, and clinical expertise. In working towards integrating the clinical aspect into the EBP educational plan, students will benefit from seeing EBP in use throughout their educational experience.

Researchers should look to investigate how to best integrate didactic and clinical instruction to improve student knowledge and behaviors towards evidence-based practice. In addition, the use of the ACI workshop as a medium for increasing ACI knowledge and comfort in EBP concepts should also be addressed. Finally, it would be beneficial to develop an inquiry that assesses the current knowledge level of EBP athletic training educators in order to establish better educational mediums for promoting evidence-based practice throughout the profession.

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**Table IV.1. Demographic Information by Participant**

| Participant Pseudonym | Sex | Years of Experience as an Athletic Trainer | Years of Experience as an Approved Clinical Instructor | Clinical Setting | EBP Included in ACI Training | EBP Concepts Taught in ATEP Didactic Coursework |
|---|---|---|---|---|---|---|
| Balanos | Male | 16 | 4 | Clinic | No | Unsure |
| Bozzell | Male | 5 | 3 | Collegiate | Yes | Yes |
| Fontes | Female | 19 | 17 | Collegiate | No | Yes |
| Gathers | Male | 5 | 4 | Collegiate | No | No |
| Gatti | Male | 8 | 6 | Collegiate | No | No |
| Hamby | Female | 16 | 10 | Collegiate | No | Unsure |
| Holzman | Male | 8 | 3 | High School | No | Unsure |
| Kleeman | Male | 9 | 8 | Collegiate | No | Unsure |
| Kopicko | Male | 12 | 10 | Collegiate | Yes | Yes |
| Kukler | Male | 7 | 3 | Collegiate | No | Yes |
| Magee | Female | 8 | 6 | Collegiate | No | Yes |
| McPherson | Female | 14 | 10 | Collegiate | Yes | Yes |
| Myrman | Male | 3 | 2 | Collegiate | No | Yes |
| Stanlet | Male | 14 | 9 | Collegiate | No | Yes |
| Towle | Female | 10 | 9 | Collegiate | No | Yes |
| Vint | Male | 6 | 5 | Collegiate | No | Yes |

**Table IV.2. Semi-structured Interview Protocol**

1. Please explain your EBP process. What elements and degree do you use the five-steps of EBP?
   Probe: What specific EBP skills do you personally utilize?

2. Can you discuss why you chose to implement EBP into your clinical practice and when you started doing so?

3. Please discuss the importance of ATs using EBP concepts in their clinical practice.
   Probe: Why do you believe EBP is important or not important?

4. What barriers do you encounter when trying to utilize EBP concepts in your clinical practice?

5. Discuss the emphasis, if any, that is placed on utilizing EBP concepts in your work environment.

6. How long have you been incorporating EBP when working as an ACI with your students?

7. How do you incorporate EBP in teaching your ATS clinically?

8. Does the academic program you serve as an ACI for teach EBP in the classroom?

   Can you discuss how you were made aware of the EBP skills students are learning?

   Do you feel like these communications are enough?
   Probe: What would be more helpful?

   Is there a programmatic effort to tie the EBP skills learned in the classroom into the students' clinical practice? What does it entail?

   If EBP is not taught in the classroom, why have you decided to incorporate EBP when teaching students clinically?

9. When was your last ACI training and was EBP part of the curriculum?

10. What EBP skills do you find yourself helping students with the most?

11. What do you feel is the best way to get students to utilize EBP clinically?

12. Please discuss which part or parts of the EBP process are most difficult for students to apply clinically.

13. Please discuss any barriers you encounter when teaching EBP to your students.

14. Does the level of athletic training student you are working with affect the EBP skills you use with that student?

    Probe: What skills do you find appropriate with lower level students?

    Probe: What skills do you find appropriate with higher level students?

15. As a clinician, how do you feel EBP could be expanded to other athletic trainers not currently using it?

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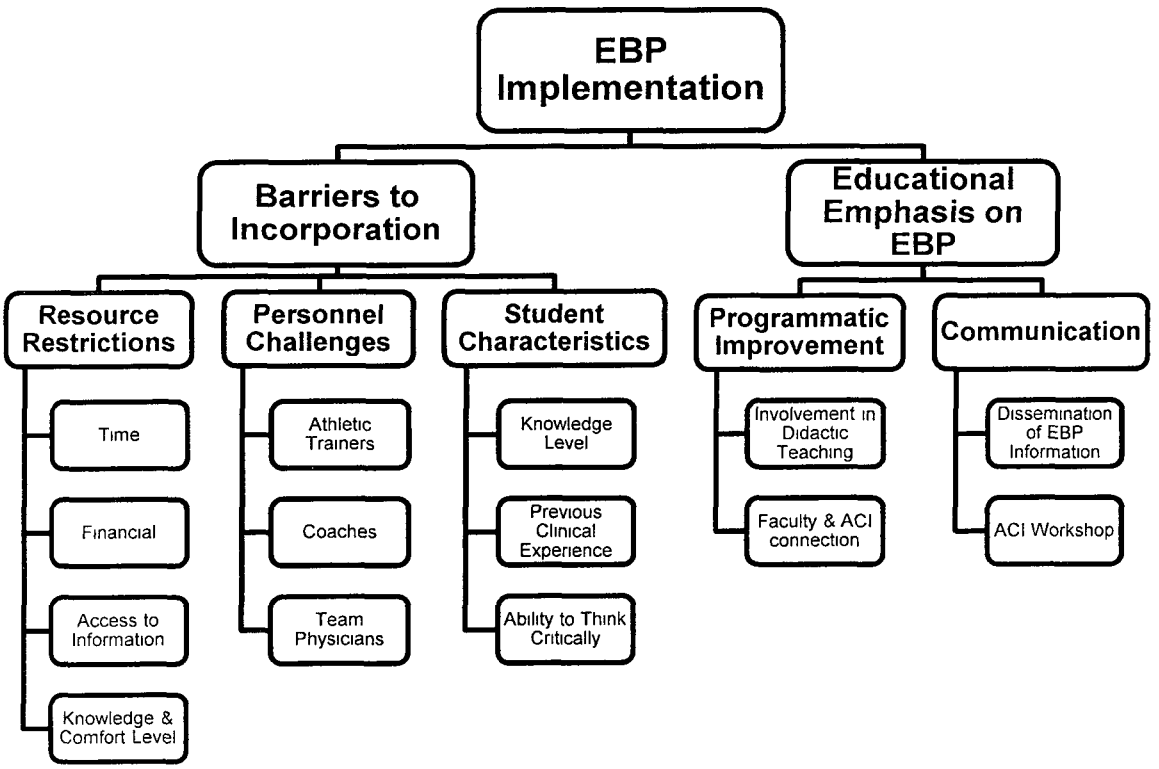
**Figure IV.1.** Conceptual Framework of Themes and Sub-Themes



# Chapter V

# Project II

# The Development and Reliability of the Evidence-Based Concepts Assessment: An Instrument to Assess Athletic Trainers' Perceived Importance, Knowledge, Attitudes & Beliefs, Barriers, and Accessibility to Evidence-Based Practice

Title: The Development and Reliability of the Evidence-Based Concepts Assessment: An Instrument to Assess Athletic Trainers' Perceived Importance, Knowledge, Attitudes & Beliefs, Barriers, and Accessibility to Evidence-Based Practice

Authors: Dorice Hankemeier, Cailee Welch, Jessica Walter, Sarah Manspeaker, Bonnie Van Lunen

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## INTRODUCTION

Incorporation of evidence-based practice (EBP) concepts will be required when the fifth edition of the National Athletic Trainers' Association (NATA) Educational Competencies are released. The Institute of Medicine (2003) report on *Health Professions Education: a Bridge to Quality* identified EBP as one of the five core competencies that all healthcare professionals must develop and maintain proficiency (Institute of Medicine, 2003; Sauers, 2005). However, athletic trainers have reported they do not believe they have the required knowledge or comfort level to implement EBP in clinical practice (Hankemeier & Van Lunen, In Review; Manspeaker & Van Lunen, In Press).

Research in nursing (Brown, Wickline, Ecoff, & Glaser, 2009; Hart et al., 2008; Kim, Brown, Fields, & Stichler, 2009; Melnyk, Fineout-Overholt, Feinstein, Sadler, & Green-Hernandez, 2008; O'Donnell, 2004), physical therapy (Jette et al., 2003), and medicine (Johnston, Leung, Fielding, Tin, & Ho, 2003) has evaluated the knowledge, attitude, barriers, and skills use of evidence-base practice through quantitative survey instruments. The knowledge assessment in these surveys has typically come from a self-reported understanding of EBP concepts (Brown et al., 2009; Jette et al., 2003; Johnston et al., 2003; Melnyk BM et al., 2004; O'Donnell, 2004), or through a pre-post assessment following an EBP intervention (Hart et al., 2008; Kim et al., 2009). The only research to date on athletic trainers' perceived knowledge has come from qualitative interviews (Hankemeier & Van Lunen, In Review; Manspeaker & Van Lunen, In Press). Lack of knowledge has been described as a barrier across many of the health care professions (Brown et al., 2009; Jette et al., 2003; Manspeaker & Van Lunen, In Press). As athletic

training moves towards incorporating EBP educational competencies, a more quantitative assessment of athletic trainers' knowledge will be necessary. In addition to lack of knowledge, barriers such as lack of time, institutional support, and lack of available resources have been identified in other healthcare professions (Brown et al., 2009; Jette et al., 2003; Johnston et al., 2003; O'Donnell, 2004).

The emphasis for the athletic training profession to implement and include EBP in athletic training education has come from the need to move towards third party reimbursement (Hertel, 2005), improve patient care (Sauers, 2009; Steves & Hootman, 2004), and to validate the profession (Hertel, 2005; Steves & Hootman, 2004; Winterstein & McGuine, 2006). In order for changes to occur a culture of EBP needs to emerge, and thus the attitude of the profession must be one that embraces EBP (Sauers, 2009). The purpose of this study was to develop a survey instrument that would assess an athletic trainers' perceived importance, attitudes & beliefs, knowledge, accessibility to EBP resources, and their perceived barriers to EBP implementation.

## METHODS

### Questionnaire Development

In the fall of 2009, we conducted a literature review to locate instruments that assess EBP components and to assess the current state of EBP within the athletic training profession. The literature review helped to guide the conceptual formulation of the survey instrument. We were unable to find any surveys assessing EBP in athletic trainers, but did find several surveys across other healthcare professions. For this instrument, we patterned our assessment tool after a similar survey used to assess the

beliefs, attitudes, knowledge, and behaviors of physical therapists (Jette et al., 2003) and a study investigating the attitudes towards using EBP in surgeons (Kitto et al., 2007).

From the instruments evaluated, the *Evidence Based Concepts Assessment* (EBCA) was originally designed to include 42 Likert response items, six multiple choice questions, and two multipart questions for a total of 50 items. These questions addressed: (1) Perceived Importance of EBP concepts (6 Likert scale items), (2) Attitudes & Beliefs towards EBP (14 Likert scale items), (3) Accessibility to EBP resources (2 multipart questions), (4) Knowledge of EBP (6 multiple-choice questions), (5) Confidence in Knowledge (6 Likert scale items), and (6) Barriers to EBP implementation (16 Likert scale items). Content of the EBCA instrument can be found in Table V.1.

Once the EBCA was developed, the instrument was sent to a panel of five experts to evaluate the instrument for content validity, comprehensibility, comprehensiveness, and completion time. The panel was comprised of a physical therapist with EBP and survey construction knowledge, two athletic training clinicians, and two athletic training educators with survey experience. Panelists were asked to rate each item of the EBCA on a scale of 1-3. A rating of a "3" indicated that the item was acceptable and should remain in the survey as written, a rating of "2" meant that the item would be acceptable once revised, and a rating of "1" meant that the item was poor and should be removed. Items that were rated "1" by more than one panelist were removed from the survey instrument, while items rated as a "2" were revised and amended as necessary. The panel of experts recommended rewording and adding a couple of items throughout this process. The final version of the EBCA consisted of 51 items (Appendix 1).

**Participants**

Participants (n=1,249) were selected through census sampling of undergraduate professional athletic training education program directors, undergraduate professional athletic training education faculty and clinical instructors, athletic training clinicians, post-professional athletic training educators, and post-professional athletic training students. Response rates and participant information for all of the aforementioned groups can be found in Table V.2. This study received University IRB approval for exempt research and the participants' completion of the online survey served as their consent to participate.

**Procedures**

Reliability of the EBCA was assessed on a large sample of athletic trainers in various clinical and educational roles in order to obtain a representative sample of all athletic trainers. Due to the multiple groups being targeted, the procedures for recruiting participants were slightly different for each group.

*Undergraduate Athletic Training Education Program Directors*

A list of Commission on Accreditation of Athletic Training Education (CAATE) accredited athletic training education program directors was obtained through the CAATE webpage (http://www.caate.net). Each program director (n=348) of the professional undergraduate programs was contacted via telephone asking for their consent to participate in this research investigation. In addition, they were also asked to disseminate the survey to the remainder of the associated educational faculty and clinical instructors at their institution. If the program director was not reached within four phone calls made over the course of a one week period of time, an email was sent to the

program director requesting participation in the study. At the time of consent, the athletic training education program (ATEP) program director was asked to provide the number of additional faculty, approved clinical instructors (ACIs), and clinical instructors utilized in the instruction of athletic training students that they would be forwarding the survey information to. A total of 213 program directors were reached via telephone or email and 209 agreed to participate. Collectively, the program directors indicated they would send the EBCA to 2,346 faculty and clinical instructors.

*Athletic Training Clinicians*

A list of the names and email addresses for all participants was obtained from the National Office for the NATA via the *NATA Survey List Request Form*. Information for certified athletic trainers from the ten NATA districts in all work settings, except college/university, secondary school, or business/sales/marketing, were requested for this investigation. Athletic trainers in the college/university and secondary school settings were excluded to reduce the potential for crossover with individuals who had affiliations with athletic training education programs. The NATA office database produced 3,937 members that met the requested criteria and the research team purchased the email addresses of these members. Email addresses were used to request participation in filling out the EBCA. A total of 3,877 emails were successfully sent; 60 email addresses were returned as a delivery failure due to an unknown or expired address.

*Post-Professional Educators*

Post-professional educators' names were obtained from the NATA Post-Professional Athletic Training Education Program Evaluation Annual Report for the 2008-2009 academic year. Email addresses were used to request participation in filling

out the EBCA. Educators from 15 post-professional education programs (n=47) received an email to participate.

*Post-Professional Education Athletic Training Students*

The names of students enrolled in a post-professional athletic training program were also obtained from the program director or institution's website. Email addresses for students in 15 post-professional athletic training programs were found on the associated institution's website or a survey link and request for participation was forwarded to the student by their graduate program director. A total of 223 students were initially sent an email asking for participation in filling out the EBCA.

*Data Collection*

Data collection occurred during the spring of 2010. Once the email addresses were received for the individuals listed above, an email was sent containing the following items: the purpose and importance of the research study, a request for their participation, the estimated time to complete the survey, the URL hyperlink directing them to the survey webpage, date the survey should be completed, and the contact information for the researcher. Participants were given four weeks from the date of recruitment to complete the survey. Follow-up emails were sent to the participants biweekly during this time. The reminder emails included the same information as the initial email, as well as an additional statement to thank those participants who had already completed the survey. If a participant chose to contact the primary researcher to confirm he/she had completed the survey, that individual's email address was removed from the list and they no longer received reminder emails.

In addition to the above data collection procedures, a small group of athletic trainers (n=32) were asked to complete the questionnaire twice with three weeks in between each administration. Each individual took the EBCA and was then asked to refrain from looking up any additional information before taking the survey again. Three weeks following the initial submission of the EBCA, the participant was asked to take the survey again. The participant was given a unique access code to enter upon starting the survey. This allowed the responses from both administrations of the EBCA to be compared. This comparison allowed us to determine the test- re-test reliability for the six knowledge questions. Twenty-seven participants (84%) completed the EBCA on both occasions, with a mean of 22 days in between each EBCA submission.

**Data Analysis**

Once the participant completed the survey (indicated by clicking "submit" on the final screen), the information was automatically sent to the University database system. Participant responses were generated in PASW Statistics (version 18.0, SPSS Inc. Chicago, IL). Each subsections' categorical response items were included in a principal component factor analysis with varimax rotation. Principal component was used as an analysis to identify the sets of variables that correlated with each other (Portney & Watkins, 2009). Eigenvalues of $\geq 1$ and factor loading scores $\geq 0.4$ were used to select that factors that explained the most total variance (Cork, Detmer, & Friedman, 1998; Johnston et al., 2003; Portney & Watkins, 2009; Taylor et al., 2001). Factor loading scores greater than .4 demonstrate a strong relationship within the factor. Kaiser-Meyer-Olkin (KMO) was used to determine if the sample was adequacy of the sample for a factor analysis. Negative statements in the attitudes and beliefs section were recoded for

the component analysis (Johnston et al., 2003). Following determination of the factor structure, Cronbach's alpha was used to determine the internal consistency of each component that was derived (Johnston et al., 2003). Percent agreement was used to determine the pre- post-test reliability for the knowledge questions.

**RESULTS**

A total of 1,249 of 6,702 EBCA surveys were returned (18.64%) among all groups. Participants ranged in age from 22 to 73 years (34.60±8.61). More males completed the survey (n=658, 52.7%) than females (n=591, 47.3%). Means, standard deviations, factor loadings for each item and Cronbach's alpha for each section and component are detailed in Table V.3.

*Importance of EBP Concepts*

The KMO measure of sampling adequacy was acceptable at a level of .717. The scree plot supported the single factor solution explaining 28.1% of the variance. One component was derived from the *Importance* section: 1 – Steps of EBP (5 components; Cronbach's alpha = .686).

*Attitudes & Beliefs of EBP*

The KMO measure of sampling adequacy was acceptable at a level of .867 for all the scale items in the *Attitudes & Beliefs* section. All scale items in this section had a high level of internal consistency with a Cronbach's alpha of .761. The scree plot supported a 4-factor solution explaining 54.5% of the variance. Four components were derived from this section: 1 – Negative Perceptions (6 components; Cronbach's alpha = .736); 2 – Benefits to Practice (5 components; Cronbach's alpha =.732); 3 – Personal Interest (2

components; Cronbach's alpha = .608); 4 – Lack of Strong Evidence (2 components; Cronbach's alpha = .497).

*Accessibility of EBP Resources*

Data analysis procedures for accessibility focused on single question items addressing the single concept of frequency of use for various resources, thus internal consistency measures were deemed unnecessary for this section.

*Knowledge of EBP Concepts*

Reliability for each of the six knowledge questions was established through test-re-test reliability. Percent agreement for the knowledge questions ranged from .63 to .96. This shows that the questions were fair to extremely reliable in that an individual would answer similarly in two different administrations of the survey (Portney & Watkins, 2009). Percent agreement results by question can be found in Table V.4.

*Confidence in Knowledge*

The *Confidence in Knowledge* had a moderate level of internal consistency (Cronbach's alpha = .760). Principal component analysis was not conducted for this section due to the scale responses being a direct result of the participants' confidence in their answer from the previous knowledge section. The confidence scale was independent of any other factors, and thus further analysis was deemed unnecessary.

*Barriers to EBP Implementation*

A principal component analysis of the 16-item *Barriers to EBP Implementation* section of the EBCA was conducted. The KMO measure of sampling adequacy was acceptable at a level of .900 for all the scale items in the *Barriers* section. All scale items in this section had a high level of internal consistency with a Cronbach's alpha of .870.

The scree plot supported a 3-factor solution explaining 49.6% of the variance. Three components were derived from the *Barriers* section: 1 – Personal Skills & Attributes (8 items; Cronbach's alpha = .831); 2 – Support & Accessibility of Resources (6 items; Cronbach's alpha = .712); 3 – Understanding (5 items; Cronbach's alpha =.667). Since the third component only had two items that had not already been loaded into one of the first two components, this subset of the barriers section was not included.

**DISCUSSION**

This paper focused on the development and reliability of the *Evidence-Based Concepts Assessment*; a self-administered questionnaire that assessed an athletic trainers' perceived importance, attitudes & beliefs, knowledge, accessibility, and barriers of EBP. To our knowledge this is first questionnaire to assess these characteristics in the athletic training profession. Our findings indicated that the questionnaire has satisfactory reliability of all sections and subsections. The development of the questionnaire was driven by the need to establish an instrument for the profession of athletic training. The reliability of the *Importance of EBP Concepts*, *Attitudes & Beliefs towards EBP*, and *Barriers to EBP Implementation* sections demonstrated similar Cronbach's alpha coefficients as EBP questionnaires in nursing (Funk, Champagne, Weise, & Tornquist, 1991; Hart et al., 2008) and medicine (Johnston et al., 2003; Kim et al., 2009).

The results of the component analysis demonstrated that the *Importance* scale was more reliable with only the five statements related to the steps of EBP as defined by Sackett et al (Sackett, Richardson, Rosenberg, & Haynes, 1997). The statement that was removed did not specifically address one of these steps, but instead addressed the participants' personal experience with EBP. The *Attitudes & Beliefs towards EBP*

section produced four subsections in which to assess the perceptions of athletic trainers. The factors in the first component were similar to the attitudes identified by Johnston et al, (2003). Statements in this factor focused on the negative perceptions people have such as EBP being a "fad" or a "cook book" approach to clinical practice. Although the survey statements were different in each instrument, the factor had similar levels of internal consistency as demonstrated by the Cronbach's alpha (Johnston et al., 2003). The second and third components derived from the *Attitudes* section addressed the benefits EBP provides to a clinicians personal practice and the clinicians' personal interest in improving their EBP skills. These statements have been supported through surveys in physical therapy (Jette et al., 2003) that show that clinicians value the benefit of EBP and they want to improve, but often barriers get in the way of being able to fully implement EBP.

Each of the knowledge questions also addressed one of the specific steps of the EBP process. These questions demonstrated fair to excellent test- re-test reliability. Previous assessment of knowledge through surveys have used Likert scale statements (Brown et al., 2009; Johnston et al., 2003; Melnyk BM et al., 2004), or perceived understanding by ranking EBP terms (Jette et al., 2003). We believed that these self-perceived measurements of knowledge were aimed to get a more true measure of athletic trainers' knowledge. The *Berlin Questionnaire* (Fritsche, Greenhalgh, Falck-Ytter, Neumayer, & Kunz, 2002) uses a set of 15 multiple-choice questions built around clinical scenarios for medical students and residents. The fact that the questions were suited towards medical scenarios made it difficult to use for the profession of athletic training. In addition, EBP is relatively new to athletic training and the more in depth nature of the

*Berlin Questionnaire* may have been too advanced for the current state of knowledge in athletic training. Information from these previous studies was taken into account, and questions on the steps of EBP were written for EBCA inclusion. The associated confidence scale items allowed the participant to indicate how confident they were in their answer to each of the multiple-choice questions. Assessing the confidence allowed calibration of the scale with the knowledge questions.

The components derived from the *Barriers to EBP Implementation* section identified two categories addressed frequently by clinicians. The first component of *Personal Skills & Attribute Barriers* included similar statements as those expressed by athletic training educators (Manspeaker & Van Lunen, In Press) and approved clinical instructors (Hankemeier & Van Lunen, In Review). Athletic trainers have stated that their own lack of knowledge and comfort with EBP limits their ability to use EBP processes in their clinical practice setting. The second component, *Support & Accessibility of Resources Barriers* addressed support from colleagues and the ability to access literature and specific resources that could help with patient care. Approved clinical instructors indicated that access to appropriate literature and administrative support were both significant barriers they faced in their daily practice (Hankemeier & Van Lunen, In Review). The scale item related to "time" as a barrier did not contribute to one of the two factors established through the principal component analysis. Time has been shown to be one of the largest barriers to EBP implementation across all healthcare professions (Brown et al., 2009; Jette et al., 2003; O'Donnell, 2004). Even though time did not fit into one of the two components, it is a barrier that can stand alone and it was kept in the survey for that purpose.

## CONCLUSION AND IMPLICATIONS

Evidence-based practice and the evaluation of EBP are often reduced down to just the steps of EBP. Changes in attitudes and perceptions as well as knowledge are important precursors to changes in clinician and educator behavior (Johnston et al., 2003). The *Evidence Based Concepts Assessment* was developed to assess several aspects of EBP that athletic trainers have indicated as important. Our analysis demonstrated that this questionnaire is a reliable method for assessing the perceptions of athletic trainers in regards to evidence-based practice, but it should be noted that the importance and knowledge sections only examined the foundational concepts of EBP.

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**Table V.1. Content of EBCA Survey Categories**

| Survey Category | Content | Question Format |
|---|---|---|
| Importance of EBP Concepts | Developing a clinical question, Appraising literature, Basing clinical decisions on evidence, Using evidence to influence patient outcomes, Searching the literature to support clinical practice, Allowing your personal experience to influence clinical decision making | Likert scale (1 = Not Important, 4 = Very Important) |
| Attitudes & Beliefs towards EBP | Importance to credibility of athletic training, Effects on my daily practice, Improves quality of patient care, "Cook book" approach to clinical practice, Lack of strong evidence | Likert scale (1 = Strongly Disagree, 4= Strongly Agree) |
| Accessibility to EBP Resources | Direct access to and frequency of utilization of: systematic reviews, peer reviewed journals, clinical prediction rules, professional literature, online search databases, NATA think tanks, textbooks, websites, and NATA position statements | Check list of frequency (1 = More than once a week, 2 = Once a week, 3 = Bi-weekly, 4 = Once a month, 5 = Less than once a month, 6 = Never) |
| Knowledge of EBP | Steps of evidence based practice, Types of research designs, Developing a clinical question, Assessment of treatments, Searching the literature, role of personal expertise | Multiple Choice Questions (Four answer choices) |
| Confidence in Knowledge | Assessing confidence of their answer to corresponding knowledge question | Likert scale (1 = Not at all Confident, 4 = Extremely Confident) |
| Barriers to EBP Implementation | Accessibility of resources, Administrative support, Ability to perform EBP steps, Personal interest, Personal confidence, Understanding of EBP process, Time, Support from colleagues | Likert scale (1 = Strongly Disagree, 4 = Strongly Agree) |

**Table V.2. Response Rates for each Participant Group**

| Role | Initial Requests Sent (n) | Survey Responses Returned (n) | Response Rate (%) |
|---|---|---|---|
| Undergraduate Athletic Training Education Program Director | 209 | 132 | 63.16% |
| Undergraduate Athletic Training Education Faculty & Clinical Instructors | 2,346 | 306 | 13.04% |
| Athletic Training Clinicians | 3, 877 | 716 | 18.47% |
| Post-Professional Athletic Training Educator | 47 | 24 | 51.06% |
| Post-Professional Athletic Training Student | 223 | 71 | 31.84% |
| Total Combined | 6,702 | 1,249 | 18.64% |

**Table V.3 Factor Scores for Individual Items Included in Each Component**

| Statement | Mean Score (range 1-4) | Std. Deviation | Factor Loading Score | Cronbach's Alpha |
|---|---|---|---|---|
| **Importance of EBP** | | | | .586 |
| ***Steps of EBP*** | | | | .686 |
| Developing a clinical question | 3.55 | .628 | .520 | |
| Critically appraising the literature for used in decision making | 3.46 | .624 | .741 | |
| Basing clinical decision making on current best evidence | 3.57 | .556 | .665 | |
| Using evidence-based practice to influence patient outcomes | 3.44 | .626 | .681 | |
| Searching the literature for information to support clinical practice | 2.44 | .626 | .714 | |
| **Attitudes & Beliefs towards EBP** | | | | .761 |
| ***Negative Perceptions*** | | | | .736 |
| The adoption of evidence-base practice places unreasonable demands in my daily practice | 2.15 | .602 | .534 | |
| Evidence-based practice does not take into account the limitation of my clinical practice setting | 2.64 | .709 | .606 | |
| Evidence-based practice does not take into account patient preferences | 2.62 | .655 | .577 | |
| Using evidence-based practice is a "cook book" clinical practice | 2.14 | .663 | .703 | |
| Using evidence-based practice will reduce my professional independence in clinical decision making | 2.02 | .588 | .716 | |
| The concept of evidence-based practice is a "fad" that will come and go | 1.82 | .595 | .486 | |
| ***Benefits to Practice*** | | | | .732 |
| Application of evidence-based practice is important to the credibility of the athletic training profession | 3.63 | .508 | .521 | |
| Literature and research findings are useful in my day-to-day practice | 3.20 | .572 | .694 | |
| Evidence-based practice improves the quality of patient care | 3.30 | .596 | .606 | |
| Evidence-based practice is a process that helps me make decisions about patient care | 3.10 | .548 | .718 | |
| Developing a clinical question helps direct my search for evidence | 3.13 | .570 | .635 | |
| ***Personal Interest*** | | | | .608 |
| I need to increase the use of evidence in my daily practice | 3.09 | .636 | .809 | |
| I am interested in learning or improving the skills necessary to incorporate evidence-based practice in to my practice | 3.22 | .571 | .627 | |
| ***Lack of Strong Evidence*** | | | | .497 |
| Strong evidence is lacking to support most of interventions I use with my patients | 2.32 | .677 | .801 | |
| Strong evidences is lacking to support the primary population(s) I work with | 2.39 | .695 | .753 | |

**Table V.3 Factor Scores for Individual Items Included in Each Component cont.**

| Statement | Mean Score (range 1-4) | Std. Deviation | Factor Loading Score | Cronbach's Alpha |
|---|---|---|---|---|
| **Barriers to EBP Implementation** | | | | .870 |
| ***Personal Skills & Attribute Barriers*** | | | | .831 |
| Ability to critically appraise the literature | 2.28 | .745 | .673 | |
| Personal confidence to implement changes in my clinical practice | 2.24 | .749 | .625 | |
| Personal interest in evidence-based practice | 2.34 | .805 | .597 | |
| Understanding of the evidence-based practice process | 2.46 | .791 | .649 | |
| Understanding of statistical analyses | 2.57 | .791 | .511 | |
| Ability to make independent clinical decisions | 2.02 | .743 | .665 | |
| Ability to develop an answerable clinical questions | 2.22 | .682 | .722 | |
| Familiarity with internet databases and search engines | 2.19 | .818 | .584 | |
| ***Support & Accessibility of Resources Barriers*** | | | | .712 |
| Accessibility of information resources | 2.28 | .825 | .628 | |
| Support from administration | 2.16 | .769 | .659 | |
| Ability to find research literature that relates to my patient population | 2.46 | .789 | .662 | |
| Accessibility of patient outcome assessments | 2.61 | .711 | .539 | |
| Collective support among colleagues in my facility | 2.25 | .762 | .479 | |
| Application of research findings to individual patients with unique characteristics | 2.58 | .672 | .476 | |

**Table V.4. Percent Agreement for Knowledge Questions**

| Question | Percent Agreement |
|---|---|
| 1. What is the first step in the EBP process? | .963 |
| 2. Which type of research design is considered to have the highest quality of evidence? | .778 |
| 3. When defining a clinical question using the PICO technique, which factor should you consider first? | .704 |
| 4. When assessing the outcome of a treatment you used, what factor would most likely lead you to use it again? | .741 |
| 5. When conducting a literature search, which of the following on-line sources holds the highest quality content? | .852 |
| 6. In what way should your personal experience with a particular treatment contribute to your clinical practice? | .630 |

# Chapter VI

# Project III

# Perceived Importance, Knowledge, and Confidence of Evidence-Based Practice Concepts in Athletic Training Educators, Clinicians, and Students

Title: Perceived Importance, Knowledge, and Confidence of Evidence-Based Practice Concepts in Athletic Training Educators, Clinicians, and Students

Authors: Dorice Hankemeier, Cailee Welch, Jessica Walter, Bonnie Van Lunen, Eric Newton, Stacy Walker, Shana Pribesh, Beth Jamali

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## INTRODUCTION

In 2003, the Institute of Medicine released a report entitled *Health Professions Education: a Bridge to Quality* that cited evidence-based practice (EBP) as one of five essential competencies all health care professionals should possess (Institute of Medicine, 2003; Sauers, 2005). In addition to EBP, this report suggested competencies in providing patient-centered care, working in interdisciplinary teams, applying quality improvement, and utilizing informatics (Institute of Medicine, 2003). Evidence-based practice is sought to be a method of professional practice that synthesizes the best research evidence, patient values, and a clinicians' expertise (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). This increased focus on EBP in health care professions has led to the necessity of EBP in the profession of athletic training. The commitment of the National Athletic Trainers' Association (NATA) to the promotion of EBP has been evident through grant funding for evidenced-based research, inclusion of Cochrane based grading of NATA position statements (Kronenfeld et al., 2007), and a more focused emphasis on EBP in the fifth edition of the NATA Educational Competencies set to be published in the Spring of 2011 (Sauers, 2009).

This focus on EBP marks a shift in thinking among health care professionals from an emphasis of decisions based on tradition and opinion to that of actions based on data-driven, clinically relevant research. For clinicians and educators in athletic training to make this shift, they should be able to: formulate relevant clinical questions, efficiently search for the best research evidence, evaluate and assess the evidence, apply the research evidence to their patient population, and evaluate and understand how the patients' values contribute to patient care (Guyatt et al., 2000; Sackett, Richardson, Rosenberg, &

Haynes, 1997; Steves & Hootman, 2004). However, one of the greatest barriers to EBP implementation in athletic training (Hankemeier & Van Lunen, In Review; Manspeaker & Van Lunen, In Press) and other healthcare professions (Brown, Wickline, Ecoff, & Glaser, 2009; Jette et al., 2003; O'Donnell, 2004) is a clinicians' perceived lack of knowledge on how EBP can be properly implemented into patient care.

The focus on evidence-based practice in patient care is crucial to the advancement of athletic training (Welch et al., In Review). Although more evidence-based publications and initiatives are available within athletic training there is still a dearth of information to support current clinical practice (Manspeaker & Van Lunen, 2010; Sauers, 2009; Steves & Hootman, 2004; Winterstein & McGuine, 2006). Clinicians and athletic training educators need to continue to promote the use of EBP so the profession can move forward. In order for the athletic training to be seriously considered for third party reimbursement, the profession will need to demonstrate the effectiveness and scientific support for our treatments and demonstrate that our care improves patient outcomes (Denegar, 2008; Hertel, 2005; Sauers, 2009). Before this can occur, the profession has to promote and educate clinicians to practice in an evidence-based manner.

While athletic training educators have the ability to instill the necessity of EBP in current and future students, veteran clinicians will also need to advance their current EBP knowledge in order for the profession to advance. Limited research has been conducted assessing the current knowledge level of athletic trainers in regards to EBP. Regardless of knowledge level, a clinicians' comfort level with EBP plays a large role in whether or not their behavior changes (Jette et al., 2003; Melnyk, Fineout-Overholt, Feinstein, Sadler, & Green-Hernandez, 2008). Understanding the present knowledge level,

perceived importance, and confidence of athletic trainers in a variety of settings will help identify the current state of EBP in athletic training. This information will then provide a starting point for how to best educate and promote change in clinical practice.

Therefore the purpose of this study was to determine the perceived importance, knowledge, and perceived confidence of the basic EBP steps for athletic training clinicians, educators, and students. Several hypotheses were developed for this inquiry and are as follows: 1) Individuals with a terminal degree and post-professional educators would demonstrate higher perceived importance, knowledge, and perceived confidence scores on the *Evidence Based Concepts Assessment (EBCA)* 2) Clinicians not affiliated with an education program would demonstrate lower perceived importance of EBP concepts than all other athletic training roles 3) Individuals who have had EBP in an ACI workshop, part of the educational training, or those who have attended an EBP workshop or tutorial in the last year would demonstrate higher knowledge scores than who had not 4) A moderate to strong positive relationship between perceived importance, composite confidence and the total knowledge score would be present. 5) A moderate to strong negative relationship between years of athletic training experience and both total knowledge score and perceived importance would be shown. Research has shown that younger clinicians who have had EBP as part of their educational preparation are more likely to have increased knowledge versus those clinicians who have been practicing longer (Jette et al., 2003). Independent variables were athletic training role (undergraduate athletic training education program director, approved clinical instructors, athletic training clinicians, post-professional educators, and post-professional students), highest degree attained (bachelor's, masters, terminal), and history of EBP education as

part of ACI workshops, educational preparation, or workshops within the past year. The dependent variables were the total knowledge score, composite confidence in knowledge score, and a perceived importance composite score.

## METHODS

### Participants

Census sampling of undergraduate professional athletic training education program directions, approved clinical instructors, athletic training clinicians not associated with education programs, post-professional athletic training educators, and post-professional athletic training students was conducted for this study. The *EBCA* survey was sent out to a total of 6,702 individuals and 1,209 individuals responded (18.04%). Participant demographic information can be found in Table VI. 1. We received University IRB approval for exempt research and the participants' completion of the online survey served as their consent to participate.

### Procedures

Participant recruitment took place during the spring of 2010 for each of the athletic training groups. Due to the multiple groups being targeted, the procedures for recruiting participants were slightly different for each group.

*Undergraduate Athletic Training Education Program Directors*

The contact information for each of the Commission on Accreditation of Athletic Training Education (CAATE) accredited athletic training education program directors (n=348) were obtained through the CAATE webpage (http://www.caate.net). Each program director was contacted via telephone asking for their consent to participate. During the phone discussion, in addition to asking for their participation, the program

director was informed of the purpose of the research investigation and they were asked if they would be willing to disseminate the survey to the remainder of the associated educational faculty and approved clinical instructors affiliated with their institution. If the program director was not reached within four phone calls made over the course of a one week period of time, an email was sent to the program director requesting participation in the study. At the time of consent, the athletic training education program (ATEP) program director was asked to provide the number of additional faculty and approved clinical instructors (ACIs) that they would be forwarding the survey information to. A total of 213 program directors were reached via telephone or email and 209 agreed to participate. Some program directors agreed to participate themselves, but declined to send the information on to their faculty and ACIs. Collectively, the program directors indicated they would send the *EBCA* to 2,346 faculty and ACIs. Only 266 (11.34%) individuals in this group responded.

*Athletic Training Clinicians*

Through the *NATA Survey List Request Form*, a list of the names and email addresses for all participants was obtained from the NATA National Office. Information for certified athletic trainers from the ten NATA districts in all work settings, except college/university, secondary school, or business/sales/marketing, were requested for this investigation. Athletic trainers in the college/university and secondary school settings were excluded to reduce the potential for crossover with individuals who had affiliations with athletic training education programs. The research team purchased the email addresses of the 3,937 members produced from the NATA office database. Email addresses were used to request participation in filling out the *EBCA*. A total of 3,877

emails were successfully sent; 60 email addresses were returned as a delivery failure due to an unknown or expired email address. Of the 3,877 requests that were sent, 716 (18.47%) individuals responded by completing the survey.

*Post-Profession Educators*

Post-professional educators' names were obtained from the NATA Post-Professional Athletic Training Education Program Evaluation Annual Report for the 2008-2009 academic year. Each educator on the list was sent an email request to participate in filling out the *EBCA*. Educators from 15 post-professional education programs (n=47) received an email to participate. One post-professional education program was eliminated from participating since it was the home institution of the researchers. Twenty-four (51.06%) of post-professional educators responded to the request for participation.

*Post-Professional Education Athletic Training Students*

Email addresses for students currently enrolled in 15 post-professional athletic training programs were found on the associated institution's website or a survey link and request for participation was forwarded to the student by their graduate program director. One program director declined to send the survey to their students, so that program was eliminated from the participant pool. A total of 223 students were initially sent an email asking for participation in filling out the *EBCA* and 71 (31.84%) completed the survey.

*Survey Distribution*

Once the email addresses were received for the individuals listed above, an email was sent containing the following items: the purpose and importance of the research study, a request for their participation, the estimated time to complete the survey, the

URL hyperlink directing them to the survey webpage, date the survey should be completed, and the contact information for the researcher. Participants were given four weeks from the date of recruitment to complete the survey. Biweekly, follow-up emails were sent as reminders to the participants. The reminder emails included the same information as the initial email, as well as an additional statement to thank those participants who had already completed the survey. If a participant chose to contact the primary researcher to confirm that they had completed the survey, that individual's email address was removed from the list and they no longer received reminder emails.

**Instrumentation**

The *EBCA* was designed by the research team to assess the perceived importance (six Likert-scale items), attitudes and beliefs (15 Likert-scale items), knowledge (six multiple choice questions), confidence in knowledge (six Likert-scale items related to their response on knowledge section), accessibility (two multi-part questions), and barriers (16 Likert-scale items) to EBP for a variety of athletic trainers. The *EBCA* contains elements from the *Evidence-Based Practice Questionnaire* developed by Jette et al (2003) as well as an instrument developed by Kitto et al (2007) to assess surgeons attitudes towards EBP. In addition, the *Evidence Based Concept Knowledge, Attitude and Use (EBKCAU)* developed by Manspeaker et al (In Review) used to assess students' knowledge and use of EBP was consulted in the development of the EBCA. Participants completed all aspects of the survey, however, only the perceived importance, knowledge, and confidence in knowledge are addressed in this manuscript due to the enormity of the data set. Subsequent manuscripts will discuss the attitudes and beliefs, accessibility to

EBP resources, and perceived barriers of EBP of athletic training educators and clinicians.

*Perceived Importance*

The perceived importance section consisted of six Likert-scale items asking the participant to rate the importance of concepts related to the steps of EBP. The participant had four choices where "1" indicated that the concept was "not at all important" and "4" indicated that the concept was "very important". A principal component analysis showed that the sixth perceived importance item did not fit well with the rest of the scale items. Due to this, the perceived importance composite score only included the five items related to the steps of EBP; the sixth item was still included in the *EBCA* for descriptive purposes. The composite score was calculated by adding up the responses to each of the five importance statements. This score was then averaged by the number of response items to normalize the perceived importance composite score back to the Likert scale where a score of "4" is the maximum possible.

*Knowledge*

The knowledge section consisted of six multiple choice questions that centered on the steps of evidence-based practice. The questions were developed from information in the current literature as well as instruments utilized in other health care professions (Jette et al., 2003; Manspeaker et al., In Review). Every question was awarded one point for a correct response and zero points for an incorrect response. The total knowledge score resulted from adding each question together to achieve a total score out of six possible points. A higher total knowledge score indicated a higher level of knowledge. Sample survey questions from the knowledge section can be found in Table VI.2.

*Confidence in Knowledge*

The confidence in knowledge section consisted of six Likert-scale items. The participants were asked to rate their confidence on their ability to correctly answer each of the six multiple-choice knowledge questions. The participants had four choices where "1" indicated that they were "not at all confident" in their answer and a response of "4" indicated that they were "extremely confident" in their answer. The composite confidence in knowledge score was achieved by averaging all of the responses to normalize the score to a scale. A score closer to "4" indicated that the participant had more confidence in their responses to the knowledge questions.

*Survey Analysis*

The survey was created and sent to a panel of five experts that have had significant experiences (educational, clinical, research) with EBP in athletic training or other health care professions to assess the content validity of the instrument. Reliability of the *EBCA* was assessed in a separate investigation through the use of principal component analysis to determine the consistency of each Likert subscale and with Cronbach's alpha to determine the internal consistency. Reliability for each of the scales and subscales were as follows: five Likert item perceived importance ($\alpha = .69$), 15 Likert item attitudes and beliefs ($\alpha = .76$), six Likert item confidence in knowledge ($\alpha = .76$), and 16 Likert item barriers ($\alpha = .87$). The reliability of the six knowledge questions was determined through test- retest percent agreement that ranged from .63 to .96.

**Data Analysis**

The *EBCA* was a web-based survey held on the institutions' server. Once the participant completed the survey (indicated by clicking "submit" on the final screen), the

information was automatically sent to the University database system. Participant responses were generated in PASW Statistics (version 18.0, SPSS Inc. Chicago, IL). Descriptive statistics were used to calculate the means, standard deviations, and frequencies of the information. The alpha level was set at $p \leq .05$. A one-way ANOVA was used to determine the difference in knowledge scores for the athletic training role of the participant and between highest level of degree. Tukey's HSD was used for post hoc analysis following the one-way ANOVA. A Kruskal-Wallis (H) test was used to determine the differences for the non-parametric data of perceived importance composite score and the composite confidence in knowledge score among the various athletic training roles and level of highest degree of the participants. A Mann-Whitney U test (U) statistic with Bonferroni adjustment was utilized to address the inflation in the Type I error rate common with multiple comparisons. An independent samples t-test ($t$) was used to determine the difference in total knowledge scores of participants who had EBP in their ACI trainings, part of their education preparation, or those who had attended an EBP course within the past year and those with no such exposure. Spearman's rank correlations ($\rho$) were used to assess the relationship between years of athletic training experience and the composite confidence in knowledge and perceived importance scores as well as between the total knowledge score and the composite confidence and perceived importance scores. A Pearson's product moment correlation ($r$) was used to assess the relationships between total knowledge score and the years of athletic training experience.

## RESULTS

The response rate of all participants was 18.04% (1,209 out of 6,702 recipients responded). Overall, athletic trainers demonstrated low total knowledge scores (64.2% ± 1.29), denoted that they were "mildly to moderately" confident (2.71/4.0 ± .55), yet indicated that EBP concepts were "moderately to extremely" important for inclusion (3.49/4.0 ± .41). Descriptive statistics (mean ± SD) for each of the athletic training roles are presented in Table VI.3 and descriptives for highest degree attained are presented in Table VI.4. Figure VI.1 shows frequencies for each of the importance scale items. Frequency counts for the correct response to each knowledge question and the corresponding level of confidence for all participants is found in Figure VI.2.

*Perceived Importance*

There was a significant difference in the perceived importance composite score among the different athletic training roles ($x^2$ =18.77, $p$ = .001) and the highest educational degree attained ($x^2$ =19.34, $p$ < .001). Clinicians not associated with an education program demonstrated lower perceived importance composite scores than post-professional educators ($U$ = 5778.5, $z$ = -2.77, $p$ = .006) , but had no difference with undergraduate athletic training education program directors, approved clinical instructors, or post-professional athletic training students. Athletic trainers who possessed a terminal degree demonstrated higher perceived importance composite scores than those with a bachelors degree ($U$ = 24568.0, $z$ = -2.89, $p$ = .004) and those with a masters degree ($U$ = 45991.0, $z$ = -4.26, $p$ < .001). There was a weak positive relationship between the perceived importance and total knowledge score ($\rho$ = .114, $p$ <. 001). There was no

significant relationship between years of athletic training experience and the perceived importance composite score.

*Knowledge*

There was a significant difference in the total knowledge score among the different athletic training roles ($F_{4, 1208} = 19.0$ , $p < .001$). Post-professional educators demonstrated significantly higher total knowledge scores than clinicians ($p = .004$), but did not differ for undergraduate program directors ($p = .70$), ACIs ($p = .32$), or post-professional students ($p = .99$). In addition, clinicians not associated with education programs demonstrated significantly lower total knowledge scores than undergraduate program directors ($p < .001$), ACIs ($p < .001$), and post-professional students ($p < .001$). There was also a significant difference in the total knowledge score among highest education degree attained ($F_{2, 1203} = 12.68, p < .001$). Athletic trainers who possessed a terminal degree demonstrated higher total knowledge scores than those with a bachelor's degree ($p < .001$) or a master's degree ($p < .001$). There was a weak negative relationship between years of athletic training experience and total knowledge score ($r = -.098, p = .001$).

There was no significant difference in knowledge score of ACIs who have had EBP as part of their ACI training or workshops and those who have had no exposure. In addition undergraduate athletic training education program directors and ACIs who had EBP as part of their educational preparation or those who have gone to an EBP workshop, tutorial, or seminar in the past year did not demonstrate any significant difference for total knowledge score than those who had not had these previous exposures to EBP.

*Confidence in Knowledge*

There was a significant difference in the composite confidence in knowledge score among the different athletic training roles ($x^2$ =67.16, $p < .001$) and the highest educational degree attained ($x^2$ =76.19, $p < .001$). Post-professional educators demonstrated higher confidence in knowledge than undergraduate program directors ($U$ = 749.5, $z$ = -4.12, $p < .001$), ACIs ($U$ = 907.0, $z$ = -5.832, $p < .001$), clinicians not associated with an education program ($U$ = 2675.5, $z$ = -5.77, $p < .001$), and post-professional students ($U$ = 455.5, $z$ = -3.42, $p$ = .001). Individuals with a terminal degree demonstrated higher confidence in knowledge when compared to those with a bachelor's degree ($U$ = 16066.5, $z$ = -8.26, $p < .001$) or those who have obtained a masters degree ($U$ = 35699, $z$ = -7.80, $p < .001$). There was a weak positive relationship between the years of athletic training experience and the composite confidence in knowledge score ($\rho$ = .070, $p$ =. 015). Additionally, there was a weak positive relationship between the total knowledge score and the composite confidence in knowledge score ($\rho$ = .226, $p <$. 001).

**DISCUSSION**

The knowledge assessed via the *EBCA* was very foundational in nature as the questions addressed components related to the five steps of evidence-based practice. Although the questions were foundational, athletic trainers still demonstrated a low knowledge of these concepts with an average of 64.2%. Fritsche et al (2002) examined the knowledge of EBP concepts via the *Berlin Questionnaire* and found that health care professionals had a mean of 42%. Similarly, Nicholson et al (2007) evaluated health care clinical educators' knowledge of EBP concepts via the *Fresno Test*. These clinical educators demonstrated low knowledge with average scores of 57.9%. Even though

athletic trainers' demonstrated higher average scores than those demonstrated by the *Fresno Test* and *Berlin Questionnaire*, these results should be interpreted cautiously. Both of the aforementioned instruments used to determine knowledge of health care professionals concerning EBP were initial knowledge assessments that happened several years ago. Since that time, workshops, educational courses, and programs have been implemented to improve knowledge. These interventions have shown a 57% (Fritsche et al., 2002) and a 20.5% (Nicholson et al., 2007) increase in knowledge on the *Berlin Questionnaire* and *Fresno Test,* respectively. It should also be noted that the content of these assessments was much more in depth than just the five steps of EBP indicating again that the athletic trainers' knowledge is lagging behind that of other health care professionals.

The perceived importance composite score of 3.49 out of 4 indicates that athletic trainers believe that EBP concepts related to the steps of EBP are moderately to extremely important. While the perceived importance level is high and participants knowledge level is low it shows that individuals value the need for EBP, but are still lacking in the knowledge and ability to successfully implement the concepts. We hypothesized that clinicians not associated with an athletic training education program would demonstrate lower perceived importance composite scores than all other groups. Contrary to our hypotheses, clinicians only had significantly lower importance composite scores when compared to post-professional educators. Evidence-based practice is a pressing topic in many athletic training education settings and we thought that clinicians who were not consistently involved in the discussion to implement EBP into educational standards might not value EBP has highly or have as much exposure as other groups.

Each of the different roles of athletic trainers in this study perceived EBP concepts as moderately to extremely important which left little room for significant differences between groups. The fact that there was little difference between clinicians and all of the other roles could lend support to the fact that the NATA has done a good job of promoting (Denegar, 2008; Hertel, 2005; Sauers, 2009; Steves & Hootman, 2004; Winterstein & McGuine, 2006) the need for EBP through research and editorials emphasizing the need for EBP in our patient care. This was also supported in the fact that there was no relationship between the years of athletic training experience and perceived importance. Implementing EBP starts with creating a culture that embraces the concepts of EBP (Sauers, 2009). Based on our results it appears that the athletic training profession values the importance of EBP, but that there needs to be emphasis on increasing the knowledge of these concepts.

In contrast to the athletic training role, individuals with a terminal degree did have significantly higher perceived importance scores than those with either a bachelors or masters degree. Obtaining a terminal degree often contains significant coursework in statistical analyses and often requires completion of a research project or dissertation (Hertel, West, Buckley, & Denegar, 2001). In addition, a doctoral program focuses more on statistical components and leads to a greater understanding of appraising research evidence. Our results supported our hypothesis that individuals with terminal degrees would perceive EBP concepts as more important.

While we hypothesized that post-professional educators would demonstrate significantly higher knowledge scores than all other individuals, our results indicated that they only achieved significantly higher scores than athletic training clinicians. We

believed that the research emphasis of post-professional programs would lead post-professional educators to achieve higher scores than individuals who are not working with statistical analyses and critical appraisal on a regular basis. Contrary to what we hypothesized, clinicians demonstrated lower knowledge scores than all other groups. We believe this could be due to the fact that the knowledge questions focused specifically on the basic steps of EBP. While the basic steps of EBP are not fully implemented into the athletic training profession, there has been increased emphasis on EBP implementation into professional athletic training education programs (Manspeaker & Van Lunen, 2010; Sauers, 2009). Interestingly, post-professional students demonstrated significantly higher knowledge scores than both approved clinical instructors and athletic training clinicians. While this does not support our initial hypothesis, it makes sense that students currently involved in an advanced educational program focusing on research skills, appraisal skills, and scholarship would perform better in knowledge related to these areas.

In an assessment of physical therapists, Jette et al (2003) found that individuals who had advanced degrees were more likely to be more knowledgeable. As with perceived confidence, individuals in this study who had earned a terminal degree attained higher knowledge scores. Individuals with terminal degrees not only had to complete education that focused on research design, statistical concepts, and critical appraisal, but often they are required to maintain their scholarly research and publication for promotion and tenure (Brumels & Beach, 2008; Hertel et al., 2001). Conducting research and maintaining a record of scholarly activity would lead to more familiarity of the foundational EBP concepts we assessed in the *EBCA*.

The presence of EBP in some post-professional curriculums and in select professional athletic training education could explain the weak negative relationship between knowledge score and years of athletic training experience. This indicates that younger individuals and those with less experience have higher knowledge than those who have been in the profession for some time. We also hypothesized that undergraduate program directors and ACIs who participated in EBP workshops or courses in the past year, had educational preparation in EBP, or had EBP as part of their ACI training would have significantly higher knowledge scores. The results were contrary to our hypotheses in that no differences were found in these groups. Most of workshops in athletic training to this point have focused more on introductory concepts and those workshops are more likely to change the attitude in favor of EBP rather than fully educating to be an evidence-based clinician (Yousefi-Nooraie, Rashidian, Keating, & Schonstein, 2007). In fact, short courses or workshops do not change a clinicians' knowledge and very rarely change behavior in clinicians or educators (Coomarasamy & Khan, 2004). As the profession aims to include EBP in the professional preparation of an athletic training student further investigation should examine the best methods to improve knowledge. Foundational concepts such as developing clinical questions, searching for literature, and identifying appraised resources should be covered early within educational preparation (Yousefi-Nooraie et al., 2007). By providing these concepts early within an educational process, students will then be able to build upon this foundational knowledge to understand advanced critical appraisal and more advanced statistical concepts. While these recommendations are specifically for educational programs, the same idea should be followed when trying to educate the rest of the athletic training profession. As our

results indicate, athletic trainers believe the concepts of EBP to be important, but they are still lacking the knowledge to apply them correctly. If the profession is committed to moving forward to become a profession that values EBP, then there must be a systematic method put in place to advance EBP knowledge among all parties.

In addition to a low knowledge level, athletic trainers demonstrated a mild to moderate level of confidence in their knowledge level. Post-professional educators and individuals with terminal degrees displayed significantly more confidence in their knowledge. As with the increased knowledge level, post-professional educators often have their terminal degree and are more likely to feel comfortable with the concepts associated with EBP. Even though these groups had higher composite confidence scores, they still were on the lower end and there was only a weak positive correlation between total knowledge score and confidence. You would expect as knowledge increased, an individuals' confidence would also increase proportionally. This weak correlation signifies a lack of confidence in the ability to correctly understand EBP concepts. The weak positive correlation between years of experience and confidence was supported by Jette et al (2003) who found that younger physical therapists reported more confidence in their skills than older (50+ years of age) clinicians.

The difficulty in comparing our results to that of other healthcare professions is that there are very few survey instruments that assess knowledge through multiple choice questions. Outside of the *Fresno Test* and *Berlin Questionnaire* we did not find other instruments to compare to our knowledge assessment. Several assessments of a clinicians' knowledge ask participants to rank their level of knowledge on specific terms or concepts like "odds ratio" or "systematic reviews" (Brown et al., 2009; Hart et al.,

2008; Jette et al., 2003; O'Donnell, 2004). Each term was ranked on a Likert scale and then totaled for a knowledge score. While this demonstrates a clinicians' perceived knowledge, it is more of a self-report level of comfort with a term instead of a true measure of their ability to fully understand the term correctly. Even though our knowledge assessment only consisted of six questions, we were still able to determine the clinicians' ability to correctly understand the foundational concepts of the steps of EBP. This lack of knowledge and confidence in their knowledge has been expressed in qualitative interviews with athletic training educators (Manspeaker & Van Lunen, In Press) and approved clinical instructors (Hankemeier & Van Lunen, In Review). Both of these groups indicated that their own lack of knowledge was a barrier in implementing EBP with students. Ultimately the goal of EBP is to help improve patient care through combination of best evidence, clinician expertise, and the patients' goals and values (Sackett et al., 1996; Sauers, 2009). In order to do this, the profession has to continue to support and promote the knowledge level of athletic trainers.

**Limitations**

Certain limitations were present in this study that could have affected the results. The sampling procedures used for identification and dissemination of the survey instruments were varied in order to reach all of the intended participants. While the same procedures in terms of request for participation were followed across all groups, the identification of participants varied greatly. We believed that the different methods were necessary to appropriately reach the intended populations, but it did provide limitations. In particular, the use of undergraduate athletic training education program directors to identify and disseminate the survey instrument to approved clinical instructors within

their program led to a low response rate, but it was the only way we could have assessed this critical population of athletic training educators. Program directors were asked to provide the number of people they would forward the request for participation to, but this number was not confirmed. Unfortunately the follow-up with these individuals also had to go through the program director. The low response rate of (11%) is not ideal, but we would have been unable to reach this group without going through program director. Another limitation is that individuals who worked in the collegiate and high school settings were eliminated from participation in order to limit the potential for crossover with participants who were affiliated with education programs. The athletic training clinicians in those settings were not included thus limiting the ability to generalize the results of this study to all individuals in those settings. The validity of the *EBCA* could come into question. While there was a panel of experts who reviewed the document for content validity, the lack of a gold standard instrument within the field of athletic training made establishing validity of this instrument difficult. Finally, the concepts included in the *EBCA* were specific to the foundational concepts of the steps of EBP and did not include more advanced concepts. The small number of knowledge questions limits the ability of the *EBCA* to fully demonstrate knowledge across a wide variety of basic and advanced concepts. It must be understood that the concepts in this knowledge assessment were basic in nature.

## CONCLUSIONS AND IMPLICATIONS

Athletic trainers value the concept of EBP and believe that the process of EBP is important to the profession, but in this inquiry they demonstrate a low level of knowledge and confidence in that knowledge. While post-professional educators and individuals

with terminal degrees have higher knowledge, it is important to understand that clinicians who aren't associated with education programs are lagging in EBP knowledge. There has been an increased focus on incorporating EBP in the educational curriculum of athletic training students (Sauers, 2009), but we must also work to improve the knowledge level of clinicians that have completed their education. Currently, online educational modules are being created to help increase the knowledge base of the athletic training profession in foundational and more advanced EBP concepts. Future research should investigate the best methods to use in promoting knowledge in individuals who are no longer in an educational program. In addition, we should also investigate the effectiveness of workshops, online modules, and educational programming geared toward promoting EBP.

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**Table VI.1. Participant Demographics (n=1209)**

| Characteristic | Program Director n = 132 | | Approved Clinical Instructor n = 266 | | Clinicians n = 716 | |
|---|---|---|---|---|---|---|
| Age[a] | | | | | | |
| 20 - 29 years | 5 | (3.8%) | 122 | (45.9%) | 218 | (30.4%) |
| 30 - 39 years | 50 | (38.2%) | 96 | (36.1%) | 227 | (31.7%) |
| 40 - 49 years | 50 | (38.2%) | 33 | (12.4%) | 158 | (22.1%) |
| 50 – 59 years | 23 | (17.5%) | 14 | (5.3%) | 98 | (13.7%) |
| 60 – 69 years | 3 | (2.3%) | | | 15 | (2.1%) |
| 70 – 79 years | | | 1 | (.4%) | | |
| Gender | | | | | | |
| Male | 68 | (51.5%) | 138 | (51.9%) | 400 | (55.9%) |
| Female | 64 | (48.5%) | 128 | (48.1%) | 316 | (44.1%) |
| Ethnicity | | | | | | |
| African American | 3 | (2.3%) | 3 | (1.1%) | 11 | (1.5%) |
| Asian | | | 2 | (.8%) | 10 | (1.4%) |
| Caucasian | 126 | (95.5%) | 246 | (92.5%) | 648 | (90.5%) |
| Hispanic | 1 | (.8%) | 3 | (1.1%) | 29 | (4.1%) |
| Latin American | | | 5 | (1.9%) | 9 | (1.3%) |
| Native American | | | 5 | (1.9%) | 5 | (.7%) |
| Pacific Islander | | | | | 4 | (.6%) |
| Other | 2 | (1.5%) | 2 | (.8%) | | |
| Years AT Exp.[b] | | | | | | |
| 1 – 5 years | 3 | (2.3%) | 96 | (36.1%) | 190 | (26.5%) |
| 6 – 10 years | 18 | (13.6%) | 84 | (31.6%) | 167 | (23.3%) |
| 11 – 15 years | 32 | (24.2%) | 36 | (13.5%) | 109 | (15.2%) |
| 16 – 20 years | 31 | (23.5%) | 23 | (8.6%) | 99 | (13.8%) |
| 21 – 25 years | 18 | (13.6%) | 13 | (4.9%) | 69 | (9.6%) |
| 26 – 30 years | 18 | (13.6%) | 7 | (2.6%) | 41 | (5.7%) |
| 31 – 35 years | 7 | (5.3%) | 4 | (1.5%) | 27 | (3.8%) |
| 36 – 40 years | 5 | (3.8%) | | | 13 | (1.8%) |
| 40 + years | | | | | 1 | (.1%) |
| Highest Education Level | | | | | | |
| Bachelors | | | 46 | (17.3%) | 232 | (32.4%) |
| Masters | 63 | (47.4%) | 203 | (76.3%) | 423 | (59.4%) |
| EdD | 28 | (21.2%) | 2 | (.8%) | 3 | (.4%) |
| PhD | 41 | (31.3%) | 9 | (2.4%) | 7 | (1.0%) |
| DPT | | | 4 | (1.5%) | 42 | (5.9%) |
| DO | | | 1 | (.4%) | | |
| DC | | | | | 5 | (.7%) |
| MD | | | | | 3 | (.4%) |
| PA | | | 1 | (.4%) | 1 | (.1%) |

[a] There was one missing value for age on program director

[b] There were three missing values for ACI years of experience

[c] There were three missing values for highest education level in Post-professional students

**Table VI. Participant Demographics (n=1209) cont.**

| Characteristic | Post-Professional Educators n = 24 | | Post-Professional Students n = 71 | |
|---|---|---|---|---|
| Age[a] | | | | |
| 20 - 29 years | | | 67 | (94.4%) |
| 30 - 39 years | 15 | (62.5%) | 1 | (1.4%) |
| 40 - 49 years | 6 | (25.0%) | 2 | (2.8%) |
| 50 – 59 years | 1 | (4.2%) | 1 | (1.4%) |
| 60 – 69 years | 2 | (8.3%) | | |
| Gender | | | | |
| Male | 12 | (50.0%) | 24 | (33.8%) |
| Female | 12 | (50.0%) | 47 | (66.2%) |
| Ethnicity | | | | |
| African American | | | 2 | (2.8%) |
| Asian | 1 | (4.2%) | 1 | (1.4%) |
| Caucasian | 22 | (91.7%) | 62 | (87.3%) |
| Hispanic | 1 | (4.2%) | 3 | (4.2%) |
| Latin American | | | 3 | (4.2%) |
| Years AT Exp.[c] | | | | |
| 0 – 5 years | | | 67 | (94.4%) |
| 6 – 10 years | 4 | (16.7%) | | |
| 11 – 15 years | 9 | (37.5%) | | |
| 16 – 20 years | 3 | (12.5%) | 2 | (2.8%) |
| 21 – 25 years | 4 | (16.7%) | | |
| 26 – 30 years | 1 | (4.2%) | | |
| 31 – 35 years | 1 | (4.2%) | 1 | (1.4%) |
| 36 – 40 years | 1 | (4.2%) | | |
| 40 + years | 1 | (4.2%) | | |
| Highest Education Level[c] | | | | |
| Bachelors | | | 68 | (95.6%) |
| Masters | 1 | (4.2%) | | |
| EdD | 2 | (8.3%) | | |
| PhD | 21 | (87.5%) | | |

[a.] There was one missing value for age on program director
[b.] There were three missing values for ACI years of experience
[c.] There were three missing values for highest education level in Post-professional students

**Table VI.2. Sample EBCA Knowledge Questions**

| 2. Which type of research design is considered to have the highest quality of evidence? (Choose one) | |
|---|---|
| [ ] Randomized controlled trial | [ ] Independent laboratory investigation |
| [ ] Case Study | [ ] Single subject design |

| 5. When conducting a literature search, which of the following On-line sources holds the highest quality content? (Choose one) | |
|---|---|
| [ ] Google Scholar | [ ] Medline |
| [ ] Cochrane Database | [ ] WebMD |

**Table VI.3. Descriptive Statistics for Each Athletic Training Role**

| Concept | Undergraduate Athletic Training Education Program Director ($M \pm$ SD) | Approved Clinical Instructor ($M \pm$ SD) | Athletic Training Clinician ($M \pm$ SD) | Post-Professional Athletic Training Educator ($M \pm$ SD) | Post-Professional Athletic Training Student ($M \pm$ SD) |
|---|---|---|---|---|---|
| Perceived Importance Composite Score ** Total = 4 | 3.52 ± .44 | 3.44 ± .41 | 3.49 ± .41 | 3.71 ± .35 | 3.60 ±.37 |
| Total Knowledge Score ** Total = 6 | 4.18 ± 1.18 | 4.03 ± 1.13 | 3.62 ± 1.35 | 4.54 ± .88 | 4.65 ±.91 |
| Composite Confidence in Knowledge Score ** Total = 4 | 2.86 ± .58 | 2.64 ± .53 | 2.67 ± .55 | 3.36 ±.40 | 2.99 ± .46 |

**Figure VI.1. Perceived Importance of EBP Concepts**

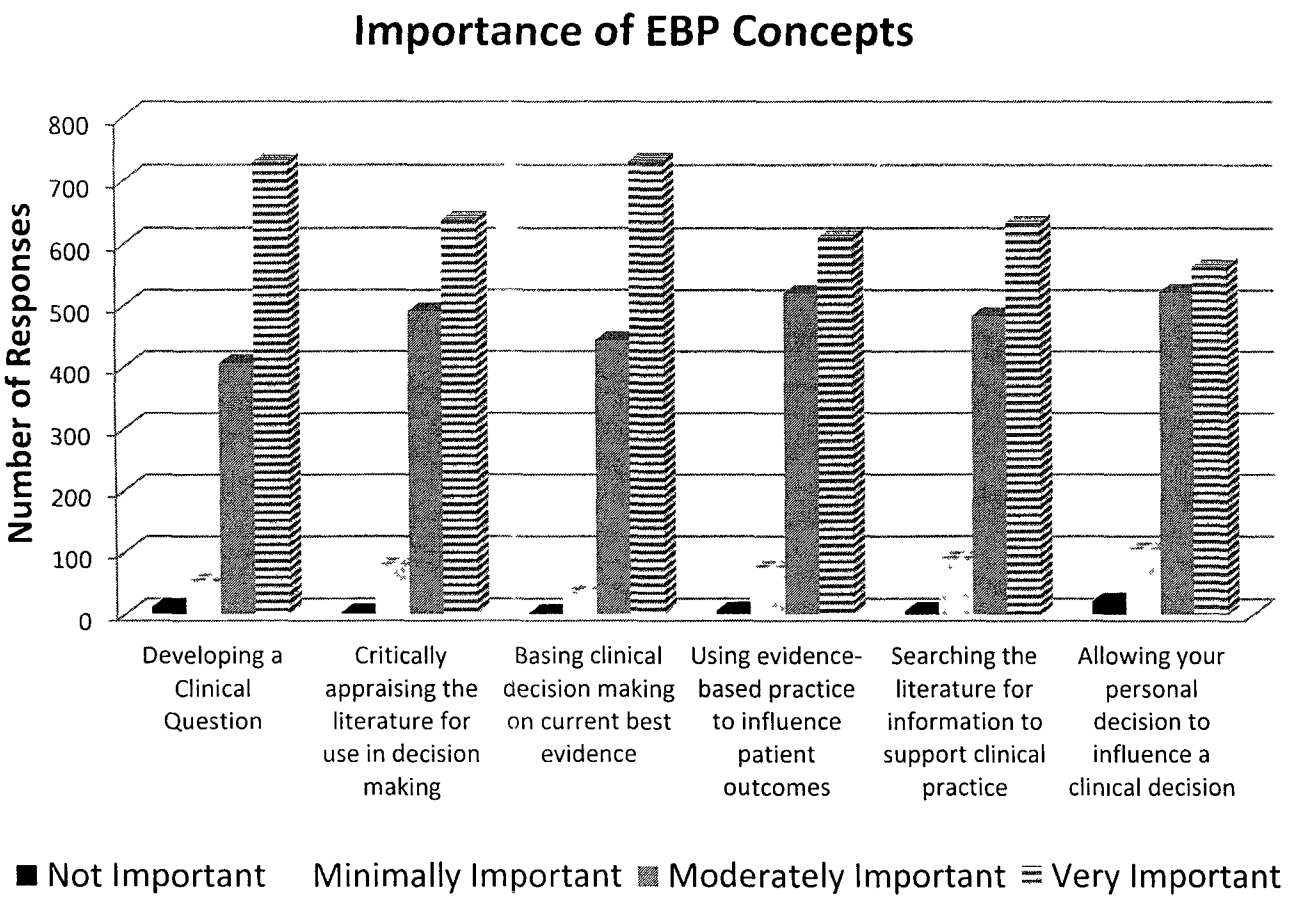

Figure VI.2. Confidence in Knowledge

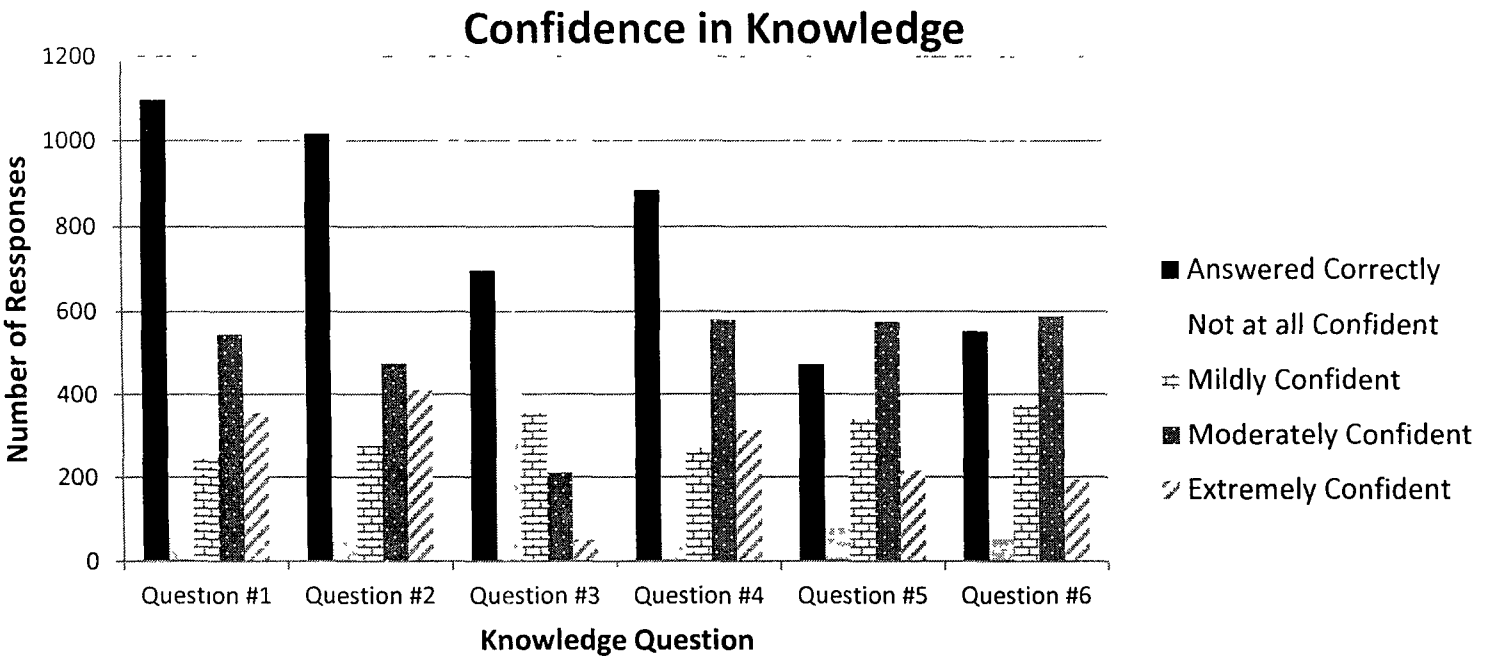

**Table VI.4. Descriptive Statistics for Highest Degree Attained**

| Variable | Bachelors Degree ($M \pm$ SD) | Masters Degree ($M \pm$ SD) | Terminal Degree ($M \pm$ SD) |
|---|---|---|---|
| Perceived Importance Composite Score ** Total = 4 | 3.51 ± .37 | 3.45 ± .43 | 3.59 ± .42 |
| Total Knowledge Score ** Total = 6 | 3.76 ± 1.35 | 3.78 ± 1.25 | 4.31 ± 1.24 |
| Composite Confidence in Knowledge Score ** Total = 4 | 2.60 ± .57 | 2.69 ± .53 | 3.06 ±.49 |

# Chapter VII

# CONCLUSIONS

The projects included have offered additional insight as to the current practices and knowledge of approved clinical instructors in regards to EBP. The first project identified ACIs' perceptions on the importance of implementing EBP into clinical athletic training experiences as well as strategies to incorporate EBP with students during their clinical experience. Approved clinical instructors believe EBP is important to advance the profession and demonstrating this importance to students will reiterate the need for all athletic trainers to incorporate EBP in clinical practice. Strategies such as discovery, promotion of critical thinking, and sharing of information were used to implement EBP with students in the clinical setting. In addition, ACIs believed that modeling behavior was the most appropriate avenue to affect behavioral change in students. While modeling behavior was determined to be appropriate strategy to influence change, ACIs reported that barriers of adequate resources, personal knowledge, personnel conflicts, and a gap between the didactic and clinical educational structure limited their own ability to utilize EBP concepts in their clinical environment.

The barriers identified by ACIs led to the development of the Evidence-Based Concepts Assessment (EBCA). The EBCA is a reliable instrument to assess several aspects of an athletic trainers' understanding and perceptions of EBP concepts. We found that the overall knowledge level of the basic steps of EBP and the confidence in knowledge of athletic trainers is below average and lagging behind that of other health care professions. This low knowledge level is present despite the fact that the majority of athletic trainers cited that they believed the concepts of EBP are important to their own

clinical practice and to the profession. Approved clinical instructors and athletic training clinicians demonstrated the lowest knowledge and confidence level when compared to program directors, post-professional educators, and post-professional students.

The findings of these projects have further demonstrated the need for EBP in athletic training education and the athletic training profession overall. Clinicians, educators, and students value EBP for the profession, but still face barriers related to their own knowledge and ability to fully integrate evidence into daily practice. The current literature related to improving EBP knowledge and behaviors is lacking in athletic training. Investigation into educational strategies to improve ACI knowledge and comfort with using EBP is warranted since EBP will continue to become a larger focus of professional athletic training education programs. Future research should focus on improving knowledge, but more importantly address how to best change the behavior of clinicians so they are practicing in a more evidenced-based manner. Finally, evaluation of student outcomes and behaviors as a result of didactic and clinical integration of EBP should be implemented.

# APPENDIX 1

# THE EVIDENCE-BASSED CONCEPTS ASSESSMENT

# *EBCA*

**Evidence-Based Concepts Assessment**

The purpose of this study is to assess the knowledge, importance, and accessibility of evidence-based practice of athletic training educators and clinicians. This research study has been approved by the Human Subjects Committee of the Darden College of Education at Old Dominion University.

**This survey is broken into 6 main sections:**
1. Importance (6 Likert scale questions)
2. Attitudes & Beliefs (15 Likert scale questions)
3. Accessibility (2 multiple part questions)
4. Knowledge (6 Multiple Choice questions)
5. Barriers (16 Likert scale questions)
6. Demographics

The survey will take you approximately 15-20 minutes to complete. Please read all questions and answer them to the best of your ability. Your completion of this survey will be considered your consent to participate in this study. All information that you provide will be kept confidential. Upon completion of each survey page press the NEXT button and the next page of questions will appear. If you need to stop the survey and return to it later, please press the SAVE button. This will allow you to start the survey from where you left off. When you have completed the survey, please push the FINISH button to submit your responses.

Thank you in advance for your participation.

**Evidence-Based Concepts Assessment**
**Part One: Importance**

**DIRECTIONS:**
Please rate how important each concept of the evidence-based practice process is to you using the following choices

**EBP Concept**
A. This concept is very important for the evidence-based practice process
B. This concept is moderately important for the evidence-based practice process
C. This concept is minimally important for the evidence-based practice process
D. This concept is not important for the evidence-based practice process

**1. Developing a clinical question**
*{Choose one}*
( ) Very Important
( ) Moderately Important
( ) Minimally Important
( ) Not Important

**2. Critically appraising the literature for use in decision making**
*{Choose one}*
( ) Very Important
( ) Moderately Important
( ) Minimally Important
( ) Not Important

**3. Basing clinical decision making on current best evidence**
*{Choose one}*
( ) Very Important
( ) Moderately Important
( ) Minimally Important
( ) Not Important

**4. Using evidence-based practice to influence patient outcomes**
*{Choose one}*
( ) Very Important
( ) Moderately Important
( ) Minimally Important
( ) Not Important

**5. Searching the literature for information to support clinical practice**
*{Choose one}*
( ) Very Important
( ) Moderately Important
( ) Minimally Important
( ) Not Important

**6. Allowing your personal experience to influence a clinical decision**
*{Choose one}*
( ) Very Important
( ) Moderately Important
( ) Minimally Important
( ) Not Important

**Evidence-Based Concepts Assessment**
**Part Two: Attitudes & Beliefs**

**DIRECTIONS:**
For the following series of questions, please assess your beliefs using these choices:

A. I strongly agree with this statement
B. I agree with this statement
C. I disagree with this statement
D. I strongly disagree with this statement

**1. Application of evidence-based practice is important to the credibility of the athletic training profession.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**2. Literature and research findings are useful in my day-to-day practice.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**3. I need to increase the use of evidence in my daily practice.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**4. The adoption of evidence-based practice places unreasonable demands in my daily practice.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**5. I am interested in learning or improving the skills necessary to incorporate evidence-based practice in to my practice.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**6. Evidence-based practice improves the quality of patient care.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**7. Evidence-based practice does not take into account the limitations of my clinical practice setting.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**8. Strong evidence is lacking to support most of the interventions I use with my patients.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**9. Evidence-based practice is a process that helps me make decisions about patient care.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**10. Evidence-based practice does not take into account patient preferences.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**11. Using evidence-based practice is a "cook book" clinical practice.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**12. Using evidence-based practice will reduce my professional independence in clinical decision making.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**13. The concept of evidence-based practice is a "fad" that will come and go.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**14. Developing a clinical question helps direct my search for evidence.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**15. Strong evidence is lacking to support the primary population(s) I work with.**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**Evidence-Based Concepts Assessment**
**Part Three: Accessibility**

**DIRECTIONS:**
**Use of Literature**
For the next series of questions, please respond to the following statement using the provided responses:

Which of the following time frames best describes the number of times you utilize the following resources to influence your clinical practice?

**1. Systematic Reviews and/or Meta-Analyses**
*{Choose one}*
( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**2. Peer-Reviewed Journal Articles**
**(e.g. Journal of Athletic Training, American Journal of Sports Medicine, Journal of Strength and Conditioning Research, etc.)**
*{Choose one}*
( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**3. Clinical Prediction Rules**
*{Choose one}*
( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**4. Professional Literature**
**(e.g. NATA News, Training & Conditioning, BioMechanics, etc.)**
*{Choose one}*

( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**5. Cochrane Databases**
*{Choose one}*

( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**6. Medline/Pub Med Databases**
**(e.g. Ovid SP, Pub Med, Medline, etc.)**
*{Choose one}*

( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**7. NATA Think Tanks**
*{Choose one}*

( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**8. Textbooks**
*{Choose one}*
( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**9. Websites**
**(e.g. Google Schoolar, Wikipedia, WebMD, etc.)**
*{Choose one}*
( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**10. NATA Position Statements**
*{Choose one}*
( ) More than once a week
( ) Once a week
( ) Bi-weekly
( ) Once a month
( ) Less than once a month
( ) Never
( ) I am unfamiliar with this source

**Evidence-Based Concepts Assessment**
**Part Three: Accessibility**

**DIRECTIONS:**
**Availability of Information**
Direct Access is defined as being able to access the resource and its content through work or home yourself without assistance from other individuals.

**Which of the following resources do you have direct access to? (Please check all that apply)**
*{Choose all that apply}*
( ) Systematic Reviews and/or Meta-Analyses
( ) Peer-Reviewed Journal Articles
( ) Clinical Prediction Rules
( ) Professional Literature
( ) Cochrane Databases
( ) Medline/Pub Med Databases
( ) NATA Think Tanks
( ) Textbooks
( ) Websites
( ) NATA Position Statements

**Evidence-Based Concepts Assessment**
**Part Four: Knowledge**

**1A. What is the first step in evidence-based practice process?**
*{Choose one}*
( ) Searching for research literature
( ) Critically appraising the current research
( ) Defining a clinical question
( ) Choosing a research database

**1B. How confident are you that you answered this question (1A) correctly?**
*{Choose one}*
( ) Not at all
( ) Mildly
( ) Moderately
( ) Extremely

**2A. Which type of research design is considered to have the highest quality of evidence?**
*{Choose one}*
( ) Randomized controlled trial
( ) Independent laboratory investigation
( ) Case study
( ) Single subject design

**2B. How confident are you that you answered this question (2A) correctly?**
*{Choose one}*

( ) Not at all
( ) Mildly
( ) Moderately
( ) Extremely

**3A. When defining a clinical question using the PICO technique, which factor should you consider first?**
*{Choose one}*

( ) Return to play criteria
( ) Patient goals
( ) Potential interventions
( ) Personal experience

**3B. How confident are you that you answered this question (3A) correctly?**
*{Choose one}*

( ) Not at all
( ) Mildly
( ) Moderately
( ) Extremely

**4A. When assessing the outcome of a treatment you used, what factor would MOST likely lead you to use it again?**
*{Choose one}*

( ) Patient satisfaction with outcome
( ) Outcome agreement with current literature
( ) Short length of treatment time to achieve outcome
( ) Outcome achieved consistent with selected goals

**4B. How confident are you that you answered this question (4A) correctly?**
*{Choose one}*

( ) Not at all
( ) Mildly
( ) Moderately
( ) Extremely

**5A. When conducting a literature search, which of the following On-line sources holds the highest quality content?**
*{Choose one}*

( ) Google Scholar
( ) Medline
( ) Cochrane Database
( ) WebMD

**5B. How confident are you that you answered this question (5A) correctly?**
*{Choose one}*
( ) Not at all
( ) Mildly
( ) Moderately
( ) Extremely

**6A. In what way should your personal experience with a particular treatment contribute to your clinical practice?**
*{Choose one}*
( ) Develop expertise that can be passed on to students
( ) Guide future clinical practice and decision making
( ) Provide solid evidence in the support to treatments
( ) Create standard treatment protocols for all patients

**6B. How confident are you that you answered this question (6A) correctly?**
*{Choose one}*
( ) Not at all
( ) Mildly
( ) Moderately
( ) Extremely

**Evidence-Based Concepts Assessment**
**Part Five: Barriers**

**EBP Barrier**
A. I strongly agree this item is a barrier preventing me from utilizing EBP
B. I agree this item is a barrier preventing me from utilizing EBP
C. I disagree this item is a barrier preventing me from utilizing EBP
D. I strongly disagree this item is a barrier preventing me from utilizing EBP

**1. Accessibility of information resources**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**2. Support from Administration**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**3. Ability to critically appraise the literature**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**4. Ability to find research literature that relates to my patient population**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**5. Personal confidence to implement changes in my clinical practice**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**6. Personal interest in evidence-based practice**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**7. Accessibility of patient outcome assessments**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**8. Understanding of the evidence-based practice process**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**9. Collective support among colleagues in my facility**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**10. Application of research findings to individual patients with unique characteristics**

*{Choose one}*

( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**11. Understanding of statistical analyses**

*{Choose one}*

( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**12. Ability to make independent clinical decisions**

*{Choose one}*

( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**13. Ability to develop an answerable clinical question**

*{Choose one}*

( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**14. Time**

*{Choose one}*

( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**15. Familiarity with Internet databases and search engines**

*{Choose one}*

( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**16. Availability of evidence-based practice mentors**
*{Choose one}*
( ) Strongly Agree
( ) Agree
( ) Disagree
( ) Strongly Disagree

**Evidence-Based Concepts Assessment**
**Part Six: Demographics**

**Demographic Information**

**Age:**
*{Enter text answer}*
[ ]

**Gender:**
*{Choose one}*
( ) Male
( ) Female

**Ethnicity:**
*{Choose one}*
( ) African American
( ) Asian
( ) Caucasian
( ) Latin American
( ) Native American
( ) Pacific Islander
( ) Other [ ]

**How many years of experience do you have as a certified athletic trainer:**
*{Enter text answer}*
[ ]

**Are you currently a member of the National Athletic Trainers' Association?**
*{Choose one}*
( ) Yes
( ) No

**Professional Credentials**
**(check all that apply)**
*{Choose all that apply}*

( ) ATC
( ) CSCS
( ) EMT
( ) MD
( ) OT
( ) PA
( ) PT
( ) PTA

**What is your current role in the athletic training education program? (check all that apply)**
*{Choose all that apply}*

( ) Program Director
( ) Clinical Coordinator
( ) Approved Clinical Instructor (ACI)
( ) Clinical Instructor

**How many years have you been a program director in your current position?**
*{Enter text answer}*
[ ]

**How many years have you been an ACI in your current position?**
*{Enter text answer}*
[ ]

**Level of Education (select the highest degree earned)**
*{Choose one}*

( ) Bachelors degree
( ) Masters degree
( ) EdD
( ) PhD
( ) DPT
( ) MD
( ) DO
( ) PA

**BOC Certification Route:**
*{Choose one}*

( ) Internship athletic training program
( ) Accredited athletic training program

**Type of Educational Program:**
*{Choose one}*
( ) CAATE accredited entry-level masters athletic training education program
( ) NATA accredited post-professional athletic training education program
( ) Other

**Per semester/trimester/quarter, how many students on average to you supervise clinically as an ACI?**
*{Enter text answer}*
[ ]

**What is your current academic rank within your institution? (check all that apply)**
*{Choose all that apply}*
( ) Professor
( ) Associate Professor
( ) Assistant Professor
( ) Instructor
( ) Clinical Instructor
( ) Department Chair
( ) Other

**Do you have an academic rank in the institution with which you are affiliated?**
*{Choose one}*
( ) Yes
( ) No

**How many current students do you have that are formally admitted into your athletic training education program?**
*{Enter text answer}*
[ ]

**How long has your athletic training education program been accredited?**
*{Enter text answer}*
[ ]

**Do you encourage other faculty and instructors within your athletic training education program to utilize current evidence in their teaching?**
*{Choose one}*
( ) Yes
( ) No

**On average, how many hours per week do you dedicate to academic coursework preparation and teaching?**
*{Choose one}*
( ) Less than 10 hours
( ) 11 - 20 hours
( ) 21 - 30 hours
( ) 31 - 40 hours
( ) Greater than 40 hours

**How many other full time instructors (including yourself) teach within your athletic training curriculum?**
*{Enter text answer}*
[ ]

**Do you currently teach any course(s) within your athletic training education program?**
*{Choose one}*
( ) Yes
( ) No

**What percentage of your workload distribution is allocated towards formal classroom instruction?**
*{Enter text answer}*
[ ]

**Which of the following best describes the setting at which you do the majority of your patient care:**
*{Choose one}*
( ) Clinic
( ) College/University
( ) High School
( ) Hospital
( ) Industrial
( ) Military/Law Enforcement
( ) Performing Arts
( ) Professional Sports

**How many full-time certified athletic trainers (including yourself) are in the facility in**
**which you do the majority of your patient care:**
*{Enter text answer}*
[ ]

**Do you currently practice clinically as an athletic trainer?**
*{Choose one}*
( ) Yes
( ) No

**On average, how many hours per week do you practice clinically?**
*{Choose one}*

( ) Less than 10 hours
( ) 11 - 20 hours
( ) 21 - 30 hours
( ) 31 - 40 hours
( ) Greater than 40 hours

**In your educational preparation, did you have a course in which a majority of the content focused on evidence-based concepts?**
*{Choose one}*

( ) Yes
( ) No

**In the past year, have you attended an "evidence-based"-related workshop, course, or tutorial?**
*{Choose one}*

( ) Yes
( ) No

**Has evidence based practice been a component of your ACI training?**
*{Choose one}*

( ) Yes
( ) No

**Thank you for your time and participation in this study.**

All comments and questions should be directed towards one of the following:

Dorice Hankemeier, MSEd, ATC
Doctoral Student, Human Movement Science
Old Dominion University
dhankeme@odu.edu

**Your answers will be submitted after you press the FINISH button below.**

# VITA

Dorice A. Hankemeier, ATC

*Department of Study*

Old Dominion University
Department of Human Movement Sciences
Student Recreational Center
Norfolk, VA 23529

*Education*

May 2010 Doctor Of Philosophy
Human Movement Science
Old Dominion University
Norfolk, VA

May 2003 Master of Science in Education
Old Dominion University
Norfolk, VA

May 2001 Bachelor of Arts
Central College
Pella, IA

*Professional Experience*

**Instructor of Human Movement Science**

- Department of Human Movement Science, Old Dominion University, Norfolk, VA, August 2008 – May 2010
- Instructor: HE 224: Advanced First Aid, EXSC 322 Anatomical Kinesiology, EXSC 340: Prevention & Care of Athletic Injuries
- Teaching assistant HMS 711/811: Motion Analysis, HMS 657: Lower Extremity Management Issues, ESPR 756: Education in Athletic Training
- Responsible for recruitment and admission of Fall 2009 master students

**Assistant Professor/Clinical Coordinator of Athletic Training Education**

- Anderson University, Anderson, IN, August 2003 – July 2008
- Co-author of self-study for CAATE re-accreditation
- Served as an Approved Clinical Instructor for athletic training students
- Instructor in Kinesiology Department: ATRG 1460: Emergency Response, ATRG 1590: Advanced Athletic Training, ATRG 1530: Theory and Conditioning of Athletes, ATRG 3440: Therapeutic Rehabilitation, ATRG 4910: Senior Seminar, ATRG 1490: Beginning Athletic Training for Non-Majors, Various Athletic Training Clinical courses