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ORIGINAL RESEARCH

Self-Perceived Educational Preparedness of Entry-Level Athletic Trainers Regarding Preventing Sudden Death in Sport

Kelly D. Pagnotta, MA, ATC, PES; Stephanie M. Mazerolle, PhD, ATC, LAT; Thomas M. Yabor, MA, ATC; Anthony C. Salvatore, MS, ATC; Douglas J. Casa, PhD, ATC, FACSM, FNATA
Department of Kinesiology, Korey Stringer Institute, University of Connecticut, Storrs

Context: As the first medical professionals on scene when emergency situations arise in sport, athletic trainers (ATs) need to be proficient in recognizing and managing these conditions. Recent evidence regarding exertional heatstroke indicates a lack of educational training as a factor preventing implementation of best practices, yet other causes of sudden death exist, and little is known about the educational training provided to the AT.

Objective: To gain insight into the entry-level AT and athletic training students' (ATSs') perceptions of education received in the area of emergency care techniques.

Design: Mixed methods study.

Setting: Athletic training programs (ATPs) and practice settings.

Patients or Other Participants: Thirteen first-year ATs (n = 7) or recent ATS graduates before employment (n = 6).

Data Collection and Analysis: One-on-one phone interviews were conducted and transcribed verbatim. Data were analyzed inductively using a grounded theory approach and open coding. Close-ended questions were analyzed by calculating frequencies, means, and standard deviations. Multiple analyst triangulation and peer review were used to establish data credibility.

Results: One main theme emerged: participants revealed they perceived their education to be compartmentalized. Compartmentalization comprised 3 subthemes: cognitive knowledge, skill implementation, and clinical integration. Participants received the cognitive knowledge through traditional teaching methods but had minimal hands-on laboratory practice in the area of basic emergent and immediate care skills. Instructors placed greater focus on situations or cases that educators had encountered versus on the broader scope of conditions. Contrived, discussion-based instructional methods rather than real-life integration were used to evaluate the ATSs' ability to apply the knowledge and skills.

Conclusions: Beyond providing ATSs with the necessary didactic knowledge and hands-on practice through structured laboratory sessions, educators must also provide the opportunity for clinical application of knowledge and skills. Athletic training students must be provided opportunities to apply emergent care skills in order to demonstrate competency and critical thinking.

Key words: Emergency care, pedagogy, clinical integration

Please address all correspondence to Kelly D. Pagnotta, MA, Department of Kinesiology, University of Connecticut, 2095 Hillside Road U 1110, Storrs, CT 06269. kelly.pagnotta@uconn.edu.

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INTRODUCTION

Athletic training programs (ATPs) rely on the National Athletic Trainers' Association (NATA) Educational Competencies[1] to guide curriculum development and implementation, as this document provides the guidelines for entry-level knowledge and clinical skills to be mastered before being eligible for certification and provision of services to patients. Although specific in content and knowledge, the document allows for autonomy among programs in terms of how they deliver this information through instructional methods of their own selection. Programs often utilize a combination of didactic learning and clinical education experiences to help facilitate the knowledge and skill acquisition, as outlined in the NATA Educational Competencies. Moreover, athletic training educators rely on previous educational training and personal experiences to guide the knowledge they share with their students and instructional style selection to deliver the necessary information.[2,3]

Athletic training educators utilize traditional teaching methods, such as lecture or instructor-driven discussion sessions, to relay the cognitive knowledge outlined in the NATA Educational Competences, as well as laboratory sessions under the directed supervision of an instructor to provide clinical skill integration.[2] Athletic training students (ATSs) welcome classroom and clinical experiences, which possess authenticity to allow for critical thinking and competency development.[4] In addition to spending time engaged in clinical education experiences, ATSs are often exposed to problem-based learning techniques, simulations, and case study discussion in the classroom as a means to promote "realness" in the learning experience.[2,3] One particular content area that requires realism in learning experiences is the area of preventing sudden death and emergency procedures. Although a rare situation, sudden death in sport has become a very relevant topic for athletic training professionals as a result of the associated prevention techniques and recent media coverage.

Sudden cardiac death, head injuries, and heat illnesses are among the top 3 causes of sudden death in sport.[5–7] Since 1982, 1866 sudden deaths have been recorded during sport participation,[6,8] with the 3 previously mentioned causes receiving the most attention in the media as well as by researchers. The attention has focused on the best methods with which to prevent the occurrence of sudden death, evaluate the conditions for diagnosis, and determine the appropriate measures for treatment and care. The NATA Educational Competencies have reflected this information within the cognitive and psychomotor skills as well as clinical integration proficiencies, which require the athletic training professional to be well versed in emergency care procedures.[1] Furthermore, the textbook *Preventing Sudden Death in Sport and Physical Activity*[5] was released in summer of 2011; this text was the first to examine the causes of sudden death and their signs, symptoms, and treatment protocols. The overall objective of the book was to educate the sports medicine professional regarding the most appropriate measures when faced with an emergency situation.[5] The NATA also released a position statement, *Preventing Sudden Death in Sport,* in 2011 as well; this statement outlines proper prevention, recognition, and treatment for the most common causes of sudden death in sport.[7] This position statement is more specific for each condition than is the NATA position statement: *Emergency Planning in Athletics*.[9] Previous research has indicated that athletic trainers (ATs) rely heavily on previous educational training and professional experiences[2] when selecting diagnostic tools and management protocols; therefore, providing them with the most current knowledge and skills is imperative to preventing sudden death in sport.

Exertional heat stroke (EHS) has received increased attention during recent years, mainly as a result of its rising occurrence.[6] This growing rate is alarming because EHS is preventable and treatable once accurately diagnosed.[5,7] Previous research[2,3] examined ATs' use of rectal temperature and cold-water immersion as best practices and found a gap between cognitive knowledge and clinical practice. The chief reason for the AT to avoid using rectal temperature assessment and cold-water immersion was found to be a lack of confidence or comfort[8] with the skills due to a lack of specific training.[2,3] Since educational training can be critical in providing the future athletic training professional with the competence and confidence necessary to utilize the skills to manage an emergency situation, it is important to ascertain how they are being trained. Information specific to EHS has been gathered previously; however, the broader topic of other emergency care procedures has yet to be investigated. Therefore, the purpose of our study was to build upon the work of Mazerolle and colleagues[2,10] to learn how ATPs prepare students to become competent in emergency care procedures. Specifically, we were concerned with understanding the educational training received by the ATS regarding sudden death and emergencies in sport.

METHODS

In our exploratory study, we used a mixed-methods approach to discover whether the entry-level athletic training professional is prepared to handle and manage a case of sudden death. Two cohorts of participants were involved: (1) those ATSs who were eligible to sit for the Board of Certification (BOC) exam and (2) those who had been certified for less than 1 year (first-year ATs). Our study design relied heavily on qualitative methods, as they provide the best insight into human behavior, attitudes, and beliefs.[11] Moreover, they allow the researcher to develop a theory from the collected data to identify and explain possible reasons for human behavior or actions.[11,12] The use of a short but in-depth survey instrument also helped quantify the experiences of

these participants and helped to support the data generated by the individual interviews. Our study received institutional review board approval before data collection occurred.

Participants

A total of 13 participants (7 males, 6 females) took part in our study. The participants were either students enrolled in their final semester of undergraduate education (n = 6) or recent graduates currently practicing as a clinical AT, either through a graduate assistantship, internship, or full-time employment (n = 7). This mixed sample was purposeful, as we aimed to gain a holistic view. All students were taught under the 4th edition of the NATA Educational Competencies. We completed data collection during the spring semester in 2011.

We initially sent emails explaining our study and steps for data collection to 150 randomly selected program directors (PDs) in Commission on Accreditation of Athletic Training Education (CAATE)–accredited programs to help facilitate enrollment into our study. This helped recruit the participants, as currently there is no database for student members enrolled in CAATE programs.[12,13] The PD was asked to first review the email, which also contained the consent form and background questionnaire survey, and was then asked to forward it to all current students and recent graduates. Any interested participant directly contacted the investigators. In addition, the researchers capitalized on preexisting professional relationships to help identify potential participants meeting the criteria.[14] After the initial emails were sent, recruitment continued by snowball sampling,[12,14] as recruited participants were used to recruit additional participants.

Data Collection

Based upon our purpose, the researchers developed a 2-phase research agenda. Phase I included a background questionnaire (Appendix), which was structured and used close-ended questions. Phase II included a series of interview questions using a semistructured, open-ended format. This format was selected because of the flexibility it afforded to further explore the topic, particularly because of the autonomy afforded each ATP,[12] as well as based on the triangulation it allowed with a more structured questionnaire. Phase I focused on each of the top 10 causes of sudden death in sport,[5,7] particularly the participant's knowledge of the topic, awareness of literature on the topic, and time spent learning about the topic. Phase II focused on the educational experiences of the participant as an ATS while learning about sudden death. Specifically, the participants were asked to describe their learning experiences, methods of instruction used by their faculty/instructor, and comfort level with educational material regarding the causes of sudden death in sport. Information gained in Phase I helped moderate and guide data collection in Phase II. The design of the interview guide was purposeful, as we were concerned with educational training received before eligibility for the BOC examination as well as any on-the-job training or continuing educational training.

A 5-member research team developed both the background questionnaire and the interview guide. Members included 2 athletic training educators, 2 graduate assistant ATs, and 1 qualitative researcher. Each member of the panel was selected as a result of his expertise in content, methodology, and/or clinical practice. Before data collection, the background questionnaire and interview guide were reviewed by 2 AT experts not involved with data collection procedures. Both experts have extensive background in AT education and the topic of preventing sudden death in sport. After the initial review by the 2 experts, we conducted a pilot study with a small cohort of ATSs (n = 2). Updates and changes were made to the interview items to improve the clarity of the questions posed.

All participants filled out a background questionnaire in order to gain demographic information and base of knowledge regarding the prevention of sudden death (Phase I). After all documents were completed, a phone interview time was established. Semistructured phone interviews were conducted with all participants after completion of the background questionnaire. Interviews were scheduled at the convenience of the participant, conducted during the last 2 weeks of April, and lasted approximately 30 minutes. All interviews were audio recorded, transcribed verbatim, and destroyed once transcription was complete. All transcriptions were electronic and stored on the computers of the principal investigator and the student researchers. Only the researchers involved in our study had access to the transcripts, which were destroyed upon completion of data analysis. Pseudonyms were assigned to all participants.

Data Analysis and Trustworthiness

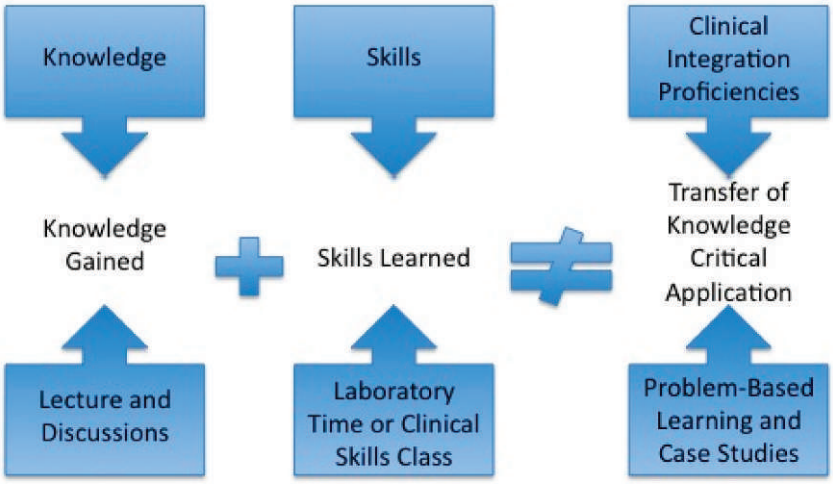
We analyzed interview transcripts using a modified grounded theory approach, as summarized by Strauss and Corbin[15] and Glaser and Strauss,[16] as well as by other researchers.[14,17] The transcriptions were read completely to gain a holistic understanding of the data. On subsequent readings specific incidents and commonalities were given labels to represent their meaning within the transcripts. The research agenda and questions guided our analysis of the data. Once initial coding procedures were completed, the researchers discussed the concepts and commonalities and were found to be in agreement with regard to the overarching themes of the interviews. Background questionnaires were analyzed using means, standard deviations, and frequencies. These data were combined to support the findings from the interview data.

The credibility of the research procedures and trustworthiness of the data analysis and interpretation were established using 3 strategies: (1) methodological triangulation, (2) transcript verification, and (3) multiple analyst triangulation.[12] Using both in-depth phone interviews and a survey questionnaire helps triangulate the results from the interviews by verifying and supporting the data generated from the survey questionnaire.[11,12] Participant verification was secured by allowing the interview participants the ability to review their transcripts from the recorded interviews. Participants were allowed to make any changes or updates to ensure accuracy. Multiple analyst triangulation was met by having the researchers code independently and then meet to discuss themes and commonalities. The researchers were in agreement with regard to the results.

RESULTS

One dominant theme, compartmentalization, emerged from the data to explain student perceptions of how ATPs prepare

Figure. Compartmentalization of cognitive knowledge, skill implementation, and clinical integration.



their ATSs to manage a potential case of sudden death in sport. The participants' reported that while they received the cognitive knowledge regarding sudden death in sport, they had minimal hands-on practice of certain skills associated with those conditions. The participants revealed that educators utilized traditional teaching methods such as lecture and discourse to relay cognitive knowledge regarding sudden death in sport and laboratory time to provide practice with basic skills, such as spine boarding and first aid, although the time was limited. The participants revealed a focus on situations or cases that the athletic training educators had encountered versus the broader scope of conditions that may cause sudden death. When evaluating the ATSs' ability to critically apply their knowledge and psychomotor skills, little real-life integration was used; rather, more contrived discussion-based instructional methods were used. In the opinion of the ATSs, this approach limited their development of critical thinking and confidence with emergency care procedures. A complete discussion ensues with supporting quotes from our participants.

Compartmentalization

Compartmentalization can be summarized by 3 key categories: cognitive knowledge, skill implementation, and clinical integration, as depicted in the Figure. Participants acknowledged gaining the appropriate knowledge related to sudden death, but they realized that only certain concepts received hands-on training or afforded a chance to critically apply the knowledge gained in the classroom setting.

Cognitive Knowledge. Information regarding sudden death or emergency care procedures was distributed, according to the participants, throughout their undergraduate academic experiences, rather than in a single class solely devoted to emergency procedures. Several participants indicated that time spent on sudden death was very limited, with a majority of the coursework devoted to evaluation of orthopaedic injuries and management of those pathologies. James illustrates this finding when he shared the following: "I'd say from sophomore year throughout [the program], [sudden death] is not a major time commitment, just because there is so much other material we have to know." After assuming a full-time position, another participant realized she felt inadequately prepared regarding sudden death. Denise disclosed the following:

> *These disorders were taught straight from the book instead of saying these are the things that might happen that can differentiate what you're going to do. When I came [to my first job] I felt like there were athletic trainers who were more prepared than me, who knew more about sudden death prevention and management.*

Classic didactic practices were the most commonly utilized method of instruction in terms of managing a condition that may lead to sudden death. Allen said, "I'd say mostly lecture was the primary means of education." Hannah had a similar reflection regarding the use of instructional methods, explaining

> *It was more lecture based and [class] discussion. We'd have a PowerPoint, a scenario presented, and interactive discussion led by the teacher. I don't remember anything other than practicing spine boarding and CPR [cardiopulmonary resuscitation].*

Laurie, too, reflected, "For CPR and first aid there was a lab component, but as far as heat illness and other pathologies, that was only taught through lecture." Delivery of information related to sudden death in sport, as supported by the previous quotes as well as the following, was mainly achieved through traditional lecture, and in some cases class-led discussions, but rarely were these reinforced with skill development. Mandy said, "[We learned] about the different conditions, not necessarily hands-on practice of evaluating and managing these conditions."

Information was also gathered regarding the ATSs' knowledge of the NATA position statements that were specifically related to sudden death in sport. Many, but not all, of the participants were aware of the position statements. However, full comprehension of the information contained in each position statement was limited. Several indicated that the position statements were not used as a part of their educational preparation. In Table 1 we present the 12 NATA position statements associated with preventing sudden death and how many of our participants remembered using each

Table 1. National Athletic Trainers' Association (NATA) Position Statement Use in Class and Students' Comfort Level

	Have Read the Position Statement		Comfort Level with Position Statement[a]	
Statement	Yes	No	High	Low
AEDs[18]	9	4	8	5
Asthma[19]	9	4	8	5
Commotio cordis[20]	6	7	5	8
Concussion[21]	12	1	10	3
Diabetes[22]	9	4	7	6
Emergency planning[9]	12	1	12	1
Heat illness[23]	12	1	11	2
Lightning[24]	10	3	10	3
SCA in high school and college[25]	5	8	5	8
SCT[26]	8	5	7	6
Youth football and EHI[27]	8	5	8	5

Abbreviations: AED, automatic external defibrillator; SCA, sudden cardiac arrest; SCT, sickle cell trait; EHI, exhertional heat illnesses.

[a] Comfort level was assessed on a Likert scale of ranging from 1 to 10; a score was considered low if it fell between 1 and 5, and high scores fell between 6 and 10.

during their educational training. Three ATSs reported never learning about sickle cell trait; therefore, they were not familiar with the condition or that the NATA issued a position statement.

Skill Implementation. Throughout our interviews, participants consistently acknowledged that they had received minimal hands-on practice of a majority of the psychomotor skills associated with preventing sudden death, such as taking blood sodium or glucose levels, administering an epinephrine auto injector, or rectal temperature assessment. Practice or laboratory time was primarily focused on the more traditional skill sets related to emergency care, such as first aid, CPR, and spine boarding. Table 2 presents the average time (in hours) spent on each of the leading causes of sudden death, as estimated by the participants. For each condition, the participants were asked "How many hours of classroom time were spent on the education of [that specific condition]." They gave a wide range of answers, as indicated by the large standard deviations. Head injuries, cardiac conditions, and exertional heatstroke were reported to be the conditions that were given the most emphasis in our participants' ATPs. While discussing his educational experiences with sudden death, Joe said "I don't remember anything other than practicing spine boarding and CPR." When asked specifically about other skill sets, such as cold-water immersion or oxygen, Joe said "No, we did not practice those skills." James echoed Joe's evaluation of time spent in a clinical skills lab:

> *We'd go over something [in class], then have a lab session for the topic. We did not do a lot of lab work with the emergency protocols or conditions. The majority of the lab stuff [related to sudden death] did deal with spine boarding.*

Several participants noted being lectured on a particular topic or concept related to sudden death, but not having the opportunity to practice the skills being discussed. Andrea alluded to a lack of skill development, sharing this reflection: "I think if our emergency class went more in depth into conditions that cause death and if we had time to practice the different procedures associated with these conditions I'd be a little more comfortable." Another participant recognized that more time was spent on the day-to-day type of injuries an AT was likely to see rather than conditions related to sudden death. He shared,

> *It really wasn't stressed as much in our education. We focused more on getting evaluation experience and the day-in, day-out operation of athletic training. There [were] some times where we would go over it, but it wasn't as much as I think it should be.*

This group recognized the importance of practicing clinical skills before they actually use them in clinical setting. When asked about ways to improve competence and confidence with management of a potential case of sudden death all participants discussed more hands-on training, beyond spine boarding or CPR. Denise said, "Absolutely [need more time practicing]." Another shared, "The kind of hands-on experience [we had in the classroom], such as more time practicing cold-water immersion or oxygen administration, actual automatic external defibrillator (AED) administration could be improved on as well." Similarly, another stated the following:

Table 2. Number of Perceived Hours of Class Time Spent per Condition

Condition	Hours (Mean ± Standard Deviation)
Anaphylaxis	3 ± 2
Asthma	4 ± 3
Cardiac	8 ± 6
Diabetes	4 ± 3
Exertional heatstroke	8 ± 5
Exertional sickling	3 ± 3
Head injuries	11 ± 10
Hyponatremia	4 ± 4
Hypothermia	3 ± 3
Lightning	3 ± 2
Spinal cord injuries	7 ± 4
Other trauma	6 ± 4

I think more hands-on practice in the classroom that gives you opportunities to practice different skills. And also more time focused on each specific condition and how to manage those situations in class in general, instead of just touching on different topics in many classes.

Opportunities for development of skills related to the diagnosis and treatment of certain conditions related to sudden death in sport were not afforded to the ATSs, as highlighted by the participants' reflections. CPR and spine boarding skills were consistently discussed, but other skills, such as oxygen administration or cold-water immersion, among others, were rarely mentioned.

Clinical Integration. The participants described their learning opportunities related to sudden death as structured around traditional methods such as lecture, laboratory time, and facilitated discussions. However, the chance to integrate their knowledge and skills in a real-time clinical setting with patient care was missing. A majority of the participants discussed the use of case studies or simulations as the only means with which to apply their knowledge pertaining to sudden death, but they recognized that these methods were contrived and lacked realism. Lexi said,

We did some case scenario work [in our class]. We would "talk" through the process of managing a condition in a small group or individually. I think those small group discussion/case scenarios are kind of a big component of the education and integration of materials.

Allen also described limited time to integrate his knowledge:

Everything was presented as cut and dry [in our classes]. They [my instructors] used scenarios in the class. The class was used as a lab to practice what we were learning [in the didactic class] because little happened in the clinical sites [related to sudden death]. Outside of the clinical class there isn't much exposure. In football we practiced spine boarding and reviewed the EAP, but outside of that there was not much integration.

One participant did discuss the importance of real-time learning or comprehensive patient care in learning. He shared this experience regarding a cardiac event:

During camp we had a student who lost consciousness in the athletic training room and the EAP was initiated. One of our athletic trainers performed CPR, and I was charged with waving in the ambulance. It was surreal [experience]. Also, one of the other [assistant] athletic trainers activated the EAP. They instructed everyone where to go and a second athletic trainer helped keep everyone clear and aided in instructing people where to go.

When asked to evaluate their programs' success [on a Likert scale] in preparing them to manage a potential case of sudden death, this cohort responded with a mean score of 6 ± 2, with 1 being *least prepared* and 10 being *most prepared*. Most likely the limited time spent on several of the conditions related to sudden death in sport influenced this rating, as did the lack of clinical integration. Ken rated his abilities "6.5–7." He followed this up by sharing, "because just having a summer course is not enough [to feel prepared]." Comparably, Mandy replied, "8: I feel fairly confident I'd do everything right, but I don't have a ton of experience [from the classroom or clinic] to aid me in this situation."

DISCUSSION

In our exploratory study we sought to understand how ATs and ATSs were prepared to manage emergency conditions. By utilizing ATSs, we were able to focus on the educational training without the influence of continuing education or job-specific training, as the education foundation is the basis for entry-level certification. Specifically, we were concerned with the ATSs' knowledge regarding the causes of sudden death, instructional methods used to impart the knowledge and skills, and confidence with management if a potential emergency situation arises. Our results indicate that during their undergraduate training, AT professionals are given limited opportunities to develop clinical competence to recognize, treat, and manage these emergency situations. As in the work of Mazerolle et al,[2,3,10] our findings illustrate that the preprofessional receives limited opportunities to gain hands-on training and clinical integration of those skills necessary to manage certain causes of sudden death in sport. Additionally, the results of our study correspond with the work of Mazerolle et al[2,10] regarding the importance of educational training on EHS, just one of the causes of sudden death, as many AT professionals are deficient in training regarding the best practices of EHS and therefore are not utilizing them in daily practice or instruction of the ATS. In addition, in our study we found that many participants described a compartmentalized educational experience, through which there was little opportunity for the integration of their cognitive knowledge and psychomotor skills learned via traditional instructional methods such as lecture, discussion, or laboratory sessions. The value of applying knowledge to authentic, real-life experiences is well documented in the literature[4,28,29] for those students enrolled in medical and health care programs. Therefore, our data indicate that AT educators need to incorporate more opportunities for implementation of learned knowledge that include modeling and feedback.[4]

Cognitive Knowledge

Comparable to the literature regarding instructional methods utilized to educate the ATS on EHS practices,[2,10] our findings indicated the prevalence of a traditional lecture-based style to deliver the foundational concepts related to sudden death in sport. The use of lecture is most important when delivering the foundational concepts related to a topic, particularly when discussing the signs and symptoms of a condition or ways to evaluate or manage the condition. When initially introducing the conditions related to sudden death in sport, AT educators are encouraged to utilize this method of instruction, as it allows for the development of a strong underpinning. Lecture, however, offers little opportunity for the development of analytical thinking for the learner, and therefore other methods are necessary to foster the development of clinical competence.[30] Mazerolle et al[31] found that the ATS who is not afforded the opportunity to gain hands-on training with rectal temperature assessment and cold-water immersion for the recognition and treatment of EHS feels less comfortable with the use of the devices, a crucial factor that impedes

incorporation of those methods into actual clinical practice by the AT.[10] This same concept can be applied to other emergency procedure skills, including equipment removal, AED usage, and supplemental oxygen administration.

Several more traditional instructional methods that still capture the more traditional components of a lecture-based style but facilitate learning in a more real-time environment are available to the AT educator. Dialogical discourse, experiential learning, and background connection activities can afford the AT educator the chance to provide realism with regard to the information being delivered in the classroom setting.[2,30] Athletic training educators appear to capitalize on the use of case studies and case-contrived, problem-based scenarios to replicate authentic learning experiences, something previously indicated as important for learning and development of confidence clinically.[4] The use of contrived scenarios with instructor-driven or peer-driven discourse is helpful for learning and is also used by AT educators when covering EHS.[2] Although an important means to promote realism and critical application of knowledge, the scenarios discussed by our participants did not require implementation of skills related to the recognition and care of many of the causes of sudden death in sport.

Similar to the findings of Mazerolle et al,[2,10,31] information being delivered by the traditional means of instruction was derived from the NATA position statements. Our findings also support the findings of another study[3] examining the educators' views on preparing the ATS to manage an emergency situation, which indicates that more instruction time is spent on such topics as general emergency planning, heat illnesses, cardiac issues, and concussions. Interestingly, however, our participants were more versed regarding the NATA position statements on emergency planning and concussions but were less comfortable with those related to sudden cardiac death, the leading cause of death in sport and often a topic considered of importance for AT educators.[3]

Skill Implementation

A predominant theme echoed by many of our participants was the lack of laboratory time to practice hands-on skills associated with preventing sudden death, which echoes the results of previous research.[8,31,32] As discussed by this group of AT students and professionals, the majority of laboratory time was spent on first aid, CPR and AED, and spine boarding, and little or no time was allotted for skills such as rectal temperature assessment, Epi pen training, or glucose testing. This can be partially explained by an AT educator's previous clinical experience, which has been found to mediate selection of topics covered and time allotted for learning.[3] The finding can also be rationalized by an AT educator's previous educational training and comfort level with providing instruction and feedback to the ATS.[2]

The NATA's 5th Edition of the Athletic Training Education Competencies[1] makes significant changes regarding concepts related to sudden death in sport. Specifically, those changes include the following: "the addition of skill in assessing rectal temperature, oxygen saturation, blood glucose levels, and use of a nebulizer and oropharyngeal and nasopharyngeal airways."[1(p5)] The update to the competencies reflects the recommendations of NATA position statements and the most current evidence regarding these concepts. Athletic training educators must be prepared to provide the ATS not only with this information via lecture but also with the chance to develop competence in using those skills through directed instruction during laboratory sessions. The AT professional must be aware of all NATA position statements and must also be prepared to utilize the recommendations made within those statements in order to provide optimal care to their patients. The seriousness of sudden death in sport requires the AT educator to facilitate learning opportunities that provide the ATSs with the chance to apply their knowledge and skills in an authentic experience to develop clinical competence.

Clinical Integration

The lack of integration in the clinical setting emerged partly as a result of the previous theme, laboratory time, but also because of the reliance on lecture-based techniques to deliver the information regarding sudden death in sport. Our participants indicated that their AT educators try to bring realism to the topics through various methods, including case studies, personal stories, and class discussion. However, they also noted that they were rarely forced, during these classroom experiences, to implement or apply their knowledge. Again, the ATS seeks authentic learning experiences to gain understanding and competence, but in the case of sudden death, as a result of its rarity, the chance to practice those skills in a controlled environment is imperative to gain competence.

The use of clinical practicum experiences is often an instructional method used by ATPs to facilitate real-time learning; however, as mentioned previously, cases of sudden death do not occur regularly, as do other musculoskeletal injuries; therefore, the chance to apply the necessary skills is limited. When an emergency situation occurs, such as a suspected spinal injury, a supervising clinical instructor is more likely to use the student as a means to alert emergency medical services, limiting her opportunity to actual apply her knowledge and skills in the management of the situation. Recognizing this, AT educators need to provide more experiences that foster realism to allow for competence to develop (such as spine boarding on the ice, or in the mud, or helping an asthmatic athlete). In addition to incorporating more realistic classroom experiences, AT educators should consciously implement critical thinking methods in order to replicate real-life situations.

The importance of replicating real-life situations in the classroom is paramount because a study conducted by Mensch and Ennis[4] revealed that many ATSs and AT educators reported that treating real patients in clinical rotations was more meaningful than laboratory or classroom experiences. Solely teaching the material and performing laboratory sessions is simply not enough, because there is nothing that brings both the cognitive knowledge and psychomotor skills together in a practical manner. Many of our participants recalled minimal integration of clinical scenarios in the classroom; therefore, bringing more real-life scenarios into the classroom can begin to bridge the gap between classroom and clinical practice.

Additionally, real-time experience has been shown in other literature[33–36] to increase student's self-efficacy, which can be

essential in the development of confidence as a clinician and is a construct used in adult learning literature. Hoban and Hoban[34(p9)] stated, "Based on Bandura, self-efficacy is defined as one's confidence that he or she has the ability to complete a specific task successfully and this confidence relates to performance and perseverance in a variety of endeavors." An important aspect of the definition to note is that self-efficacy is task specific. Cervone and colleagues'[36] description of self-efficacy states that the biggest influence in self-efficacy is a mastery experience. Bandura's Social Learning Theory of self-efficacy[33] further explains that if someone cannot experience the specific skill personally, watching a peer perform the task will increase his perceived self-efficacy. This means that the best way to increase a student's self-efficacy with a task is to allow him to experience and perform it himself. If this is not plausible, watching a peer perform the same task can also increase self-efficacy in a task. Athletic training educators should be cognizant of this theory and aim to afford students mastery experiences in order to increase their self-efficacy with emergency procedures.

Recommendations

Our study illustrated that entry-level ATs are not being provided with the opportunity to develop clinical competence to deal with emergency situations and prevent sudden death in sport. In order to better prepare ATs, the AT educator should incorporate more realistic case scenarios into the classroom, provide more hands-on training with all skills related to sudden death in sport, and, finally, create opportunities for critical application of both knowledge and skills associated with preventing sudden death. This will increase students' self-efficacy and therefore clinical usage of best practices within our profession.

In regard to emergency procedures, traditional instructional methods should not be completely dismissed; however, they should not be the sole method of education. Hands-on training for all skills must be afforded each ATS. During the laboratory sessions the following must be provided to the ATS: (1) the instructor must model the skills before the ATS practices; (2) feedback for learning and improvement must be given; and (3) an authentic environment for implementation must be created to provide realism.[2] Furthermore, effort should be made to create an environment in which ATSs are encouraged to critically think and apply what they have learned, including both their knowledge and skills. Most often the ATS is only asked to recall the information during class discussions or case study presentations, rather than implement the necessary skills she has recalled as important to implement. Case studies, scenarios, and problem-based learning can still serve as the foundation, but the AT educator must require the ATSs to go beyond memory recall and apply their knowledge and skills to demonstrate higher-level thinking.

Limitations

We recognize that our study has some limitations. The first was a small sample size, which was a split sample of last-year AT students and recent ATP graduates. Although our results support those of previous literature,[2,10,31] the findings can really only be generalized to those AT professionals who have recently completed their degree programs. The rationale behind including both recent graduate ATs and those who were 1 year from graduation was to capitalize on participants' reflections regarding their experiences. Inclusion of both criteria also allowed us to triangulate the data, gaining both an immediate evaluation of the programs' performance as well as the benefit of a year to reflect upon those experiences.

Future Research

Future research should evaluate the effectiveness of the use of more realistic instructional methods and hands-on practice. Areas of interest may include specific educational techniques, including contrived laboratory situations, problem-based learning, and practice in the clinical setting. In conjunction with looking at ATSs' education in the clinical setting, additional research can be performed that examines how preceptors teach in the clinical setting while still providing care to athletes.

Another area for further investigation is the general satisfaction regarding educational preparedness. This can be accomplished with a prospective study using ATSs, following them for an amount of time through their careers in order to see how their perspectives change with regard to their professional education and how their education as ATSs has affected them as professionals in the field.

CONCLUSIONS

Our study found that ATSs are given a good basis of knowledge throughout their preprofessional education. However, this education is focused mainly on evaluation and treatment of orthopaedic injuries. We found that minimal time was devoted to the evaluation and immediate care of emergency situations and that even less time was devoted to the practice of skills associated with the management of such conditions. We feel thatmore time must be allotted to the practice of these skills and the integration of this knowledge in the clinical setting. In educating ATSs, it is not enough to solely provide information and have the ATSs regurgitate facts; we must strive to create an educational environment that breeds great health care professionals who are prepared to deal with any type of condition, no matter how menial or grave.

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Appendix. Phase I Background Questionnaire

Emergency Action Plans

Did you learn about emergency action plans and preparing for emergencies?
Yes ____ No ____
**If "Yes," please respond to the following questions below.*

Were you made aware of the NATA's Position Statement on Emergency Planning in Athletics?
Yes ____ No ____

Did you read it? Yes ___ No ___
How comfortable do you feel with the information contained in this document?
Not comfortable 0 1 2 3 4 5 6 7 8 9 Very Comfortable

What other documents/resources/tools did you use? _____
_____
_____
_____

What types of hands-on/laboratory/scenarios did you use? _____
_____
_____

Asthma

Did you learn about asthma? Yes ____ No ____
**If "Yes," please respond to the following questions below.*

What is the biggest indicator for you when making an assessment? _____
_____

What is the appropriate treatment? _____
_____

Were you made aware of the NATA's Position Statement on Management of Asthma in Athletics?
Yes___ No___

Did you read it? Yes___ No___
How comfortable do you feel with the information contained in this document?
Not comfortable 0 1 2 3 4 5 6 7 8 9 Very Comfortable

What other documents/resources/tools do you use? _____
_____
_____
_____

What types of hands-on/laboratory/scenarios did you use? _____
_____
_____

*Note: Questions were also included for sudden cardiac death, methicillin-resistant *Staphylococcus aureus* (MRSA), exertional heat illnesses, exertional sickling, head injuries, diabetes, and spinal injuries.