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Core Competency–Related Professional Behaviors During Patient Encounters: A Report From the Association for Athletic Training Education Research Network

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Context: To enhance the quality of patient care, it is important that athletic trainers integrate the components of the core competencies (CCs; evidence-based practice [EBP], patient-centered care [PCC], health information technology [HIT], interprofessional education and collaborative practice [IPECP], quality improvement [QI], professionalism) as a part of routine clinical practice. In what ways, if any, athletic training students (ATSs) are currently integrating CCs into patient encounters (PEs) during clinical experiences is unclear.

Objective: To describe which professional behaviors associated with the CCs were implemented by ATSs during PEs that occurred during clinical experiences.

Design: Multisite panel design.

Setting: A total of 12 professional athletic training programs (5 bachelor's, 7 master's level).

Patients or Other Participants: A total of 363 ATSs from the athletic training programs that used E*Value software to document PEs during clinical experiences participated.

Main Outcome Measure(s): During each PE, ATSs were asked to report whether professional behaviors reflecting 5 of the CCs occurred (the professionalism CC was excluded). Summary statistics, including means ± SDs, counts, and percentages were tabulated for the professional behaviors of each CC.

Results: Data from 30 630 PEs were collected during the study period. Professional behaviors related to EBP were the most frequently incorporated during PEs (74.3%, n = 22 773), followed by QI (72.3%, n = 22 147), PCC (56.6%, n = 17 326), HIT (35.4%, n = 10 857), and IPECP (18.4%, n = 5627).

Conclusions: It is unsurprising that EBP and PCC behaviors were 2 of the most frequently incorporated CCs during PEs due to the emphasis on these competencies during the past several years. However, it is surprising that ATSs did not incorporate behaviors related to either HIT (in 65% of PEs) or IPECP (in 82% of PEs). These findings suggest that directed efforts are needed to ensure that ATSs are provided opportunities to incorporate professional behaviors related to the CCs during clinical experiences.

Key Words: clinical education, evidence-based practice, health information technology, interprofessional collaborative practice

Key Points

- Athletic training students were most able to implement behaviors associated with evidence-based practice and patient-centered care during clinical experiences, but they lacked opportunities to implement behaviors associated with interprofessional education and collaborative practice and health information technology.
- More effort is needed to ensure that students can electronically document patient encounters and use data from electronic medical records to make informed patient care decisions.
- Athletic training programs must provide opportunities for students to gain experience in roles that enable athletic trainers to be viewed as members of the health care team.

It has been nearly 2 decades since the National Academy of Medicine (formerly the Institute of Medicine) released *Crossing the Quality Chasm: A New Health System for the 21st Century*,[1] a report that called for an overhaul of the current health care system that would ideally result in improved patient outcomes by changing the environment in which health care is delivered. This report resulted in the recommendation to incorporate 5 core competencies (CCs) into health care and health professions education to prepare all practitioners for the demands of practice in the 21st century.[2] These competencies are evidence-based practice (EBP), patient-centered care (PCC), use of health information technology (HIT), interprofessional education and collaborative practice (IPECP), and quality improvement (QI).[1–3]

Health professions education programs have slowly adopted the competencies but have done so in a siloed manner,[4] and this independent approach may result in

health care providers who are educated about the competencies but are not prepared to implement them in practice.[5] In fact, 1 of the specific educational gaps noted by employers at sites where clinical education occurred was the disconnect between knowledge acquired by students in their entry-level programs and their skill in applying this knowledge during patient care opportunities in clinical practice.[5] These same employers also noted that many students across health care programs displayed underdeveloped professional behaviors in clinical practice, a lack of well-roundedness, and an inability to apply principles of patient care to a wide range of populations.[5]

The CCs identified for athletic training have been well defined in the literature.[6–8] However, whereas previous researchers[7,9] found that these CCs could be demonstrated through a variety of professional behaviors, continued emphasis has been placed on the intertwining of the CCs and the importance of not implementing them individually.[7] For example, determining the best concussion treatment protocol for a patient requires an understanding of current best practices (EBP), coordination with other health care professionals (IPECP), and consideration of patient history (HIT), goals (PCC), and activities of daily living (PCC) and might require clinicians to evaluate emerging evidence on treatment and assessment techniques (EBP).

Students in professional athletic training programs are expected to meet specific standards, demonstrating a minimum level of proficiency in the delivery of patient care for each of the CC areas.[6] Therefore, the purpose of our study was to describe which professional behaviors associated with the CCs athletic training students (ATSs) were implementing during patient encounters (PEs) throughout professional athletic training program clinical experiences.

METHODS

Design

We used a multisite panel design to track PE data entered in the E*Value software platform (a web-based data-management system; MedHub) by professional ATSs during 1.5 calendar years. Before the start of this study, institutional review board approval was received from the sponsoring institutions and the individual participating institutions when warranted.

Participants

In December 2016, we distributed a brief online survey to program directors and clinical education coordinators of Commission on Accreditation of Athletic Training Education (CAATE)–accredited professional athletic training programs to inquire whether they used E*Value to track students' clinical education opportunities. A total of 37 programs indicated they used the software and thus were considered for recruitment. To be recruited, programs had to meet the following inclusion criteria: (1) used E*Value for at least 1 year before the study, (2) required students to track PEs (*case logging*) in E*Value during the clinical experiences, and (3) had a Board of Certification 3-year aggregate first-time pass rate >85%. We selected an 85% pass rate to ensure that the programs would not be in danger of falling below the CAATE-required 70% minimum during the study period. A total of 15 programs met these criteria and were recruited for participation. Of the 15 programs, 12 agreed to participate (5 bachelor's, 7 master's level).

All students enrolled in the 12 programs (n = 363) were informed that their program would be participating in the research study. Informed consent forms were signed by the program director (PD), and all PEs recorded by students occurred as a part of their organized clinical experience each semester. Before data collection, 1 research team member worked with each PD to ensure that the Case Logs Module in the program's E*Value account included all of the necessary data fields.

Instrumentation

Data for this study were collected through E*Value, used in this case by ATSs to capture information specific to PEs during clinical experience opportunities. Although E*Value has numerous features, data for this investigation were collected within the Case Logs Module. This module allows students to securely log data specific to clinical experiences: PEs, patient procedural opportunities (input related to procedures and International Classification of Diseases–10 codes), and use of the CCs via custom questions. As part of encounter tracking, ATSs entered several variables related to each PE. For the purposes of this article, we focus only on the variables related to the CCs. For each PE, ATSs were asked to report whether professional behaviors reflecting 5 of the CCs occurred. These professional behaviors were adopted from a previously validated survey to explore postprofessional ATS' perceived abilities regarding the 6 CCs.[7] For our purposes, professional behaviors reflecting the professionalism competency were excluded because this is a competency that, although reflected throughout a clinical experience, is not necessarily captured during individual PEs. A list of the professional behaviors per CC is provided in Table 1.

Procedures

Programmatic and Student-Level Training. During the fall 2017 semester, we conducted program- and student-level training sessions with 3 of the 12 programs. Training with the PD or coordinator of clinical education entailed a review of the setup of the Case Log Module to ensure consistency among programs; coordinating the data download, transfer process, and time frame; and review of the procedures for the student-level training. Student-level training sessions occurred individually with each program via videoconference and involved all students in the participating program. During student-level training, we reviewed the Case Log Module and all operational definitions of the various input variables (eg, professional behaviors related to the CCs) and discussed the importance of timely data entry.

Data Collection—Phase 1. During spring 2018, ATSs in the 3 programs began to enter data using the Case Log Module of E*Value. We chose to begin data collection with only 3 programs to ensure that the procedures were effective and clearly understood by all students and that the data download and transfer process between the program and research team occurred in a timely manner.

Table 1. Professional Behaviors per Core Competency

Core Competency	Professional Behavior	Response
Evidence-based practice (EBP)	Regarding this patient encounter, did you	Yes
	1. Ask a question of a clinician (including a preceptor)?	No
	2. Search for any available evidence?	
	3. Apply evidence previously learned?	
	4. None of the above	
Patient-centered care (PCC)	Regarding this patient encounter, did you	Yes
	1. Discuss the patient's goals with the patient?	No
	2. Collect information through a patient-reported outcome measure?	
	3. Collect information through a clinician-reported outcome measure?	
	4. None of the above	
Health information technology (HIT)	Regarding this patient encounter, did you	Yes
	1. Document the information obtained from this encounter in an electronic health/medical record (EHR/EMR)?	No
	2. Use information from an EHR/EMR to assist with the clinical decision-making process?	
	3. None of the above	
Interprofessional education and collaborative practice (IPECP)	Regarding this patient encounter, did you	Yes
	1. Interact with another athletic trainer besides your preceptor?	No
	2. Interact with (an)other health care provider(s) outside of athletic training besides your preceptor?	
	3. Interact with another learner besides an athletic training student?	
	4. None of the above	
Quality improvement (QI)	As a result of this patient encounter, did you	Yes
	1. Reflect on your experience to identify potential areas for improvement and successes?	No

At the end of the spring 2018 semester, we analyzed the data-collection procedures to determine whether any adjustments were needed. Because no adjustments to the data-entry forms or the data-collection procedures were made, the data collected during the spring 2018 semester were included in the final analyses.

Data Collection—Phase 2. At the beginning of the 2018–2019 academic year, we conducted program- and student-level training for the other 9 participating programs and repeated the student-level training for the newly admitted ATSs in the 3 programs that collected data in spring 2018. During the 2018–2019 academic year, the PD or coordinator of clinical education monitored student data entry in E*Value and provided reminders to ATSs throughout each semester. Data were downloaded and transferred to the research team every 2 weeks. After the completion of the study period (spring 2019), each participating program received a research study honorarium.

Table 2. Participating Program Demographics (N = 12)

Program	Institution Type	Program Type	Participating Students	Total Recorded Encounters
Program Alpha	Public	Bachelor	7	48
Program Bravo	Private	Bachelor	18	754
Program Charlie	Private	Bachelor	23	1495
Program Delta	Public	Bachelor	14	1398
Program Echo	Public	Bachelor	77	1682
Program Foxtrot	Private	Masters	19	796
Program Golf	Public	Masters	20	1056
Program Hotel	Public	Masters	18	2101
Program India	Private	Masters	18	1972
Program Juliet	Private	Masters	42	5583
Program Kilo	Public	Masters	37	7143
Program Lima	Public	Masters	45	6602

Data Analysis

Patient encounter data were uploaded into SPSS (version 23; IBM Corp) for analysis. Summary statistics, consisting of mean ± SD, counts, and percentages, were provided for each professional behavior of the 5 CCs.

RESULTS

In total, data on 30 630 PEs were entered by 338 ATSs from the 12 programs. Demographic variables of the participating programs are displayed in Table 2. Inclusion of the CCs during PEs ranged from 18.4% to 74.3% (Figure 1).

Evidence-Based Practice

The ATSs reported the incorporation of at least 1 professional behavior related to EBP in 74.3% (n = 22 773) of the 30 630 PEs entered. Among those 22 773 PEs, students described the inclusion of 1 professional behavior related to EBP in 48.8% (n = 14 947) of PEs, 2 professional behaviors in 18.3% (n = 5597) of PEs, and 3 professional behaviors in only 7.2% (n = 2194) of PEs (Figure 2).

Patient-Centered Care

For the 3 professional behaviors related to PCC (Figure 3), ATSs noted the inclusion of at least 1 professional behavior in 56.5% (n = 17 326) of all the PEs reported. The inclusion of only 1 professional behavior related to PCC was recounted in 36.6% (n = 11 224) of PEs, 2 professional behaviors in 12.2% (n = 3737) of PEs, and 3 professional behaviors in 7.7% (n = 2346) of PEs.

Health Information Technology

Students reported the incorporation of at least 1 professional behavior related to HIT in 35.4% (n =

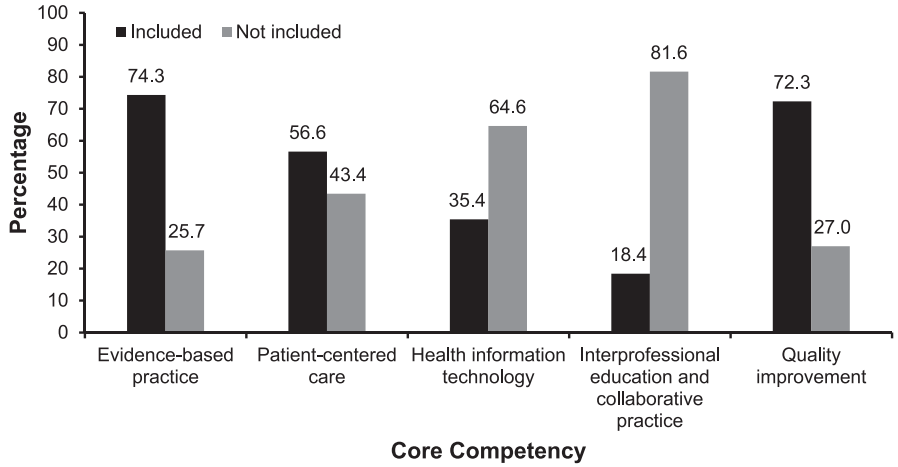

Figure 1. Composite inclusion of core competencies during patient encounters.

10 857) of the 30 630 PEs entered. Of the 10 857 PEs, ATSs described the inclusion of 1 professional behavior related to HIT in 31.9% (n = 9784) of PEs and 2 professional behaviors in only 3.2% (n = 969) of PEs (Figure 4).

Interprofessional Education and Collaborative Practice

For the 3 professional behaviors related to IPECP (Figure 5), ATSs indicated the inclusion of at least 1 professional behavior in only 18.4% (n = 5627) of all the PEs reported. Only 1 professional behavior related to IPECP was noted in 16.1% (n = 4919) of PEs, 2 professional behaviors in 1.9% (n = 586) of PEs, and 3 professional behaviors in 0.2% (n = 57) of PEs.

Quality Improvement

For each PE, ATSs were asked to report whether they reflected on their PE experience to identify potential areas for improvement. A response to this item was missing for 215 PEs. Therefore, of the 30 415 responses entered, ATSs stated that they reflected on the experience for 72.3% (n = 22 147) of PEs.

DISCUSSION

As athletic training continues to emphasize the CCs, it is important to ensure that ATSs are exposed to PE opportunities that promote the inclusion of professional behaviors related to the CCs. Previous researchers[8] have focused on ATSs reporting whether they thought they had implemented CCs during a PE but did not provide details of which aspects (ie, professional behaviors) of the CCs were being implemented. In addition, the investigators[8,10] who conducted studies in this area collected PE data from only 1 professional athletic training program during a single academic semester. For our study, in which we collected

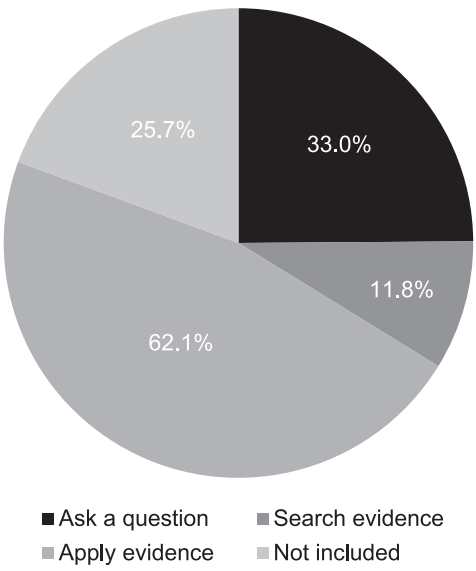

Figure 2. Frequency breakdown of the professional behaviors related to evidence-based practice.

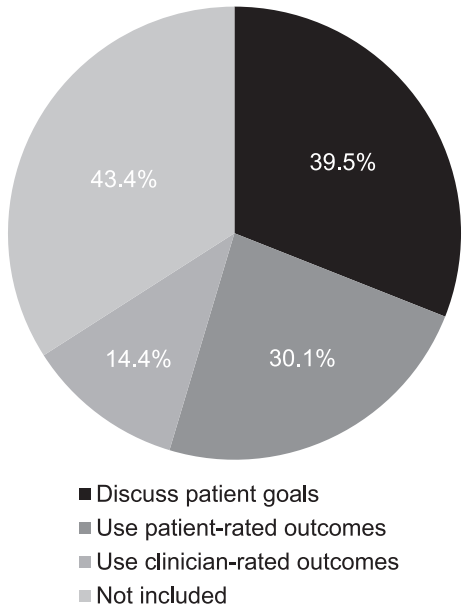

Figure 3. Frequency breakdown of the professional behaviors related to patient-centered care.

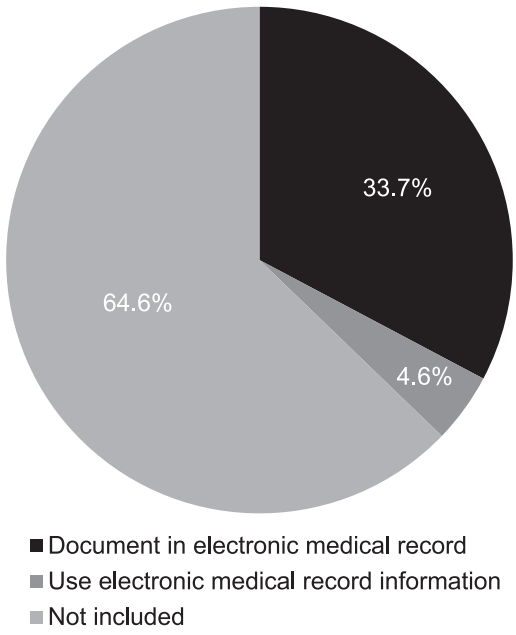

Figure 4. Frequency breakdown of the professional behaviors related to health information technology.

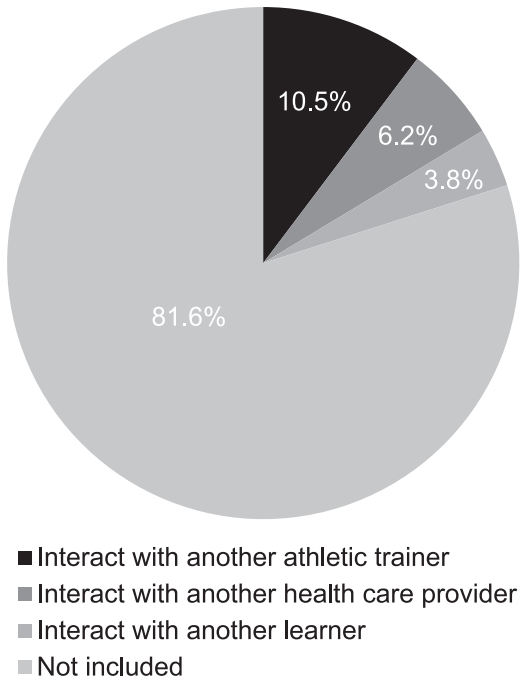

Figure 5. Frequency breakdown of the professional behaviors related to interprofessional education and collaborative practice.

data from 12 professional athletic training programs for more than 2 academic semesters, we sought to both confirm the findings of past authors and to provide a more in-depth picture of which individual professional behaviors linked to CCs were being implemented by ATSs during PEs. In general, our results indicated that whereas ATSs were exposed to PE opportunities that did include professional behaviors, some behaviors were more adequately addressed during PEs than others. Given the interwoven nature of the CCs, professional behaviors associated with the CCs influenced their shared implementation.

Inclusion of EBP and PCC

With an emphasis on EBP and PCC across the athletic training profession for 10 years, it is not surprising that professional behaviors related to EBP and PCC were 2 of the most commonly reported CCs during PEs. In 2011, the National Athletic Trainers' Association released the 5th edition of the *Athletic Training Education Competencies*,[11] which specifically included competencies centered on EBP and PCC. Since then, professional athletic training programs have been required to educate students on the fundamentals of these 2 CCs.

It is interesting that of the professional behaviors related to EBP, our participants indicated that they applied previously learned evidence during 62% of PEs, which is consistent with previous research[10] regarding the implementation of EBP during PEs. However, we were unable to determine whether the previously learned evidence was from the available published literature or knowledge gained in the classroom. Regardless, it is unsurprising that searching for available evidence occurred in only approximately 12% of PEs. Whether the low percentage of this professional behavior relates to practices modeled by the preceptor or to a perceived lack of access to available evidence, both of which are consistent with previous studies,[12,13] is unclear.

Earlier authors[10] indicated that PCC was implemented by ATSs in 90% of PEs, which is much higher than described by our participants. We attribute this difference to our method of asking ATSs about behaviors associated with PCC rather than asking if they generally thought they had implemented PCC. In addition, Cavallario et al[10] only examined PEs at 1 institution, so it is possible that the single institution placed more emphasis on PCC. Use of clinician-reported outcome measures (eg, strength, range of motion, joint laxity) by our participants was alarmingly low, considering the importance of using such measures to guide clinical decision making for patient care.[14] Despite having participated in an orientation for this study, some ATSs may not have understood the clinician-reported outcome measures terminology or that these measures are routinely used in clinical practice to assess conditions and impairments.[14] This finding points to the need to emphasize the distinction between patient-reported and clinician-reported outcome measures in the didactic education of ATSs and the need for preceptors to model incorporating these measures during clinical experiences.

The use of patient-reported outcomes (PROs) was acknowledged twice as often as clinician-reported outcomes, although the former were still used in only about one-third of encounters. This result is consistent with a study of athletic trainers (ATs) in which just under one-third of participants indicated using PROs routinely in their clinical practice.[15] Our findings underscore the need for athletic training programs to emphasize PRO use as well as potentially assist students and preceptors in identifying mechanisms to overcome barriers to PRO use, such as a lack of familiarity, time constraints, or organizational barriers.[15] Finally, our work may suggest that ATSs were not reporting the inclusion of patient- or clinician-rated outcomes because these were not being documented by

preceptors, which is consistent with previous research[15–18] on PROs and documentation practices among ATs.

To truly practice in an evidence-based manner, ATs must intertwine the professional behaviors reflective of the other CCs. For example, if ATs are not using PROs and not documenting the services they provide, they are not providing evidence-based care.[19] If ATs are not working with others and not using patient data to drive decisions, they are not focusing on PCC. Ultimately, the CCs are inextricably intertwined, and to truly achieve both EBP and PCC, we would expect similar use of professional behaviors associated with HIT and IPECP, which was not the case. Despite increased emphasis on EBP and PCC in athletic training over the last decade, it appears that additional progress is required to secure opportunities for ATSs to implement specific professional behaviors associated with EBP and PCC as they relate to the other CCs.

Inclusion of HIT

Professional behaviors related to HIT were not included in 65% of PEs. This result is concerning and suggests that ATSs were neither provided with opportunities to document patient care services in electronic health or medical records (EHR or EMR) nor did they use information from an EHR or EMR to assist with the clinical decision-making process. To deliver high-quality patient care, ATs must be able to efficiently document the patient care services provided and use that data to make informed decisions throughout the PE.[20]

For several years, investigators[17,18,21] have identified a multitude of challenges that prevent ATs from efficiently documenting patient care at the point of care. Challenges such as lack of time, patient volume, available resources, and where care is provided[17,18,21] have affected ATs' perceptions of documentation[18] as well as their documentation behaviors.[21] Also, ATs have noted the lack of incentive to document given that they are not reimbursed for services rendered.[18] Specific to athletic training clinical education, Neil et al[16] observed that 82% of preceptors permitted ATSs to document patient care in some capacity but that several perceived that deterrents such as patient privacy, legal concerns, and workplace structural barriers limited the opportunities for students to document at the point of care.

Our findings about behaviors related to HIT and those from previous studies regarding documentation practices in athletic training suggest the need to promote better mechanisms to ensure that ATSs gain experience with patient care documentation at the point of care. Furthermore, to truly achieve EBP and PCC, it is vital that ATs collect meaningful data that can be effectively used to assist with the clinical decision-making process via high-quality documentation habits at the point of care.[20] Also, greater effort is required to ensure appropriate documentation of patient care and that using patient data to make informed decisions is being modeled to ATSs in the clinical environment. To overcome perceived barriers expressed by ATs and clinical preceptors, including an academic EMR in athletic training education may be valuable. Academic EMRs are specifically designed for simulation learning and often supply case scenarios and simulated experiences to not only improve documentation behaviors[22] but also promote critical thinking, decision making, and the incorporation of technology in clinical practice.[23] In athletic training education, academic EMRs may be the solution for providing patient care documentation experience and incorporating professional behaviors related to HIT, which are emphasized in "The Prioritized Research Agenda for the Athletic Training Profession."[24]

Inclusion of IPECP and QI

The omission of IPECP from 82% of almost 31 000 PEs is perhaps the most alarming outcome of our study. This result is consistent with earlier athletic training research, which indicated that fewer than one-quarter of PEs included this CC.[10] Interprofessional education and collaborative practice is a necessary precursor to delivering high-quality patient care, and the past practice of health care professional silos is no longer acceptable in the delivery of health care.[25] Specifically, for the profession of athletic training to be considered an integral part of the health care team, ATSs must gain experience in these interactions.

The setting structure has an inherent effect on the ability to practice collaboratively, and the structure of athletic training in the athletic or academic model for the delivery of care hampers opportunities for interaction among ATs and other health care providers.[26,27] More recently, the medical model has been proposed as the preferred infrastructure for the delivery of athletic training services. A medical model of delivery aligns the coordination of patient care alongside other health care providers, as opposed to athletic administrators, and this alignment facilitates the integration of multiple health care providers for delivering the best available care and expertise to the patient. This model has been proposed to increase the likelihood of PCC and interprofessional collaborative practice.[26] Limited information is available on the existence of medical models in National Collegiate Athletic Association (NCAA) institutions, although sources estimated a range from 20% to 50%.[27,28] Unfortunately, about half of these institutions lacked a defined model for the delivery of care,[28] and evidence of such models in the secondary school setting is nonexistent. Our findings support the need for medical models, specifically in settings to which ATSs might be assigned to complete their clinical experiences. The inclusion of sites with medical models for delivery of athletic training services in the assigned clinical experiences of ATSs has the potential to increase students' exposure to IPECP and their inclusion of professional behaviors related to IPECP, given that students will inherently have increased access to other health care providers.

The lack of IPECP likely influenced attainment of some of the other CCs as well. For example, to provide an ideal level of PCC, shared decision making is a core element in the treatment process.[29,30] Evidence-based practice can only be achieved with the integration of clinical expertise, and this theoretically would require a diverse range of health care experts participating in the care of a given patient. To support this concept, more emphasis has been placed on the need for interprofessional EBP across disciplines in recent years.[31,32] Thus, given that our ATSs incorporated IPECP in fewer than 20% of their PEs, the question is whether we can truly achieve EBP or PCC implementation without being a

collaborative member of a health care team.[30] Program administrators should examine the IPECP component of their professional athletic training programs to identify ways to increase opportunities for ATSs to participate in interprofessional care, especially given that this will likely influence the inclusion of other CCs as well.

Quality improvement was reportedly incorporated into a relatively high percentage of PEs, although this result should be interpreted cautiously. The ATSs were given a binary response option as to whether they had reflected on the PE to learn what could have been improved. In addition, this was the only question that inquired about a thought process versus the physical performance of a behavior. Despite encouraging results, it remains unclear which aspects of the encounter they reflected on or what components of QI were actually considered. The CAATE has defined *QI* as a systematic process that is continuously performed to measurably improve health care services,[6] and it is possible that this was not captured accurately via encounter-based data collection. A systematic review[33] of the principles of instructing QI in health professions education revealed that it required a combination of didactic instruction and real-life clinical practice. Meaningful participation in projects attempting QI in the clinical setting can be inherently challenging because the time frame necessary to complete multiple systematic plan-do-study-act cycles extends beyond the length of the typical clinical rotation.[33] Medical residency programs have attempted to address this obstacle by implementing sequential transfer of planned projects so that the incoming resident takes over where the outgoing resident left off.[33] This would be a reasonable approach for athletic training programs as well, especially at clinical sites that are regularly affiliated with an individual program.

Although QI application is best learned in the clinical environment, research in physician training has demonstrated that QI is also ideally learned during interdisciplinary experiences.[34] Our findings regarding low IPECP implementation reported by ATSs call into question the accuracy of ATSs' reporting and whether they truly implemented important QI characteristics during their PEs.

Opportunities for ATSs to engage in clinically meaningful, long-term QI opportunities must be identified. Programs may need to strategize a succession plan for students to continue such opportunities from cohort to cohort. Most important, programs should strongly consider making IPECP a priority for clinical experiences. In the absence of IPECP at available clinical sites, program administrators should identify mechanisms for supplementing athletic training clinical experiences with other forms of clinical education so that ATSs can learn how to practice using an interdisciplinary approach.

LIMITATIONS AND FUTURE DIRECTIONS

As with all studies, ours was not without limitations. Data collection, though large scale in nature, relied on the accuracy of self-reported behaviors of ATSs during their clinical experiences. Future researchers should triangulate self-reported behavioral data with preceptor-reported data to ensure accuracy. We specifically attempted to capture the inclusion of QI in PEs, but this competency may be better measured longitudinally across a clinical experience. Future investigators may also seek to determine whether the frequency of implementation of professional behaviors corresponds with ATSs' increases in confidence and capability when performing those behaviors over time.

CONCLUSIONS

We found that ATSs were most able to implement professional behaviors associated with EBP and PCC during clinical experiences, yet they lacked opportunities to implement behaviors associated with HIT and IPECP. The primary intent of clinical education experiences is to allow students the opportunity to develop clinical skills and behaviors that can be directly translated into clinical practice upon entry into the profession. However, if students are not taught a professional behavior in the classroom and do not see it modeled during clinical experiences, it is unlikely that behavior will translate into routine practice when they become independent clinicians. It is essential that ATSs are provided opportunities to gain experience with ATs being viewed as members of the health care team. Achieving these goals will require a multipronged approach in which (1) preceptors teach and model professional behaviors related to the CCs in the clinical setting, (2) athletic training programs prioritize professional behaviors during preceptor development, and (3) ATSs are required to report PEs so that their clinical experiences can be effectively monitored.

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