Simulated Patients Are Predominantly Used to Teach and Evaluate Athletic Training Students' Skills: A 10-Year Follow-Up

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Context: Health care education needs to include methods of teaching and evaluation that are realistic and mimic patient care.

Objective: To follow up on previous research regarding the methods athletic training educators use to evaluate and teach athletic training students' clinical skills during clinical experiences and in the classroom/laboratory.

Design: Cross-sectional.

Setting: Public and private institutions.

Patients or Other Participants: Program directors of all accredited professional athletic training programs as of November 2015 (N = 372) were asked to participate; a total of 90 participated.

Data Collection and Analysis: The electronic survey consisted of 6 demographic questions, 6 questions regarding methods used to teach and evaluate clinical skills, and 6 items regarding barriers, educational content areas, and practice settings for real-time patient encounters. The Cronbach α determined internal consistency, $\alpha = 0.784$. Descriptive statistics were computed for all items. An analysis of variance and independent t tests analyzed differences among institutions/programs with different demographic characteristics with regard to methods, barriers, educational content areas, and settings used for teaching and evaluating skills. The α level was set at .05.

Results: Simulated patients and real-time evaluations were the most prevalent methods of teaching and evaluating clinical skills in the classroom/laboratory and during clinical experiences, respectively. Students' lack of self-confidence (4.10 ± 0.835) was the most common barrier during clinical experiences. The clinical examination and diagnosis (4.54 ± 0.656) and acute care of injury and illness (4.39 ± 0.775) content areas ranked highest for sufficient opportunities for real-time skill evaluation. One-way analysis of variances revealed no significant differences related to institutional/program demographics regarding opportunities for or barriers to teaching and evaluating skills.

Conclusions: Ten years after our previous research, athletic training students' skills are still primarily taught and evaluated via simulated patients, with a slight increase in real-time patient encounters. Professional programs should continue using simulations and consider real-time encounters to provide additional patient care experiences.

Key Words: Simulations, standardized patients, teaching methods, evaluation methods

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KEY POINTS

- There has been an increase in the number of real-time patient encounters used for teaching and evaluating athletic training students' clinical skills.
- Simulated patients continue to be the most commonly used method of teaching and evaluating athletic training students' clinical skills.
- A student's lack of confidence was listed as the most prominent barrier preventing real-time patient care experiences.

INTRODUCTION

In our previous research,[1,2] simulations were used as the predominant method used to evaluate athletic training students' clinical skills. However, there is growing evidence in health care education today to suggest that the traditional methods used to teach clinical skills, such as history taking, physical examination, differential diagnosis, psychological/ethical/legal issues, and management plan making, are inadequate.[3,4] Across medical and health care education, students have expressed frustration with passive approaches to learning,[3,5,6] preferring those methods that allow for active thinking, clinical decision making, and opportunities to obtain feedback regarding their performance.[7,8] The role of providing effective feedback to the learner is the single most important feature that affects learning.[9]

Learning is contextual,[9] so students need to be placed in patient care situations where they are required to make clinical decisions similar to those made in autonomous practice.[3] It is imperative that teaching and evaluation methods used during professional education parallel patient care. Success in solving one kind of patient care problem is a poor predictor of success when faced with other clinical situations.[9] For students to be able to solve a patient's problem, it is crucial to understand not only the concepts of the disease or pathology, but also the process of how and why they make a clinical decision.[10] Previous researchers[4,11–13] suggest providing students with learning experiences in context, similar to those that would be encountered in actual patient care, such as simulations, may facilitate subsequent retrieval of relevant knowledge during clinical practice. Thus, it is important to ensure that students are exposed to patient situations they will encounter during patient care,[14] particularly in the early stages of professional education.[3,9]

Patient interactions have always been an integral part of professional education in health care,[15] including athletic training. Previous researchers reported that athletic training students' clinical skills were predominantly evaluated via simulations, whereas most reliable methods of evaluation such as real-time patient encounters and standardized patients were used less frequently.[1,2] However, previous researchers did not examine the methods athletic training faculty use to teach these clinical skills. Therefore, the purpose of this follow-up investigation was to identify not only the methods athletic training educators use to evaluate athletic training students' clinical skills, but also the methods used for teaching these clinical skills in the classroom/laboratory setting and during clinical experiences. The following questions guided the investigation:

1. What common methods (eg, real time, simulated patients, standardized patients) are used to teach and evaluate athletic training students' clinical skills?
2. What athletic training educational content areas lend themselves more easily to real-time clinical skill evaluation?
3. What barriers exist that hinder real-time clinical skill evaluation?
4. Are there sufficient opportunities in a variety of athletic training practice settings for real-time clinical skill evaluation?
5. Are there differences between programs with different demographics or characteristics in relation to the methods, content areas, practice settings, and barriers regarding the evaluation of clinical skills?

METHODS

Participants

All faculty who were identified as the director of the professional (bachelor's and master's level) athletic training programs accredited by the Commission on Accreditation of Athletic Training Education were recruited to participate (except at the researchers' institutions). At that time, a total of 389 program directors were initially contacted, with 17 e-mails being returned as undeliverable, bringing the population total to 372. A total of 90 program directors (24.2%) completed the Methods Used to Teach and Evaluate Athletic Training Students survey. Respondent demographics are presented in Table 1.

Procedures

Institutional review board approval was obtained before data collection began. A list of all program directors from professional programs (both bachelor's and master's level) as of November 2015 was obtained. Each program director received an e-mail that included the overall purpose and importance of the research study, the estimated time to complete the survey, an invitation to participate, and an electronic link to the survey instrument. Two reminder e-mails were sent to nonrespondents at 2-week intervals.

Instrumentation

The validity and reliability of the original instrument, the Methods of Clinical Proficiency Evaluation in Athletic Training (MCPEAT) survey, has been established.[2] At the time the original study was conducted, the third edition of the *Athletic Training Education Competencies*[16] was used as

Table 1. Participant Demographics

Demographic Variable	No. (% of Sample)
Sex	
Male	42 (46.7)
Female	48 (53.3)
Degree offered	
Professional bachelor's	77 (85.6)
Professional master's	10 (11.1)
Both bachelor's and master's	3 (3.3)
Athletics affiliation	
National Collegiate Athletic Association	
Division I	41 (45.6)
Division II	18 (20.0)
Division III	23 (25.6)
National Association of Intercollegiate Athletics	8 (8.9)
No. of students enrolled in professional program	
Less than 10	4 (4.4)
10–19	14 (15.6)
20–29	17 (18.9)
30–39	20 (22.2)
40–49	15 (16.7)
50–59	10 (11.1)
60–70	3 (3.3)
More than 70	7 (7.8)
National Athletic Trainers' Association district	
1	6 (6.7)
2	5 (5.7)
3	11 (12.2)
4	17 (18.9)
5	15 (16.7)
6	8 (8.9)
7	3 (3.3)
8	2 (2.2)
9	17 (14.4)
10	7 (8.0)

constructs for identifying the methods, educational content areas, settings, and barriers regarding clinical proficiency evaluation. For the current investigation, the MCPEAT survey was updated to determine not only the methods with which clinical integration proficiencies are evaluated today, but also the methods used to teach clinical skills in the classroom and during clinical experiences. The updated survey, Methods Used to Teach and Evaluate Athletic Training Students, also included questions about barriers, educational content areas, and settings regarding real-time clinical skill evaluation. The instrument was also updated to the fifth edition of the *Athletic Training Education Competencies*.[17] The survey consisted of a total of 18 items. There were 6 questions that used the 5-point Likert scale regarding demographic characteristics of respondents (eg, degree offered, number of students in program) and 6 items identifying specific teaching and evaluation methods used in the classroom and during clinical experiences (eg, type of patient encounter used, number of patient encounters per semester). Additionally, 6 Likert-scale items (1 = *strongly disagree* to 5 =

strongly agree) assessing respondents' perceptions regarding opportunities for real-time clinical proficiency evaluations in various athletic training practice settings relative to the educational content area and barriers to real-time clinical skill evaluation were included.

The following definitions were used to operationalize terminology for respondents. *Simulated patients* were defined as an encounter in which athletic training students provide patient care to a mock patient, an individual who has no training to consistently portray a patient with a specific pathology. We defined a *real-time encounter* as an encounter in which athletic training students provide patient care to a real patient in the classroom/laboratory or during clinical experiences under the supervision of an athletic trainer or other health care provider. We defined a *standardized patient encounter* as an encounter in which athletic training students provide care to a standardized patient, an individual intentionally trained to consistently portray a patient with a specific pathology.

Face validity and content validity of the updated survey were established by 5 educators considered content experts in athletic training education. Each item was assessed for content and clarity, and items were clarified or additional items were added as needed. Cronbach α was used to determine internal consistency of survey items, with α coefficient of 0.784.

Data Analysis

Descriptive statistics were computed on all survey items. An analysis of variance (ANOVA) determined differences between athletic training programs with select demographics/characteristics (eg, National Collegiate Athletic Association [NCAA] athletic affiliation, number of students enrolled in program) associated with the barriers, methods, content areas, and settings regarding methods used to teach and evaluate clinical skill. In addition, an independent-samples t test determined differences related to select demographics/characteristics (eg, sex, degree offered) with regard to the methods and settings used to teach and evaluate clinical skills. Data are presented in representative categories. The α level was set at .05, and Bonferroni corrections were used for multiple comparisons. The minimum target sample size of respondents was 70, which yielded an effect size of 0.80 and power of 0.95 for detecting a large effect. Data analysis was performed using IBM SPSS (version 22.0; IBM SPSS Inc, Chicago, IL).

RESULTS

Interestingly, only 31.1% of respondents (n = 28) reported that they track or document the number of real-time patient encounters athletic training students complete during clinical experiences. Simulated patients and real-time encounters were reported as the predominant methods for teaching and evaluating athletic training students' knowledge, skills, and abilities. Simulated patients were the most frequently reported method used in the classroom for teaching purposes. Respondents reported using more simulated patient encounters, with 94.4% of respondents (n = 85) reporting the use of simulated patients for teaching purposes compared with 56.8% (n = 50) using real-time encounters for teaching purposes. We found that 26.7% of respondents (n = 24) used standardized patients in the classroom for teaching purposes. Simulated patients were also more frequently used in the classroom for evaluation purposes,

Table 2. Types of Patient Encounters for Teaching and Evaluating Clinical Skills

Type of Patient Encounters	No. (% of Sample)
Teaching	
Real-time encounters	
Classroom	50 (56.8)
Clinical education	85 (94.4)
Simulated patients	
Classroom	85 (94.4)
Clinical education	72 (80.0)
Standardized patients	
Classroom	24 (26.7)
Clinical education	16 (17.8)
Evaluation	
Real-time encounters	
Classroom	54 (60.7)
Clinical education	87 (96.7)
Simulated patients	
Classroom	84 (93.4)
Clinical education	72 (80.0)
Standardized patients	
Classroom	32 (35.6)
Clinical education	15 (16.7)

Table 3. Frequency of Patient Encounters for Teaching and Evaluating Clinical Skills in the Classroom

No. of Patient Encounters per Semester	No. (% of Sample) — Teaching Clinical Skills	No. (% of Sample) — Evaluating Clinical Skills
Real-time encounters		
Do not use	40 (44.4)	38 (42.2)
1–3	26 (28.9)	23 (25.6)
4–6	8 (8.9)	11 (12.2)
7–10	3 (3.3)	8 (8.9)
>10	13 (14.4)	10 (11.1)
Simulated patient encounters		
Do not use	3 (3.3)	6 (6.7)
1–3	24 (26.7)	30 (33.3)
4–6	27 (30.0)	27 (30.0)
7–10	8 (8.9)	10 (11.1)
>10	28 (31.1)	17 (18.9)
Standardized patient encounters[a]		
Do not use	62 (68.9)	55 (61.1)
1–3	18 (20.0)	23 (25.6)
4–6	4 (4.4)	6 (6.7)
7–10	1 (1.1)	2 (2.2)
>10	3 (3.3)	1 (1.1)

[a] Not all participants responded; n = 88 (teaching), n = 87 (evaluating).

where 93.3% of respondents (n = 84) used simulated patients for evaluation purposes compared with 60.7% (n = 54) who used real-time encounters. We also found that 35.6% of respondents (n = 32) used standardized patients for evaluating clinical skills in the classroom. During clinical experiences, real-time encounters were used most frequently. We found that 94.4% (n = 85) of respondents used real-time encounters to teach clinical skills during clinical experiences, compared with 80.0% (n = 72) that used simulated patients for teaching purposes. We found that 17.8% of respondents (n = 16) used standardized patients during clinical experiences for teaching purposes. Real-time encounters were also used more frequently during clinical experiences to evaluate athletic training students' clinical skills, where 96.7% of respondents (n = 87) used real-time encounters for evaluation purposes, compared with 80.0% (n = 72) that used simulated patients. We found that 16.7% of respondents (n = 15) used standardized patients during clinical experiences for evaluation purposes. Descriptive statistics for the methods used for teaching and evaluating clinical skills are presented in Table 2.

Methods of Teaching and Evaluating Athletic Training Students

Descriptive statistics regarding the frequency of patient encounters for teaching and evaluating clinical skills in the classroom are presented in Table 3. When examining simulated patients, 31.1% of respondents (n = 28) used more than 10 encounters for teaching, compared with 18.9% (n = 17) for evaluation purposes in the classroom. Regarding real-time encounters, 14.4% of respondents (n = 13) used more than 10 encounters while teaching, compared with 11.1% (n = 10) for evaluation purposes. It should also be noted that 1 to 3 standardized patient encounters were used more frequently for both teaching and evaluating clinical skills, where 20.0% (n = 18) and 25.6% (n = 23) were reported respectively. An independent-samples t test revealed significant differences in male and female respondents' use of real-time patient encounters in the classroom. Women reported more frequent use of real-time patient encounters to evaluate athletic training clinical skills in the classroom ($t_{87} = -2.291$, $P = .024$) than men. A 1-way ANOVA revealed that respondents whose program had less than 10 students enrolled used simulated patients for evaluation purposes in the classroom significantly more often than all other respondents, $F_{7,81} = 3.254$, $P = .004$. No differences were found related to NCAA athletics affiliation, professional degree offered, or National Athletic Trainers' Association (NATA) district regarding use of simulated patients for evaluation purposes.

Descriptive statistics regarding the frequency of patient encounters for teaching and evaluating clinical skills during clinical experiences are presented in Table 4. When examining simulated patients, 30.0% of respondents (n = 27) used 1 to 3 encounters for both teaching and evaluation purposes during clinical education. Regarding real-time encounters, 48.9% of respondents (n = 44) used more than 10 encounters while teaching, compared with 41.1% (n = 37) for evaluation purposes. It should be noted that 1 to 3 standardized patient encounters were used more frequently for both teaching and evaluating clinical skills, 11.1% (n = 10) and 7.8% (n = 7) were reported respectively. An independent t test revealed no differences related to respondents' demographic characteristics regarding use of real-time, simulated, or standardized patients for teaching or evaluation purposes.

Opportunities for Patient Encounters Within Athletic Training Content Areas

Descriptive statistics for respondents' perceptions regarding opportunities for teaching and evaluating clinical skills within each athletic training content area are presented in Table 5.

Table 4. Frequency of Patient Encounters for Teaching and Evaluating Clinical Skills During Clinical Education

No. of Patient Encounters per Semester	No. (% of Sample)	
	Teaching Clinical Skills	Evaluating Clinical Skills
Real-time encounters		
Do not use	5 (5.6)	1 (1.1)
1–3	13 (14.4)	16 (17.8)
4–6	13 (14.4)	16 (17.8)
7–10	15 (16.7)	20 (22.2)
>10	44 (48.9)	37 (41.1)
Simulated patient encounters		
Do not use	19 (21.1)	19 (21.1)
1–3	27 (30.0)	27 (30.0)
4–6	24 (26.7)	22 (24.4)
7–10	8 (8.9)	11 (12.2)
>10	12 (13.3)	11 (12.2)
Standardized patient encounters[a]		
Do not use	68 (75.6)	70 (77.8)
1–3	10 (11.1)	7 (7.8)
4–6	2 (2.2)	5 (5.6)
7–10	2 (2.2)	0 (0.0)
>10	2 (2.2)	2 (2.2)

[a] Not all participants responded; n = 84 (teaching), n = 84 (evaluating).

Respondents perceived that the content areas of clinical examination and diagnosis (4.54 ± 0.656), acute care of injury and illness (4.39 ± 0.775), and therapeutic interventions (4.33 ± 0.764) presented more opportunities for real-time patient encounters for teaching and evaluating clinical skills than other content areas. Interestingly, the content areas of psychosocial strategies and referral (3.87 ± 0.902), acute care of injury and illness (3.76 ± 1.105), and clinical examination and diagnosis (3.61 ± 1.187) were perceived to provide more opportunities for teaching and evaluating clinical skills via simulated or standardized patients. A 1-way ANOVA revealed that respondents with more than 70 students enrolled within the program perceived significantly more opportunities for real-time patient encounters within the therapeutic interventions domain than other respondents, $F_{7,81} = 3.116$, $P = .006$. No differences were found related to NCAA athletics affiliation, professional degree offered, or NATA district regarding educational content areas.

Opportunities for Real-Time Encounters in Clinical Practice Settings

Descriptive statistics for respondents' perceptions regarding opportunities for real-time patient encounters for teaching and evaluating athletic training students' clinical skills in various athletic training practice settings are presented in Table 6. Respondents perceived that the secondary school (4.40 ± 0.716), college/university (4.25 ± 0.883), and rehabilitation clinic (3.92 ± 0.956) practice settings presented more opportunities for real-time patient encounters to teach and evaluate athletic training students' clinical skills than other practice settings. An independent-samples t test revealed significant differences in men's and women's perception of

Table 5. Opportunities for Teaching and Evaluating Clinical Skills Within Athletic Training Content Areas

	Rating, Mean ± SD[a]	
	Real-Time Patient Encounters	Simulated or Standardized Patient Encounters
Evidence-based practice	3.58 ± 1.005	3.39 ± 1.024
Prevention and health promotion	3.98 ± 0.834	3.37 ± 0.930
Clinical examination and diagnosis	4.54 ± 0.656	3.61 ± 1.187
Acute care of injury and illness	4.39 ± 0.775	3.76 ± 1.105
Therapeutic interventions	4.33 ± 0.764	3.52 ± 1.114
Psychosocial strategies and referral	3.54 ± 1.103	3.87 ± 0.902
Health care administration	3.62 ± 0.955	3.22 ± 0.909
Professional development and responsibility	3.44 ± 1.040	3.16 ± 0.940

[a] 1 = *strongly disagree*; 5 = *strongly agree*.

opportunities for real-time patient encounters in the athletic training practice settings. Male respondents reported perceiving more opportunities for real-time patient encounters in the hospital setting ($t_{87} = 2.078$, $P = .041$) than female respondents. A 1-way ANOVA revealed that respondents with an institutional athletic affiliation within the National Association of Intercollegiate Athletics (NAIA) perceived significantly more opportunities for real-time patient encounters in the military ($F_{3,83} = 4.033$, $P = .010$), performing arts ($F_{3,83} = 4.365$, $P = .003$), and professional sports ($F_{3,84} = 3.078$, $P = .032$) practice settings. No differences were found related to professional degree offered or NATA district regarding opportunities for real-time encounters in different clinical practice settings.

Barriers to Real-Time Patient Encounters

Descriptive statistics for respondents' perceptions regarding barriers to real-time patient encounters during clinical experiences are presented in Table 7. Respondents reported athletic training students' lack of self-confidence (4.10 ± 0.835), preceptors' lack of confidence in the athletic training student (3.82 ± 1.122), and inadequate volume of injuries, illnesses, or pathologies during clinical experiences (3.82 ± 1.275) as barriers hindering real-time patient encounters. Respondents also reported patient care being a priority over students' clinical experiences as a barrier to real-time patient encounters. A 1-way ANOVA revealed no differences related to respondents' characteristics regarding barriers to real-time clinical skill evaluation.

DISCUSSION

Methods of Teaching and Evaluating Athletic Training Students' Clinical Skills

Professional education plays an important role in providing opportunities in the classroom/laboratory as well as during clinical experiences for students to practice and apply clinical

Table 6. Opportunities for Real-Time Patient Encounters Within Practice Settings

Athletic Training Practice Setting (No. of Responses)	Mean ± SD	Rating[a] No. (%)				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
College/university (89)	4.25 ± 0.883	0 (0.0)	7 (7.8)	4 (4.4)	39 (43.8)	39 (43.8)
Secondary school (90)	4.40 ± 0.716	0 (0.0)	2 (2.2)	6 (6.7)	36 (40.0)	46 (51.1)
Hospital (89)	3.21 ± 1.172	7 (7.8)	18 (20.0)	26 (28.9)	26 (28.9)	12 (13.3)
Military (88)	3.35 ± 1.204	8 (8.9)	8 (8.9)	35 (38.9)	22 (24.4)	15 (16.6)
Occupational health (89)	3.37 ± 1.081	4 (4.4)	12 (13.3)	34 (37.8)	28 (31.1)	11 (12.2)
Performing arts (87)	3.31 ± 1.204	8 (8.9)	12 (13.3)	26 (28.9)	30 (33.3)	11 (12.2)
Professional sports (89)	3.15 ± 1.275	12 (13.3)	14 (16.6)	23 (25.6)	28 (31.1)	11 (12.2)
Physician's office (88)	3.37 ± 1.148	7 (7.8)	12 (13.3)	22 (24.4)	37 (41.4)	10 (11.1)
Public safety (88)	3.01 ± 1.189	12 (13.3)	12 (13.3)	38 (42.2)	17 (18.9)	9 (10.0)
Rehabilitation clinic (89)	3.92 ± 0.956	2 (2.2)	5 (5.6)	17 (18.9)	39 (43.3)	26 (28.9)

[a] 1 = strongly disagree; 5 = strongly agree.

skills. Because learning is context specific, the teaching and evaluation methods used in the classroom/laboratory and during clinical experiences should parallel the types of encounters that students will experience during their athletic training practice. The methods of teaching and evaluating students need to mimic the manner in which they will practice during patient care, allowing for the development of mental processes or illness scripts.[9] Thus, it is important to appreciate the value of real-time patient encounters and seek opportunities to make these encounters available as much as possible[1] while teaching and evaluating athletic training students'

clinical skills. Ideally, the methods used by athletic training educators should provide a highly contextualized patient care experience that is likely to represent patient encounters students will experience during autonomous clinical practice.[4] However, we've found that the methods that athletic training educators use when teaching and evaluating students has remained relatively stagnant. Despite the need for ensuring that teaching and evaluation methods parallel patient care practices, only 31% of respondents document whether clinical skills are evaluated in real time during clinical experiences, compared with 16.4% reported in our previous research.[1,2]

Table 7. Barriers to Real-Time Patient Encounters

Barrier	Mean ± SD[a]	Rating[a] No. (%)				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Lack of students' initiative	3.69 ± 1.024	3 (3.3)	13 (14.4)	8 (8.9)	51 (56.7)	15 (16.7)
Lack of students' confidence	4.10 ± 0.835	0 (0.0)	9 (10.0)	0 (0.0)	54 (60.0)	27 (30.0)
Preceptors' lack of confidence in student	3.82 ± 1.122	0 (0.0)	10 (11.1)	16 (17.8)	43 (47.8)	21 (23.3)
Preceptors' lack of ability to perform specific clinical skill	3.28 ± 1.090	4 (4.4)	24 (26.7)	16 (17.8)	35 (38.9)	11 (12.2)
Preceptors' lack of clinical experience in providing patient care	3.04 ± 1.193	5 (5.6)	28 (31.1)	23 (25.6)	26 (28.9)	8 (8.9)
Preceptors' lack of interest in being a clinical teacher	3.36 ± 1.045	4 (4.4)	24 (25.6)	15 (16.7)	30 (33.3)	17 (18.9)
Inadequate volume of injuries, illnesses or pathologies during clinical education	3.82 ± 1.275	2 (2.2)	13 (14.4)	7 (7.8)	45 (50.0)	23 (25.6)
Injury occurrence does not coincide with clinical education	3.73 ± 0.981	2 (2.2)	10 (11.1)	16 (17.8)	44 (48.9)	18 (20.0)
Injury occurrence does not coincide with students' progression through the athletic training program	3.41 ± 1.090	2 (2.2)	22 (24.4)	17 (18.9)	35 (38.9)	14 (15.6)
Insufficient time of preceptor to spend with students to engage in patient care	3.12 ± 1.244	6 (6.7)	31 (34.4)	14 (15.6)	24 (26.7)	15 (16.7)
Patient care is too often a priority over students' clinical education	3.73 ± 0.974	0 (0.0)	12 (13.3)	21 (23.3)	35 (38.9)	21 (23.3)
Coach/administrator gives minimal or no support of student clinical education	2.99 ± 1.176	7 (7.8)	31 (34.4)	18 (20.0)	24 (26.7)	10 (11.1)

[a] 1 = strongly disagree; 5 = strongly agree.

We identified simulated patient encounters and standardized patients as alternative methods of teaching and evaluating students' clinical skills. One of the benefits of simulated and standardized patients is that students are allowed sufficient time to practice clinical skills without the pressure of busy clinical practice.[15] As found in previous research,[1,2] use of simulated patients continues to be the most predominant methods of teaching (94.4% classroom, 93% clinical experiences) and evaluating (93% classroom/laboratory, 80% clinical experiences) athletic training students' clinical skills. However, it should be noted that one pitfall of simulated patient encounters is that most are developed on the spot to meet the immediate needs of a student. Poorly designed and implemented simulated patient encounters often overlook or exclude higher-level cognitive skills (ie, critical thinking, decision making) and focus solely on psychomotor skills.[1] Simulated patient encounters do not allow for the opportunity to collect programmatic educational outcomes, as each simulation is different for each student. Despite their limitations, simulations will likely continue to be used until more reliable and valid methods are easily accessible in the classroom/laboratory setting and during clinical experiences.

Clinical evaluation of students is valued as a hallmark process for professional development.[18] Principles of adult learning support teaching and evaluation models where students are actively engaged in clinical learning by being encouraged to make decisions about patient care.[3] Most respondents use real-time patients for teaching (57% classroom/laboratory, 94% clinical experiences) and evaluating (61% classroom/laboratory, 97% clinical experiences) athletic training students' clinical skills. Similarly, educators in medical education[19] use real-time patients for teaching, specifically for history-taking and communication skills. With real-time evaluations, students have ample opportunities to apply theory to clinical practice, including critical thinking and decision-making processes.[18] Interestingly, female respondents identified more use of real-time patient encounters for teaching clinical skills than male respondents in the classroom/laboratory. We deduce that women are more likely to reach out to practicing clinicians to facilitate actual patients coming into the classroom/laboratory setting. These real-time clinical evaluations (both in the classroom and during clinical experiences) are important to the development of students because they allow students to make clinical decisions based on the patient presented before them.[1]

Interestingly, respondents with less than 10 students enrolled in their program reported use of simulated encounters more than other respondents. We deduce that because of smaller numbers of students enrolled in each cohort, simulated patient encounters are easier to implement in the classroom/laboratory. In addition, respondents with more than 70 students enrolled in the professional program reported more opportunities for real-time patient encounters in the therapeutic intervention content area than other respondents. Although no literature exists to support this, we surmise that because of large numbers of students per cohort, faculty and preceptors are maximizing opportunities for students to engage in real-time patient encounters in the classroom/laboratory and during clinical experiences.

Standardized patients provide athletic training students an opportunity to complete patient encounters in a nonthreatening environment that allows for the direct application of knowledge and skill.[20] Standardized patients have long been valuable in the teaching and evaluation of health care students.[13] Medical education,[15,21] nursing,[22] and other health professions use standardized patients for teaching and evaluating clinical skills. Fewer respondents noted using standardized patients for teaching (27% classroom/laboratory, 18% clinical experiences) and evaluating (36% classroom/laboratory, 17% clinical experiences) athletic training students' clinical skills, compared with 56%[2] and 47%[1] who previously reported using standardized patients to evaluate clinical skill. We feel this drop-in numbers are a more accurate representation of their use than that in our previous study because of athletic training educators possessing a better understanding of standardized patients. At the time of our initial study, no research using standardized patients had been reported in the athletic training literature. Since our original work, there has been an increase in publications and presentations reporting educational outcomes related to using standardized patients in athletic training. Standardized patients are an exemplary teaching strategy because they offer students a transition from didactic learning to patient-based clinical learning without unnecessary concern or risk of causing harm to a patient.[13] Additionally, the authenticity and fidelity of standardized patient encounters allow students to interact with the patient in a manner similar to how they would interact with a real patient during clinical experiences.[23] These types of encounters should continue to be used for teaching and evaluation purposes because they have been shown to improve athletic training students' confidence,[23,24] self-reflection,[24] and psychosocial intervention and referral skills.[25]

Opportunities for Real-Time Patient Encounters in Clinical Practice

As found in our previous investigations,[1,2] our current respondents ranked the secondary school and college/university settings as providing the most opportunities for real-time clinical skill evaluation. This is important because clinicians need to hone their skills through training activities that are designed to maximize improvement in patient care.[9] We found that respondents from programs with the NAIA athletics affiliation reported more opportunities for real-time patient encounters outside the collegiate setting. Institutions within the NAIA athletics affiliation often have fewer sports programs offered on campus, as well as smaller numbers of preceptors. It is likely that these respondents seek out clinical education sites beyond collegiate athletics. Regardless of athletics affiliation, it is important that athletic training faculty and preceptors maximize opportunities during clinical experiences that allow students the opportunity to provide real-time patient care.

Traditional clinical experiences provide an inconsistent number and type of patient encounters. These experiences are not sufficient to teach students to perform psychomotor skills competently, even for relatively straightforward patient problems.[26] Researchers in pharmacy education[27] found that students developed competency of clinical skills with more exposure to patient encounters or repeated skill performance. Interestingly, the educational content areas of psychosocial intervention and referral, acute care of injury/illness, and clinical examination and diagnosis were ranked as having more

opportunities for real-time patient encounters. We deduce that these educational content areas were ranked highly because they require a high degree of clinical reasoning and decision making. In medical education, clinical reasoning was best taught during the course of a clinical encounter or during the observation of a clinical encounter led by a student clinician.[9] Students need to be placed in clinical education settings that provide adequate opportunities for real-time patient encounters to teach and evaluate clinical skills. It is unclear how the addition of immersive clinical experiences where students are in clinical experiences full time will affect the opportunities for real-time evaluation. Like our previous study, this study was based on perception; future research is needed that documents numbers of real-time patient encounters as well as the volume and types of patient encounters students experience during clinical experiences in their various settings.

Barriers to Real-Time Patient Encounters

In our investigation, we found that several barriers were more prominent at preventing real-time clinical skill evaluation during clinical education. A majority of respondents either agreed or strongly agreed that a student's lack of self-confidence (n=81) or the preceptor's lack of confidence in the student (n = 64) was a barrier to real-time clinical skill evaluation. With clinical decision making, confidence is often associated with knowledge; however, other factors can affect a student's level of confidence (eg, amount of training and expertise, time allocated to decision making, levels of self-confidence).[28] What seems most evident in terms of student confidence is that when students have repeated exposure to a clinical experience, they have a greater potential for their confidence to improve.[29] These barriers are important to note because opportunities may exist for students to demonstrate their skills on a patient, but confidence in the student's ability (from both the student and preceptor) could be a limiting factor in completing such an evaluation. Thus, it is important for students to be provided opportunities for real-time clinical skills evaluation, in the classroom laboratory setting and during clinical experiences.

Previously, we established inadequate volumes of injuries and conditions[1,2] as the most predominant barriers to evaluating athletic training students' skills in real time. Similarly, most respondents (n = 68) in the current investigation either agreed or strongly agreed that an inadequate volume of injuries, illnesses, or pathologies prevented real-time evaluation of clinical skills. We also found that, as in our original investigation,[2] role strain of the preceptor continues today, preventing the real-time evaluation of clinical skills. Researchers in podiatry[30] reported role strain as a barrier to clinical education, including amount of preparation time, number of students supervised, and responsibility of evaluating students' learning. It is unclear how the addition of immersive clinical experiences, where students are in clinical experiences full time, will affect the barriers to real-time evaluation. As with our previous study, our results were based on perceptions of program directors; thus, it is imperative that future research explore the barriers to real-time encounters students experience during immersive clinical experiences, as these barriers could be different.

Respondents continue to report patient care as a priority over student clinical experiences. This is a dilemma, insofar as the preceptor's primary role is that of a health care provider, but students must be observed during clinical interactions and provided adequate feedback throughout clinical experiences.[3] As patient care continues to take priority over students' clinical experiences, can program administrators ensure that students are being afforded appropriate opportunities to engage directly in-patient care? In our study, 35 respondents (38.9%) agreed and 21 respondents (23.3%) strongly agreed that patient care takes priority over student clinical experiences, which is lower than previously reported by preceptors[1] and program administrators.[2] Because patient care still exists as a barrier to real-time skill evaluation, faculty are encouraged to use simulated patient encounters, rather than mock evaluations. Students have reported that mock evaluations and role play are undesirable options because they lack authenticity.[13]

Limitations and Future Research

The results of our investigation add to the knowledge base of athletic training education, shedding light on the methods educators use in the classroom/laboratory and during clinical experiences to teach and evaluate students' clinical skills. One limitation of the current investigation is our lower-than-anticipated response rate. Despite our response rate being lower than rates in previous research (54%[1] and 59%[2]), we gained a sense that the methods used for evaluating clinical skills have not changed drastically within the last 10 years. The similar findings improve the external validity of our current investigation. Additionally, the responses are perceptions of program directors; preceptors or students could provide a more holistic view of methods used to teach and evaluate clinical skills.

Examining the methods educators use to teach clinical skills in the classroom/laboratory and during clinical experiences was not included in our original research.[1,2] When compared with our previous research, findings from the current investigation suggest that educators need to better use more contemporary educational strategies, such as simulations and standardized patients, often used by other health care professions to teach and evaluate students' clinical skills as they continue to evolve to meet the demands of professional practice. With the transition of the professional degree from the bachelor's to master's level underway, athletic training faculty need to use teaching and evaluation methods that provide opportunities for students to engage with patients in a nonthreatening environment in a manner such as they would during patient care, with methods such as high-fidelity simulations and standardized patients. Previous research compared perceptions of program directors[1] and preceptors,[2] whereas our current research examines only program directors. It will be important in the future to add the perceptions of athletic training students regarding how teaching and evaluation methods impact their development. Future research also should examine how simulated and standardized patients are being used to teach and evaluate clinical skills in the classroom/laboratory and during clinical experiences. Additionally, future research should examine the nature of real-time patient encounters used in the classroom/laboratory and during clinical experiences for teaching and evaluating clinical skills.

CONCLUSIONS

Undoubtedly, athletic training, as a profession, has evolved within recent years; however, the methods used to teach and evaluate athletic training students' clinical skills have remained consistent. After 10 years, athletic training students'

skills are being evaluated primarily via simulated patients, whereas the methods that athletic training faculty use for teaching clinical skills include both simulations and real-time patient encounters. Educators are also using simulated patients as the predominant method of teaching clinical skills. Despite that simulated patients are most frequently used, students are being provided opportunities to engage in real-time and standardized patient encounters for both teaching and evaluation purposes. Clinical skills can be taught and evaluated via a myriad of different educational techniques. We expect our students, in a short period of time, to collect the necessary information, make clinical observations and diagnoses, and develop an intervention strategy specific to the patient's problem(s). Thus, it is imperative that athletic training education evolve and that there be a change in methods used to teach and evaluate clinical skill. Educators should provide students with the opportunity to learn and practice clinical skills within the content of patient care. Athletic training faculty should use patient encounters as an important mechanism that allows students to build and integrate skills for reaching clinical decisions. To achieve this, professional programs are encouraged to continue using simulations and standardized patients, and to use real-time encounters when available to provide additional patient care experiences in the classroom/laboratory.

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