

KNOWLEDGE OF ATHLETIC TRAINERS REGARDING AIRWAY ADJUNCTS

A thesis

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ABSTRACT

Context: Research shows that knowledge gaps occur among various professions and practitioners, which may harm patients. Little research has been done in Athletic Training to determine if knowledge gaps exist. **Objective:** To determine the relationship between perceived and actual knowledge of airway adjunct use and determine the difference in perceived knowledge. **Design:** Knowledge assessment **Setting:** Web-based survey **Participants:** 2000 Certified Athletic Trainers received the survey via email, 152 responded. Our response rate was 7.6%. **Interventions:** The perceived knowledge questionnaire was modified from Flynn and Goldsmith 5-item subject knowledge assessment. Flynn and Goldsmith examined the assessment tool to ensure validity and reliability. The 5 original items were applied to airway adjunct use to assess pre and post test perceived knowledge. We performed a factor analysis, which revealed that, 68.7% of the variance was assumed within 3 factors defined as knowledge retrieval, comprehension, and knowledge utilization. **Main Outcome Measures:** We measured pre and post-test perceived knowledge using the perceived knowledge questionnaire. Actual knowledge was measured using an assessment consisting of 9 questions related to common airway adjunct uses. We asked each participant to rate their likelihood to pursue continuing education during the pre and post-test perceived knowledge questionnaire. We also asked participants how often life-saving skills were used in their job. We used dependent t-tests to determine the pre and post-test differences in perceived knowledge and likelihood to pursue continuing education. A correlation analysis was used to determine the relationship between perceived and actual knowledge. We

used an analysis of variance to determine if differences in actual knowledge existed between genders, employment settings, and how frequently they used life saving skills. **Results:** We identified no significant change ($t_{150} = -0.91$, $p = 0.37$, 95% CI = -0.17 to 0.06) in likelihood to pursue continuing education from before (pre = 4.35 ± 1.30) and after testing (post = 4.40 ± 1.35). A poor relationship ($r = 0.36$, $p < 0.001$) was identified between perceived knowledge and actual knowledge. We found a significant difference ($F_{1,145} = 4.63$, $p = 0.03$, $1-\beta = 0.57$) between the frequency of use of life saving skills and actual knowledge. **Conclusion:** We identified a knowledge gap amongst athletic trainers in the use of airway adjuncts. Although the likelihood to pursue continuing education score was high, the score did not significantly increase after completing the assessment, which is inconsistent with previous literature. Participants who use life saving skills more frequently scored higher on the actual knowledge assessment, suggesting that the more frequently athletic trainers utilize a skill, the more knowledge they demonstrate.

PREFACE

As an undergraduate student my professors always stressed the importance of life-long learning, and avoiding complacency in the field of athletic training. I began to realize the importance of this message as I started graduate school and practicing as a newly certified AT. I didn't realize how much more there was to learn. I wanted to develop a project that would be relevant to practicing clinicians and demonstrate the importance of continuing education. With the help of my thesis committee we have developed a project that fulfills both. As I look back on the process I can't help but feel proud of the hard work and time spent completing this project.

ACKNOWLEDGMENTS

First and foremost I would like to thank my family for their support, without them I would not be where I am today. I would also like to thank my friends for their advice throughout the completion of this project. Finally, I would like to thank my thesis committee. Your hard work and guidance allowed me learn much more than how to write a thesis. Thank you for all you have done to help me complete this project.

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CHAPTER 1

INTRODUCTION

Research in health care is rapidly increasing the quantity of information available. Research shows that knowledge gaps occur among various professions and practitioners, which may harm patients. Knowledge gaps occur when a difference in actual and perceived knowledge is present. In fact many individuals are unaware they possess a knowledge gap.¹⁻⁷ Continuing education (CE) is an effective mechanism to bridge knowledge gaps. Research has shown that practitioners who participate in CE have better patient outcomes.^{8,9} The CE sessions increase the practitioners knowledge in the content area which allows them to provide better care for their patients.

In Athletic Training, CE provides the development of skills beyond the National Athletic Training Association's (NATA) educational competencies for entry-level practice.¹⁰ The NATAs educational competencies define the scope of practice in athletic training.¹¹ Rycroft-Malone discusses the process of change based on evidence in nursing.¹² Changes occur when current research shows better patient outcomes using another method of care, thus creating a new clinical practice guideline.¹² To implement the use of new clinical practice guidelines practitioners must be educated on the new method.¹² The process of change in athletic training begins with the Board of Certification (BOC) conducting a role delineation study. The BOC does this every five years to assess essential knowledge and skills for athletic trainers, based on their

findings new competencies are created.¹⁰ As new competencies are included CE is necessary update clinicians because knowledge gaps may exist. The use of airway adjuncts in athletic training is a new addition to the 5th edition of the NATA's educational competencies. Knowledge gaps may be prevalent in certified athletic trainers' (AT) use of airway adjuncts. Therefore, the purpose of this study is to determine the relationship in perceived and actual knowledge, along with the difference in pre-test and post-test perceived knowledge in airway adjunct use.

Research Questions

R1: What is the relationship between perceived and actual knowledge of the use of airway adjuncts in certified athletic trainers?

R2: What is the difference between pre-test and post-test perceived knowledge of the use of airway adjuncts in certified athletic trainers?

Hypotheses

1. Perceived knowledge will weakly correlate with actual knowledge in airway adjunct use.
2. Perceived knowledge will significantly decrease after the actual knowledge assessment.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this literature review is to discuss the current literature regarding actual and perceived knowledge, the evolution of athletic training education, and the implications of changing the scope of practice. Understanding the impact of a knowledge gap is imperative to health care professionals to ensure their patients' safety. Searches on the topic were completed using the following databases: PubMed, CINAHL, EBSCOhost, and Medline. The following key words were used to search the literature: actual knowledge, perceived knowledge, knowledge gap, competency-based education, scope of practice, practitioner knowledge, patient outcomes and continuing education.

Actual and Perceived Knowledge

A knowledge gap demonstrates a lack of knowledge in a specific content area, which may lead to potentially hazardous situations for both patients and clinicians. Identifying a knowledge gap requires an assessment of perceived knowledge and actual knowledge. A difference in perceived and actual knowledge indicates a knowledge gap. Actual knowledge is the possession of knowledge, or what an individual actually knows.¹³ Perceived knowledge refers to one's feeling of knowing, also defined as the illusion of knowing.¹³

Many investigations have demonstrated healthcare professionals' knowledge on various topics.¹⁻⁷ Multiple studies have been completed measuring nurses' actual and perceived

knowledge of diabetes mellitus.^{1,4-6} Drass and associates created and validated the Diabetes Self-Report Tool (DSRT) and Diabetes: Basic Knowledge Test (DBKT), which was used in the other research studies.⁴ Researchers found a knowledge gap in nurses' knowledge of diabetes mellitus, using a correlational design to measure the difference on the DSRT and DBKT.⁴⁻⁶ Baxley and colleagues also had participants complete the DBKT and DSRT. They found a poor correlation between perceived knowledge and actual knowledge of diabetes mellitus in nurses.¹ Lehna and Myers measured nurses' perceived knowledge and actual knowledge of burn prevention, using a burn prevention survey.² One question on the survey asked participants to rate perceived burn prevention knowledge and nine questions related to actual burn prevention knowledge, the remainder of the survey included basic demographic questions and potential mechanisms to teach burn prevention. Researchers used a correlation coefficient to determine the relationship between actual and perceived burn prevention knowledge; they found that the relationship is statistically significant but not meaningful.² Previous research is inconclusive to determine knowledge gap in health care professionals.

Table 1. Previous Research Findings

Author	Correlation coefficient	p-value
Baxley ¹	0.23	p=0.21
Lehna ²	0.124	p=0.046
Naughton ³		p<0.001
Drass ⁴	-0.36	p<0.001
El-Deirawi ⁵	0.402	p<0.001
Chan ⁶	0.32	p<0.0001
Eberman ⁷	0.097	p=0.328

Research has shown the prevalence of knowledge gaps in individuals working in health care.³⁻⁷ Knowledge gaps that have not been identified can put the practitioner and patient at risk.

In an effort to protect patients and treat them with the highest standard of care, practitioners need to be aware of the negative side effects of having a knowledge gap. They must strive to recognize areas in which they have a knowledge gap and work to bridge the gap, to prevent them from putting a patient in a potentially harmful situation.

Competency-based Education

In the 1980s following the first NATABOC role delineation study, competency-based education (CBE) became the foundation of athletic training education.¹⁴ CBE provides a set of skills, clinical abilities, and knowledge that must be mastered by students, through the evaluation of competencies and proficiencies.¹⁵ Students practice under the guidance and direct supervision of an instructor or preceptor, who ensures they are appropriately performing skills.

Instructors/preceptors assess the students in a variety of ways such as, watching the students' interactions with patients, discussing a case, or involving them in a scenario that requires the student to demonstrate skills.¹⁶ Assessment allows the preceptor to provide feedback to the student about skills that were performed.

The BOC requires that students graduate from a CAATE (Commission on Accreditation of Athletic Training Education) accredited undergraduate program to be eligible for the certification exam.¹⁴ Undergraduate athletic training programs use the NATA educational competencies (5th Ed.) as the knowledge and skill set required for entry-level education.¹⁷ The BOC certification exam questions are developed to assess athletic training knowledge within the 5 domains defined by the BOC Role Delineation/Practical Analysis (RD/PA).¹⁸ According to the BOC testing report the total pass rate for April 2011-February 2012 was 47.9%.¹⁹ The first time pass rate was 82.3% and the retake pass rate was 41.8%.¹⁹ Exam questions are created by a committee of BOC certified ATs. Independent judges validate questions for relevancy to current

athletic training practice and by ATs for content and clarity.¹⁸ The BOC ensures competency by establishing a minimum pass rate using the Angoff Modified Technique. This technique requires a group of judges (certified athletic trainers) to determine the probability that a minimally acceptable candidate will answer the question correctly.¹⁸ The Angoff Modified technique requires the judges to determine what the competency level must be for a minimally acceptable candidate.

Prior to the CBE model, athletic training offered two methods to achieve certification, the first was a formal education and the second an internship route based on clinical hours with less emphasis on course work.¹⁴ The Educational Task Force formed in 1994 to examine the current athletic training education guidelines and provide recommendations for changes for the future of AT education.²⁰ The goals of the task force were to enhance the credibility within health care professions and better prepare athletic trainers.¹⁴ The task force proposed the elimination of the internship route in 1996, because it no longer prepared athletic trainers according to the new standards of the profession. The proposal was approved by the NATA and the internship route was eliminated in 2004.²⁰ Another important change proposed by the task force and approved by the NATA was the training of clinical instructors.¹⁴ Preceptors, formerly referred to as clinical instructors, must complete annual training about their roles and responsibilities in teaching and evaluating athletic training students.¹⁷

Clinical education in the allied health professions has developed into a structured and organized environment intended to create learning opportunities for students.¹⁴ Preceptors provide formal instruction and assessment of clinical proficiencies to athletic training students in the classroom, laboratory, and clinical education setting.¹⁷ Assessment is a key component of CBE: it allows for early recognition of deficiencies and remedial action.¹⁶ Holmboe et al. cites

six key points that are fundamental to effective assessment: 1) assessment should be continuous and frequent, 2) assessment must be criterion-based, 3) assessment must occur during work-based experiences, 4) assessment tools must meet the minimum quality standards, 5) qualitative assessment should be included, and 6) assessments should be completed by more than one individual and include the students input.¹⁶ Assessment of clinical proficiencies allows for documentation and evaluation of learning over time.²¹

Learning over time requires students to enhance skills through multiple experiences over the course of their education.²¹ Students must show translation of the skills they acquired in the classroom to practical application in a clinical environment.²¹ Amato, Konin, and Brader suggest a five level matrix for evaluation of clinical proficiencies, the levels begin with the instructor teaching and demonstrating basic skills and concepts in the classroom to the final assessment and evaluation of a senior student.²¹ All assessments made to demonstrate learning over time are derived from the NATA educational competencies (5th Ed.).

Airway Adjunct Devices

As the athletic training profession evolves new competencies are added with each new RD/PA. The use of airway adjunct devices is a new addition to the 5th edition of the NATA educational competencies. Airway adjunct devices are used to (1) clear and maintain the patients airway, (2) provide adequate ventilation and promote pulmonary gas exchange, and (3) supply supplemental oxygen.²² The types of airway adjunct devices incorporated in the 5th ed. of the Athletic Training Education Competencies include (1) oropharyngeal airways (OPA), (2) nasopharyngeal airways (NPA), (3) supraglottic airway (SGA), and (4) suction.²² OPAs designed to fit the natural shape of mouth and throat. They are used when a patients tongue falls back on the posterior pharynx.²² NPAs are inserted into the nasal passageway to secure an airway.²²

SGAs are also known as blind insertion airway devices (BIAD) and are inserted into the pharynx to establish an airway.²² OPAs and SGAs stimulate the pharyngeal (gag) reflex and should not be used in patients that are responsive or have an intact reflex. Suction is useful when the patient has gurgling sounds with breathing or artificial ventilations or when breathing is obstructed by body fluids.²²

Athletic trainers who were certified prior to the 5th edition of the NATA educational competencies were not educated on airway adjuncts as part of their curriculum. ATs must be aware of the changes made to the educational competencies and seek CE in areas they have not been trained in, or possess a knowledge gap. Learning over time is important beyond entry-level education. Recent graduates will have the basic tools to practice as an athletic trainer, but must realize the importance of continual knowledge acquisition with new experiences. Those individuals must understand they may have knowledge gaps, which could place a patient in a potentially harmful situation. Graduates who understand the difference in perceived and actual knowledge and the possible negative outcomes associated will also understand the importance to bridge their knowledge gap. Closing the gap in knowledge is completed by CE.

Continuing Education

According to the BOC, CE is intended to promote continued competence, development of current knowledge and skills and enhance professional skills and judgment beyond the levels required for entry-level practice.¹⁰ The current entry-level knowledge is defined by the BOC RD/PA.¹¹ The BOC expects all ATs to maintain entry-level knowledge in accordance with the RD/PA. If a knowledge gap exists, the ATs should seek CE in those areas.

Armstrong and Weidner discuss two forms of CE, formal and informal.²³ Formal CE consists of BOC approved workshops, seminars, or professional conferences. Reading athletic

training journals, mentoring colleagues, holding professional office, and supervising students during clinical experiences are examples of informal CE. The BOC does not issue continuing education units (CEUs) for informal CE. Armstrong and Weidner cited improvements in the perception of clinical skills and patient care from informal CE activities, whereas formal activities increased knowledge.²³

Hughes conducted a study of ATs to identify attitudes toward and deterring factors in CE.²⁴ ATs overall indicated a positive attitude towards CE. However three groups were distinguished based on the lack of course relevance. Hughes found a greater concern on course relevance in ATs with more experience and less concern in ATs with less experience.²⁴ His findings suggest that ATs with more experience understand areas where they possess a knowledge gap and seek to pursue CE in those areas to lessen the gap. Conversely, newly certified ATs may not be cognizant of their knowledge gaps and seek CE in all areas instead of where they lack knowledge.

CE is effective at improving patient outcomes as shown by Cabana et al and Clark et al.^{8,9} Both researchers educated physicians on asthma care of children.^{8,9} Cabana et al compared changes in health care provider attitudes, change in provider behavior, changes in patient symptoms and health care utilization, and changes in office visit length.⁸ The educated physicians were more likely to have increased confidence in ability to develop a treatment plan when compared to the control group.⁸ Children cared for by the educated physicians were limited in activity significantly less than patients in the control group (8.5 vs 15.6 days; $p < .05$).⁸ Clark et al found similar results in physician behavior, they were more likely to address specific fears of their patients. Parents in the experimental group said the physician was more reassuring and encouraging, and set goals for the child.⁹ Parents also reported they felt better prepared to handle

their child's asthma care at home when treated by physicians who were educated.⁹ Clark et al reported fewer non-emergent office visits in patients in the treatment group, while no difference was reported for emergency department visits and hospitalizations.⁹ While neither Cabana or Clark examined the change in knowledge of physicians who participated in CE, they showed the increase in physician confidence, parent satisfaction, and increase in patient outcomes.^{8,9}

CE is an effective mechanism to ensure that ATs are bridging their knowledge gap when new competencies are defined by the RD/PA. When changes occur to the athletic training educational competencies in accordance with the RD/PA, the scope of practice for ATs must be modified. Schuiling and Slager define the scope of practice for midwives in a five-part description: 1) defines the practice of midwives, 2) distinguishing which patients midwives care for, 3) identifies skills midwives should or should not possess, 4) assists in the development of practice guidelines, and 5) describes critical incidents in the clinical setting from a contextual framework.²⁵ Nurse practitioners have practice acts regulated at the state level that determine what a practitioner can do in that state.²⁶ The American Academy of Nurse Practitioners develops and publishes statements on the scope of practice of nurse practitioners. National and state regulatory boards and employers use the statements to develop the scope of practice, and provide best care to patients.²⁶ ATs similarly use position statements from the NATA to develop standards of best practice. Changes to a profession's scope of practice occurs from a number of variables: patient needs, practitioner philosophy, years of experience and education, state laws and national standards, and policies and procedures of the institution.²⁵ These adjustments take place and new responsibilities are defined within the scope of practice. For ATs, it means the RD/PA creates new competencies for entry-level knowledge.

The BOC mandates 75 continuing education units (CEUs) every 3 years for an AT to maintain their certification.¹⁰ The National Commission on Certification of Physician Assistants (NCCPA) requires that physician assistants (PAs) take a recertification exam every six years, along with completing 100 continuing medical education (CME) credits every two years.²⁷ CEUs and CMEs for AT and PA respectively both equate to one contact hour.^{10,27} Occupational therapists must complete 36 professional development units (PDU) every three years to allow for recertification via the National Board of Certification in Occupational Therapy (NBCOT).²⁸ A professional development unit varies in the number of contact hours required for one unit.²⁹ For example, every two hours spent completing a peer review of a manuscript equates to one PDU, whereas one hour at a workshop or lecture is one PDU.²⁹ CE for physical therapy is regulated by each state's licensing board. The amount of CE required differs by state, 21 states have no requirements and the remaining states vary from 10 hours every year to 50 hours every three years.³⁰

Organizations that certify and/or license health care providers understand the significance of CE, which is why they mandate the amount required. CE is important to bridge an individual's knowledge gap. Unidentified knowledge gaps place patients in potentially harmful situations. Health care professionals need to be committed to identifying personal knowledge gaps and seeking CE in those areas. They should strive to stay current with their scope of practice and literature in their field. Understanding the importance and striving to decrease knowledge gaps allows health care professionals to safely and effectively provide the best care for their patients.

CHAPTER 3

METHODS

Research Design

This study had two aims: (1) to measure the relationship between perceived and actual knowledge and (2) to measure the change in perceived knowledge after an actual knowledge assessment. Each AT's perceived knowledge was measured before and after assessing his/her actual knowledge. The change in perceived knowledge was measured using a pre-test post-test design. Perceived and actual knowledge were correlated to determine the relationship between them. The correlation between actual and perceived knowledge identifies a knowledge gap.

Participants

We used the NATA membership directory to select 2000 ATs. The NATA grants graduate assistants access to 2000 current members for research. Participants must have current certification. Participants were excluded if they are retired or have a membership lapse.

Instrumentation

Two testing instruments were used in this study: the Perceived Knowledge Questionnaire (PKQ) and the Actual Knowledge Assessment (AKA). The PKQ allowed each participant to assess his or her perceived knowledge of airway adjunct use. The PKQ is modified from Flynn and Goldsmith's 5-item subject knowledge assessment tool.³² Flynn and Goldsmith completed five empirical studies to estimate internal and external consistency of the PKQ.³² In their

investigation they established dimensionality, generalizability, test-retest reliability, psychometric properties, content, convergent, criterion, nomological and construct validity.³² The validation involved several constructs, which expanded the generalizability and as such, allowed us to insert airway adjuncts as the primary content evaluated in PKQ.

The AKA (Appendix B) measures each participant's understanding of the use and implementation of airway adjuncts based on the following (Table 2) NATA Educational Competencies¹⁵:

Table 2. NATA Educational Competencies

Code	Competency
AC-9	Differentiate the types of airway adjuncts (oropharyngeal, nasopharyngeal, supraglottic) and their use in maintaining a patent airway in adult respiratory and/or cardiac arrest.
AC-10	Establish and maintain an airway, including the use of oro- and nasopharyngeal airways, and neutral spine alignment in an athlete with a suspected spine injury who may be wearing shoulder pads, a helmet with and without a face guard, or other protective equipment.
AC-11	Determine when suction for airway maintenance is indicated and use according to accepted practice protocols.

The AKA was emailed to the undergraduate students to determine content validity. We performed a factor analysis, which revealed that, 68.7% of the variance was assumed within 3 factors defined as knowledge retrieval, comprehension, and knowledge utilization. Participants were asked five demographic questions, based on gender, years of experience, and other credentials. Participants will also indicate job setting, specifically, work in an emergent setting where life saving skills are more frequently practiced.

Procedure

We emailed participants instructions and the questionnaires via electronic mail (https://indstate.qualtrics.com/SE/?SID=SV_82OrDLCfMXjRb13). Participants had 3 weeks to

complete the survey. We sent a reminder e-mail after 2 weeks. The e-mail was sent out twice, once at the end of the academic year and once at the beginning. Participants completed demographic questions (4 items) followed by the pre-test PKQ (6 items – 6-point Likert response: Strongly Disagree to Strongly Agree), AKA (6 multiple choice, 1 matching), and post-test PKQ (6 items), respectively. No feedback was provided following the AKA.⁷

CHAPTER 4

MANUSCRIPT

Introduction

The quantity of new evidence based information practitioners must assess to remain relevant and retain effective patient engagement requires continual review and application.¹⁰ Research indicates that knowledge gaps occur among various professions and practitioners, which may harm patients, when practitioners fail to recognize evidence based changes relevant to clinical practice. The lack of attention to updated information creates a difference in actual and perceived knowledge which may be compounded by individuals unaware they possess a knowledge gap.¹⁻⁷ Practitioners who participate in Continuing Education (CE) have better patient outcomes.^{8,9} The CE sessions are effective mechanisms to bridge knowledge gaps thereby increasing the practitioners knowledge in the content area which allows them to provide better care for their patients.

CE in athletic training allows skill development beyond the National Athletic Training Association's (NATA) educational competencies for entry-level practice.¹⁰ The NATAs educational competencies define the scope of practice in athletic training entry level professionals.¹¹ Changes to current practices occur when current research indicates better patient outcomes using another method of care, thus creating a new clinical practice guideline.¹² To implement the use of new clinical practice guidelines practitioners must be educated on the new

method.¹² New clinical practices are traditionally added to educational program competencies, however practicing clinicians must seek the information either through individual inquiry or continuing education resources.¹⁰ As new competencies are included CE is necessary update clinicians to reduce knowledge gaps that may exist.

The use of airway adjuncts in athletic training is a new addition to clinical practice of athletic training. . Although this new clinical practice is now part of the NATA educational competencies, knowledge gaps may exist among certified athletic trainers' (AT). Therefore, the purpose of this study is to determine the relationship in perceived and actual knowledge, along with the difference in pre-test and post-test perceived knowledge in airway adjunct use.

Methods

This study is a knowledge assessment with two aims: (1) to measure the relationship between perceived and actual knowledge and (2) to measure the change in perceived knowledge after an actual knowledge assessment. Each ATs perceived knowledge was measured before and after assessing his/her actual knowledge. The change in perceived knowledge was measured using a pre-test post-test design. Perceived and actual knowledge were correlated to determine relationship. The correlation between actual and perceived knowledge identifies a knowledge gap.

Participants

We used the NATA membership directory to select 2000 ATs. The NATA grants graduate assistants access to 2000 current members for research. Participants had to have current certification and were excluded if they were retired or had a membership lapse. We had 152 participants respond for a 7.6% response rate, although we do not know how many e-mails were not delivered. Previous research found a 20.5% response rate when examining web-based

responses.³¹ The 152 respondents had an average of 13.84±9.39 years of experience. Table 3 includes demographic information for the participants.

Table 3. Participant Demographics (N = 152)

Characteristic (No. Reporting)	Frequency (%)
Sex (n = 137)	
Male	79 (57.7)
Female	58 (42.3)
Employment setting (n = 152)	
College/University	48 (31.6)
Secondary/Intermediate	58 (38.2)
Clinic/Hospital	29 (19.1)
Professional	1 (0.7)
Other	16 (10.5)
Years of Experience (n = 150)	
< 5 years	25 (16.7)
5-10 years	36 (24.0)
> 10 years	89 (59.3)
Are life saving skill necessary (n = 151)	
Yes	136 (90.1)
No	15 (9.9)
Frequency of life saving skills use (n = 147)	
Not at all	76 (51.7)
Occasionally	71 (48.3)

Instrumentation

Two testing instruments were used in this study: the Perceived Knowledge Questionnaire (PKQ) and the Actual Knowledge Assessment (AKA). The PKQ assessed each participants perceived knowledge of airway adjunct use. The PKQ was modified from Flynn and Goldsmiths 5-item subject knowledge assessment tool.³² Flynn and Goldsmith completed five empirical studies to estimate internal and external consistency of the PKQ.³² In their investigation they established dimensionality, generalizability, test-retest reliability, psychometric properties, content, convergent, criterion, nomological and construct validity.³² The validation involved

several constructs, which expanded the generalizability and as such, allowed us to insert airway adjuncts as the primary content evaluated in PKQ.

The AKA measured each participant's understanding of the use and implementation of airway adjuncts based on the NATA Educational Competencies (Table 2). The AKA was given to the undergraduate students to determine content validity. We performed a factor analysis, which revealed that, 68.7% of the variance was assumed within 3 factors defined as knowledge retrieval, comprehension, and knowledge utilization. Participants were asked five demographic questions, based on gender, years of experience, and other credentials. They also indicated job setting and if they worked in an emergent setting where they use life saving skills.

Procedure

We sent participants instructions and the questionnaires via electronic mail (https://indstate.qualtrics.com/SE/?SID=SV_82OrDLCfMXjRb13). They had 3 weeks to complete the survey. We sent a reminder e-mail after 2 weeks. They completed demographic questions (4 items) followed by the pre-test PKQ (6 items – 6-point Likert response: Strongly Disagree to Strongly Agree), AKA (6 multiple choice, 1 matching), and post-test PKQ (6 items), respectively. No feedback was provided following the AKA.⁷

Statistical Analysis

We used a correlation analysis to determine the relationship between perceived and actual knowledge. We used dependent t-tests to determine the pre and post-test differences in perceived knowledge and likelihood to pursue continuing education. We used separate one-way analyses of variance to determine if differences in actual knowledge existed between genders, employment settings, years of experience, and frequency of using life-saving skills. We used scheffe post hoc analyses where appropriate. Significant was set at $p < 0.06$ a-priori.

Results

We identified a poor relationship ($r = 0.36$, $p < 0.001$) between perceived knowledge and actual knowledge. We identified no significant change ($t_{151} = 1.17$, $p = 0.25$, 95% CI = -0.04 to 0.14) in perceived knowledge from the pre-test (pre = 3.43 ± 1.35) to post-test (post = 3.38 ± 1.30), yet the scores indicated that participants perceived only moderate competence with airway adjunct skills. Participants recognized the need for continuing education prior to testing (pre = 4.35 ± 1.30), and as such, no significant increases ($t_{150} = -0.91$, $p = 0.37$, 95% CI = -0.17 to 0.06) in likelihood to pursue continuing education after testing existed (post = 4.40 ± 1.35). When stratifying our sample by gender and employment setting regarding actual knowledge, we identified no significant differences (Gender: $F_{1,135} = 0.213$, $p = 0.65$, ES = 0.002) ; (Employment Setting: $F_{1,148} = 0.82$, $p = 0.49$, ES = 0.016). We did, however, recognize significantly higher actual knowledge ($F_{1,145} = 4.63$, $p = 0.03$, ES = 0.031) among participants employing life-saving skills more frequently (occasionally= 6.5 ± 0.3) than those that do not (not at all= 5.7 ± 0.3). We identified a poor relationship ($r = 0.045$, $p = 0.583$) between actual knowledge and the likelihood to pursue continuing education. When stratifying our sample by actual knowledge and likelihood to pursue continuing education regarding years of experience, we found no significant differences (Actual knowledge: $F_{2,147} = 2.357$, $p = 0.98$, $1-\beta = 0.471$); (Continuing education: $F_{2,147} = 0.545$, $p = 0.581$, $1-\beta = 0.139$). Participants who used life-saving skills more frequently (occasionally = 4.57) were no more likely to pursue continuing education ($t_{144} = -1.63$, $p = 0.106$, 95% CI = -0.77 to 0.075) than the group that didn't use life saving skills (not at all = 4.22).

Discussion

The primary purpose of this investigation was to determine the relationship between perceived and actual knowledge. We hypothesized that perceived knowledge would weakly correlate with actual knowledge. The results from this study indicate a poor relationship between perceived and actual knowledge. Our finding is similar to previous research that also identified weak relationships between perceived and actual knowledge.¹⁻⁷ The poor relationship between actual and perceived knowledge, a knowledge gap, can have negative implications for patients because updated or new clinical practice is not employed and thus the lack of use may result in diminished patient outcomes.^{8,9} Clinicians with a knowledge gap may not maintain the standard of care, which can be potentially dangerous for patients. Our research demonstrates a knowledge gap in airway adjunct use among certified athletic trainers. The airway adjunct competencies are recent additions to the AT scope of practice, thus practicing clinicians need CE to obtain new knowledge about proper uses. The need for CE may be translated to other emerging skills within the scope of practice. Continuing education in the medical professions is important for two primary reasons, maintaining the integrity of the profession and establishing a legal standard. Continuing education is essential to bridge the knowledge gap of clinicians to promote better care for patients.

We also examined the change in perceived knowledge before and after the AKA. We hypothesized that perceived knowledge would significantly decrease after the AKA. Our findings indicated no significant change in pre-test and post-test perceived knowledge. This result suggests that participants were confident in their perceived knowledge at the onset, and the test did not change that perception much. Although participants indicated low perceived knowledge of airway adjuncts, the participants still perceived they knew more than reality. These

results suggest that practitioners failed to accurately recognize their lack of knowledge, which could potentially harm patients. Clinicians that perceive a greater understanding of airway adjuncts than reality may try to perform a procedure that they are not proficient, thus potentially failing to perform a life-saving technique properly. Because inclusion of airway adjuncts to athletic training education competencies, a required standard of care practitioners must include in clinical practice is established.

Previous research suggests that regardless of perceived knowledge, practitioners might be more likely to pursue continuing education in an area of weakness.⁷ Our study differs from past literature since the likelihood to pursue information preceded the actual test. Although no significant change was reported, pre-test likelihood to pursue CE was high indicating participants recognized the need for CE before completing the survey. Previous research indicates positive attitudes and understanding of the importance of CE in ATs.²⁴ Three groups of ATs have been identified based on the importance of course relevance when searching for CE opportunities.²⁴ The more experience an AT, the more important course relevancy because mature practitioners tend to reflect on their knowledge gap. Younger, newly certified ATs tend not to know their weaknesses and they pursue CE in areas that are interesting to them.²⁴ We found no differences in the years of experience and likelihood to pursue CE. We attributed this to the high likelihood to pursue CE for all participants because a knowledge gap exists in airway adjunct use.

We identified a significant difference between actual knowledge and the frequency with which participants used life saving skills. Thus individuals who use life saving skills more frequently have a higher knowledge of airway adjuncts, suggesting that routine practice is essential for efficacy in clinical practice. Individuals who use life saving skills can critically reflect on each experience and consider areas of strength and weakness, improving with each use

and becoming more familiar with proper techniques. Given the finding that AT's who use life-saving skills often or frequently demonstrate more knowledge than those who don't, the implications for teaching and learning skills are important. In the event that we encourage ATs to attend CE events regarding airway adjuncts, this would need to be reinforced with regular practice, so skills wouldn't degrade over time. In CPR skill retention, we know that clinicians often lost skills in 6 to 12 months.³²⁻³⁷

Based on the literature emergent care skills should be taught using a scenario based approach.^{34,39} Individuals should review knowledge and skills every 6-12 months to prevent the significant decreases that occurs over time.³³⁻³⁹ ATs and other healthcare professionals need to be aware of the decreases of knowledge and skills over time and proactively seek CE. Our results also indicate a knowledge gap among ATs in the use of airway adjuncts. CE is needed to decrease the knowledge gap and to ensure that ATs are meeting the standard of care. Future research should include an educational opportunity after the survey to determine how many ATs actually pursue CE after they selected that it was necessary. CE course should include a knowledge and skill assessment to determine if the clinician is proficient in the airway adjunct competencies. Due to airway adjuncts being an emergent care skill, CE should focus on skills practice.

Conclusion

Findings from the current study indicate that a difference in perceived and actual knowledge of airway adjunct use in ATs exists, which suggests that more vigilant use of CE is necessary in certified athletic trainers. Likewise, ATs recognize their lack of knowledge but were not accurate as to the extent of knowledge deficit and therefore may apply clinical practice where proficiency is lacking. ATs were likely to pursue CE to decrease their knowledge gap. We

found a significant difference between actual knowledge and the frequency of use of life saving skills, suggesting that individuals that use the skills more regularly are more knowledgeable implying that more frequent practice may be needed to retain skill competency. Our findings suggest that ATs are aware of the knowledge gap of the proper applications of airway adjuncts and are likely to pursue CE to decrease the gap. CE opportunities are necessary to aid practitioners and ensure that ATs are meeting the standard of care for the profession.

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APPENDIX A: STUDY PARAMETERS

Operational Definitions

Actual knowledge: Actual knowledge is a possession of knowledge, or what an individual actually knows.¹³

Airway adjunct devices: Airway adjunct devices are breathing devices commonly used in athletic training for three main functions: (1) clear and maintain a patent airway, (2) provide adequate ventilation and promote pulmonary gas exchange, and (3) supply supplemental oxygen.²²

Clinical proficiencies: Clinical proficiencies synthesize cognitive, psychomotor, and effective teaching objectives and describe them in terms of measurable clinical skills.¹⁴

Competence: Competence is the possession of knowledge, skills, and attitudes, along with the ability to use these in the clinical environment to effect desired results for patients.²⁹

Competency based education: Competency based education is a data-based, adaptive, performance-oriented set of integrated processes that facilitate, measure, record, and certify within the context of flexible time parameters the demonstration of known, explicitly stated, and agreed upon learning outcomes that reflect successful functioning in life-roles.⁸

Continuing education: CE is intended to promote continued competence, development of current knowledge and skills and enhancement of professional skills and judgment beyond the levels required for entry-level practice.¹⁰

Educational competencies: The educational competencies are a set of cognitive, psychomotor, and affective requirements in athletic training professional preparation.¹⁴

Perceived knowledge: Perceived knowledge refers to one's feeling of knowing, also defined as the illusion of knowing.¹³

Scope of practice: Scope of practice defined by the educational competencies (Role delineation study 5th ed)

Assumptions

1. Participants are competent in basic computer skills.
2. Participants will understand and follow directions when completing the questionnaires.

Limitations

1. Participants will be self-selected.

APPENDIX B: ACTUAL KNOWLEDGE ASSESSMENT

Match the picture and name of each airway adjunct device.



Oropharyngeal airway

Nasopharyngeal airway

Supraglottic airway

Match the airway adjunct device to its function:

- Oropharyngeal airway: Used to prevent the tongue from falling back on the posterior pharynx to maintain airway
- Nasopharyngeal airway: Allows air to travel down the trachea and into lungs when oral trauma is present
- Supraglottic airway: Creates a seal in the posterior pharynx, obstructing the esophagus, which forces air into the trachea

Select the scenario in which airway maintenance is indicated:

- a) When you arrive to the scene you find an unconscious patient, who is not breathing. You try rescue breaths, which do not go in, upon assessing their airway you visually identify the obstruction in the mouth. You successfully perform a finger sweep, clearing the airway. The patients breathing rate returns to 16 breaths per minute.
- b) You are covering a football scrimmage when your athlete tackles using incorrect form and falls to the ground immediately. When you reach the athlete he is regaining consciousness with irregular breathing.
- c) *You are covering a bobsled competition when one of the sleds takes a curve wrong and crashes. The first patient you encounter is unconscious and not breathing. Your rescue breaths are successful.*

- d) You arrive on the scene to find a semi-conscious patient, you assess a breathing rate of 18 breaths per minute, normal skin color, and equal breath sounds with auscultation.
- e) All of the above
- f) None of the above

Which maneuver is used to help establish an airway in patients with a cervical spine injury?

- a) Head-tilt/chin-lift
- b) *Jaw thrust without extension*
- c) Chin tuck
- d) Jaw thrust with extension
- e) None of the above

Which airway adjunct device can be used to maintain an airway in a patient with an intact gag reflex?

- a) Oropharyngeal airway
- b) *Nasopharyngeal airway*
- c) Supraglottic airway
- d) All of the above
- e) None of the above

APPENDIX C: FUTURE RESEARCH

Future research should include an educational opportunity after the survey to determine how many ATs actually pursue CE after they selected that it was necessary. CE course should include a knowledge and skill assessment to determine if the clinician is proficient in the airway adjunct competencies. Due to airway adjuncts being an emergent care skill, CE should focus on skills practice.