

Future Directions of Evidence-Based Practice in Athletic Training: Perceived Strategies to Enhance the Use of Evidence-Based Practice

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Context: The shift to a culture of evidence-based practice (EBP) in athletic training is a necessary step in both the optimization of patient care and the advancement of athletic trainers (ATs) as health care professionals. Whereas individuals have gained knowledge in this area, most ATs still are not practicing in an evidence-based manner. Exploring perceived strategies to enhance the use of EBP will help to determine the best approaches to assist ATs in applying EBP concepts to practice to improve patient care.

Objective: To explore beneficial strategies and techniques ATs perceived would promote successful implementation of EBP within athletic training education and clinical practice.

Design: Qualitative study.

Setting: Individual telephone interviews.

Patients or Other Participants: Twenty-five ATs (12 educators, 13 clinicians; athletic training experience = 16.00 ± 9.41 years) were interviewed.

Data Collection and Analysis: One phone interview was conducted with each participant. After the interview was transcribed, the data were analyzed and coded into common themes and categories. Triangulation of the data occurred via

the use of multiple researchers and member checking to confirm the accuracy of the data.

Results: Participants identified several components they perceived as essential for enhancing the use of EBP within the athletic training profession. These components included the need for more EBP resources, more processed information, focused workshops, peer discussion and mentorship, and continual repetition and exposure. Participants also indicated that ATs need to accept their professional responsibilities to foster EBP in their daily practices.

Conclusions: The proper shift to a culture of EBP in athletic training will take both time and a persistent commitment by ATs to create strategies that will enhance the implementation of EBP across the profession. Researchers should focus on continuing to identify effective educational interventions for ATs and to determine successful strategies to implement EBP into didactic curricula and clinical practice. Additional focus should be given to which strategies most effectively produce changes in clinical practice.

Key Words: professional responsibility, mentorship, evidence-based medicine, qualitative research

Key Points

- Participants perceived that certain strategies might enhance the inclusion of evidence-based practice concepts throughout athletic training.
- Researchers should continue to identify effective educational interventions for athletic trainers and determine successful strategies to implement evidence-based practice into didactic curricula and clinical practice.
- Focus also needs to be placed on strategies that most effectively achieve knowledge translation to effect change in clinical practice.

The athletic training profession has begun to place greater emphasis on evidence-based practice (EBP) to align with the 2003 recommendations from the Institute of Medicine.¹ These recommendations focus on the inclusion of 5 core competencies: (1) delivering patient-centered care, (2) working as part of interprofessional teams, (3) practicing evidence-based medicine, (4) focusing on quality improvement, and (5) using information technology. While focusing on the EBP competency, researchers have reported that athletic training students,

educators, and clinicians believe that EBP is an important shift for the profession,^{2–6} but barriers, including time, accessibility to resources, and knowledge of EBP concepts, are preventing athletic trainers (ATs) from applying this paradigm to clinical practice.^{6–9} The release of the fifth edition of the *Athletic Training Education Competencies*,¹⁰ which includes an EBP focus, has provided a preliminary mechanism for helping future generations of ATs overcome some of these barriers at the professional education level. The hope is that the inclusion of EBP concepts within

curricula will promote a new generation of clinicians who will translate the concepts of EBP into their daily clinical practices. The incorporation of EBP will require ATs to understand and teach the principles of EBP didactically and to be familiar with and willing to implement these concepts into clinical practice.

As athletic training education moves toward EBP, practicing clinicians also must embrace and adopt this paradigm shift. The approach to creating a culture of EBP needs to be multifaceted^{7,11} and must be targeted at all ATs, including those who have been reared in a culture of tradition. Overall, one of the main goals of athletic training is to improve the outcomes of the care provided to patients.¹² However, until all members of the profession are willing to accept this paradigm shift, athletic training may never fully embrace an EBP culture.

Leaders in the profession recognize the need for change and are attempting to move in this direction.¹³ In addition to updating the educational competencies, more continuing education in the area of EBP has become available to ATs.¹⁴ The board of directors of the National Athletic Trainers' Association (NATA) provided funding for the development and dissemination of educational EBP modules that were made available to the entire NATA membership free of cost.¹⁵ A randomized controlled trial on the ability of these modules to increase knowledge of EBP concepts revealed that they were an effective mechanism to teach these concepts to ATs.¹⁵ Only an immediate knowledge increase was assessed, and no authors of the current literature have explored long-term knowledge retention and translation among ATs or implementation practices resulting from the Web-based modules.

Whereas education of current ATs is a vital step in shifting the culture of the profession, merely increasing knowledge cannot be assumed to correlate with an actual change in clinical practice. Researchers have conducted multiple systematic reviews in which they assessed the effectiveness of educational interventions on clinical practice changes. Forsetlund et al¹⁶ concluded that educational meetings elicit small improvements in professional practice and health care outcomes. Freemantle et al¹⁷ reported that printed educational materials, audit and feedback, and meetings or workshops had little to no effect on clinical practice. Most investigators^{16–20} have determined that multifaceted educational interventions (eg, didactic lecture combined with interactive discussion) and active rather than passive interventions are most effective in changing professional behavior. Oxman et al²¹ and Foy et al²² found that interventions can only be effective in changing behaviors under ideal conditions, so multiple factors, including the condition and patient and clinician attributes, should be considered when developing an educational intervention. Overall, authors^{19,23} of the majority of studies conducted to assess clinical practice changes after an intervention have indicated that most interventions are effective under some circumstances but that no single intervention is effective for all circumstances.

The true shift to EBP in athletic training requires not only enhanced knowledge of EBP concepts but also a translation of this knowledge into practices that will improve patient care outcomes. Therefore, it is important not only to assess if a knowledge gain has occurred but also to determine if and how this knowledge has translated to clinical practice.

Recently, researchers²⁴ have revealed that whereas ATs perceive they have retained knowledge gained from the Web-based modules, they have not shifted that knowledge to their daily practices in patient care. For this reason, it is necessary to seek strategies that will be most effective in bridging the gap between knowledge and practice. Qualitatively exploring the perceptions and experiences of ATs will lead to a rich perspective of which mechanisms they perceive will be most effective in shifting ideas and behaviors toward clinical practice and didactic education. A qualitative exploration allows participants to provide ideas that are not limited by the researchers' opinions and biases and ideas that they believe will ultimately influence their behaviors. Therefore, the purpose of this qualitative study was to explore the experiences and theories ATs have toward identifying beneficial strategies and techniques to promote successful implementation of EBP within athletic training education and clinical practice.

METHODS

Design

We chose the consensual qualitative research (CQR) approach to complement the emergent design of this investigation. The CQR approach is a strategy that integrates grounded theory,²⁵ phenomenology,²⁶ and comprehensive process analysis.²⁷ It focuses on the incorporation of multiple researchers and a methodologic review of several participant cases to reach a thorough and accurate description of the results.²⁸ We selected the CQR approach for this qualitative investigation to explore ATs' experiences with and theories about mechanisms that would enhance their knowledge and use of EBP throughout didactic education and clinical practice. More specifically, this study was designed to provoke a discussion of what these individuals believed to be important strategies, interventions, and techniques to integrate EBP throughout didactic education and clinical practice.

A well-constructed research team with diverse membership is a fundamental component of CQR. To overcome complex issues that often arise within qualitative data, members of the research team need to provide multiple perspectives, opinions, and levels of awareness to increase the approximation of the truth and to diminish researcher bias.²⁸ The research team for this investigation is described in an earlier study.²⁴

Participants

Participants were recruited using criterion-based sampling and stratified purposeful sampling methods. A cornerstone of criterion-based sampling is that this method ensures that participants provide the most meaningful results and that the data collected are highly applicable to the population.^{28,29} Therefore, based on a predetermined set of criteria, we selected participants who would provide the most valuable insight into the research aims. To be considered as viable candidates for this study, ATs had to have participated in the experimental group of a previous study¹⁵ and had to have accessed all 10 Web-based learning modules, which was determined through the Web-based module usage data sheet that the NATA office provided. Stratified purposeful sampling, sometimes considered as a

sample within samples, allowed us to capture major variations that might occur across a population.³⁰ To ensure a true representativeness of the athletic training population, we invited an equal number of clinicians and educators to participate in this study.²⁴

Eighty-nine of the 164 ATs who accessed the Web-based modules in the previous investigation¹⁵ met the predetermined criteria for this study. The research team confirmed data saturation of both branches of the interview protocol after 25 ATs (14 women, 11 men; athletic training experience = 16.00 ± 9.41 years) had been interviewed. Demographics of the participants in this investigation were described in an earlier study.²⁴ All participants gave written informed consent via e-mail and orally at the beginning of each individual interview, and the study was approved by the Old Dominion University Human Subjects Committee for Exempt Research.

Instrumentation

The CQR approach focuses on the use of open-ended questions (ie, interviews, questionnaires) and a semi-structured approach to ensure consistent data collection across all participants.²⁸ Given that no previously established protocol had addressed the specific research aims of this investigation, the research team searched available related literature^{4,6-9,15,18-20,23,28} and developed a new semistructured interview protocol. The unique protocol consisted of 12 open-ended main questions (see Table 3, page 223 of this issue²⁴) and potential questions that were used to probe more thoroughly when the researcher believed it was necessary.

Procedures

The primary investigator (C.E.W.) initially identified potential participants who met all inclusion criteria and stratified the potential sample before participant recruitment. After consent was received and before the interviews were conducted, participants were further stratified into 1 of the 2 interview branches in the following manner: (1) their primary athletic training role was clinical, and they were more apt to provide in-depth feedback on questions relating to clinical practice; or (2) their primary athletic training role was educational, and they were more apt to provide in-depth feedback on questions relating to didactic curricula. Recruitment and transcription procedures for this study were implemented as described in an earlier study.²⁴ This investigation began in November 2011 and continued until data saturation was met for all questions in each interview branch (December 2011).

Data Analysis and Management

The data-analysis and -management procedures for this investigation were described in an earlier study.²⁴ Given the subjective nature of qualitative research, it was essential to use several strategies to enhance the validity of the results. The nature of the CQR approach chosen for this investigation diminished bias via triangulation and peer debriefing. Ensuring that at least 2 researchers were involved in each phase of data analysis guaranteed continual triangulation of the data. The internal and external auditors provided additional viewpoints and

ensured that multiple perspectives were considered.²⁸ In addition to triangulation and peer debriefing, we used member checks in various forms throughout data collection to guarantee coherence between the intended purpose and the methods of the investigation.³⁰ The primary investigator (C.E.W.) could ask probing questions during the individual interviews to confirm proper interpretation of responses and to focus on specific concepts when deemed necessary. Furthermore, we allowed participants to review their transcripts to confirm the accuracy and representativeness of the responses and to provide additional insight and details into their ideas and experiences.

RESULTS

The CQR emergent design revealed 5 themes of the EBP Web-based modules. The Figure demonstrates the conceptual framework of these themes. For the purposes of this study, we focused solely on educators' and clinicians' perceptions of useful strategies to continue to integrate and use EBP throughout all facets of the athletic training profession.

Throughout data analysis, it was evident that ATs had several ideas for strategies that they perceived would help the profession incorporate EBP into didactic education and clinical practice. Data from this theme were reduced into 6 categories: provide more resources for implementation, more processed information, offer focused workshops, peer discussion and mentorship, continual repetition and exposure, and professional responsibility. The frequency of participant cases per category is displayed in the Table.

Provide More Resources for Implementation

Athletic trainers typically discussed the need for more resources. Participants reported that these resources are essential for effective implementation into didactic curricula and that the profession of athletic training is lacking such resources. Suggestions ranged from general EBP resources, such as books, to very specific resources, such as project examples or ideas on how to meet competencies. Dr Birch noted, "I don't feel like we necessarily have a really good EBP athletic training source. I think a lot of it is just having a source that they can use that might explain things a little differently than I do." DiLorenzo stated:

I don't know if it's a Web site that contains a list of ideas or a place where you can find samples or sample assignments. So something that shows you where to start, how to keep going, and how to keep refining assignments to make your students better consumers of evidence, as well as practitioners of the evidence.

Lavoy commented:

Providing some source looking at the competencies and proficiencies and saying, "This is a great way to incorporate EBP 1.2, and here is how you can tie this back to the module or here is another example of a way the educator can teach this."

MacIntosh explained:

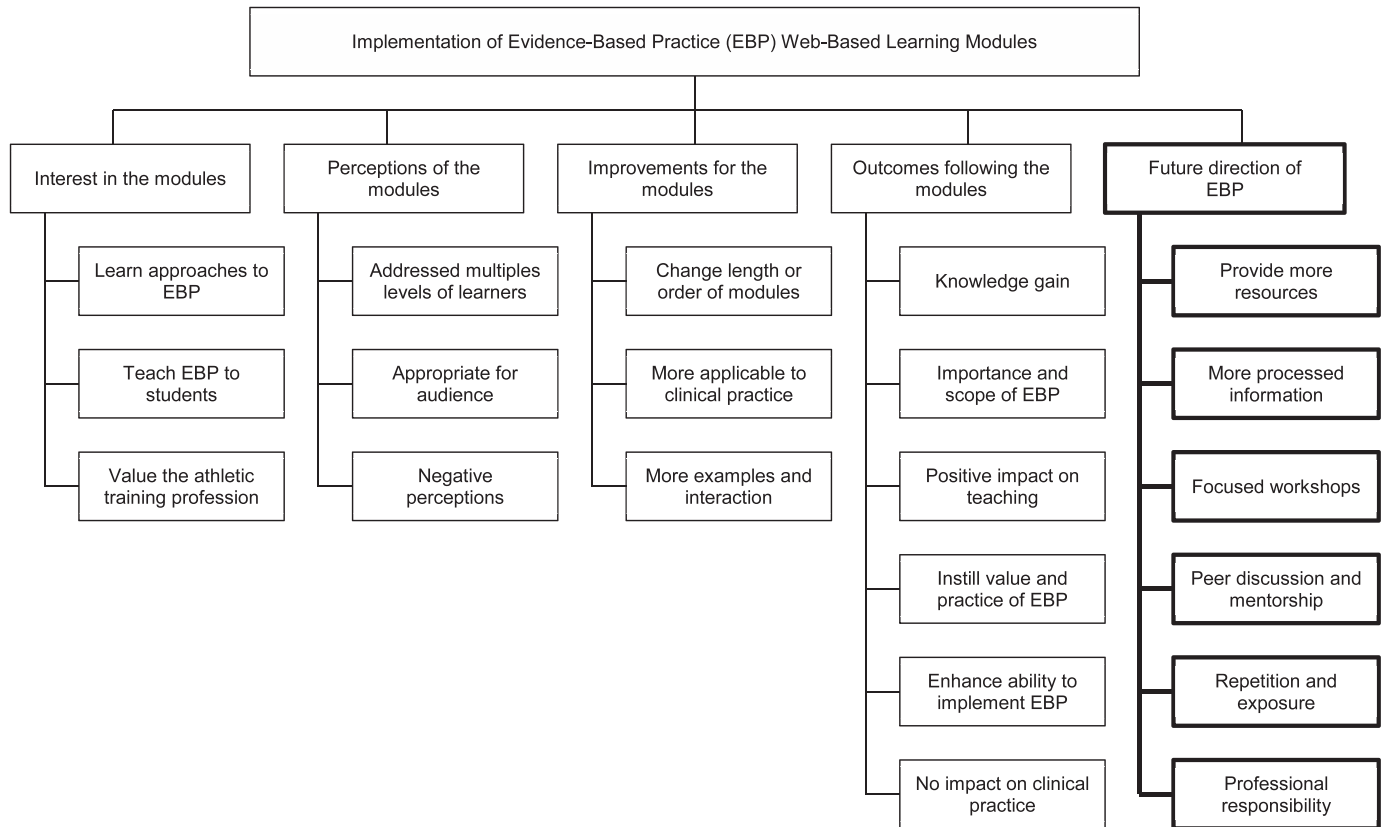


Figure. Conceptual framework of themes and categories. We focused solely on the theme of future direction of evidence-based practice.

Maybe another module online, similar to this module format, but change it up to be teaching the educator how to plug it in to the curriculum and how is it going to affect you.

More Processed Information

Variantly, ATs expressed the desire for more processed information about research literature. Participants explained that more processed information would help to minimize the time barrier by reducing the amount of time they perceive they would need to spend searching through the vast amount of literature available. Parker said:

If there's a way for that information to be processed or if every article came with like a quick summary or something like that. If there's a way to get that information and actually get it processed so you get the understanding of it without the immense time commitment of searching and then reading.

Dr Cavins observed:

If there was any way to send something on a different topic each week or one each month that would be really helpful because that's somebody taking the time to get that information to us. Especially even for the clinicians, I think this kind of summary would be very helpful to them because they have even less time. If somebody was sending me a weekly or a monthly little blurb about best

practices and whatever it is, that would be extremely helpful. So maybe, if they got put in the *ROM [Range of Motion]*, because at least with the *Range of Motion* that comes with the e-mail, where you are able to just scroll through it and click on the things that are most relevant to you or of the most interest.

Decker noted:

I almost wish there was somebody who could hand feed it to me: a specific journal that says this is all level 1 evidence and anything you read here as long as you are smart enough to apply it within the correct parameters, you can pretty much take it at face value, and you don't have to sit there and dissect it all. It's like they're doing all the hard work and in 20 minutes you can get the benefits from it.

Schaffer responded:

Table. Participant Cases by Category (N = 25)

Category	Frequency	No. of Participant Cases
Provide more resources for implementation	Typical	17
More processed information	Variant	9
Offer focused workshops	Variant	8
Peer discussion and mentorship	Variant	11
Continual repetition and exposure	Typical	12
Professional responsibility	Typical	14

I'm really not that interested in how the evidence is found; I want to see that to a degree, but I'm more interested in the outcome. Tell me which tests do I need to throw out and which ones do I keep? What practices in rehab[ilitation] do I throw out and which ones do I keep? That is the information we all want to get from this; not so much the process, but more focus on the application. That's the type of information that's going to affect my clinical practice.

In rare cases, ATs furthered the discussion of more processed information by indicating that a disconnect existed between research literature and clinical practice. Pessefall stated:

You know there are some aspects that are lost in translation right now of what the evidence is showing, how you can apply it just based on how it's presented, and how especially with the *Journal of Athletic Training* we are wanting things to be presented with *P* values and words that might not necessar[il]y be needed in order just to explain the findings and how you can apply that to the overall practice.

Parker commented:

There's still a little bit of a disconnect in the research and then the clinical application of it. We have a lot of researchers, and their job is to do the research and try to create the best science possible even with all the biases that are out there. Whereas if I'm here and I don't really interpret data, I don't look at the statistics on a regular basis, how am I supposed to interpret that to make it a clinical impression? It would be beneficial if researchers gave a better clinical impression of it versus having every clinician be able to interpret the same things a researcher does; or hopefully the 2 can meet somewhere in the middle.

Offer Focused Workshops

In different ways, ATs described the need for more focused workshops to be offered throughout the year. State, district, and national conferences were reported to be the most common venues to hold such workshops. Participants expressed an interest in workshops focusing on 1 or 2 specific concepts within EBP as building blocks rather than intimidating courses dedicated to a large overview of all concepts involved in EBP. Lavoy explained:

There needs to be a session on how to take the EBP competencies and implement them into your program. Here is where this could go and granted it is not going to be the same across the board for everyone, but I just think some examples [of] the ways that you can group these together may be helpful.

DiLorenzo noted:

Perhaps at the NATA or at the district level, sessions that identify ways to incorporate evidence-based practice into the classroom. For example, how to create evidence-

based practice assignments or how to foster developing good clinical questions.

Decker responded:

You can offer some sort of course or class, or maybe it would be a couple of classes. I don't know how long it would take to go over this stuff, but where clinicians in the local area could come and could try and learn and start implementing some of this stuff.

Homier remarked:

I think probably the most bang for your buck is doing workshops and doing stuff either at the convention and district meetings or something like that. I think you will get more, and I think you will learn a lot more. If workshops or the sessions were broken up in certain parts or certain tasks and [we could] do something where each topic is kind of discussing and breaking it down individually while letting people do little steps instead of doing it all at once.

Peer Discussion and Mentorship

Athletic trainers expressed the need for peer discussion and mentorship regarding EBP implementation. More specifically, participants discussed the value of being able to talk about the various concepts involved in EBP with both peers and "experts." Participants indicated peer discussions on all levels from staff meetings to the national convention and via some form of Web-based open message board would be beneficial. Dr Birch explained:

Eventually, you need to start openly discussing these things with other peers. If you take the modules and you don't move forward from there, I think you're not going to be at the point where you can effectively incorporate these things because when you engage the students in the conversations with this, they come up with questions that are hard to answer unless you have your own experience with it. If you're not actively engaged in them yourself and if you're not open to dialogue with peers in these areas, I think it's going to be challenging to effectively implement them in the classroom. I think people working in education need to take it upon themselves to start having conversations with their own faculty.

Dr Harvey noted:

I think it's really important to have discussions. Face-to-face discussions at conferences and things because that's when you can really weed things out and get some clarity and find out what other people are doing and how they're doing it and what they're using and what's working well and all those kinds of things. I don't know whether that could be done in a chat format or something like that if face-to-face is not an option since across the country it's hard to get too many people together. But having some way to discuss it with others is kind of the bottom line for me. I can go through it on my own but I need to talk through stuff with other people.

Lavoy commented:

I just like things like either face-to-face like a conference where you can sit and hear what other people are doing because obviously that is where we get a lot of our ideas; I just think it would be helpful.

Continual Repetition and Exposure

Participants typically described the importance of repetition and constantly exposing ATs to the concepts involved in EBP. Dr Birch remarked:

I think one of the challenging things is that things like the modules are good, but you know if you don't apply these concepts all the time, you know if you don't use it, you lose it. You need something to come back to that will remind you. Repetition is probably the key to a lot of the more technical concepts at least.

Eckert explained:

I think this point, where EBP is within the profession itself, I think the biggest strategy, which the NATA is doing quite well, is just exposing athletic trainers to EBP. Letting them know the good things that can come from it. Putting it in different publications like the *NATA News* and the *Journal of Athletic Training* as much as they can. I think that's a very good way of doing it. I think exposure is going to be the biggest part just to get people used to hearing about it.

Schaffer said:

So I think that the information just has to keep coming out and there should always be at least 1 article in the journal on evidence-based practices; something that is going to just always keep reminding us.

Dr McDaniel commented:

Again it's multifactorial, the modules and the journal; you just need to keep coming at it from angle after angle until it gets better. There's no single strategy to solve it.

Professional Responsibility

Typically, participants indicated that ATs have a professional responsibility to learn and implement EBP within education and clinical practice and that the responsibility needs to be acknowledged at all levels. Participants expressed that individuals need to take personal responsibility to learn the information and that governing bodies need to be responsible for continuing to promote the necessity of EBP to enhance the profession. According to Schaffer, "This is the wave of the future; join it or you're not fulfilling one of your roles as an athletic trainer." Dr Birch observed:

I think people working in AT education need to take it upon themselves to be in the habit of reading what's out

there. You need to know how you can find the evidence, and you need to understand these theories before you can discuss them in class. But I really think it's a lot of the responsibility of the educators to learn these things if they don't already. It's your responsibility, just like you're responsible for any other content in your course; you're just as responsible to know that.

Meier stated:

I think it needs to be clear that it's a balanced approach and [the modules] only take us so far and we have to figure out how we're going to go the rest of the way. I think the individual educator has to take the initiative to learn the things. I mean, I think there's a lot of stuff out there from books to the modules. It's just a matter of the person becoming educated and willing to take the time to do it.

Schlade remarked:

You need to prove that this is something that isn't just for the researchers or ATEPs [athletic training education programs]. You've got to sell it. I think it needs to be talked about it and put in journals and magazines. Just get it out there in a way that is friendly to people, easy to apply, nonthreatening, lots of examples and talk about it in a way that's inviting rather than scary; remove the thought that they need to go to graduate school again to learn this stuff.

DISCUSSION

Based on the results of this qualitative investigation, ATs in both educational and patient care roles appeared to value the need for EBP in the profession. These findings are in agreement with previous research on perceptions of EBP in athletic training²⁻⁶ and in other health care professions.³¹⁻³³ Whereas recent research and other mechanisms (eg, release of the fifth edition of the *Athletic Training Education Competencies*,¹⁰ development of EBP Web-based modules) have been aimed at facilitating a shift in the culture of athletic training from one of tradition to a more evidence-based approach, the transfer from increased knowledge and awareness of EBP to an actual change in clinical practice may take time and commitment from all facets of the profession. Therefore, we must strive to find successful approaches that will bridge this gap between knowledge and behavior.

In an attempt to define appropriate mechanisms for this change, one of the research aims of this study was to determine which strategies ATs believed would be effective in bridging the gap between knowledge and clinical application. Athletic trainers generally proposed similar ideas concerning the future direction that evidence-based athletic training should take. Core ideas included more EBP resources and processed information, more focused workshops, peer discussions and mentorship, continual exposure and repetition, and professional responsibility.

More Resources and Processed Information

The primary motive for practicing in an evidence-based manner is to increase the likelihood that a clinical decision

will lead to a desirable outcome.³⁴ One of the critical steps in the process of EBP is to identify information that can guide clinical decision making. Participants in this investigation reported the need for more concrete resources to help them make a shift to EBP. Such resources include informative materials that will educate ATs on the process of EBP itself (eg, textbooks, Web-based learning modules, Webinars) and sources of evidence that are directly applicable to athletic training clinical practice (ie, more research on relevant patient populations). Some participants cited the need for general resources, such as textbooks, that can explain the concepts associated with EBP. A textbook that details the fundamental concepts of EBP and provides examples specific to athletic training may help athletic training students, educators, and clinicians understand the components involved in EBP. However, whereas this resource may be insightful, examples provided in textbooks often are outdated quickly and may not fully emphasize that EBP is a dynamic process.

Participants who identified themselves as educators were more specific about the types of resources that would be beneficial for the educational setting. Some participants discussed the need for an accessible mechanism whereby sample EBP projects and assignments could be shared among educators, and others identified the need for more direction on how to implement the specific competencies that address EBP. Whereas several potential avenues may exist to provide educators with resources to meet these requests, it is essential to consider mechanisms that have already been developed and are available to the athletic training community. The NATA ThinkTanks (<http://forum.nata.org/thinktanks/>) may be an excellent medium for educators to share ideas and assignments they have used in the classroom and to promote collaboration across various athletic training programs.

In addition to more resources, participants indicated they believe more processed information will be an effective way to translate research evidence into information that can be used in clinical practice, thus helping to diminish the gap between evidence and practice.³⁵ Athletic trainers believed that information presented in less scientific terms and information that clearly demonstrates a positive effect on patient outcomes will help overcome time and knowledge barriers that have been reported.⁶⁻⁹ Interestingly, these findings are similar to those of other health care professionals. Thompson et al³⁶ found nurses preferred sources of information that were quick to access, easy to understand, and grounded in clinical usefulness. Similarly, Grol and Grimshaw¹⁹ reviewed effective strategies for changing patient care and reported an association between clinical guidelines that offered more concrete descriptions of desired clinical applications and better compliance with recommendations. Thus, the desire for more processed information identified by participants of this investigation is not a novel idea.

Other health care professions also have taken action to provide clinicians with resources that offer more processed research evidence. The American Physical Therapy Association offers members access to Hooked on Evidence (<http://www.hookedonevidence.com/>), a database that contains current evidence about the effectiveness of physical therapy interventions. Similarly, the American College of Physicians has developed the ACP Journal Club ([\[annals.org/journalclub.aspx\]\(http://annals.org/journalclub.aspx\)\), a Web site that identifies original research and systematic reviews warranting immediate action for physicians interested in keeping abreast of the most recent advancements in medicine. Therefore, as athletic training continues to shift toward an EBP culture, it will be necessary to develop and highlight beneficial resources that will provide ATs with current literature to help them make informed clinical decisions.](http://</p>
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Resources that provide more processed information also may reduce the need for the traditional “search-appraise-implement cycle”^{36(p71)} that often is considered intimidating by clinicians who are unfamiliar with research methodology and statistics terminology. However, whereas the inclusion of more processed information may be beneficial, clinicians need to remember that regardless of the type of information available, they should still be somewhat familiar with the search-appraise-implement cycle so they can effectively provide care for each unique patient and clinical scenario. Furthermore, although presenting evidence in a more concrete manner is strongly justified, ATs still must be able to comprehend the fundamental concepts involved in acquiring research evidence. Without such knowledge, it may become difficult for clinicians to accurately appraise available literature when processed information is not available.

To date, numerous efforts have been made toward offering resources and more processed information to ATs. The NATA Executive Committee for Education has developed the EBP Task Force Initiative, which focuses on providing athletic training educators and clinicians with the resources they may need to enhance their knowledge of EBP and to begin taking the steps toward translating that information into clinical practice. Along with the development of Web-based modules to enhance knowledge of EBP among ATs, another resource initiated by the EBP Task Force is the inclusion of the “Clinical Bottom Line” in the *NATA News*. The “Clinical Bottom Line” offers processed information that addresses practices and procedures supported by evidence and includes additional references and resources. This column has appeared in the *NATA News* periodically since 2010 and has covered topics such as soft tissue tests to evaluate anterior cruciate ligament injuries and meniscal injuries, how to incorporate the Global Rating of Change scale into clinical practice, and the effects of interferential current to reduce the pain of musculoskeletal conditions.

Other valuable resources for ATs looking for more processed information are critically appraised topics (CATs). A CAT is a published, peer-reviewed summary of evidence that synthesizes multiple studies (no fewer than 3) assessing the same general topic of interest.³⁷ A CAT provides readers with a mechanism to incorporate current evidence into clinical practice in a manner that minimizes the time necessary to search and appraise the literature.³⁸ These CATs have been published on numerous topics relating to athletic training practices, and full CATs can be accessed at no cost via the *Journal of Sport Rehabilitation* (<http://journals.humankinetics.com/jsr-extras/jsr-critically-appraised-topics-cats>).

Along with providing more resources and processed information, it also may be beneficial to have an understanding of the different types of processed information that are currently available. Haynes³⁹ proposed the

“5S” model of searching for best evidence, which identifies more processed resources at the top of a search-strategy pyramid. The 5S model highlights studies, syntheses, synopses, summaries, and systems. *Studies* are basic original research investigations (eg, randomized controlled trials, prospective cohorts), whereas *syntheses* are more complex compilations of research findings (eg, systematic reviews, meta-analyses). *Synopses* consist of very brief reviews of original research that have been processed down to the most important and relevant points (eg, journal abstracts), and *summaries* compile the best evidence about multiple aspects of a particular condition rather than just one aspect (eg, evidence-based textbooks). Finally, the most highly regarded form of processed information proposed in the 5S model is a computerized *system* (eg, electronic medical records) that is available to link best evidence to characteristics of a specific patient case or scenario.⁴⁰ The 5S model is beneficial for distinguishing the types of processed information; however, as the information is more processed, details about how the conclusions were reached are less specific. Processed information may be extremely beneficial for clinicians who want straightforward, hands-on clinical recommendations, but reviewers of this type of information must be cautious and ensure that the conclusions drawn are accurately based on the original research.

Focused Workshops

One common mechanism for disseminating information to alter knowledge and behavior is conventions and workshops. This strategy seems appealing because it allows a large group of people to receive the same information in a relatively time-efficient and inexpensive manner and generally takes little to no active engagement with research evidence on the part of the audience. However, many times this format may serve as a platform for researchers to promote evidence that may not necessarily be clinically applicable. Throughout this investigation, it became apparent that ATs believe smaller, more focused workshops would be a better strategy to change clinical practices than large-group sessions or workshops that incorporate too much information. They believe that learning things in smaller pieces and practicing those pieces one at a time before trying to fit all the pieces of the puzzle together will benefit them. This finding is consistent with the findings of other authors investigating health care professionals. Nicholson et al⁴⁰ noted that a series of workshops focused on literature acquisition and appraisal skills was successful in increasing actual evidence-based medicine skills and participants’ comfort with those skills; however, it is unclear whether these increased skills translated into clinical practice. Additionally, whereas workshops and meetings have been reported to effectively change attitudes and perceptions of a topic among clinicians,⁴¹ they often have very little effect on clinical practice.¹⁷

Workshops covering EBP concepts have been offered at athletic training conferences for several years. The theme of the 2011 Athletic Training Educators’ Conference was “Creating a Culture of Evidence-Based Practice,” and the conference focused on various topics directly related to EBP and health care outcomes. However, this conference was held specifically for educators, so clinicians may not

have received the information. Regardless of the venue, a clear differentiation should be made between introductory and advanced EBP workshops.

Introductory workshops typically should include information pertaining to the basics of EBP, literature searching, and critical appraisal, whereas more advanced courses should focus on higher-level statistical concepts.⁴² Introductory workshops that are offered frequently change attitudes of the participants; however, many individuals do not change their practices after attending a single workshop or short course.⁴³ Furthermore, including information about advanced concepts in an introductory workshop may overwhelm participants, decreasing their willingness to incorporate these concepts into clinical practice even more. Thus, future workshops and short courses must be distinguished carefully by the type of material being presented so ATs will not be engulfed with new information that they were not expecting to receive. This may be accomplished by having a series of workshops that must be attended in sequence, building on the information gained over time.

In addition to workshops and presentations geared toward enhancing skills needed for EBP, many presenters have begun to brand their sessions with the “EBP” qualifier. As EBP workshops at the state, district, and national levels become more common, they must be focused rather than all-inclusive. Additionally, those who advertise an EBP workshop must actually present clinically useful information that is supported by all facets of EBP (research evidence, clinical expertise, and patient values). Often, the content of these sessions is related only to a couple of research articles that support a particular health intervention.⁴⁴ Athletic trainers in educational programming roles also should take these suggestions into consideration when developing district, regional, and national conventions.

Peer Discussion and Mentorship

Peer discussion and mentorship is an easy and inexpensive way of transferring information in any realm. Many participants discussed the importance of peer discussions. They believed that peer-to-peer discussion is when and how one learns the most, and sharing ideas is an ideal way to promote EBP. Peer discussions on multiple levels were suggested as a strategy to enhance the use of EBP. Participants suggested strategies such as intimate faculty and staff discussions, peer discussion groups at conventions, and remote discussions via electronic message boards. The concept of peer discussions aligns with previous research on the topic of clinical practice change. Bero et al¹⁸ conducted a systematic review and determined that interactive meetings, which promoted discussion, were a consistently effective intervention. Thompson et al³⁶ found that nurses preferred human sources of evidence over any other sources.

In addition to peer discussions, participants commonly discussed the possibility of having mentors to promote the use of EBP. The EBP mentors are individuals identified as subject-matter experts who have the ability to provide in-depth knowledge and skill to individuals seeking assistance.⁴⁵ Additionally, mentors can help ATs overcome barriers they perceive to be precluding successful EBP implementation into athletic training education or clinical

practice. Participants in our investigation suggested the need for personal mentors on whom they could call if they had questions and for experts in the concepts and implementation of EBP who could act as a support system. As the profession continues to shift toward an EBP culture, ATs will need to identify EBP experts who can help them overcome barriers and develop strategies for successful EBP integration. To promote interprofessional dialogue, ATs may seek EBP experts from other health care professions (eg, nursing, physical therapy). Within athletic training, the NATA ThinkTanks may be a great mechanism for ATs to identify experts in various areas of EBP who can lead open member-forum discussions in which issues and suggestions about the given area can be discussed.

Continual Exposure and Repetition

Most participants firmly believed that some of the most effective strategies for changing the culture of the profession were constant repetition and exposure to EBP concepts and constant reminders that EBP will lead to optimal patient care. Many participants discussed the need for multiple exposures or interventions to give them a better understanding of EBP and how it can be implemented within clinical practice. The same results have been demonstrated in numerous studies involving a multitude of health care professionals. Davis et al⁴⁶ reviewed the literature and found that mixed-model interventions led to positive performance changes in physicians and sometimes to better health care outcomes. Researchers²¹ also have demonstrated that the use of multifaceted interventions led to positive changes in professional behavior and health care outcomes. Similarly, investigators^{19,20,46} have reported that a single educational intervention is rarely effective in changing clinical practice. A single educational intervention did not affect practices among physicians regarding the detection of depression.⁴⁷ Similarly, Cameron and Naylor⁴⁸ found that active dissemination of the Ottawa Ankle Rules did not correlate with a decrease in the number of radiographs ordered. Thus, researchers²⁰ have identified that multiple interventions were superior to a single intervention. Over the next several years, ATs and leaders in the profession will need to continue to search for strategies that will enhance the use of EBP and to implement multiple modes of exposure to EBP. Increasing exposure of ATs to EBP may be conducted through various mechanisms already available to ATs (eg, *Journal of Athletic Training*; *NATA News*; NATA ThinkTanks; conferences at state, district, and national levels; EBP Web-based courses).

Professional Responsibility

As health care professionals, ATs should be responsible for being competent in all knowledge areas identified by the Institute of Medicine¹ and all skills that are included in the scope of athletic training practice, a notion that can be extrapolated to EBP. Many participants observed that the ultimate path to change in clinical practice lies in a self-motivated sense of professional responsibility. Participants agreed that the model of EBP is an important shift in thinking that the profession needs to embrace and that ATs in all facets of the profession need to assume a personal responsibility to advance athletic training and move toward

a culture of EBP. These results support the findings of Hankemeier and Van Lunen,⁴ who reported that Approved Clinical instructors, now known as preceptors, perceived that a paradigm shift of thinking is necessary for EBP to become integrated successfully within the athletic training culture.

Often, ATs use rationalizations to support their clinical decisions. This concept is not unique to ATs. Kennedy et al⁴⁹ conducted a qualitative investigation of the gap between knowledge and behavior that existed in family medicine residents after an educational intervention and found that rationalizations emerged as a major theme. In addition, Thompson et al³⁶ revealed that nurses often use research only to confirm or support their current practices. Athletic trainers, similar to other health care professionals, tend to blame admitted barriers for their failure to apply research knowledge to clinical practice.^{6-8,31,32} Individuals need to take the responsibility to seek ways of overcoming those barriers. In addition, they should be willing to proactively engage with the research evidence to enhance patient care rather than relying on evidence only to support their current practices.³⁶ One of the barriers identified by ATs is the lack of available research on patient populations they commonly treat.⁷ However, until more research on these populations becomes available, ATs must seek evidence from other health care professions to help make informed decisions within clinical practice.

Athletic training education is responsible for shaping the knowledge, skills, and habits of future generations of ATs. Athletic trainers must recognize their responsibilities not only to teach the concepts of EBP in the classroom but also to adhere to those concepts when discussing clinical skills and competencies. They must play a role in facilitating the transfer of EBP to the clinical component of athletic training education and also must be willing to alter the way they approach EBP in their daily clinical practices to transfer these skills and habits to their students. Fineout-Overholt et al⁴⁵ suggested that unless students can apply the classroom-learned concepts in the clinic, they will be unlikely to adopt these concepts into their own clinical practices.

Research that is conducted within athletic training should be focused on topics that are relevant to clinical practice, should be applicable to the patient populations for whom clinicians most frequently provide care, and should be reported in more clinically applicable ways. Furthermore, research should be progressive, should be conducted on populations that ATs treat (eg, the physically active population), and should address issues that affect a large number of clients and patients. To help initiate more specific athletic training research, the NATA Foundation⁵⁰ has announced a request for proposals of investigations designed to produce athletic training clinical outcomes. This request aligns with the NATA Foundation's list of research priorities, which includes several areas that will provide evidence for the effectiveness of athletic training services.⁵⁰ However, the funding for these clinical outcome studies may exceed the capabilities of the NATA Foundation, and ATs may need to seek other sources of funding to conduct research. Regardless, producing research on topics that are most relevant to athletic training and presenting findings in a manner that is easy to understand are necessary components to facilitate a culture of EBP within athletic training.

Limitations

We selected the participants for our study from ATs who took part in a study to determine if Web-based modules enhanced knowledge of EBP concepts, so they were from a nonrandomized sample of the population. Their experiences or involvement with techniques to effectively implement EBP into athletic training curricula or clinical practice may have influenced their views on which strategies they perceived to be the most effective. Although we assumed all participants spoke truthfully about their experiences with strategies to integrate EBP within the profession, the self-report nature of implementing EBP within their practices also may be a limitation.

CONCLUSIONS

Evidence-based practice entails much more than just the understanding of research methods and data analysis. The proper shift to this culture in athletic training is going to take not only time but also a continued dedication by ATs to create mutually beneficial strategies that will enhance the implementation of EBP across the profession. No party is more or less important than another, and no athletic training venue is excluded. Each AT needs to commit to improving patient care and needs to take the responsibility of playing his or her part in this culture shift. The discussion of EBP in other health care professions (eg, nursing, physical therapy, occupational therapy) began long before it did in athletic training, and these professions are still searching for strategies to fully implement EBP and improve patient care.

Given that the clinical aim of ATs is to facilitate the healing process and promote positive patient outcomes, the aim of the profession as a whole should be to seek out strategies to accelerate the shift in clinical practice to a culture of EBP and improved patient care. Our participants perceived that strategies including components such as more EBP resources, more processed information, focused workshops, peer discussion and mentorship, and repetition and exposure might enhance the inclusion of EBP concepts throughout athletic training. Researchers should focus on continuing to identify effective educational interventions for ATs and to determine successful strategies to implement EBP into didactic curricula and clinical practice. Additional focus should be given to which strategies most effectively achieve knowledge translation to effect change in clinical practice.

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