SENIOR ATHLETIC TRAINING STUDENTS' PERCEPTIONS AND SELF-REPORTED
BEHAVIORS OF EVIDENCE-BASED PRACTICE

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ABSTRACT

Title: Senior Athletic Training Student's Perceptions and Self-Reported Behaviors of Evidence-Based Practice

Context: Entry-level athletic training education is currently transitioning to include evidence-based practice (EBP) into their curriculums to continue to establish athletic training as a prestigious allied health profession.

Objective: To determine senior athletic training student (SATS) perceptions of EBP and examine the self-reported behaviors of EBP to gain insight into the instructional methods currently used to educate athletic training students in EBP as the method of delivering care to patients.

Design: Grounded theory study

Setting: Commission on Accreditation of Athletic Training Education accredited undergraduate athletic training programs.

Participants: Thirteen senior athletic training students [11=female, 2=male, currently completing their last semester/quarter of their athletic training education program (ATEP)] were interviewed to discover their perceptions, self-reported behaviors of EBP.

Data Collection and Analysis: SATS perceptions and self-reported behaviors of EBP were discovered and explored qualitatively using grounded theory methodology. Constant comparison and coding allowed theories to be developed. Peer debriefing and multiple analyst triangulation evaluated the emerging theories to establish trustworthiness.

Results: The analysis revealed that SATS have a positive perception of utilizing research to guide or supplement their clinical practices. The emerging theories demonstrated that the SATS have knowledge of how to use EBP when providing care to their patients. The perceived instructional methods focused on acquiring medical literature, with slight emphasis on appraising and applying it into clinical practice. Some ATEP assignments required SATS to acquire and appraise medical literature, which in turn some of the SATS were able to use in their clinical practices. SATS also expressed acquiring medical literature on their own to address a problem in their clinical practices, but the SATS did not appraise the found medical literature nor discuss it with their patients. The SATS did express confidence in their ability to communicate to their patients and establish trust by educating their patients.

Conclusions: The SATS interviewed attained a scholastic knowledge of EBP. Other medical professions re-structured their curricula to have students use EBP. The changes in athletic training curriculum have allowed athletic training students to continue the incorporation of EBP. The instructional methods, described by the SATS, used to teach EBP do not appear to be as structured as other medical professions. Through the continued integration of EBP education into all levels of athletic training education, the profession can continue to enhance itself as a prestigious allied health profession.

Key Words: Research utilization, Evidence acquisition, Athletic training students, Qualitative research, Grounded Theory research

<u>ACKNOWLEDGEMENTS</u>

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CHAPTER 1

INTRODUCTION

Evidence-based practice is a problem-solving approach[1] to providing medical care to

patients. The incorporation of the best current evidence from well-designed studies, a clinician's

expertise, and a patient's values and preferences[1-4] into the medical care provided defines the

evidence-based practice approach. During clinical practice a clinician can rely on the evidence-

based practice approach to determine an evidence -supported clinical decision.[1] The evidence-

based practice approach is a five-step process that first requires the clinician to formulate an

appropriate clinical question.[5] The clinician will then seek out the most recent and appropriate

evidence from key terms.[4,5] The evidence is then appraised to determine its trustworthiness and

applicabilty.[4,5] The evidence along with the patient's values and preferences determine the type

of care given.[4,5] The patient's outcome is evaluated and provides insight into the effectiveness of

the care. [4,5] The effect of the care provided along with other published patient outcomes can

establish new care guidelines,[6] which allow the provision of consistent effective[1] care.

The athletic training profession has enhanced their reputation as an allied health

profession[7] by including evidence-based practice in the athletic training educational

competencies.[8] The athletic training educational competencies are a required companion

document[1] to the standards for accreditation of entry-level athletic training education programs

(ATEP).[9] Every ATEP is required to meet these standards as it prepares graduates to be entry-level athletic trainers.[9]

Revisions of the athletic training educational competencies in 2006[8] implemented that evidence-based practice be the process in which athletic trainers deliver care[8] to patients. This was the first occurrence of required instruction on evidence-based practice. In 2004, the *Journal of Athletic Training* (JAT) introduced an evidence-based practice literature section.[10] This is a valuable source for JAT readers to locate and become familiar with evidence-based practice research.

We have not found evidence that examined the instructional methods used to teach evidence-based practice to athletic training students. This lack of evidence questions the ability of newly certified athletic trainers to use the evidence-based practice approach in the delivery of care to their patients. We will assess senior athletic training student's perceptions and self-reported behaviors of evidence-based practice. We hope to assess the senior athletic training student's level of understanding and document any examples of their application of evidence-based practice process.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Varying Terminology

A search of medical literature revealed numerous definitions of evidence-based practice. Many allied health professions use specific terms when discussing the incorporation of medical research into health care delivery. We have chosen to use the term evidence-based practice during our discussion. We will draw upon other allied health professions literature that may use different terms to explain their process. Specifically we searched the literature for implementation of evidence-based practice into their curriculums.

Search criteria and restrictions

The CINAHL, ERIC, E-Journals, Health Source: Nursing/Academic education, PubMed, MEDLINE and Cochrane Library electronic databases were searched. The search terms used for these selected databases were "Evidence-based Practice", "Evidence-based Medicine", "Education", "Curriculum," and "Efficacy". We did not include literature published prior to 1990. We only considered published literature from Peer-reviewed scholarly journals and each journal article must include references. Standardized documents and statements from the National Athletic Trainer's Association (NATA) and Commission on Accreditation for Athletic

Training Education (CAATE) websites provided insight into the current requirements of athletic training education.[7-9]

<center>Athletic Training Educational Requirements</center>

CAATE Accreditation

Individuals are qualified to be certified athletic trainer once they have passed the National Athletic Training Association (NATA) Board of Certification (BOC) examination. They become eligible to sit for the BOC examination upon successful completion of a Commission on Accreditation of Athletic Training Education (CAATE)-accredited educational program.[11] CAATE developed the Standards for the Accreditation of the Entry-Level ATEP[9] By upholding these minimum standards,[9,11] a CAATE-accredited ATEP can prepare its attendees to challenge the BOC examination.[11] Each accredited ATEP is required to disseminate this information to their students. The NATA has created a companion document to assist in this process.

The Athletic Training Educational Program

The NATA companion document[7] to the CAATE Standards for the Accreditation of Entry-Level ATEP[9] is titled the Athletic Training Educational Competencies and Clinical Proficiencies.[7] The Athletic Training Educational Competencies are educational objectives which are the basis for entry-level ATEP's curriculum's.[7] These competencies as well as the clinical proficiencies are what each athletic training student is required to learn. When an athletic training student has become proficient in all the athletic training educational competencies and has obtained their bachelor's degree, then they have attained all the knowledge, skills, and behaviors necessary to challenge the BOC examination.[7]

Revisions to the Athletic Training Educational Competencies

Revisions to the Athletic Training Educational Competencies and Standards for the

Accreditation of Entry-Level ATEP provide an accurate representation of what the

responsibilities and actions of practicing athletic trainers. The release of the fourth edition of the

Athletic Training Educational Competencies occurred in 2006. The revisions affected almost

every educational competency area along with the introduction of The Foundational Behaviors of

Professional Practice section.[8] It contains the common values, behaviors, and practices of

certified athletic trainers'.

The athletic training Foundational Behaviors of Professional Practice educational

competencies section implemented Evidence-based practice as the method in which to deliver of

care to patients.[8] The implementation of evidence-based practice was not new to the field of

medicine or athletic training, but this is the first time that it has been included in the athletic

training educational competencies. The behaviors in this section permeate every aspect of the

professional practice of athletic training.[7] Curriculum incorporation and clinical instructor

modeling are methods in which the behaviors are learned by athletic training students.[7] Clinical

role-modeling is an effective teaching strategy.[7]

What is Evidence-Based Practice?

Definition of Evidence-Based Practice

Evidence-based practice is a multi-step procedure that identifies the care delivered to

patients by incorporating evidence and individual expertise. This is accomplished by integrating

individual clinical expertise[1,3,4] with the best available external clinical evidence from systematic

research.[1,3,4] (Figure 1) Since evidence-based practice involves the usage of clinical expertise

along with incorporating external evidence[3]; both of these processes need to be specifically

defined.

The experiences and judgments attained from clinical practice define clinical expertise.

The process of acquiring the best available external clinical evidence is the issue or barrier for

many clinicians[3,4] who are attempting to incorporate evidence-based practice into their own

clinical practices. Medical literature, which is clinically relevant and focused on diagnostic tests,

treatment techniques, preventive programs, and prognostic markers qualify as the best available

external clinical evidence.[4] When clinicians apply their expertise along with evidence, the care

they provide is best-suited care specifically available for that patient.[1,12-14]

Some authors of medical literature feel that a busy clinician cannot adopt evidence-based

practice.[3] This opinion is invalid due to reports, from busy clinicians, stating that the a busy

clinician is able to locate, appraise and incorporate the best evidence available along with the

patients values when determining the patients care.[3] The lack of good evidence[15,16] is another

caveat in the difficulties in the ability of clinicians applying evidence-based practice. The lack of

evidence[17] and the lack of good evidence[1] had a significant role in the implementation and

creation of the evidence-based practice process.

Origins of evidence-based practice

The origins of evidence-based practice follow the progression of medical education.

During the early 19th century, American Medical Education went through a drastic reform.[17] The

reform revealed weaknesses in the medical literature available in America, the lack of research

integration into clinical practice and some of the inconsistencies of the American Medical

Education system.[17] In the following decades, medical education in Europe began to develop

and incorporate medical research into practice.[17] During medical education reform in the United

Kingdom one of the most influential medical research organizations was created.[1,5,17] The

Cochrane Collaboration began to gather together the best available evidence and make it

available to medical practitioners.[1,5,17] This availability of medical research allowed clinicians to

begin to incorporate the evidence into their clinical decisions.[1,5,17]

The Evidence-based practice process

The evidence-based practice process is a five-step process.[1,4,5] By following each step of

the evidence-based practice process, the clinician can make the best evidence based clinical

decision for that patient.[1]

Step 1-Formulating an appropriate clinical question

An appropriate clinical question can be easily created by using the Patient-Intervention-

Comparison-Outcome (PICO) format.[5,18,19](Figure 2) The PICO format allows the clinician to

identify the key terms of their clinical question. The clinician can then focus on the best method

of searching the medical literature for evidence using the established key terms. This format

establishes a solid framework that will ensure the question is applicable[20] and not too broad or

too narrow.[5]

Step 2-Search for the best evidence

The clinician will search the medical literature for evidence, using the established key

terms, to find answers to the clinical question. Online medical literature databases (Table 1)

provide easy access to evidence. The evidence located during the key terms search of the

medical literature databases is collected. The accessibility and knowledge of how to access and

search the medical literature databases for evidence has been identified as one of the clinical

adoption barriers of evidence-based practice.[3,4,19,21] Each working environment must establish a

method in which clinicians can access the medical literature. Using workstations located at

bedside[22] allow instant access to online databases. Smart phones[23], "evidence-based workstations"[23] and availability of other reference materials[17] can be used expedite the medical literature searching process. The clinician now appraises the collected evidence.

Step 3-Critical appraisal of the found evidence

The third step in the evidence-based practice process is the critical appraisal of the found evidence. To critically appraise evidence an understanding of research methods, terminology, and inferential statistics are needed.[4,19,24] In medical research there is an established hierarchy of research. This hierarchy establishes the level (Table 2) or signifies strength of an experimental design. A meta-analysis' and systematic reviews provide the strongest sources of evidence. The lowest source of evidence is unpublished clinical observations due to the unreliability of the methodology.[25]

SORT grading system

A common tool used to assess the level of evidence in medical literature is the SORT grading system (Table 3). This system grades the medical literature and establishes the evidence from the medical literature as being good quality (level 1), limited quality (level 2) or other evidence (Level 3). The SORT grading system also uses a grading scale that provided a recommendation of the evidence being consistent and based off good quality literature (Level A), inconsistent based off limited quality literature (Level B) and poor quality of literature (Level C).[26]

AGREE instrument

The AGREE instrument is a tool used in nursing to critically appraise medical literature and assess how it can be used clinically. The evidence is critically appraised and then graded using the 23 item instrument that represent the six domains in nursing.[5]

Step 4-Implementation of the evidence and patients values

The clinician takes into consideration the patients needs, wants, opinions and beliefs along with best evidence derived from the medical literature. This step does not imply that the clinician should blindly administer the strategies deduced from the best critically appraised evidence. The patient's uniqueness and characteristics must be involved in the application of care.[3-5,18,19,24]

Step 5-Evaluation of the outcome

Now the clinician will reflect back on the care they provided. Reflection on the entire evidence-based practice process will allow the clinician to examine the weaknesses in their own evidence-based practice behaviors as well as discover new ways to improve upon their working environment so that they can apply evidence-based practices better in the future.[3,5,19]

Importance of Evidence-Based Practice

Patients expect evidence-based practice.

Patient populations expect to receive healthcare based off medical research.[12-14] In a recent poll in the state of California, voters felt that the healthcare they were receiving was based on sound medical evidence.[12] Recently it has been reported that well below half of the medical care given is supported by evidence.[13] A conflict is occurring between patients expectations and the actual amount of evidence supported care is being given. This misperception is a major conflict that is occurring in our healthcare system.[12-14] If patients expect to receive healthcare based on evidence then healthcare providers should incorporate the available evidence in to the clinical decision.

Evidence-based practice importance in athletic training

Athletic trainers have incorporated evidence-based practice into their clinical practices. The new section in the Journal of Athletic Training, titled Evidence-Based Practice, exemplifies that point. Athletic trainers are now able to access good quality evidence and can confidently implement it in their daily clinical practice. Athletic trainers must continue to augment the current available evidence to provide support to new clinical practices as well as strengthen current clinical practices.[4,27] The implementation of evidence-based practice in the delivery of care to our patients helps support the ongoing fight to receive third-party reimbursement for athletic training services.[2,4,28] Athletic trainers can begin to publish athletic training treatment guidelines through the utilization of evidence-based practice. Successful implementation of evidence-based practice in daily clinical practice will provide examples of good clinical outcomes from athletic training services. These good clinical outcomes can be published and provide support for future athletic training clinical practices.[6]

Examples of evidence-based practice literature for athletic trainers

Athletic Therapy Today published an evidence-based practice approach to treating patients with patellofemoral pain.[29] The literature evaluated multiple systematic reviews and other clinical trials on the different rehabilitation exercises available for treating patellofemoral pain.[29]. It supported the usage of closed kinetic-chain and open-kinetic chain exercise along with a focus of restoring the entire quadriceps function will decrease patellofemoral pain symptoms.[29] Another example that is supporting evidence-based practice in athletic training is an article in the Cochrane Database of Systematic Reviews. The article discussed rehabilitation strategies for hamstring injuries.[30] The management of hamstring injuries should focus on lumbar spine,

sacroiliac and pelvic alignment and postural control mechanisms.[30]   It has been found that by

increasing lumbar stability and pelvic motor control help reduce hamstring injuries.[30]

How evidence-based practice is learned

Only a few examples have been published describing successful implementation of

evidence-based practice into a curriculum. Role modeling evidence-based practice,[1]

incorporating specific didactic courses into curriculums[17] and providing evidence-based practice

workshops[31] to clinicians are methods in which successful learning of the evidence-based

practice process has occurred.

Role Modeling Evidence-Based Practice

The allied health professions use role modeling and mentorship to educate students on

how to use evidence-based practice. The mentor's responsibility is to engage the students to use

evidence-based practice during their clinical experiences.[1,17,32-35] By surrounding the students

with supporters of evidence-based practice the students begin to use evidence-based practice as

the method in which they deliver care.[1,17,32-35]

Didactic instruction

Educating students early on has shown to improve the understanding[36] of how to

incorporate evidence-based practice into clinical practice. Different allied health professions

have created variations· on the five-step process[1,17-19,33,34,36-38] for evidence-based practice. The

inclusion of class assignments or projects encouraged the students to practice[17,33,36,37] what they

have learned.

Evidence-Based Practice workshops for clinicians

Addressing already practicing clinicians can be difficult when educating them on

evidence-based practice. Evidence-based practice workshops have shown an increase in

knowledge[39] and ability to incorporate evidence-based practice into their clinical practice.[31,39,40] Discussing every step of the evidence-based practice process allowed the clinicians to gain a better understanding of the available evidence.[31,39,40]

Grounded Theory

Qualitative Research Paradigms

Qualitative research uses inductive reasoning to develop hypotheses which explain specific phenomena and situations.[41] Following a naturalistic approach, a researcher can an gain insight or understanding into the meanings people place on their lived experiences and social interactions.[41,42] The researcher draws conclusions, from their newly gained insight, to generate hypotheses.[41]

Grounded Theory Methodology

Grounded theory methodology originated by Glasser and Strauss during the mid-1960's.[41-44] This method generates theory that is grounded or formed on the data obtained in a study.[42-45] Grounded theory methodology is based on theoretic framework of symbolic interactionism.[41,44] Symbolic interactionism states that meaning is derived from social interactions, specific situations or phenomena.[43,44] By analyzing experiences or perspectives pertaining to social interactions, specific situations or phenomena a researcher can determine unique constructs.[45] The constructs will then form the basis of the theory that explains the specific social interaction, situation or phenomena.[42,45] Interviews and observations allow for rich detailed descriptions of social interactions, specific situations or phenomena.[43,45]

Grounded Theory Data Analysis

Grounded theory data analysis employs an iterative approach. The iterative approach requires cycles of simultaneous data collection and analysis.[45] The constant comparative method

identifies unique incidents or constructs and compares them against other identified examples. This continuous comparison produces rich detailed constructs that are refined constantly.[44,45] The researcher ceases data collection when no new constructs are identified during data collection, which signifies data saturation. The constant comparative uses the first level of grounded theory coding, open coding.[42,43,45] Open coded data represent the thoughts, ideas, and meanings of the subjects. The researcher organizes the open coded data into like categories or groups. The second level of grounded theory coding, axial coding identifies the connections between the open coded data categories.[42,43,45] Analysis of the identified links or categories encompasses the process of the third level of grounded theory coding, selective coding. The researcher creates a central category or link that provides an explanation for the phenomenon under investigation. The selective coding process identifies the theory, which explains the phenomenon under investigation.[42,43,45]

Examples in Athletic Training

Two examples grounded theory research in the field of athletic training are published by Pitney WA & Ehlers GG[46] and Pitney WA.[47] All of which interviewed subjects and used the open, axial, selective grounded theory coding of the transcribed interviews. These two examples reinforce the point that grounded theory methodology is the appropriate choice of methodology designed to develop concepts that provide an explanation of social phenomenon.[45] In Pitney WA & Ehlers GG[46] the study wanted to gain insight into the mentoring process with undergraduate athletic training students. The researchers interviewed 13 athletic training students and three certified athletic trainers. During selective coding, the researchers identified three categories from nine open coded themes. The three categories led to the theory that mentors must be accessible and approachable, both the student and the mentor must take initiative in the

mentoring process, and the student must realize the benefit of gaining insight into working professionally. The Pitney WA[47] gained understanding in the professional socialization of certified athletic trainer's working in the high school setting. The researchers interviewed 15 certified athletic trainers working in the high school setting or have in the past. The researchers identified two categories during the selective coding process, organizational learning, and creating networks for learning. These two categories led to the theory that pre-service learning and continuing education should help foster the skills needed to reinforce the self-directed learning, evaluation, reflection, and critical thinking that are required in the high school setting.

CHAPTER 3

METHODOLOGY

Design of Study

We used a qualitative approach to determine the senior athletic training student's

perception and self-reported behaviors of evidence-based practice. The qualitative approach

provided a detailed insight into the instructional methods used to teach evidence-based practice

to athletic training students. The paucity of data regarding athletic training student's instruction

in evidence-based practice supports a qualitative inquiry. We used a grounded theory analysis to

identify the evidence-based practice instructional methods used by the instructors of the senior

athletic training students.

Participants

We interviewed 13 senior athletic training students. Each student has completed most of

their didactic curriculum and has had the greatest opportunity to become proficient in their skills.

We reached data saturation after interviewing 13 senior athletic training students from CAATE -

accredited undergraduate ATEPs. We determined data saturation by comparing the similarity of

responses from each of the subjects. Data saturation occurs when responses became mostly alike

and repetitive.

Participant recruitment procedure

We identified participants through the NATA membership directory. The directory includes member's names and contact information for those who wish to post that information. We generated a list of student members from the directory. A table of random numbers identified potential participants. Each value on the table of random numbers corresponds to the list of student members listed on the NATA student membership directory. We contacted potential participants via email and solicited their participation. This initial email (Appendix C) stated the purpose of the study, inclusion criteria, and a request to participate. The inclusion criteria required each subject to be senior athletic training students and to have phone access. When each student fulfilled all the inclusion criteria and wished to participate, they replied to the principle investigator (PI). The PI responded to each student separately via email (Appendix C). The PI verified that each student met the inclusion criteria, described the study, described the interview procedure, discussed the methods to receive informed consent, and asked about interview availability. The PI verified the time and date of the interview in follow-up emails with each individual participant. The individual telephone interviews took place during designated time set by the participant and researcher. The PI exhausted the list of potential participants before data saturation; the table of random numbers identified 500 additional potential participants. Analysis of the responses from the 13 senior athletic training student interviews established data saturation. The senior athletic training students were able to withdraw from participation at anytime during the initial contacts or thereafter.

Methods for Receipt of informed consent

We obtained a signed informed consent document (Appendix C) from each participant.

Subjects were able to use one of the three methods to return the signed informed consent

document:

1. We will mail a copy of the informed consent document, a pre-addressed stamped envelope to the preferred mailing address of each participant. They will sign and mail the document back to the PI.
2. The participant can sign and scan the informed consent document and email it back to the PI.
3. The participant may fax a signed informed consent document back to the PI.

Nine subjects used that fax method to return their signed informed consent document to the PI.

Two subjects used the email method to return their informed consent and one subject used the

mail method to return the informed consent document to the PI.

Reminder

One day prior to the interview, all 13 subjects received a reminder email.

Data Collection

Pseudonym Identification

We assigned pseudonyms to each subject, their university, university location and any other

identifiable information described during the interview. We saved, on a secured laptop, for three

years a document including subjects' actual and fictitious information. Only investigators will

have password access to this information.

Telephone interview recording equipment

Data collection occurred by recording each individual telephone interview. We used the

Olympus TP7 Telephone Pickup device (Olympus Imaging Corp, Dallas, TX) to record each

individual telephone interview. The Olympus TP7 (TP7) is a telephone pickup device, which

allows recording of sound received by a built in microphone located in an earpiece. To create a

recording of each telephone interview we placed the TP7 earpiece into the ear canal of the PI and

held a cellular phone up to the earpiece. Holding the speaker portion of the cellular phone

against the earpiece and speaking clearly during the interview the microphone picked up each

side of the conversation. The TP7 allowed access through a connection cable into the

microphone jack of a computer. We connected the microphone connection cable from the TP7

to a laptop computer. Using the Audacity software program (Audacity inc.,

http://audacity.sourceforge.net/) the TP7 signals were then turned into an .mp3 computer file.

We transcribed and analyzed each interview into a Microsoft Word document. We secured all

computer files on the researcher's laptop and external hard drive for three years. A password

will keep the researcher's laptop and external hard drive secure.

Recording procedure

The PI called the participants preferred telephone number. Once the subject accepted the

call, the PI began recording. We did not restrict the type of phone used by the participant.

Subjects were able to choose to use either a landline phone or a cellular phone for the interview.

During the interview, when disruption (cell phone interference) hindered an accurate recording

of the interview, the PI asked for clarification.

Interview guide

The PI conducted the interview from a quiet environment. The PI used an interview guide

(Appendix C) to keep the interview process consistent. The PI greeted the subject and asked if

they were ready to begin. The PI asked a series of questions where the subject must answer,

verbally, yes or no. The questions are:

1. Do you understand that you are voluntarily participating?
2. Do you understand that we are recording the entire interview?

The PI kept the subjects' responses confidential and at any point, if they wish to stop the interview, they were free to do so with no penalty. We reminded the subjects that they make take a break at any time during the interview. If the subject agrees to continue, the PI asks the research questions.

Interview questions

Participant's responses to the twelve open ended questions provided the data for this study. The intention of the interview is to allow the participant to give a richly detailed explanation. The PI gained further clarification of the participants' responses to the questions by using probes.[48] This further clarification allowed for richer detail and explained any new terminology or themes that may arose unexpectedly. Example probe[48] questions are:

- "Tell me more about that assignment?"
- "Who taught you the new skill?"
- "Did you have a positive outcome?"
- "Have you used any other techniques?"

Below are the questions that the PI asked each participant:

1. Please tell me about a situation that occurred during your clinical experience that you had difficulty determining the diagnosis of an injury?
2. Did you seek help? How?
3. Please tell me about a situation that occurred during your clinical experience that you had difficulty in determining a treatment program?
4. Did you seek help? How?
5. How do you evaluate the care you are providing to your patients?
6. Tell me about a situation in which you have incorporated a new skill into to your clinical practice?
7. Describe to me a situation in which you incorporated a skill you learned from reading medical literature into your clinical practice?
8. How have you accessed medical literature in the past?
9. What instruction have you been given on how to access medical literature?
10. Tell me about a situation in which you were required to look up medical literature?
11. How do you know when medical literature is high quality?

12. How do you include your patient's opinion in the care you deliver?

13. Describe to me a situation in which your patient's opinion or feelings changed the care you delivered?

During each interview, the PI noted the general theme of interview responses. The interviews ceased once the subjects answered all questions and probes. The PI thanked the participant and ended the call and recording.

Data Analysis

The PI manually transcribed verbatim each telephone interview into Microsoft Word document. The PI reviewed and compared the interview notes to determine data saturation.

Grounded theory coding

We used a grounded theory coding approach to analyze the data for any emerging themes. Coding the data allowed the themes to emerge more promptly. During the interviews, we identified themes from the responses to the research questions and probe questions. We grouped and reviewed the immediately identified themes, which is termed open coding. The open coded data from each interview represents the thoughts, ideas and beliefs of each of the subjects.[43] We used the open coded data to analyze the responses from ongoing interviews until saturation. The open coded data is coded again using axial coding. Axial coding organizes the open coded data into like categories or subcategories.[43] The third method of coding links these subcategories. This third method of coding is selective coding, which groups the categories into a central theory or phenomenon.[43] The selectively coded data represents the general occurrences or experiences of the subjects. The experiences, generated from or grounded in the data, represent the perception and self-reported behaviors of evidence-based practice in the senior athletic training students. Due to the nature of the research questions and this type of study, no

assessment can be determined. We only will describe the common experiences and actions of the senior athletic training students using evidence-based practice.

Trustworthiness

We established trustworthiness[4,5,17] by peer debriefing and multiple analyst triangulation. We transcribed and coded the first interview. One other experienced qualitative researcher examined the transcribed and coded data. The experienced qualitative researcher evaluated the coding of the data. Based on the expert's advice changes to the coding strategy may occur. The PI then continued the interviewing and open coding process incorporating the expert's advice and recommendations. Once the PI determined saturation, the PI contacted the expert again. The expert reviewed two other open coded interviews and the three levels of coding completed by the PI. The PI used the expert's advice and recommendations when determining the themes and results of this study.

TABLES

Table 1[21] Key Resources for Accessing Evidence-Based Information

Key Resources for Accessing Evidence-Based Information

Publisher URL	Description of Resource Cost
ACP Journal Club	
American College of Physicians http://www.acpjc.org/	• Contains selected citations and abstracts of articles that report original studies and systematic reviews from the biomedical literature; focuses on articles of immediate interest to internists. Articles are summarized in "value added" abstracts and commented on by clinical experts. • Rate varies on status and location of individual. See http://www.acponline.org/catalog/journals/acpjc.htm#rates.
CINAHL	
CINAHL Information Systems http://www.cinahl.com/	• Focuses on the literature of nursing and allied health professions and provides citation and abstract only with selected full text. Uses a clinical question and develops interventions based on evidence. Also includes the definition, incidence, etiology and prognosis of the disease condition. • Cost depends on access mode and vendor.
Clinical Evidence	
British Medical Journal http://www.clinicalevidence.com/ceweb/conditions/index.jsp	• International source of the best available evidence on the effects of common clinical interventions and contains citation and abstract with summary of the article. • Rate depends on access mode and status. See http://www.clinicalevidence.com/ceweb/products/index.jsp for rates.
Cochrane Database of Systematic Reviews	
Update Software http://www.update-software.com/clibng/cliblogon.htm	• Full text systematic reviews on the effects of health care. • Rate depends on access mode. Rates available at http://www.wileyeurope.com/wileycda/section/id-101096.html.
The following five databases are subsets of Cochrane:	
Cochrane Central Register of Controlled Trials (CENTRAL) Update Software http://www.update-software.com/clibng/cliblogon.htm	• Bibliography of controlled trials including reports published in conference proceedings and in many other sources not currently listed in MEDLINE or other bibliographic databases
Cochrane Database of Methodology Reviews (CDMR) Update Software http://www.update-software.com/clibng/cliblogon.htm	• Full-text systematic reviews of methodological studies.
Cochrane Methodology Register Update Software http://www.update-software.com/clibng/cliblogon.htm	• Bibliography of articles and books on the science of research synthesis.
Health Technology Assessment Database Update Software http://www.update-software.com/clibng/cliblogon.htm	• Information on health care technology assessments.
NHS Economic Evaluation Database Update Software http://www.update-software.com/clibng/cliblogon.htm	• A register of published economic evaluations of health care interventions.
Database of Abstracts of Reviews of Effectiveness (DARE)	
NHS Centre for Reviews and Dissemination. http://www.york.ac.uk/inst/crd/darehp.htm	• Structured abstracts of systematic reviews. • Provides summaries of systematic reviews that also provides a critical commentary on the quality of the review. • No charge.
EMBASE: Rehabilitation & Physical Medicine	
Excerpta Medica database (Elsevier Science) http://www.embase.com/	• Rehabilitation & Physical Medicine is a subset of the EMBASE database that contains citations related to rehabilitation and physical medicine, and focuses on all aspects of the rehabilitation of somatic and mental disorders using physiotherapy and other therapeutic modalities. • Cost depends on access mode and status. See http://www.ovid.com/site/catalog/database/82.jsp?top=2&mid=3&bottom=7&subsection=10 for details.
Evidence-Based Practice	
American Academy of Family Physicians http://www.ebponline.net/	• Evidence-based continuing medical education resource for family physicians. • Starts with a clinical question chosen by practicing family physicians and includes a summary of the evidence. • Rate depends on status. See http://www.ebponline.net/forms/frm_subscribe.asp for rates.
Hooked On Evidence	
American Physical Therapy Association (APTA) http://www.apta.org/hookedonevidence/index.cfm	• Developed specifically by and for physical therapists. A searchable database of summary extractions from research articles related to physical therapy intervention. • No cost to APTA members.
MEDLINE	
National Library of Medicine http://www.pubmed.gov	• Premier health care database produced by the National Library of Medicine. Provides citation/abstract only with links to full text. • Cost depends on access mode and vendor. MEDLINE is free via PubMed—http://www.pubmed.gov.
Physiotherapy Evidence Database (PEDro)	
Centre for Evidence-Based Physiotherapy http://www.pedro.fhs.usyd.edu.au/index.html	• Developed specifically for physical therapists. Bibliographic details and abstracts of randomized controlled trials, systematic reviews. Most trials on the database have been rated for quality. • No charge.
Turning Research into Practice (TRIP)	
http://www.tripdatabase.com/	• Database of evidence-based resources; includes reports from sources such as Cochrane, and Clinical Evidence. • Allows limited number of searches without charge. Subscription information can be obtained from subs@tripdatabase.com.

Table 2[25] Hierarchy of Evidence

Hierarchy of Evidence: Levels/Rating System and Sources

Level of Evidence	Description
Level I	Evidence-based clinical guidelines based on meta-analysis of randomized controlled trials and systematic reviews of randomized controlled trials
	Meta-analysis of all relevant, well-designed randomized controlled trials (studies) (e.g., a systematic review that resulted in the ability to apply statistics to a number of randomized controlled trials that met specific criteria)
	Systematic review of well-designed randomized controlled trials that did not result in a meta-analysis
Level II	An individual randomized controlled trial (i.e., a study that meets the criteria of an experimental design)
Level III	Quasi-experimental study (i.e., a nonrandomized controlled trial, such as a nonrandomized single group pretest and posttest time series or matched case-controlled studies)
Level IV	Nonexperimental study (e.g., case-control and cohort studies)
Level V	Meta-synthesis reviews of descriptive and qualitative studies that meet criteria
Level VI	Single descriptive or qualitative study
Level VII	Opinions of respected national authorities based on their clinical experience or the opinions of expert committees, including their interpretation of nonresearch-based information, regulatory or legal opinions

Table 3[26] Strength of Recommendation Taxonomy

Strength of Recommendation Taxonomy (SORT)

Strength of recommendation	Definition
A	Recommendation based on consistent and good-quality patient-oriented evidence.*
B	Recommendation based on inconsistent or limited-quality patient-oriented evidence.*
C	Recommendation based on consensus, usual practice, opinion, disease-oriented evidence,* or case series for studies of diagnosis, treatment, prevention, or screening.

Use the following table to determine whether a study measuring patient-oriented outcomes is of good or limited quality, and whether the results are consistent or inconsistent between studies.

Study quality	Diagnosis	Treatment/prevention/screening	Prognosis
Level 1—good-quality patient-oriented evidence	Validated clinical decision rule SR/meta-analysis of high-quality studies High-quality diagnostic cohort study†	SR/meta-analysis of RCTs with consistent findings High-quality individual RCT‡ All-or-none study§	SR/meta-analysis of good-quality cohort studies Prospective cohort study with good follow-up
Level 2—limited-quality patient-oriented evidence	Unvalidated clinical decision rule SR/meta-analysis of lower-quality studies or studies with inconsistent findings Lower-quality diagnostic cohort study or diagnostic case-control study§	SR/meta-analysis of lower-quality clinical trials or of studies with inconsistent findings Lower-quality clinical trial‡ Cohort study Case-control study	SR/meta-analysis of lower-quality cohort studies or with inconsistent results Retrospective cohort study or prospective cohort study with poor follow-up Case-control study Case series
Level 3—other evidence	Consensus guidelines, extrapolations from bench research, usual practice, opinion, disease-oriented evidence (intermediate or physiologic outcomes only), or case series for studies of diagnosis, treatment, prevention, or screening		

Consistency across studies	
Consistent	Most studies found similar or at least coherent conclusions (coherence means that differences are explainable) *or* If high-quality and up-to-date systematic reviews or meta-analyses exist, they support the recommendation
Inconsistent	Considerable variation among study findings and lack of coherence *or* If high-quality and up-to-date systematic reviews or meta-analyses exist, they do not find consistent evidence in favor of the recommendation

*—Patient-oriented evidence measures outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life. Disease-oriented evidence measures intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes (e.g., blood pressure, blood chemistry, physiologic function, pathologic findings).
†—High-quality diagnostic cohort study: cohort design, adequate size, adequate spectrum of patients, blinding, and a consistent, well-defined reference standard.
‡—High-quality RCT: allocation concealed, blinding if possible, intention-to-treat analysis, adequate statistical power, adequate follow-up (greater than 80 percent).
§—In an all-or-none study, the treatment causes a dramatic change in outcomes, such as antibiotics for meningitis or surgery for appendicitis, which precludes study in a controlled trial.

FIGURE 1. The Strength of Recommendation Taxonomy. (SR = systematic review; RCT = randomized controlled trial)

Figure 1 Evidence-Based Practice Visual

Individual Clinical Expertise **+** Best Available External Clinical Evidence **=** Evidence-based Practice
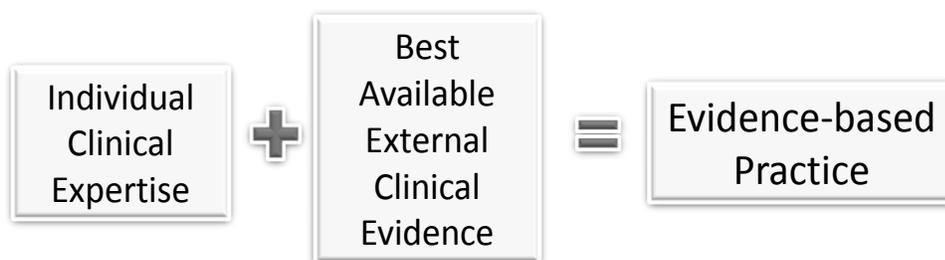
Figure 2 PICO Descriptor

Element	Descriptor
P	**Refers to the relevant patient(s) or population.**
I	**Relates to the intervention or exposure of interest.** What is the management strategy or potentially harmful exposure about which we are concerned?
C	**Refers to the comparison we may be interested in reviewing.** What management strategies are we interested in comparing? Not all questions will have a comparison group. Those issues related to therapy of harm will have two or more parts to it. This could be an intervention/exposure and a control or alternative therapy.
O	**The outcome.** What are the patient-related consequences of the exposure or intervention that we are interested in?

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MANUSCRIPT

INTRODUCTION

In 2006[6] the athletic training profession enhanced their reputation as an allied health profession[5] by revising the athletic training educational competencies by implementing evidence-based practice (EBP) as the process in which athletic trainers (AT's) deliver care[6] to patients. This was the first occurrence of required instruction on EBP. The athletic training educational competencies are a required companion document[1] to the standards for accreditation of entry-level athletic training education programs (ATEP).[7] Every ATEP is required to meet these standards as it prepares graduates to become entry-level AT's who use EBP to deliver care to their patients.[7]

EBP is a problem-solving approach[1] to providing medical care to patients. The incorporation of the best current medical literature, from well-designed studies, a clinician's expertise, and a patient's values and preferences[1,2,3] into the medical care provided defines the EBP approach. During clinical practice a clinician can rely on the EBP approach to determine an evidence supported clinical decision.[1]

We have not found evidence that examined the instructional methods used to teach EBP to athletic training students. This lack of evidence questions the ability of newly certified AT's to use the EBP approach in the delivery of care to their patients. We will assess senior athletic training student's (SATS) perceptions and self-reported behaviors of EBP. We hope to assess

the SATS level of understanding and document any examples of their application of EBP process.

METHODOLOGY

We used a qualitative approach to determine the SATS perception and self-reported behaviors of EBP, and gain detailed insight into the instructional methods used to teach EBP to athletic training students (ATS). The paucity of data regarding this subject supports a qualitative inquiry. Following this naturalistic approach, we gained insight or an understanding into the meanings people place on their lived experiences and social interactions.[9] We used a grounded theory analysis to identify the EBP instructional methods used by the instructors and the perceptions and the self-reported behaviors of the SATS. Grounded theory methodology generates theory that is grounded or formed from the data.[10,11]

Prior to data collection, we received approval from the institutional review board from Indiana State University. We received a signed informed consent document from every subject prior to data collection. We solicited for questions pertaining to the procedures of the study prior to data collection and provided the necessary clarifications to all of the subjects. Each subject specifically stated his or her understanding of the study, which required an audio recording of the entire data collection process. We gave the subjects the option to withdraw from the study at that point and anytime thereafter.

Participants

We interviewed 13 SATS. We identified participants through the NATA membership directory. A table of random numbers identified potential participants. Each value on the table of random numbers corresponded to a student member listed on the NATA student membership directory. We contacted potential participants via email and solicited their participation. We

emailed 600 potential participants and received 20 responses. The initial email verified that the

potential subject is voluntarily participating, their academic level in their ATEP and accessibility

to a telephone. The participants became subjects once the Principle investigator (PI) received

their response to the initial email. The subjects then received a follow-up email from the PI

discussing the interview procedure, audio recording procedure, and methods in which the PI may

receive the signed informed consent document. Seven subjects either did not respond to the

follow-up email or withdrew from the study due to conflicts in their availability. The PI did not

solicit for any other personal identifiable information besides verifying the subject's academic

level, preferred name, an accurate email address, and an accurate telephone number. The PI

deduced from the given information, and the NATA student membership directory, the Carnegie

Classification of Institutions of Higher Education for the 13 SATS ATEP institutions (Figure 1).

Data Collection

We interviewed each of the 13 subjects over the telephone in a quiet environment. The

PI used an earpiece with a microphone, which allowed recording of both sides of the telephone

conversation. The PI saved and converted each interview into an .mp3 file to facilitate easy

transcription of the interview into a Microsoft Word document. Thirteen open-ended questions

guided the interview (Figure 2). Each question prompted subjects to reflect on a different part of

the EBP process in rich detailed explanations. The PI gained further clarification of the

participants' responses to the questions by using probes.[12]

Data Analysis

We used grounded theory data analysis to analyze the transcribed interviews. Grounded

theory data analysis employs an iterative approach. The iterative approach requires cycles of

simultaneous data collection and analysis.[11] The constant comparative method identifies unique

incidents or constructs and compares them against other identified examples. This continuous comparison produces rich detailed constructs that are refined constantly.[11] The researcher ceased data collection when no new constructs are identified during data collection, which signifies data saturation. The constant comparative method uses the first level of grounded theory coding, open coding.[10] Open coded data represent the thoughts, ideas, and meanings of the subjects. The researcher organizes the open coded data into like categories or groups. The second level of grounded theory coding, axial coding, identifies the connections between the open coded data categories.[10] Analysis of the identified links or categories encompasses the process of the third level of grounded theory coding, selective coding. The researcher creates a central category or link that provides an explanation for the phenomenon under investigation. The selective coding process identifies the theory, which explains the phenomenon under investigation.[10]

Grounded theory coding

We used a grounded theory coding approach to analyze the data for any emerging themes. Coding the data allowed the themes to emerge more promptly. During the interviews, we identified themes from the responses to the research questions and probe questions. We grouped and reviewed the immediately identified themes, which is termed open coding. The open coded data from each interview represents the thoughts, ideas and beliefs of each of the subjects.[10] We used the open coded data to analyze the responses from ongoing interviews until saturation. The open coded data is coded again using axial coding. Axial coding organizes the open coded data into like categories or subcategories.[10] The third level of coding links these subcategories. This third level of coding is selective coding, which groups the categories into a central theory or phenomenon.[10] The selectively coded data represents the general occurrences or experiences of the subjects. The experiences, generated from or grounded in the data,

represent the perception and self-reported behaviors of evidence-based practice in the SATS.

Due to the nature of the research questions and this type of study, no assessment can be

determined. We only will describe the common experiences and actions of the SATS using

EBP.

<div align="center">Trustworthiness</div>

We established trustworthiness[3,4,8] by peer debriefing and multiple analyst triangulation.

We transcribed and coded the first interview. One other experienced qualitative researcher

examined the transcribed and coded data. The experienced qualitative researcher evaluated the

coding of the data. Based on the expert's opinion, there were no changes to the coding strategy.

The PI then continued the interviewing and open coding process while continuing to discuss the

coding strategy with the qualitative research expert. The expert reviewed all three levels of

coding completed by the PI. The PI used the expert's advice and recommendations when

determining the themes and results of this study.

<div align="center">RESULTS</div>

We were able to discover the SATS perceptions of EBP through the open coding analysis

of the 13 transcribed telephone interviews. We then continued to analyze and code the data,

utilizing axial and selective coding. Upon completion of the selective coding process, we were

able to construct a model that represents the EBP behaviors of the SATS. In addition, using this

model we are able to comment on the instructional methods used by ATEP educators to prepare

their ATS' to deliver care-utilizing EBP.

<div align="center">Perceptions of Evidence-Based Practice</div>

The SATS expressed an opinion that they will use medical literature during their clinical

practices. When an area of interest aligns with the SATS' clinical situation, the SATS' will seek

out medical literature and use it during their clinical practices. Below is Dakota's, a SATS,

explanation of the seeking out and utilizing medical literature in an area of personal interest:

> I like the ACL research on what causes (it), why it happens, and why it happens to
> the different genders. I work with a few females that have knee problems, so
> research (that) focuses on which muscles to strengthen and knowing how the core
> is incorporated into it, …teaching them good form. …I am interested in (the)
> ACL…(and) I am more cognizant on research and outside resources. Maybe
> mostly I use research for the ACL, the research…on modalities or kinesiology
> (does not) interest me as much.

> Dakota also went on to describe a reoccurring concern pertaining to utilization of

research and learning in the classroom:

> As a student, I understand the value of research, but I totally understand that
> sometimes it is hard to bridge that gap between the classroom and the athletic
> training room. I am not sure if I know a reason but sometimes it is hard to focus
> on the research that you (just) learned when you are learning so much in the
> classroom.

> Dakota's reflection on "change being hard" was a common feeling among the SATS'.

The SATS' viewed research utilization and EBP as a way to better their clinical practices. Reese

articulated how current behaviors will support a transition from an SATS to an ATC.

> I have the mind frame that…I'm a student for four years, then I'll be practicing by
> myself…I'm not gonna have that safety net of my clinical supervisor…I will say
> to myself "Oh I don't know this, what am I gonna do?"

> While interviewing the SATS' the idea of a "safety net" or a method to find a solution

occurred frequently. Each SATS' stated that as a younger ATS, they relied upon their ACI for

help, but as they progressed through the program, they began to seek out help on their own.

Carson, a SATS, expressed a feeling of uncertainty or lack of knowledge about treatments

observed during her clinical rotations as a senior. She described looking up the medical

literature on different injuries, equipment uses, and treatments seen as:

> (If) I had not encountered it; I wanted to further my own knowledge of it.

The above statements and perceptions of the 13 SATS' interviewed gave a positive outlook on EBP. The breakdown of how these behaviors occurred or how the SATS' used EBP during their clinical practices follows.

<div align="center">Examples of EBP and Instructional Methods</div>

The selective coding process identified four components that represent how the SATS used EBP during their clinical practices. Each component contains insight into the real time applications and educational preparation used to prepare each SATS. The following explanation depicts the order in which a SATS would approach a clinical situation and what educational preparation that was used to prepare the SATS.

Acquisition of Medical Literature

Identified during selective coding, three subcategories emerged which provide insight onto how the SATS' acquired medical literature. Each subcategory addresses the origin of how and why the SATS acquired medical literature.

Student Initiated

During clinical practice, the SATS' found themselves in situations that challenge their current skill set. New, unfamiliar, or rare injuries caused the SATS' to acquire medical literature. Reese describes the following experience:

> …if there is an injury that I haven't really seen a lot, then I'm kinda a little more hesitant and less confident…So I'll have to, I might even provide better care because then I'll go and do the research, and I'll ask the questions and figure out what I need to do.

Carson comments on a situation during a clinical rotation with a football team:

> During (the) end of my football rotation, I looked at more journals to find and correlate what I was learning, (observing), and what research was done.

The above situations caused the SATS' to acquire medical literature, to find a solution to a clinical problem. When addressing the locations in which the SATS' acquired medical literature, a common characteristic emerged. The SATS' were members of a professional organization that published a journal. Reese stated: "(I) read the Journal of Sports Medicine on a regular basis." Another SATS, Mitch, also comments on the usage of professional journals as a source of medical literature:

> I am a member of NATA, so I use (the) Journal of Athletic Training and I am a member of the NSCA, so (read) the Journal of Strengthen and Conditioning.

These behaviors described by the SATS' demonstrate the SATS' personal behaviors. These behaviors are separate from learned behaviors that they use, from the other two subcategories.

ATEP Instruction

The SATS' describe numerous examples of how their ATEP program instructed them on the process of acquiring medical literature. Phoenix describes how instruction on medical literature acquisition is included in the introductory ATEP courses:

> …freshman year, when we were applying to the athletic training program they told us how to access different journals.

Cameron further describes the in-class instruction on how to acquire medical literature:

> One of the first things that professor showed us was how to access and where to access peer reviewed journals. Our professor did a good job showing how to…use our library website.

Following every comment about in-class instruction, each SATS described some variation of the library staff guiding medical literature acquisition instruction. In some cases, the instruction occurred in a general education requirement English course, in another science/allied

health course, or in a higher level AT course. Cameron describes the library staff guiding

medical literature acquisition instruction received in a higher level AT course:

> Our library has tons of different directories like EBSCO host or a number of
> (other databases) that break down and tap into peer reviewed medical journals,
> related to AT…The next year (the entire AT class) went to the library and an
> employee of the library showed us more (of the libraries resources that were
> available to the class).

Each ATEP program incorporated instruction on how to acquire medical literature via

online medical literature databases. The SATS' expressed a familiarity with many of the

different medical literature databases. The other methods in which the SATS' acquired or

observed methods in which to acquire medical literature are included in the last subcategory.

Other Exposures

This last category highlights a few of the unique examples in which SATS' were able to

acquire medical literature. Casey, a SATS, describes how a physician, associated with the

ATEP, would post medical literature pertaining to "different types of fractures or different kind

of injuries" seen in the athletic training room. Jackson, a SATS, also describes exposure to

medical literature at an AT regional conference:

> I go to the SEATA conference and…will see a different ways of taping or a
> different exercise for core strengthening.

The last unique method described by the SATS' occurs when working with graduate

assistant athletic trainers. Avery describes the experience:

> …the graduate student I worked with last semester…she took the ideas from
> (medical literature) and shared them with me…

Quality Assessment of the Medical Literature

Through the selective coding analysis, two subcategories form the Quality Assessment of the Medical Literature category. Each subcategory represents a method in which the SATS' determine the quality of the medical literature.

Instruction on Determining Quality

The SATS' received guidelines or specific criteria to determine the quality of medical literature. In a few cases an AT professor required the SATS' search online medical literature databases following specific search criteria. Reese describes AT professor search criteria limitations:

> …professors will set a (publication) year that they want, they do not want any journals (published) before 2000…Some athletic training classes (require sources) specifically from the JAT.

Dakota describes the criteria mandated by an AT professor for a class project:

> Most of the guidelines are if you want good info go to library website and look online journals databases, not Google. You then can select peer-reviewed and then the JAT.

The previous two examples represent how SATS' learned to limit searches of online medical literature databases. Some of the SATS' expressed receiving detailed instruction on assessing the quality of the medical literature. Alex explains the detailed instruction received in therapeutic modalities class:

> We did evidence based "stuff", we looked at every little part of the experiment from choosing the subjects to the type of equipment they use(d) and the format of the experiment.

Self-derived Criteria

The SATS' expressed situations in which they applied their own criteria or evaluative techniques when acquiring medical literature. The SATS self-derived criteria were similar to the

detailed instruction received in AT courses, but each SATS expressed their self-derived

evaluations as being a "subjective process." Jamie, a SATS, discusses an experience using a

self-derived evaluation of medical literature:

> the ones that I kinda knew were not…I decided it…I decided it subjectively. It
> does take an awhile to look up something quality, but when you find it you know
> it.

Casey described her detailed self-derived criteria that she uses when assessing medical literature

for an AT class project:

> I would see how (the authors) went about, the objective of their experiment…and
> what kind of results they had…Did they have a long list of results (or) did they
> not do a whole lot of research in what they were going after. (I determine) how
> much effort…they put into (the experiment).

Hank describes another detailed self-derived assessment method:

> I always made sure (the resource) is peer reviewed. Just reading it and if there
> was a small sample or there was a discrepancy in the beginning or (if the authors)
> state if problems occurred.

> It is important to note, the SATS' experiences with assessing the quality of medical

literature occurred when assessing the medical literature to used for ATEP class projects. None

of the SATS' expressed assessing the acquired medical literature used when solving a problem

for their clinical practices.

Research Utilization

When analyzing the research utilization responses from the SATS' two subcategories

emerged. The SATS' either used medical literature when addressing a current clinical situation

or to gain further insight into an observed clinical scenario. The immediate application

subcategory addresses the actions of the SATS when they use medical literature to guide their

clinical practice decisions. The second subcategory further knowledge discusses the SATS'

actions that allow the SATS' to understand the medical literature that supports ongoing clinical

practices.

Immediate Application

When analyzing the research utilization responses, medical literature was able to help

Jamie, a SATS, make a medical literature supported clinical decision:

> By reading (medical literature) on ways to assess concussions, I then took it back
> into my clinical site and it kind of helped me…I remember thinking back, "Oh
> that article said this symptom and this symptom."

Jamie went on to express that, "medical literature gave her confidence in her concussion

assessments skills." Phoenix, another SATS, described how medical literature provided

guidance on better hydration techniques:

> This year we found some hydration articles, so this year we tried to incorporate
> them into our (clinical) practice to keep our guys better hydrated. A student
> brought the research to the attention of athletic training staff…the research was
> from research (that was) read during one of the (AT) classes.

Further Knowledge

The SATS' were able to describe how they used medical literature to increase their

knowledge about ongoing clinical practices. Carson, a SATS, states, "(If) I had not encountered

it I wanted to further my own knowledge of it." Carson then went on to discuss to utilizing

medical literature to gain further knowledge an ongoing clinical situation:

> One of the football players had a posterior lateral corner knee injury and after his
> surgery, he had a nerve block, with the pain medicine in it. So I wanted to see
> how (the nerve block) worked. I didn't know what type of procedures & surgeries
> it is used with. I was just interested in learning more about (nerve blocks)
> and…we had never learned about it (in class).

Hank, another SATS, went on to explain how reading medical literature changed his

current clinical practices and compared it to other ATC's current clinical practices:

> After reading a lot of the different articles and talking to my clinical advisor …I have changed how I apply laser treatments. Before we were just applying it to bruises and that kind of stuff, now I will often apply it to tendonitis. I compare the different (wattage recommendations) from the articles I have been reading, under the supervision of my clinical advisor of course, and we talk about it.

Hank described his experience utilizing research that not only increased his knowledge pertaining to ongoing usage of the laser modality, but he was also able to apply the recommendations from medical literature into his ongoing clinical practices.

Patient Education

Analysis of the SATS' responses revealed that communication with patients is an important and common skill that each SATS used to educate their patients. Many of the SATS' openly discussed their practices of communicating, by openly talking, to their patients during injury evaluations, about potential treatments or discussing how to cope participation restrictions. Dakota explains how patient education allows the patient to understand the suggested health care decisions:

> A lot of the information that athletic training students and staff know, the athletes do not know…Getting them to understand our thought process, so that we can get them to be on the same boat with us… Every athlete is competitive and wants to be out on the field, when they understand what is wrong with them and the implications of the injury, they understand why they are sitting out or why they are only practicing in a limited capacity.

Another SATS, Carson, explains why she values open communication and how she is able to portray confidence in her health care decision to the patient:

> I like to make sure the patient or the athlete knows what I am doing is going to help or they know how it works, to educate them… I want them to know what is being done to them in the process so they get a good firm grasp on rehab or anything they do and they can ask me questions of what we are doing. I let them know that I have some confidence about it; I give them the right answer and not the wrong info so they have some confidence and reassurance.

Establishing this open communication allows the SATS to be able to educate their patients. This open communication establishes the ability for the SATS to discuss a patient's opinion about the health they wish to receive.

SATS EBP Integrated Model

The SATS EBP Integrated model (Figure 3) incorporates each of the axial- and selective-coded themes. These themes represent the identified categories and subcategories, which illustrates the SATS' method of delivering care-utilizing EBP. The SATS EBP model first demonstrates how SATS locate and establish the most appropriate literature. The Acquisition of Medical Literature and Quality Assessment of the Medical Literature categories interact with each other. This interaction demonstrates that SATS' seek medical literature as well as assess the medical literature simultaneously. The SATS then uses the good quality medical literature. The utilization of the medical literature requires the SATS educate their patient.

The SATS EBP integrated model (Figure 3) is a two-step four-component model. The two components in step one (Acquisition of the medical literature category & Quality Assessment of the Medical Literature category) interact with each other and represent how a SATS acquires the current and best medical literature. Once the SATS acquires the current and best medical literature, the SATS attempts to use the acquired medical literature. Utilization of the acquired medical literature requires the SATS to educate their patient. Step two of the SATS EBP integrated model demonstrates this by the interaction of the two components in step two (Research Utilization category & Patient Education category). Completion of step two represents how the interviewed SATS' can make a clinical decision utilizing the current and best medical literature available, while also considering their patient's values and opinions.

DISCUSSION

The SATS responses allowed us to draw conclusion about their perceptions, self-reported behaviors, and instructional methods used to educate them about EBP. When we began the process of validating the results from this study, we made a discovery. Numerous medical professions have published literature focused on perceptions of EBP and instructional methods used to teach EBP among professionals and students. We will start by discussing the similar perceptions of EBP discovered between the other allied health professions and our SATS. Then we will compare and contrast the different educational interventions expressed by other medical professions in preparing its individuals to use EBP.

Perceptions of Evidence-Based Practice

Occupational therapists (OT) and Physical therapists (PT) have echoed their support of EBP. In a similar methodological study to ours, OT students (OTS) described EBP as the method to advance the OT profession and provide the best care to their patients.[13] The OTS went on to describe how utilizing EBP in their "fieldwork" allowed them to have the "book knowledge", but also to have the "street smarts" to apply the information in clinical situations. The clinical supervisor's of the OTS were observed utilizing evidence in their clinical practices.[13] The utilization of evidence by medical professionals was also discussed in a study evaluating the beliefs, attitudes and knowledge of EBP among PT's.[14] The PT's in the study rated their attitude towards EBP as a necessary to improve patient care and helps their decision making process. The uniqueness of the study evaluating PT's attitude towards EBP and the OTS' observation of their clinical supervisor's utilizing EBP clinically in both studies described a potential modeling of EBP. Modeling EBP to students, young professionals or other

colleagues was expressed as an important facilitator of EBP[13,14], but was absent in our SATS responses.

Teaching Evidence-Based Practice

We will follow the flow SATS EBP integrated model (Figure 3) when discussing the teaching strategies of EBP. We feel this will allow a direct comparison to occur between the SATS and other medical professionals described strategies. We will start by discussing the comparisons of the acquisition of medical literature.

The SATS acquire medical literature to provide insight for an unfamiliar clinical situation (injury or treatment) or due to an ATEP assignment. A study addressing the acquisition of medical literature behaviors of PT's described how the acquisition behaviors fell into three categories: proactive, reactive or a combination of both.[15] The SATS in our study potentially expressed acquiring medical literature utilizing all three categories. When the SATS expressed acquiring medical literature to address an unfamiliar clinical situation (injury or treatment), this can be described as a "reactive" behavior.[15] The SATS described how they used their professional memberships to access medical literature databases. A study addressing how to teach PT's to access medical literature also suggested using their memberships to professional organizations to access pertinent medical literature databases or resources.[16] The "proactive" behavior[15] described by the SATS occurred during ATEP assignments, which required the SATS to support their assignment with medical literature acquired from online medical literature databases. Nursing, PT and professional librarian literature provide support for the instructional methods described by the SATS. Nursing programs have adopted EBP courses into their freshman curricula.[17] These freshman nursing courses addressed how to effectively search online medical literature databases and other sources of EBP material. Inclusion of the EBP

course early on in the curriculum is similar to what SATS expressed when discussing receiving instruction in their introductory ATEP courses. The continued inclusion of advanced EBP assignments and projects expressed by the SATS is supported by studies addressing how to teach nursing and PT students EBP.[16,18] The SATS received advisement on how to use library services in their search medical literature. Librarians have published literature discussing how they can support EBP.[19,20] By introducing library services or allowing librarians to take more of an integral role in the implementation of EBP education, students and professionals in all medical professions, can benefit.[15,19,20] The final medical literature acquisition behavior mentioned by the SATS can be categorized as a "reactive" and "proactive" behavior. The SATS used other colleagues versed in EBP (graduate assistants), professional conferences, and/or workshops as a source of medical literature. PT's described using colleagues, who were "champions" in EBP, and literature received at professional workshops as sources of medical literature.[15]

The SATS expressed a limited ability or understanding of how to critically appraise literature. A study evaluating the outcomes of EBM teaching practices pertaining to medical students determined that integrating an EBM course into a curriculum and the medical students' clinical rounds could foster adequate critical appraisal skills.[21] A study of PT's demonstrated, by including a competency addressing critical appraisal in the PT curriculum, allowed PT's to be confident in their critical appraisal skills.[22] The SATS did express certain criteria in which they appraised medical literature by, but they stated that it was a subjective process. Nursing has eliminated the idea of critical appraisal being a subjective process by including research course into their curriculum.[23,24] The nursing courses along with creating a clinically appropriate question allowed the nurses to efficiently and effectively to critically appraise medical literature.

We now follow the SATS EBP integrated model (Figure 3) to the point in which the SATS are now applying the appraised medical literature to their clinical practice. The utilization of medical literature described by the SATS follows the conceptual structure of research utilization described in nursing research.[25] Research utilization can occur via three ways: Instrumental, Conceptual or Symbolic. The two circumstances in which the SATS describe utilizing research fall into either: Instrumental (Direct) or Conceptual (Indirect). Using research to make a specific clinical decision defines[25] Instrumental research utilization, which corresponds to the SATS describe research utilization behavior of "immediate application." When a clinician uses research to gain knowledge or information, this describes Conceptual research utilization.[25] The SATS demonstrated Conceptual research utilization when describing the "further knowledge" activities.

The final component in the EBP integrated model (Figure 3) defines one of the unique characteristics of EBP, the incorporation of patient values and beliefs. The SATS expressed behavior of patient education, which mirrors the suggested behavior for the other medical professions. In a study evaluating the methods in which physicians discuss health care with their patients to increase the trust that the patient has in the physician. The authors identified a few successful behaviors which increased the patient-physician trust and the patients knowledge of their condition.[26] Long discussions, allowing the patient to ask questions and giving meaningful answers to the patients questions were behaviors deemed successful.[26] These successful behaviors match and supported the SATS patient education behaviors. Nursing literature also goes on to support the use of open communication and discusses the increased time that nurses spend at the "bedside" of their patients. The increased bedside time allows them a better environment to hold open and long patient discussions.[27] Athletic trainer's compare to nurses in

this situation. Athletic trainers communicate or care for their patients on a day-to-day basis.

This allows for the same opportunity as the nursing literature describes to hold open and long

patient discussions.

Conclusion

In summary, the SATS' described knowledge of EBP and how to use it in clinical

practice. It is important to note that none of the SATS interviewed expressed completing the

entire EBP process. The SATS EBP integrated model (Figure 3) represents the individual EBP

component behaviors of the SATS. By incorporating each of the individual EBP component

behaviors, we were able to hypothesize the potential method in which SATS are currently able to

use EBP in their clinical practices.

Other medical professions seemed to have structured their curriculums around the

utilization of EBP to guide their clinical practices. Although the SATS did describe instructional

methods use to educate them on EBP, it does not seems as structured as nursing[17], PT[16], or OT[13].

Curricula should focus improving the ability of ATS to assess the quality of medical literature.

The SATS in this investigation did not demonstrate the skills necessary to competently assess the

quality of medical literature. Through the continued integration of EBP education into all levels

of athletic training education, the profession can continue to enhance itself as a prestigious allied

health profession.

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FIGURES

Figure 1 <u>Carnegie Classification of Institutions of Higher Education of SATS ATEP Institutions</u>

Carnegie Classification	# of Institutions
Balanced arts & sciences/professions, some graduate coexistence.	7
Professions plus arts & sciences, some graduate coexistence.	2
Professions plus arts & sciences, high graduate coexistence.	1
Professions plus arts & sciences, no graduate coexistence.	1
Arts & sciences plus professions, high graduate coexistence.	1
Arts & sciences plus professions, no graduate coexistence.	1

Figure 2 <u>Interview Guide:</u>

Hi _____
- I have been contacting you over the past couple weeks about allowing me to interview you about your clinical practices. Are you still interested and available to today?
- Ok, I need to go over a couple quick things before we get started:
- First, this investigation has been approved by the institutional review board here at Indiana state university. I will record our conversation for data analysis. The recording and any other information linking you to this investigation will be kept confidential. Do you give me permission to record our conversation today?
- Second, I want to let you know we can stop the interview at anytime. All I would like to do is get an idea about the things you do as an athletic training student. There are no right or wrong answers to anything we are going to discuss. Do you have any questions before we begin?
- Alright well let's get started.

1. I wanted to start off by having you tell me about a situation that has occurred during your clinical experiences, in which you have had difficulty determining the diagnosis of an injury?

2. Did you seek help? How?

3. Please tell me about a situation that has occurred during your clinical experiences in which you had difficulty in determining a treatment program?

4. Did you seek help? How?

5. Tell me about a situation in which you have incorporated a new skill into to your clinical practice?

6. Have you ever incorporated a skill you learned from reading medical literature into your clinical practices? Tell me about it?

7. Tell me about a situation in which you were required to look up and/or utilize medical literature?

8. How do you access medical literature? (Any other methods?)

9. Have you been given any instruction on how to access medical literature?

10. How do you determine the quality of medical literature?

11. Tell me about how you evaluate the care you are providing to your patients?

12. How do you include your patient's opinion in the care you deliver?

13. Describe to me a situation in which your patient's opinion or feelings changed the care you were going to deliver?

Figure 3 <u>Senior Athletic Training Student Evidence-Based Practice Integrated Model</u>

<u>Senior Athletic Training Student Evidence-Based Practice Integrated Model</u>

Acquisition of Medical Literature   **Quality Assessment of the Medical Literature**

Research Utilization

EBP
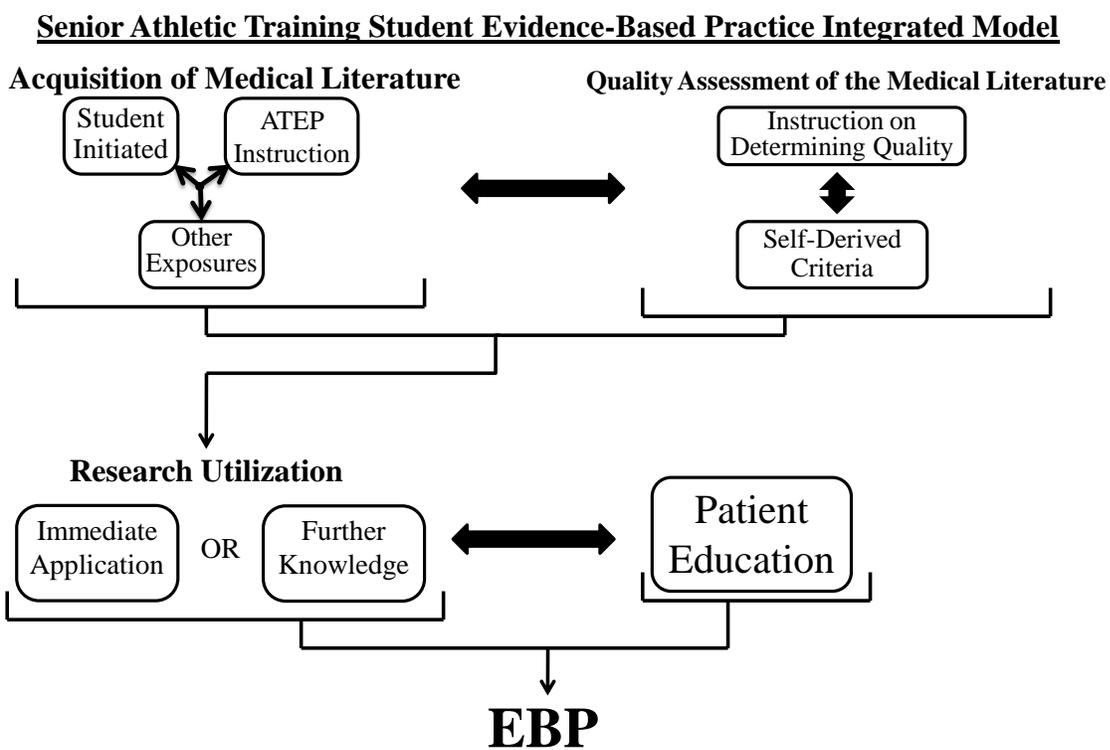
APPENDIX A: STUDY PARAMETERS

Assumptions & limitation

The inclusion of evidence-based practice into the fourth edition[8] of the athletic training educational competencies, we assume that the entry-level athletic training educational programs have altered their curriculums to include the instruction and mentorship of evidence-based practice as the method which we deliver care to patients. Responses provided strong insight into the perceptions and self-reported behaviors of the 13 senior athletic training students.

APPENDIX B: PROJECT DEVELOPMENT

Pilot Testing

We administered individual telephone interviews to three first year graduate students

enrolled in a master level advanced ATEP. The researcher will contacted each graduate student

anonymously by email. This email discussed the purpose of the pilot study, the procedure of the

pilot study, statement of confidentiality and availability. The purpose of the pilot study is to

determine the value and identify any complications with the research questions. We saved the

recorded interviews on the researcher's laptop. We will not use the interviews in any data

analysis or determination of any conclusions for this research project. We will save and secure

the pilot interviews in the same manner as the subject interviews.

Pilot testing of interview procedure

The PI conducted individual telephone interviews using the Nortel CS1000M Hybrid

PBX telephone system (Toronto, Ontario) which includes the Nortel Integrated Conference

Bridge (Toronto, Ontario) system along with the JK Audio QuickTap device (Sandwich, Illinois)

to record the entire conversation. Each pilot interview followed the same interview guide used

during the subject interviews. The PI wrote down comments of any difficulties that occur during

the interview. We asked each graduate student if there are any suggestions or questions. The

significance of this is to gain more feedback on the interview guide and procedure. We reviewed

each interview and made necessary changes to the interview protocol.

Pilot testing results

We completed three pilot interviews. No complications with equipment or recording software occurred. The 12-interview questions successfully addressed its intended topic and allowed each subject to explain in rich detail. We used Probes[44] to determine the educational preparation of obtaining medical literature and occurrences of using medical literature in clinical practice. We believe will obtain rich descriptive data if we follow the interview guide.

APPENDIX C: RELEVANT STUDY FORMS

Interview Guide:

Hi _____

- I have been contacting you over the past couple weeks about allowing me to interview you about your clinical practices. Are you still interested and available to today?
- Ok, I need to go over a couple quick things before we get started:
- First, this investigation has been approved by the institutional review board here at Indiana state university. I will record our conversation for data analysis. The recording and any other information linking you to this investigation will be kept confidential. Do you give me permission to record our conversation today?
- Second, I want to let you know we can stop the interview at anytime. All I would like to do is get an idea about the things you do as an athletic training student. There are no right or wrong answers to anything we are going to discuss. Do you have any questions before we begin?
- Alright well lets get started.

1. I wanted to start off by having you tell me about a situation that has occurred during your clinical experiences, in which you have had difficulty determining the diagnosis of an injury?

2. Did you seek help? How?

3. Please tell me about a situation that has occurred during your clinical experiences in which you had difficulty in determining a treatment program?

4. Did you seek help? How?

5. Tell me about a situation in which you have incorporated a new skill into to your clinical practice?

6. Have you ever incorporated a skill you learned from reading medical literature into your clinical practices? Tell me about it?

7. Tell me about a situation in which you were required to look up and/or utilize medical literature?

8. How do you access medical literature? (Any other methods?)

9. Have you been given any instruction on how to access medical literature?

10. How do you determine the quality of medical literature?

11. Tell me about how you evaluate the care you are providing to your patients?

12. How do you include your patient's opinion in the care you deliver?

13. Describe to me a situation in which your patient's opinion or feelings changed the care you were going to deliver?

Initial email

Dear student athletic trainer,

       My name is Greg Schneider LAT, ATC and I am a graduate student at Indiana State University. I have contacted you to ask for your participation in my research study. I am conducting individual telephone interviews of senior athletic training student's. If you are a senior athletic training student and have access to a telephone, you meet all of my criteria needed to participate.

Please consider helping me out by being a subject. Your participation will require you to complete **<u>ONLY ONE</u>** telephone interview.

If you would like to participate, please respond back by your preferred email address. I will get back to you as soon as possible.

If you have any questions or concerns do not hesitate to ask.

Thank you for your time,

Greg Schneider LAT, ATC
Indiana State University
Graduate assistant athletic trainer
Cross country/track and field
614-582-7145
Gschneider1@indstate.edu

<div align="center">Follow-up Email</div>

Dear (Subject Name),

      Thank you for volunteering to participate in my research study. First, before we go on I want to verify that you are senior athletic training student and have access to a telephone. If you answered yes to both of these criteria please read on, if not then, unfortunately, you cannot participate in this study.

      I really appreciate your participation because this research project is the basis of my master's thesis. As mentioned in the previous email, I am conducting telephone interviews. I would like to discuss your clinical experiences during the interview by asking a few questions. I will record the entire interview so that I can reflect back on our discussion. I will keep the recording and your participation in the study confidential at all times. I expect that each interview will take 45 minutes. On the day of the telephone interview, I will call you by using your preferred telephone number. I can complete the interview at anytime that best fits into your schedule. I will keep your preferred telephone number confidential and I will erase it from my records upon completion of my study.

      In addition, due to an institutional review board requirement, I will need to obtain a signed informed consent document from you. I have proposed three methods in which I may receive the signed inform consent document. First, you may mail back the signed informed consent document through the mail. You will be receiving the informed consent document a pre-stamped and addressed envelope to your preferred mailing address. Please include the mailing address in your response to this email. Second, attached to this email is an electronic copy of the informed consent document. You may download the document, place an electronic signature on the document, and email it back. The third option is to print the attached informed consent document, sign the document, and fax it to the fax number at the bottom of this email. Please choose the most convenient method.

      Lastly, I would like to obtain the necessary information from you. If you could please provide me with the following information:

      Preferred phone number:

      Mailing Address: (if you choose to mail the signed informed consent document)

Also, please take some time to look at your schedule and determine when you would be available to complete your interview. I would suggest you block out an hour worth of time, but I do not expect the interview to last more than 45 minutes.

So please take some time to time to look at your schedule and let me know when you are available. Your rapid response is greatly appreciated.

Thanks again for your participation.

Greg Schneider LAT, ATC
Indiana State University
Graduate assistant athletic trainer
Cross country/track and field
Phone: 614-582-7145
Fax: 812-237-4368

CONSENT TO PARTICIPATE IN RESEARCH

Senior Athletic Training Student's Perceptions and Self-Reported Behaviors of Evidence-Based Practice

You are asked to participate in a research study conducted by Greg Schneider LAT, ATC and Dr. Cat Stemmans, PhD, LAT, ATC, from the Athletic Training department at Indiana State University. This research study is required part of Greg Schneider LAT, ATC master's thesis. Your participation in this study is entirely voluntary. Please read the information below and ask questions about anything you do not understand, before deciding whether to participate.

OPTIONAL: You have been asked to participate in this study because you as a senior athletic training student soon will be a certified athletic trainer. You represent an important group due to the most recent athletic training educational guidelines and requirements provided the basis for your undergraduate athletic training education.

- **PURPOSE OF THE STUDY**

We will conduct an individual telephone interview. This interview will provide a record of your clinical experiences and knowledge of the utilization of medical literature during clinical practice.

- **PROCEDURES**

If you volunteer to participate in this study, we will ask you to do the following things:

Complete a telephone interview by allowing us to contact you by phone. We expect the telephone interview to last 45 minutes, but please reserve one hour's worth of time. Each interview consists of 12 interview questions. Please answer each question in as much detail as possible. We may contact you by email to ask for further detail or inquire more about your responses to the interview questions.

We will record each interview to allow us to analyze your responses in the future. We will create an electronic recording of the entire conversation. We will save each electronic recording on the researcher's secured laptop. Please be aware of the length of time expected for the interview. We will be calling from an Ohio local number (614 area code). We will not be responsible for any charges that may occur. We will adjust the date and time of the telephone interview to adhere to any potential charges.

- **POTENTIAL RISKS AND DISCOMFORTS**

Participation in this study exposes you to minimal risk. We will keep the recording of each interview confidential and only one researcher will have access to the electronic recording of each interview.

- **POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY**

The responses to the interview question will provide an account of undergraduate athletic training education.

- **CONFIDENTIALITY**

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of using pseudonyms in replacement of any names or locations. We will electronically label each interview by time and date of the interview only.

- **PARTICIPATION AND WITHDRAWAL**

You can choose whether or not to be in this study. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you do not want to answer. There is no penalty if you withdraw from the study.

- **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about this research, please contact Greg Schneider ATC, LAT by phone: 614-582-7145 or email: gschneider1@indstate.edu or Dr. Cat Stemmans by phone: 812-273-3693 or email: Cat.Stemmans@indstate.edu.

- **RIGHTS OF RESEARCH SUBJECTS**

If you have any questions about your rights as a research subject, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of Sponsored Programs, Terre Haute, IN 47809, by phone at (812) 237-8217, or e-mail the IRB at irb@indstate.edu. You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with ISU. The IRB has reviewed and approved this study.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Printed Name of Subject

_____   _____
Signature of Subject   Date

Leave this amount of space
for IRB approval stamp (unless
you plan to include the approval
information in the text of the ICD)

APPENDIX D: RAW DATA

Not applicable for this study. Interview transcriptions kept concealed to uphold confidential

participation.

APPENDIX E: STATISTICAL ANALYSIS

Not applicable for this study. Statistical analysis not needed due to qualitative methodology of study design.

APPENDIX F: RECOMMENDATIONS

Continue to implement EBP into all levels of athletic training education. Future studies should focus on the ability of athletic training professionals and students to use EBP as the method in which they deliver care to their patients. Publishing any unique or successful EBP educational strategies will allow an efficient and effective transition in athletic training education.