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Original Contributions

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Evaluation of Web-Based Education and Debriefing Sessions to Train Clinical Staff: A Pilot Study

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Abstract

Background: Ongoing clinical education is necessary to ensure safety and efficacy with infrequently used critical care modalities. An unconventional form of mechanical ventilation, high frequency oscillatory ventilation (HFOV), is used less often than conventional mechanical ventilation in critically ill patients. The authors investigated the effectiveness of web-based education, and the addition of a scenario-based simulation with a debriefing session in improving clinician confidence, cognitive knowledge, and psychomotor skills in using HFOV. **Methods:** A quasi-experimental study with pre- and post-tests was conducted. The educational strategy involved scenario-based simulation with debriefing for critical care physicians and respiratory therapists (RTs). Online education, including presentations and selected readings of HFOV protocol/evidence-based articles, was made available to participants two weeks prior to the study. Participants completed a cognitive test and affective survey before and after participating in scenario-based simulations followed by debriefing sessions. Skills during the simulation were assessed by a psychomotor checklist. **Results:** 26 participants were included: 12 RTs and 14 critical care physicians. The difference between the mean pre-test cognitive knowledge score (19.46 ± 4.17) and mean post-test score (22.00 ± 2.88) out of 30 questions was statistically significant (P=.001). The mean pre-test psychomotor skills score (2.35 ±1.10) was also significantly improved (3.15 ± 0.88, P <.001) out of a maximum score of 4. There were no statistically significant differences between gender and profession in cognitive knowledge or psychomotor scores. **Conclusion:** Our research demonstrates that hands-on simulation, combined with debriefing, enhances the educational value of web-based education in training health care providers.

Key words: high frequency oscillatory ventilation (HFOV), health care provider training, web-based education, debriefing

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Background

Unconventional mechanical ventilation strategies, like high frequency oscillatory ventilation (HFOV) are utilized when traditional mechanical ventilation is failing to meet the therapeutic objective. Limited clinical experience with HFOV in critically ill adult patients can make safe implementation difficult. The role of HFOV in the management of the adult with acute respiratory distress syndrome (ARDS) has been controversial. Most studies show that HFOV is effective in improving oxygenation; however, there is little evidence that it reduces mortality rates.[1-4] The limited evidence that supports its use, and staff unfamiliarity with the device due to infrequent use, makes implementation of the modality challenging. Further complicating the use of high risk modalities like HFOV is that patients are often severely ill. Providing HFOV as a critical care option requires staff to remain proficient in its use.

There is limited research examining the appropriateness and impact of specific educational interventions used to train health care employees in the concepts of mechanical ventilation. Although there are many educational models available to health care educators, selecting a training strategy within health care institutions is not a simple task. This is due in part to the nature of the workload and the clinical responsibilities that are part of a clinician's daily routine. To provide ongoing, around the clock education, some health care institutions have begun utilizing web-based training software to provide clinical education to their employees.[5-9]

Technology-enhanced education, like web-based training software, can be a successful pedagogical tool for delivering curricular content.[5-9] It offers many benefits when compared with traditional educational approaches, and has been shown to be effective in terms of learner adaptation and satisfaction.[5-9] The online format is a convenient and widely-accepted method of learning, especially useful for health care professionals due to their workload and different shift duties.[10] This approach can provide training for a large number of people, decrease cost, and reduce the need for classroom space and instructors.[5-9] It can also be provided alone or with supplemental components, like simulation and debriefing sessions. Debriefing is an intervention that allows sharing and discussing of information. The goal of debriefing sessions within any educational intervention is to facilitate skills improvement. Debriefing has been exhibited in numerous professional domains such as business, science, and medicine.[11, 12]

Since our institution utilizes a web-based learning management system (Blackboard Inc, Washington, D.C.) to provide clinical education, we sought to evaluate its effectiveness. It was unclear if the web-based modules alone were enough, or if supplemental training was needed. The investigators sought to determine whether simulation sessions, followed by debriefing, improved participants' confidence level, cognitive knowledge, and psychomotor skills in using SensorMedics 3100B High Frequency Oscillatory Ventilator in adult patients after they had reviewed material provided to them via a web-based learning management system.

Methods

This was a quasi-experimental research design with pre- and post-tests, that introduced an educational intervention to train clinicians in the use of HFOV in adult patients (Figure 1). Study participants included critical care respiratory therapists, resident physicians, fellow physicians, and attending physicians at a large university hospital in the Midwest. Convenience sampling was used to sample the target population. Participants were recruited by an invitation email that included information regarding the nature and the purpose of the study. Participation was voluntary and all participants were consented. This study was approved by our Institutional Review Board.

Figure 1

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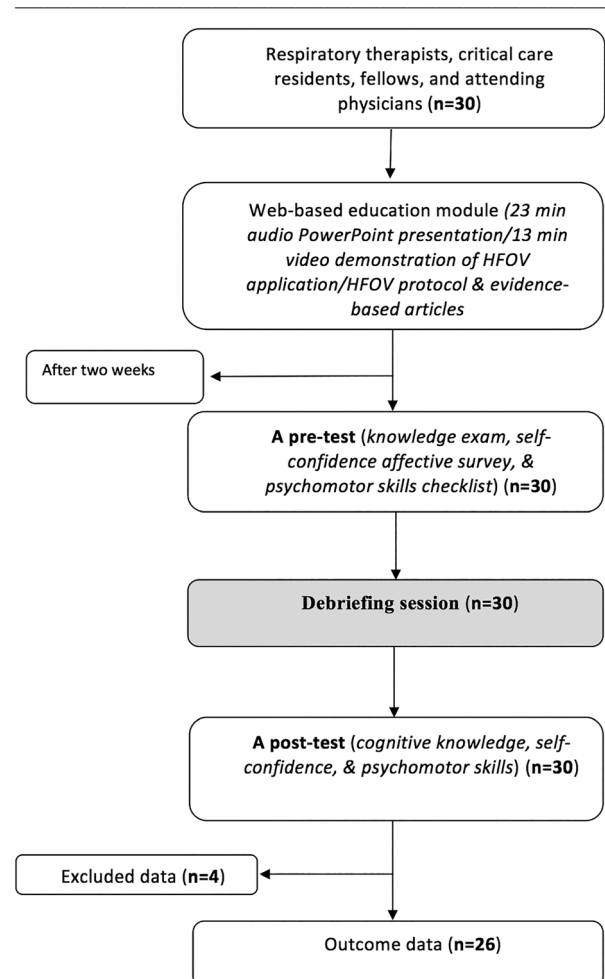
Respiratory care faculty members created a web-based teaching module on HFOV, which was posted on the learning management system. The content of the web-based education module included: a 23-minute presentation on equipment and concepts related to HFOV; a 13-minute video demonstration of HFOV application; an institutional HFOV protocol; and selected readings of evidence-based articles related to the subject matter. The web-based teaching module presented three main aspects of HFOV; theory of application, troubleshooting, and equipment. Each study participant had access to the education module. The web-based module allowed participants to access and review the materials at any time and from any location with a computer and internet connection. Each participant was given access to the education materials for a period of two weeks prior to their scheduled study day. Within the same two weeks, an HFOV device connected to a mechanical lung model was made available for all study participants to practice on independently. Each participant was asked to review the educational module before attending their individual study session.

Each individual study session began with participants completing a knowledge and self-confidence pre-survey. Psychomotor skills were evaluated by using a scenario-based simulation that was evaluated with a standard checklist to obtain baseline data. A study investigator used a pre-determined clinical scenario to simulate clinical problems that required the participant to make appropriate decisions and adjust HFOV settings as needed. All scenarios were designed according to features and aspects identified as important by the study team in HFOV application. The participants could use the HFOV protocol as a guideline for initiating, maintaining, and weaning HFOV throughout the simulation.

Immediately following the initial psychomotor test, a debriefing session was conducted with each participant individually. The intent of the debriefing session was to allow each participant the opportunity to discuss their experience with the investigator and review key concepts. The investigator reviewed any deficiencies noted during the scenario-based simulation. Immediately following the debriefing session, the participant completed a second scenario-based session. The second session re-assessed the knowledge from the first session, with the addition of troubleshooting issues. As with the initial session, the participants were debriefed. At the conclusion of all simulation and debriefing sessions, participants completed post-tests pertaining to cognitive knowledge and self-confidence. The post-tests were identical in content to the pre-tests.

Three main instruments were used within our research to measure cognitive knowledge, self-confidence, and psychomotor skills. The HFOV knowledge test consisted of 30 multiple-choice questions worth one point for each correct answer and zero points when they selected the wrong answer. Higher scores indicated greater knowledge of HFOV application. The participants' self-confidence was measured with the use of a 10-question pre- and post-affective survey, on a five-point Likert-type scale ranging from 0 (not at all confident) to 4 (completely confident). Also, a task-specific skills checklist to measure participants' psychomotor skills in applying HFOV was used. The skills checklist was broadly organized to test four major skills: initiation of HFOV, adjustment of HFOV based on arterial blood gas (ABG) at 30 minutes, obtaining follow-up chest x-ray, and adjustment of HFOV based on subsequent ABGs. The subjects received one point for each correctly done skill and zero points when the skill was done incorrectly or not done at all. The instruments had been tested for content validity by two physicians and two respiratory therapists; each of those individuals had more than five years of experience in critical care management of HFOV.

Data Analysis

The differences between pre- and post-test cognitive, affective, and psychomotor outcomes represented the effect of the web-based education and the addition of a scenario-based simulation with a debriefing session. The outcome data was collected from the post-test and was compared with the pre-test results to measure the effectiveness of the educational interventions. Descriptive statistics including the mean, median, and standard deviation were calculated to compare the cognitive test scores and scores from the affective surveys between the two groups. A paired t-test was used to assess the score differences in pre- and post-cognitive knowledge tests. The Wilcoxon signed rank test was used to analyze the differences between the pre- and post-scores of the affective surveys and McNemar's test was used to analyze pre- and post-psychomotor skills. The statistical package SPSS 23.0 (IBM, Armonk, New York) was used to run all statistical tests. A p value of less than 0.05 was considered statistically significant. The Mann-Whitney rank sum test was used to examine possible gender and profession differences in cognitive knowledge test scores and psychomotor skills total scores.

Results

The final sample of this study was a convenience sample of 30 subjects; four subjects were excluded due to incomplete information. Out of 26 participants, 12 were respiratory therapists (46.2%) and 14 were critical care physicians (53.8%). Demographic data is summarized in Table 1. Gender was similar for both groups with 53.8% female and 46.2% male participants. Ages ranged from 25 to 64 years,

Table 1
Demographic Data.

	Number (n=26)	Percent %
Gender		
Female	14	53.8%
Male	12	46.2%
Health Profession		
Respiratory Therapist	12	46.2%
Physician	14	53.8%
	Mean ± SD (n=26)	Range
Age in years	33.5 ± 7.90	25 - 64
Years in profession	6.53 ± 7.79	0.7 - 41
Estimated number of patients with ARDS	89.64 ± 143.80	4 - 500
Estimated number of patients placed on HFOV	2.54 ± 4.10	0 - 20

Figure 2

with a mean of 33.5 years (SD = 7.9). Participants reported differences in years of experience in the health care profession ranging from 0.7 to 41 years with a mean of 6.5 years (SD = 7.8). An estimated number of patients with ARDS that participants had cared for ranged from 4 to 500 patients, with a median of 25 patients. Participants reported a variety of previous experience in placing patients on HFOV; they ranged from 0 to 20 patients, with a mean of 2.5 patients (SD = 4.1).

Based on a paired t-test (Table 2), the mean cognitive pre-test score was 19.46 (SD = 4.17) and the mean post-test score was 22.00 (SD = 2.88). The improvement was statistically significant with a *p* value = .001; t (25) = 3.91. Figure 2 shows the highest score for pre- and post-cognitive test was 27 out of 30 questions, whereas the lowest score for the pre-test was 11 and the lowest score for the post-test was 15.

Following participation in the debriefing sessions, a paired samples t-test (Table 2) was conducted to compare the differences between pre- and post-psychomotor total score. The mean for psychomotor skills pre-test score was 2.35 (SD = 1.10) and the mean post-test score was 3.15 (SD
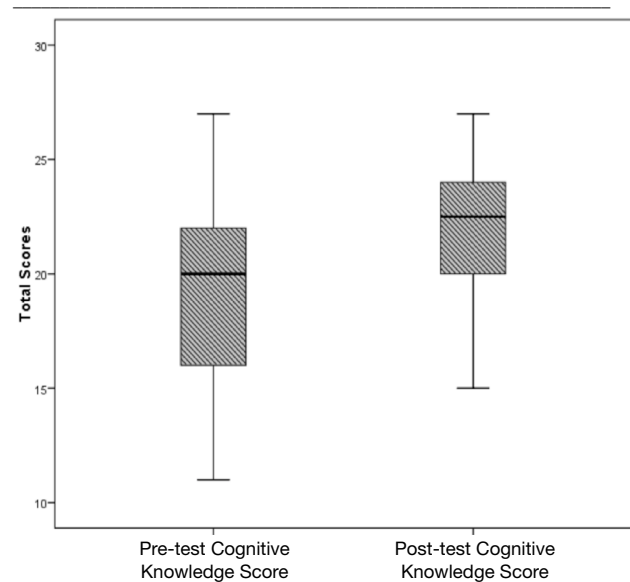
= 0.88). The improvement was statistically significant with a *p* value < .001; t (25) = 4.60. Figure 3 lists the highest score for pre- and post-psychomotor skill as 4 out of a maximum score of 4; whereas the lowest score for the pre-test was 1 and the lowest score for the post-test was 2.

McNemar's test was used to analyze the differences for each pre- and post-psychomotor skill (Table 3). For initiation of HFOV settings during the first simulation, 18 (69.2%) of the participants initiated HFOV correctly, compared to 20 (76.9%) participants during the second simulation (*p* = 0.727). The action of proper adjustment of HFOV after 30 minutes based on the ABG results occurred with 13 (50.0%) participants during the first simulation; compared to 23 (88.5%) who did it correctly during the second simulation (*p* = .013). The skill of ordering a chest x-ray two hours after starting HFOV was completed by 10 (38.5%) participants in the first simulation and 14 (53.8%) participants during the second (*p* = 0.219). In addition, the adjustment of HFOV after 4 hours based on ABG result occurred during the first simulation in 20 (76.9%) of the

Table 2
Paired T-Test, Cognitive Knowledge Total Score, and Psychomotor Skills Total Score.

	Mean ± SD (n=26)		t	df	*p*-value
	Pre	Post			
Total cognitive knowledge test scores	19.46 ± 4.17	22.00 ± 2.88	3.906	25	.001 *
Total psychomotor skills checklist scores	2.35 ± 1.10	3.15 ± .88	4.600	25	<.001 *

* Statistically significant: *P* < .05

Figure 3
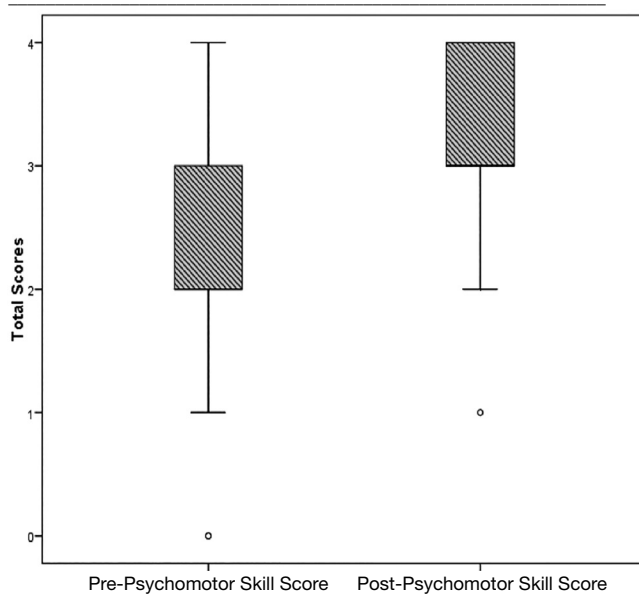
participants compared to 25 (96.2%) during the second simulation ($p = .125$).

Wilcoxon matched-pairs test analyzed the changes in affective survey (Table 4). Data analysis revealed that a statistically significant increase in confidence scores was observed in all ten evaluated questions ($p \leq .001$). Median perceived self-confidence for all participants was a range of 0 to 1 pre-debriefing session and a range of 2 to 3 post-debriefing session.

During the statistical analyses, we did subgroup analysis for gender and profession leading to differences in cognitive knowledge scores and psychomotor skills scores as a secondary outcome. The Mann-Whitney rank sum test was applied and no statistically significant differences were found.

Discussion

This study was designed to evaluate the effectiveness of simulation and debriefing as a supplement to web-based training. Since technology is readily available at our in-

Table 3

McNemar's Test: Analysis of the Differences in Each Pre- and Post- Psychomotor Skill.

	Pre-Checklist (n=26)		Post-Checklist (n=26)		
	Done	Not done/ incorrectly done	Done	Not done/ incorrectly done	*p*-value
Initiation of HFOV	18 (69.2%)	8 (30.8%)	20 (76.9%)	6 (23.1%)	.727
Adjustment of HFOV setting after 30 minutes based on arterial blood gas (ABG)	13(50.0%)	13 (50.0%)	23(88.5%)	3(11.5%)	.013 †
Order chest x-ray	10 (38.5%)	16 (61.5%)	14 (53.8%)	12 (46.2%)	.219
Adjustment of HFOV setting after 4 hours based on arterial blood gas (ABG)	20 (76.9%)	6 (23.1%)	25 (96.2%)	1 (3.8%)	.125

n\(% total)
† Statistically significant: P < .05

Table 4

Wilcoxon signed rank test: analysis of self-confidence scores in all ten questions.

	Median		Z-score	*p*-value
	Pre	Post		
Identifying a patient that may benefit from HFOV	1	2	-3.343	.001 ‡
The proposed mechanism of action and physiologic changes associated with improved oxygenation when placing a patient on HFOV	1	2	-4.066	<.001 ‡
Stating the possible complications or risks associated with HFOV	1	2	-3.522	<.001 ‡
Identifying contraindications to place patients on HFOV	1	2	-3.532	<.001 ‡
Preparing the patient to be placed on HFOV	1	2	-4.388	<.001 ‡
Gathering the necessary equipment needed to initiate and maintain the 3100B	1	2	-4.291	<.001 ‡
Initiating the HFOV protocol and establishing guidelines with the team	1	3	-4.202	<.001 ‡
Making changes to HFOV setting based on arterial blood gas results	1	3	-4.320	<.001 ‡
Performing a recruitment maneuver on the 3100B	0	2	-4.396	<.001 ‡
Instituting a cuff leak	1	2	-4.090	<.001 ‡

Likert-type scale ranging   0: Not at all confident   1: Have some confidence   2: Confident   3: Very confident   4: Completely confident
‡ Statistically significant: *p* < .05

Table 5

Mann-Whitney rank sum test: examine for possible gender and profession differences in cognitive knowledge scores and psychomotor skills scores.

	Knowledge Score						Psychomotor Score					
	Mean Rank		U value		*p* value			Mean Rank		U value		*p* value	
	Pre	Post	Pre	Post	Pre	Post		Pre	Post	Pre	Post	Pre	Post
Gender (n = 26)													
Female (n = 14)	13.86	15.18						13.32	15.5				
			79.0	60.5	.82	.23				81.5	56.0	.90	.16
Male (n = 12)	13.08	11.54						13.71	11.17				
Health Profession (n = 26)													
Respiratory Therapist (n = 12)	16.50	14.92						16.58	13.17				
			48.0	67.0	.07	.40				47.0	80.0	.06	.86
Physician (n = 14)	10.93	12.29						10.86	13.79				

stitution, we opted to utilize a web-based learning format prior to simulation and debriefing. The best educational approach to developing and maintaining infrequently used clinical skills in bedside practitioners was unknown. To our knowledge, this is the first study investigating the effectiveness of web-based education with the addition of simulation and debriefing. Our results demonstrate that the debriefing sessions generated significant improvement in cognitive, affective, and total psychomotor outcomes when compared to web-based education alone.

The use of debriefing during simulation within health care training is not a new strategy and is well documented.[13-16] Dreifuerst presented the importance of debriefing in mastering and moving learners from novice to expert in thinking, judging clinical situations, and developing participants' abilities to transfer new concepts to real clinical settings.[15] During the debriefing session, our investigators were more focused on participants' psychomotor performance than cognitive reflection. In a meta-analysis, Cheng et al. reviewed 177 studies that used debriefing during simulation. They identified the main characteristics of debriefing and effective outcomes of debriefing when combined with web-based simulation.[13] Levitt-Jones et al. concluded that video-assisted debriefing was more effective when compared to non-video-assisted debriefing.[16] Other studies showed there were no significant differences between video-assisted and non-video-assisted debriefing.[17] Short debriefing sessions with expert modeling have shown to be preferable when compared to long debriefing sessions, but the most effective debriefing model is currently unknown.[13] The characteristics of the debriefing session in our study were short, non-video-assisted sessions and in-person discussion between investigator and participant.

Our participants had varying levels of clinical experience in HFOV. The results revealed that there were no statisti-

cally significant differences between gender and profession in cognitive knowledge or psychomotor scores. The most significant challenge in using this combined training approach in our pilot study was the additional teaching time required to perform an individual debriefing session. The investigators spent a significant amount of time to adequately conduct a debriefing session. Within this study the debriefing sessions were conducted individually in a private room, as suggested by previous studies.[16]

Limitations

The limitations to this study included the small number of participants although a significant difference was found. Secondly, our study was not randomized or blinded. There was no formal control group to test and compare to the group using the debriefing session. We chose to use the pretest as the control. Third, the instruments used to examine the study outcomes were reviewed and agreed upon by our expert faculty and no other methods of validation were used. In addition, we were unable to track if all participants reviewed the web-based material prior to the debriefing session. We assumed all had reviewed the educational material before attending the pretest as instructed. This limitation may be an inherent issue with using web-based education. Finally, we did not evaluate long-term knowledge retention after the study intervention.

Conclusion

Our research demonstrates that hands-on experience and debriefing enhances the educational value of web-based education in training healthcare providers. More research is needed to understand how this educational method impacts the clinical utilization of infrequently used interventions and learner knowledge retention.

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Appendix A

Data Collection Form

ID	Age	Gender	Title	Years in Profession	# Pt with ARDS	# Pt placed on HFOV	Total Knowledge Score		Self-Confidence Scores											Psychomotor Skills Score			
							Pre	Post	Pre-Post											Pre-Post			
									Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4

Improving Critical Thinking Skills of Undergraduate Respiratory Therapy Students Through the Use of a Student-Developed, Online Respiratory Disease Management Database

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Abstract

Introduction: Development of critical thinking skills in higher education is a crucial part of any undergraduate education. The purpose of this study was to determine if a student-developed, online respiratory disease management resource would improve critical thinking skills in undergraduate respiratory therapy (RT) students. **Methods:** Utilizing previously established assignments to assess progress, first-year RT students developed their own online disease management database in the form of a wiki. The first-year RT student's assignment grades were compared to the assignment grades received by the second-year RT students from the previous year. First-year students were asked to complete a survey to gather their subjective feelings about the database creation and whether or not they perceived it as helpful in critical thinking skill development. **Results:** 39 students were enrolled in this study. The study findings indicated, with a few exceptions, that first-year students had higher scores on the specific assignments chosen to monitor critical thinking skill development. Of the 17 scores, four were significantly higher for second-year students. The final assignment showed a statistically significant improvement in scores for the first-year students. Fourteen of 19 first-year students completed the survey. The majority of survey respondents used the database often when completing assignments and perceived the creation of this resource as useful in assignment completion and improvement of critical thinking skills in the clinical environment. **Conclusion:** This study suggests that creation of a student-developed, online disease management resource can improve the critical thinking skills of RT students.
Key Words: critical thinking, respiratory therapy education, disease management education

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Introduction

Development of critical thinking skills in higher education, especially in the health sciences, is a crucial part of any undergraduate or professional education. As an educator, there is a responsibility to ensure that students graduate with the knowledge, skills, and clinical experiences necessary to have success on credentialing examinations, ensure patient care safety, and maintain a successful career as a respiratory therapist (RT). Several reports state that today's graduate RT is expected to be a consultant and participant during patient rounds, have a solid understanding of all aspects of cardiopulmonary disease, contribute to patient care discussions, and provide evidence to support suggested therapies.[1,2] Additionally, graduate RTs are expected to "begin RT practice with excellent critical thinking skills,"[1] problem solve well enough to troubleshoot all relevant technology, navigate RT protocols, and assist in patient care decision making. The expected critical thinking skills highlighted by Barnes et al[1] include the ability to prioritize, anticipate, troubleshoot, communicate, negotiate, make decisions, and reflect in the domains of technology, patients, and clinicians.

Currently, first-year undergraduate RT students experience a curriculum that presents information to them in segments, each piece getting more advanced as the curriculum progresses. It is expected that, over time and with reinforcement from lectures, laboratory exercises, and clinical experiences, the students will be able to apply or critically think about the patient as a whole. However, too often, students struggle to put everything together or to think critically in order to clinically treat a patient. One potential solution is to have student's create a respiratory therapy wiki.

Wikis are online web pages that allow students to create and share resources based on course content. Today's students appreciate the use of educational technology in the classroom, and recognize there are limitations to technology[3]. Wiki development is an organized way to sort content by utilizing links and notes to enhance the resource being created. Online access to wikis facilitates their usefulness as a clinical resource for students. A concept map helps students graphically organize and represent knowledge of a subject. It begins with a main idea and then branches out to show how that main idea relates to other concepts and topics. When used in conjunction with concept mapping, Wikis can be a valuable way to enhance critical thinking skills. Both wikis and concept mapping help students to put resources related to difficult concepts together in a way that enhances their understanding and ability to find relationships between content. Many colleges and universities utilize learning management systems (LMS) to facilitate course-related activities, including content delivery, assignment dissemination, grade tracking, and other administrative tasks. Access to wikis is often available through the LMS.

There is an expectation that RT education aids in developing critical thinking, application, and synthesis skills in clinical settings[1]. A student's inability to apply and synthesize the information presented throughout the curriculum directly affects their ability to successfully complete program assignments, such as Subjective, Objective, Assessment, and Plan (SOAP) notes and pre-clinical simulation and to be successful on post-graduation credentialing examinations. SOAP notes, sometimes known as care plans, are written documents that detail a patients admission status, current status, significant events, and plan of care in a specific format: Subjective (S), Objective (O), Assessment (A), and Plan (P). The pre-clinical patient care simulation occurred in the laboratory setting with standardized patients. Students were expected to develop an Assessment (A) and implement a Plan (P) in response to the patient scenario they were given. The purpose of this study was to determine if a student-developed, online respiratory disease management resource would improve measures of critical thinking skills in undergraduate RT students.

Methods

This study was approved by the Institutional Review Board (IRB) and was a combination of quasi-experimental and survey research. This study utilized a quasi-experimental design to determine if improvements in first-year undergraduate RT student assessment outcomes could be partially attributed to the development of an online disease management database. The survey portion of the study was conducted in order to gain subjective data that reflected the beliefs and opinions of the participants in regards to the online disease management database development. The survey was administered at the end of the treatment group's first year of the undergraduate RT program, after the database had been developed.

In order to conduct this study, an online respiratory disease management database development activity was introduced to the current first-year students while ensuring the remainder of the program remained structured the same as previous years. Since this study used a sample of convenience and had a small sample size there was no group randomization. Instead all first-year RT students (the treatment group) were required to create an online database as a part of the curriculum. Additionally, assessment outcome data was collected retrospectively from all second-year RT students (the control group) in order to make comparisons.

The online respiratory disease management database development was integrated into as many first-year courses as possible and was ongoing throughout autumn and spring semester. The students had specific deadlines for portions

Table 1

Assignment due dates by semester: all assignments were completed during the first year of the curriculum.

Assignment	Due
In-class practice SOAP note	Autumn semester week 10
Pre-clinical simulation	Autumn semester week 10
Non-acute care SOAP note #1	Autumn semester week 15
Non-acute care SOAP note #2	Spring semester week 6
Acute care SOAP note #1	Spring semester week 11
Acute care SOAP note #2	Spring semester week 15

Figure 1

Survey of first-year students regarding subjective opinions and beliefs about the creation of an online disease management database.

of the database to ensure the entire class was participating and developing the resource throughout the course of the first year.

Instrumentation

The online disease management database was created using the LMS wiki. The LMS wiki is an online, editable resource that students have access to using their university account. The page was created by one of the researchers with a basic template provided for 36 different respiratory diseases or disorders. The basic template guided students in the development of their wiki using principles of concept mapping to guide the organization of the content. Each student in the treatment group had a page that could only be seen or edited by the student or a course administrator, ensuring that each student created their own individual resource and did not simply copy another classmate's information. Students had the option to add photos, links to external resources, charts, or simply type basic information within the provided template.

Throughout the curriculum, students completed established assignments that were designed to assess critical thinking skills (see Table 1). The six assignments included a preclinical patient care simulation and five sets of SOAP notes completed during both non-acute care and acute care clinical rotations. In order to assure inter-rater reliability, grades were determined using grading rubrics and assignment grading was performed by the same rater both years. While the instructor that taught the classroom and laboratory modules on SOAP notes changed during the data collection time frame, the SOAP note learning materials remained constant. Additionally, the clinical preceptors that assist at times with the SOAP notes, remained the same for both groups.

Data Collection Procedures

Students from both the treatment and the control group received a study recruitment letter and were asked to sign an informed consent, allowing use of their grades for the

six related assignments. The Assessment (A) and Plan (P) portions of the SOAP notes and the pre-clinical simulation are intended to be indicators of critical thinking, application, and synthesis as they require the students to gather information, develop their own opinions regarding respiratory health issues the patient is facing, and then develop a detailed plan of action on how to address these issues. These scores were then gathered from the grading rubrics and placed into a de-identified excel database. A survey was administered at the completion of the treatment group's first year of the RT curriculum, which asked for subjective opinions and beliefs about the creation of an online disease management database (Figure 1).

Data Analysis Procedures

This study used a t-test to analyze the assignment data. Additionally, descriptive statistics were used to analyze the survey results. Two-tailed, t-test analysis was used to compare the mean score on assignments in order to determine if there was a statistically significant difference between classes. Alpha level was set a priori at $p \leq 0.05$.

Table 2
Population demographics.

	Group 1 (n=19), Treatment	Group 2 (n=20), Control
Mean age (years)	22.3	21.8
Gender (%)	84% female	90% female
Race (%)	68% white/non-Hispanic	70% white/non-Hispanic
	11% Asian	20% Asian
	0% African-American	5% African-American
	0% Hispanic	5% Hispanic
	21% Other	0% Other
Mean cumulative GPA at time of admission (4 point scale)	3.26	3.26
Mean prerequisite science and math GPA at time of admission (4 point scale)	3.15	3.08
Mean cumulative GPA at end of 1st year of curriculum (4 point scale)	3.56	3.55
Mean prerequisite science and math GPA at end of 1st year of curriculum (4 point scale)	3.16	3.17

Table 3
Mean GPAs by group.

	Group 1 (n=19), Treatment Mean (SD)	Group 2 (n=20), Control Mean (SD)	*p* value
Mean cumulative GPA at time of admission (4 point scale)	3.26 (0.378)	3.26 (0.378)	0.968
Mean prerequisite science and math GPA at time of admission (4 point scale)	3.15 (0.528)	3.08 (0.522)	0.675
Mean cumulative GPA at end of 1st year of curriculum (4 point scale)	3.56 (0.258)	3.55 (0.244)	0.922
Mean prerequisite science and math GPA at end of 1st year of curriculum (4 point scale)	3.16 (0.504)	3.17 (0.456)	0.982

Results

All subjects were in good academic standing at the time of the study. Group 1 (n=19), were first-year RT students and acted as the treatment group. Group 2 (n=20), were second-year RT students and served as the control group. For additional group demographics see Table 2.

Data analysis showed no statistically significant difference between group 1 and group 2 on measures of academic achievement at the time of the study (cumulative grade point average (GPA) and prerequisite science and math GPA at the time of admission and also at the end of year one). Means and standard deviations for the above are listed in Table 3.

Critical Thinking Assignment Results

Comparison of assignment scores is presented in the order in which the assignments were completed in the curriculum in Table 4. Data analysis showed that on the in-class practice SOAP notes, second-year students' means for the Assessment (A), the Plan (P), and the total grade for the SOAP notes were all statistically significantly higher than the means for first-year students. At about the same point in the curriculum that the students completed an in-class practice SOAP note, they participated in a pre-clinical simulation. Similar to the results on the in-class practice SOAP note, the second-year students' mean for total grade for the pre-clinical simulation was statistically significantly higher than the mean for first-year students. Assessment (A) and Plan (P) grades for the pre-clinical simulation were not analyzed due to the fact that all students achieved the same grade.

There were no statistically significant differences in mean scores between first-year students and second-year students for the non-acute care SOAP note #1 total grade, non-acute care SOAP note #2 total grade, and the acute care SOAP

Table 4
Mean scores for critical thinking assignments by group.

	Group 1 (n=19), Experimental Mean (SD)	Group 2 (n=20), Control Mean (SD)	*p* value
Assessment – In-class practice SOAP	12.947 (.8481)	14.333 (.8876)	.000*
Plan – In-class practice SOAP	9.421 (.6925)	10 (0)	.002*
Total – In-class practice SOAP	40.158 (6.0646)	45.875 (1.8416)	.001*
Assessment and Plan – Pre-clinical simulation	20 (0)	20 (0)	
Total – Pre-clinical simulation	45.842 (1.3648)	50 (0)	.000*
Assessment – Non-acute care SOAP #1	2.75 (.43301)	2.445 (.52937)	.057
Plan – Non-acute care SOAP #1	2.6579 (.45803)	2.525 (.45811)	.371
Total – Non-acute care SOAP #1	9.0695 (.94851)	8.744 (.78242)	.249
Assessment – Non-acute care SOAP #2	2.3026 (.73871)	1.9375 (1.04464)	.218
Plan – Non-acute care SOAP #2	2.4211 (.50037)	2.525 (.51235)	.526
Total – Non-acute care SOAP #2	8.1337 (1.28320)	7.711 (1.54174)	.359
Assessment – Acute care SOAP #1	2.6053 (.46634)	2.5125 (.84088)	.675
Plan – Acute care SOAP #1	2.6974 (.46082)	2.8125 (.27951)	.356
Total – Acute care SOAP #1	9.0526 (1.01482)	8.9425 (1.11889)	.750
Assessment – Acute care SOAP #2	2.7237 (.57672)	2.575 (.47365)	.384
Plan – Acute care SOAP #2	2.8813 (.17417)	2.6125 (.57052)	.056
Total – Acute care SOAP #2	9.4842 (.68436)	8.9325 (.86910)	.035*

*=Statistically significant difference

note #1 total grade. And although they were not statistically significantly higher, means for first-year students were higher than means for second-year students on all assignments except non-acute care SOAP note #2 Plan (P) and acute care SOAP note #1 Plan (P). For the acute care SOAP note #2 total grade, the mean for first-year students was statistically significantly higher than second-year students. The acute care SOAP note #2 Assessment (A) and Plan (P) results show no statistically significant differences between the means, however first-year students mean scores were higher than second-year students. See Table 4 for details.

Survey Results

After completion of the six assignments, first-year students were asked to complete a short survey (Figure 1). Fourteen of 19 group members completed the survey for a response rate of 73.7%.

The first survey question asked the students how useful developing an online disease management database was for the completion of the six assignments. The majority (64.3%-85.7%) of students rated the database development as useful or better on a 4-point Likert-type scale, for all 6 assignments. These results indicate that the students felt that developing the database was useful in completing their assignments. See Table 5 for details.

The next question asked students to what extent they used the online disease management database when specifically completing the five SOAP note assignments. This survey did not ask if the students utilized the database during the pre-clinical patient care simulation because the database was not made available to them during the pre-clinical patient care simulation. The results indicated that as the students progressed through the curriculum and completed more of their disease management database, the utilization of the database increased with only 28.6% using the database for

Table 5
Student ratings of usefulness of disease management database (Not useful = 1 and Very useful = 4 on a 4 point Likert-type scale).

How useful was developing the online respiratory disease management database in helping you complete the following assignments? (n=14)

	Not useful/ Somewhat useful [n (%)]	Useful / Very useful [n (%)]
In-class practice SOAP	5 (35.7)	9 (64.3)
Pre-clinical simulation	3 (21.4)	11 (78.6)
Non-acute care SOAP #1	3 (21.4)	11 (78.6)
Non-acute care SOAP #2	3 (21.4)	11 (78.6)
Acute care SOAP #1	2 (14.3)	12 (85.7)
Acute care SOAP #2	2 (14.3)	12 (85.7)

Table 6

Frequency of student wiki use on SOAP note assignments (Never = 1 and Always = 4 on a 4 point Likert-type scale).

To what extent did you use the ongoing online respiratory disease management database when writing the below listed SOAP reports? (n=14)

	Never/Occasionally [n (%)]	Often/Always [n (%)]
In-class practice SOAP	10 (71.4)	4 (28.60)
Non-acute care SOAP #1	7 (50)	7 (50)
Non-acute care SOAP #2	7 (50)	7 (50)
Acute care SOAP #1	3 (21.4)	11 (78.6)
Acute care SOAP #2	6 (42.9)	8 (57.1)

the in-class practice SOAP notes and approximately 67.9% using the database for the acute care SOAP notes. See Table 6 for details.

The third survey question asked students whether they felt that developing the online disease management database was beneficial to their understanding of the patients and their disease processes in the clinical environment. Thirteen of the 14 respondents (92.9%) answered yes it was beneficial to their understanding in clinical environments.

At the conclusion of the survey students were given the opportunity to provide comments regarding the disease management database creation. The students reported that they found the creation of the database to be "helpful in organizing my thoughts," "a nice central location to find information about the many diseases covered in the program," "beneficial to my SOAP reports," and "I enjoyed the ability to add photos and charts to my resources."

Discussion

Results indicate that having RT students develop an online disease management database has the potential to improve their critical thinking skills. The results depicted a clear and consistent trend in the data to support this claim. While the majority of the results were not statistically significant, if the study were to be reproduced with a larger sample size, it is possible that the results would become statistically significant.

Overall, study findings show that members of the treatment group performed better on the majority of assignments than members of the control group. The treatment group also showed improvement in grades from the first in-class practice SOAP note through the last acute care SOAP note #2. The students also reported to use the wiki more over this same time period. Additionally, surveyed students rated the creation of the disease management database as useful in the completion of assignments requiring critical thinking skills.

These findings are consistent with numerous previous studies conducted in nursing and other allied health fields. A few of these previous studies[4-9] showed that when students are exposed to student-centered, active learning techniques they are more likely to perform at a higher level and will also report higher levels of satisfaction within their education.[4,5] Other studies reported that utilizing technology and e-learning in the classroom is an excellent way to improve critical thinking skills, as long as it is not the only strategy employed.[6,7] A third grouping of studies concluded that utilization of concept mapping and resource development has been shown to improve critical thinking among undergraduate students.[8,9]

A wiki was developed and integrated into the first two semesters of the RT curriculum in an attempt to combine critical thinking development strategies with the reported value of using wikis to develop critical thinking skills.[3] The study by Thiele, Mai, and Post[3] showed that students played a more active role when they were the authors of the wiki. It also showed that when the students were the authors of the wiki, their critical thinking abilities increased, whereas when students were the peers, simply utilizing and editing the wiki but not aiding in the creation, their critical thinking abilities were not enhanced. For this reason, students were required to actively participate and develop their own individual wiki resource over the course of the year.

Subjectively, students shared that the database was indeed helpful in putting all the pieces together. By having a central location to keep the information collected over the course of the year, students expressed that they felt more organized and better prepared to tackle assignments as well as their clinical rotations. Students shared "I think that the online database was helpful as we could access it on our phones or on the computers in the library, and "it was beneficial to our SOAP reports." Students also indicated on the survey, and throughout the course of the year, that the database creation, was "helpful in organizing thoughts." They also expressed that the database was helpful in their SOAP report writing and that, ultimately, creating this database helped during clinical rotations.

Finally, as this study developed, it became clear that there was a need for a respiratory therapy critical thinking assessment tool similar to what exists in nursing and other allied health training programs. A critical-thinking assessment tool for respiratory therapy would have allowed educators to assess students upon entry to the program and then monitor their improvement over the course of the semesters. As shown in a previous study, assessment tools should be discipline-specific and should be utilized at numerous points throughout the curriculum to truly assess students' critical thinking abilities.[9] Instead, for this study, specific assignments and their previously established rubrics were used to

show improvement in critical thinking. Had there been an assessment tool readily available, students could have been individually assessed and monitored at any point throughout the year. Since a tool of this nature does not yet exist in respiratory therapy, the surrogate assignments provided us with the opportunity to assess students' critical thinking at different points in the curriculum.

The downfall to this strategy was that surrogate assignments, such as SOAP reports and clinical simulations, had the potential to mask students who had highly developed critical thinking skills upon entry to the program. In addition, performance on course assignments can also be effort-dependent. While there was no way to compensate for not being able to assess critical thinking upon entry into the program, different strategies were employed to help minimize the effect that effort would play in this study. Previous studies[4,5] show that students who experience student-centered environments are more likely to have an enriched learning experience, higher levels of motivation during the course, and be actively engaged. In the case of this study, the online respiratory disease management database combined technology and concept mapping in the form of wikis, was student-centered, and encouraged students to play an active role in their education. In the future, if a critical thinking assessment tool specific to respiratory therapy is developed, this study should be repeated to determine if a direct measure of critical thinking skills is affected by the development of the wiki.

Limitations

There are several limitations to this study. The sample size was small (n=39), and there was no randomization within the study. Also, there was no direct measure of critical thinking used in this study. Instead of a direct measurement tool, six assignments were used as surrogates. Finally, this study was limited by the fact that the LMS wiki could not provide analytics showing how often students actually accessed their database. For this reason, this study was forced to rely on self-reported survey results.

Conclusions

Critical thinking is an essential skill to be learned by all medical and allied health professionals. This study suggests that a student-developed online disease management resource can improve the critical thinking skills of respiratory therapy students. Additionally, the study found that the majority of students perceived the creation of this resource as useful in assignment completion and improvement of their critical thinking skills in the clinical environment. This study also revealed that, while there are components of the respiratory therapy curriculum that can be used to assess students' critical thinking skills, there is a need for a direct critical thinking assessment tool in respiratory therapy education.

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Respiratory Therapy in Colombia: A Historical and Regulatory Perspective

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Abstract

Respiratory therapy is considered one of the newest health professions in Colombia. In Colombia, respiratory care has been traditionally the responsibility of health professionals such as physicians, nurses, and physical therapists. The field has evolved through a series of events that have helped in defining the role of the respiratory therapist and establishing the regulatory mechanisms to develop it as a true health profession. This article provides a historical and regulatory perspective of the respiratory therapy profession in Colombia. It also reviews how and when respiratory therapy was recognized as a licensed profession and discusses how it has gained recognition in the clinical setting as an integral part of the health care team.

Key words: Colombia, health professions, respiratory therapy, regulation, license

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Introduction

The profession of respiratory therapy originated in the United States and Canada more than 60 years ago.[1] The practice of "inhalation therapy" was initially limited to a small number of technical tasks and focused on the delivery of oxygen therapy.[2] It wasn't until the late 1940s and 1950s that inhalation therapy "technicians" were provided informal training in hospitals and clinics. Over the coming decades, these short-term training programs eventually evolved into degree-offering formal educational programs.[3]

Respiratory therapy in Colombia is currently practiced by following the standards established by countries such as the United States and Canada, where academic programs and respiratory care professionals have flourished.[4,5] The respiratory therapist has been defined as a professional who is responsible for the evaluation, diagnosis, management, education, evaluation, and rehabilitation of patients with diseases that affect the cardiopulmonary system.[6] Over time, the profession of respiratory care in Colombia will continue to evolve. Through change and innovation, this profession has flourished; today Colombia counts on advanced practitioners to provide respiratory care throughout the country.[7]

Despite its solid foundation and emerging reputation, respiratory therapy has lacked a clear conceptual description that goes beyond completion of daily tasks. It can be challenging to define what the profession does and how it differs from similar services offered by other health professions in Colombia such as nursing and physical therapy.[8] Thus, professional identity is the most important challenge for respiratory therapy in Colombia. This article reviews some of the theoretical references that have contributed to the development of respiratory therapy in Colombia in its different historical stages. It also proposes a conceptual approach to the profession of respiratory therapy in the country.

Respiratory Therapy as a Profession

The evolution of respiratory therapy throughout history is fundamental to understanding the development of the field as a profession and the definition of its body of knowledge.[9] In order to obtain legitimacy any field of study such as respiratory therapy, has to overcome obstacles imposed by economic, political, and even sometimes religious forces. Autonomy of a profession is only achieved over stages of evolving that define and validate the benefit to the medical community and the public at large.[10,11] Benavent and Bourdieu have described the three stages a profession undergoes as it becomes a legitimate and valued medical service. These stages are discussed below, along with discussing how respiratory care evolved in Colombia.[12,13]

Stage of Primary Practices: Level of the Essential and Basic (2697 A.C.-1970)

At this stage, the earliest example of the developing profession was characterized by only isolated events. While the Egyptian culture determined breathing as the fundamental principle of life, Hindu wisdom considered life completely dependent on the act of breathing. The first practice of aerosol therapy and cerebro-cardiopulmonary resuscitation maneuvers were carried out during this time.[14] Hippocrates, Aristotle, Galen, Boyle, Dalton, and Beddoes among others, contributed during this period with studies in cardiorespiratory physiology and the use of oxygen.[15] Between 1900 and 1930, a few specific therapeutic practices helped in consolidating a better definition of the profession. These practices included postural drainage, use of the nasal catheter for oxygen administration, artificial ventilation, medical gas analysis, and the use of respiratory and physical exercises for patients with various cardiopulmonary dseases.[16, 17] The polio epidemics in Denmark and the United States (1942-1952) marked a monumental historical reference for the profession worldwide as many of these victims required assistance with breathing. Another major historical event that spurred the development of respiratory medicine was military conflicts. The need to treat battlefield injuries resulted in the development of artificial airways, mechanical ventilation, and monitoring of cardiopulmonary function. These events helped with the early development of the respiratory care profession. During the 1950s emphasis was placed on developing effective means to artificially ventilate patients, providing therapies for bronchial hygiene, and effective delivery of oxygen.[18]

In Colombia, the initial stage of respiratory care practices goes back to the early 1940s. During this time respiratory care related tasks were provided by those who practiced medicine and nursing. Bronchial hygiene was only offered in private institutions until 1946, when the Ministryof Hygiene and the Colombian Institute of Social Security were created.[19] In 1947, the first basic practices of kinesiotherapy of the thorax were carried out in public and military hospitals in Bogota, Colombia's capital. In 1949, members of the Inhalation Therapy Association, today known as American Association for Respiratory Care (AARC), provided some training to nurses, physical therapists, and anesthesiologists in regard to aerosol therapy and bronchial hygiene. Dr. Carlos Salinas, an anesthesiologist, and Mrs. Rosa Karels created the first two-year respiratory therapy program in Colombia in 1952. This began to mark the academic baseline for the development of technical programs in respiratory therapy in Colombia. By 1958, respiratory care was evolving into an identified profession, however the practice was modeled after the American professional practice model.[20] Although the growth of respira-

tory therapy during the first part of the twentieth century was slow, major advances in bioengineering, pharmacology, and critical medicine made the period between1950 and 1970 historical.[12] At the end of this stage, the practice of respiratory care was seen as essential in all areas of clinical practice. A significant emphasis was placed on the health-disease process during this time.[21] Both physical therapy and respiratory care became distinct, emergent allied health professions.[22]

Stage of Institutionalization Processes: Level of legitimacy (1970-1997)

During this stage, there was still a great deal of influence from North American practices. This period was characterized by a great emphasis on clinical outcomes, attainment of quality of life, and greater commitment of the population for its well-being. [22] One of the most significant events during this period, that moved respiratory care along, were the scientific and technological advances in pulmonology, critical medicine, and cardiovascular medicine. The words "interdisciplinary" and "multidisciplinary" became key terms that helped defined the profession of respiratory care. Between 1978 and 1985, the role of the respiratory therapist expanded as cardiovascular and pulmonary diseases significantly increased worldwide. This change demanded a larger number of trained personnel.[23] In 1984, there was significant pressure to train technicians in respiratory therapy to take care of patients with a myriad of cardiopulmonary pathologies. The Andean Area Technological Foundation graduated the first group of respiratory therapists in Colombia in 1987. Then in 1989 the Foundation for Higher Education (FEES) started the training of technologists in respiratory care. By 1993, the University of Boyacá, the Catholic University of Manizales, the University Foundation of the Americas of Medellin, and the University of Santiago de Cali, began to train respiratory therapy students at a professional level by awarding a four-year bachelor's degree. This program was approved and regulated by the Ministry of National Education through the Colombian Institute for the Promotion of Higher Education.[20] The Legal Decree of 1990 provided disciplinary legitimacy to respiratory therapy as a profession in Colombia. This was modified four years later, requiring that a degree in respiratory therapy had to be obtained from an approved institution of higher education. Three additional programs were created during this time. In 1994, the first professionally-prepared class of respiratory therapists graduated, and a special resolution by the government ruled that every institution from the first to the fourth level of care providing health services should employ professionals in respiratory therapy. An official document published in 1996 included respiratory therapy services as a fundamental part of health institutions to guarantee mini-

mum conditions for the provision of services in function of continuous improvement.[20]

Stage of Consolidation: Level of Legitimacy (1998-Present)

The stage of consolidation, although key for the legitimization of the profession of respiratory therapy in Colombia, is still a period in history where debate and reflection regarding the profession takes place. The past twenty years of the profession in Colombia have been characterized by an emphasis on the accreditation processes that are similar to accreditation of programs in North America. During the last decade, academic programs in Colombia have recognized the critical value of research and international alliances necessary to earn accreditation. This process has been in part responsible for clarification on what respiratory therapists' job description is, how it differs from other disciplines that provide some degree of respiratory care, and what the respiratory therapy evidence is supporting. It has become evident in Colombia that the respiratory therapist contributes to the multidisciplinary care team in many clinical areas such as critical care, medical and surgical wards, and patient transport.

The need for respiratory therapy to be recognized as a distinct health profession has motivated professional associations in Colombia to play a more critical role in the promotion of the profession in general. The Colombian Association for Respiratory Therapy Programs (ACOLFATER) was founded in 2001 as a result of numerous meetings held by faculty, hospital directors, and directors of respiratory therapy programs. ACOLFATER established guidelines for respiratory therapy education, occupational profiles of the respiratory therapist, curricular structures and training areas, and regulatory aspects of professional practice, among others. As an academic and scientific organization, the ACOLFATER has supported respiratory care and its mission of contributing to the excellence of teaching and research activities. The numerous academic meetings carried out by the organization since its inception have contributed significantly to the professional development in the country and have facilitated the legitimization of the profession.[24] Resolution 2772 filed in 2003 by the Colombian Ministry of National Education defines the minimum conditions for the training of respiratory therapy professionals, and it suggests the curricular construction of the undergraduate program and outlines the characteristics that determine the quality of the academic program seeking official accreditation in institutions that offer health science professions.[25] ACOLFATER has established, during these last two decades, all the curricular guidelines and has begun to emphasize training in cardiac care as an integral part of the profession. By making cardiac care a more visible and complementary element to the body of

Figure 1
Evolution of Respiratory Therapy in Colombia

TIME PERIOD	2.697 A.C.	1970 - 1997	1998 - PRESENT
LEVELS OF DEVELOPMENT	FOUNDATIONAL - BASIC	ACADEMIC SCHOOLS	PROFESSIONAL ORGANIZATIONS
ELEMENTS OF DEVELOPMENT	Vaporizations Empirical technology Negative pressure ventilation	Delineation of roles in respiratory care between RT/RN/PT Establishment of BSRC academic programs	Regulatory Period Colombian Associations NBRC AARC - ICRC SOLACUR
TITLE AWARDED	Bronchial Hygienist	PT / RT / Respiratory Kinesiotherapist	Respiratory Therapist

knowledge of the profession, the field of respiratory care has evolved to more of a "cardiopulmonary or cardiorespiratory care" and as such, it is adopted as a description of the curriculum in all of the six accredited Colombian respiratory therapy programs. As cited by Oulego,[26] Champion,[27] and Healy,[28] "the heart and the respiratory system are two closely related organs that form a functional unit known as a cardiorespiratory system. The diseases of these two organs often coexist and influence each other." This obvious connection between the heart and lungs has made the adoption of the program title "cardiopulmonary care," a common practice in Colombia.

As part of the evolution of the profession, the Colombian College of Respiratory Therapy (CCTR) was created in 2005. This college is modeled by the guidelines and principles of the American Association for Respiratory Care. CCTR seeks to improve the conditions of the professional by positioning the practitioner in the realm of the health professions and promoting excellent scientific and academic rigor.[24]

Participation at international conferences and the establishment of international academic affiliations and agreements have also contributed to the recognition of the Colombian respiratory care professional. In the last four years, and for the first time in the history of respiratory therapy in our country, several Colombian faculty have presented at the AARC Congress and at other professional meetings, along with publishing in peer-reviewed publications.[29-36] Other faculty have actively participated, over the last decade, as invited speakers at the American Thoracic Society and Canadian Society for Respiratory Care conferences, and a number have presented at Latin American Society for Respiratory Care conferences since its inception in 2012.

Colombia is one of the countries that has a direct affiliation with the National Board for Respiratory Care (NBRC) in the U.S. through its Latin American chapter (CLACPTER), which has certified over 200 respiratory therapists that have successfully passed the Spanish version of the NBRC entry-level credentialing exam.[37]

The Commission on Accreditation for Respiratory Care (CoARC) has played a significant role in guiding the process of accreditation in Colombia.[24] One of the last pieces of legislation in Colombia defining the profession as "human talent in health" dates back to 2004. This legislation was signed and filed as Law 1164 in 2007.[38] The presence of official accreditation and support by the Ministry of Health and the Ministry of Education have offered a favorable scenario to the progress of the respiratory care profession in Colombia. Finally, the AARC's Clinical Practice Guidelines (CPGs) have greatly impacted how respiratory therapy is practiced in Colombia. These guidelines are reviewed and covered throughout every curriculum and serve as the base for clinical and preclinical competencies. In the clinical setting, the CPGs guide the creation of policies and procedures for many respiratory care departments throughout the country.

Figure 1 summarizes the evolution of respiratory therapy throughout the stages discussed. This diagram shows the

three key chronological periods discussed in the manuscript and the levels of development for the profession from its early stages to the foundation of academic societies during the last two decades. The basic distinction, title, or degree conferred is shown as the profession has evolved over time. Adapted from: Bourdieu P. Intellectual field and creative project; Cobo, EA. The human body movement in the teaching of physiotherapy at the University of Boyacá, Tunja 1993 – 2006; Master's thesis in history. Tunja: Pedagogical and Technological University of Colombia, 2012.

Conclusion

Respiratory therapy, while a young profession in Colombia, has clearly gained recognition and identity among the health professions. Overcoming economic, political, and administrative obstacles has helped respiratory therapy in Colombia to earn well-deserved respect as a critical profession and the respiratory therapist is an extremely valuable member of the multidisciplinary team providing care for patients with cardiopulmonary diseases.

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Evaluation of RT Attitudes and Behaviors Following Completion of the AARC's "Clinician Training on Tobacco Dependence for Respiratory Therapists": A Pilot Study

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Abstract

Background: A limited number of respiratory therapists (RTs) have training in tobacco dependence treatment. While ample opportunities exist in RT practice for patient intervention, there were no national training programs specifically designed for RTs to properly prepare for tobacco dependence counseling. **Methods:** Training was developed to improve knowledge, skills, and self-efficacy for providing brief tobacco cessation interventions. It includes interactive, behaviorally focused video examples demonstrating evidence-based interactions with a diverse population of tobacco users. The effectiveness of the training was evaluated with pre- and post-intervention evaluation measures to determine perceived knowledge as well as self-reported behaviors and self efficacy in providing counseling. **Results:** Sixteen of 48 participants completed both the pre- and post-evaluation. Fifteen of 16 indicated the course would increase the number of tobacco cessation counseling sessions they conducted, and all participants indicated that the course would increase the quality of counseling sessions. From pre- to post-training, there was a 53.9% increase in the number of patients the participants asked about smoking behaviors, a 64.5% increase in the number of patients they advised to quit, a 136.6% increase in the number of patients they referred to smoking cessation counseling, and a 267.6% increase in the number of patients referred to the National Network of Tobacco Cessation Quitlines. **Conclusions:** The RT training improved knowledge, self-efficacy, and self-reported counseling behaviors. This pilot data suggests that RTs trained in brief tobacco dependence interventions can contribute to a reduction in tobacco use through increased evidence-based advice and referral, thereby possibly effecting cessation rates.

Key Words: tobacco dependence training, smoking cessation, tobacco dependence counseling

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Introduction

Respiratory therapists (RTs) have a plethora of opportunities to assist in preventative efforts and engage tobacco users regarding tobacco dependence. While ample intervention opportunities exist, there previously were no national training programs specifically designed for RTs to properly prepare for this significant interaction. The U.S. Department of Health and Human Services' Clinical Practice Guideline (HHS CPG)[1] recommends systematic and multidisciplinary cessation programs. The AARC developed a training program in 2014 to provide a comprehensive online tobacco dependence clinician training for RTs to assist tobacco dependent individuals. The overall goal of this project was to increase the proficiency of RTs in the 5 A's (Ask, Advise, Assess, Assist, and Arrange) and the Ask, Advise, Refer (AAR) models outlined in the HHS CPG[1], as well as in making pharmacotherapy recommendations. Utilization of an online training platform will promote access to the training by all practicing RTs. The primary goal of the training is to reduce the number of tobacco users nationwide using evidence-based educational and interactive approaches. This can be accomplished by increasing the number of RTs prepared to help tobacco users quit.

A limited number of RTs have training in tobacco dependence treatment. The result is a cadre of RTs available, yet ill equipped to recommend pharmacotherapy and provide assistance to current tobacco users. Approximately 14% of RTs are trained for these conversations.[2] In 2014, it was found that formal RT education devotes an average of 165 minutes of instruction for tobacco-related content.[3] With approximately 8,000 new RT graduates per year,[4] this lack of instruction results in a small number of RTs prepared to initiate the smoking cessation conversation. In addition, only 83 of over 50,000 AARC members have self-reported they have completed training and have earned the Certified Tobacco Treatment Specialist (CTTS) credential.[5] The 2014 AARC Human Resources Survey also indicated that the median amount of respiratory therapy experience after completing initial respiratory therapy training was 15 years, resulting in much of the RT workforce being trained before tobacco dependency may have been included in respiratory therapy curriculum.

In addition, there is a gap in the literature related to the RT's knowledge and self-efficacy for providing tobacco dependence counseling, which can be partially attributed to the lack of formalized education in this area for currently practicing RTs. Therefore, there is a need to illustrate the effectiveness of training in improving knowledge and self-efficacy for improving brief interventions. The purpose of this descriptive pilot study was to describe self-reported counseling and referral behaviors as part of a brief tobacco cessation intervention both before and after completion of the AARC's "Clinician Training on Tobacco Dependence for Respiratory Therapists" program. Additionally, the study was designed to evaluate RTs' attitudes and self-efficacy for providing tobacco dependence counseling before and after completing the training.

Methods

The AARC's "Clinician Training on Tobacco Dependence for Respiratory Therapists" program was designed to prepare RTs to provide tobacco dependence counseling to patients in a variety of patient care settings. The AARC tobacco dependence training provides guidance for delivery of personalized, tailored tobacco cessation interventions. Training materials provide resources that can be used to tailor smoking cessation programs and activities for each environment, as well as for audiences with various levels of health literacy. This training builds upon existing resources, including the AARC's "Clinician's Guide to Treating Tobacco Dependence"[6] and the "Rx For Change"[7] program to increase the knowledge, behaviors, and self-efficacy for providing brief interventions. The program addresses the need for tailored, interactive, behaviorally-focused video examples to demonstrate appropriate interactions with the tobacco user. This program was designed for respiratory therapists who have successfully completed entry-level respiratory therapy education and earned either the Certified Respiratory Therapist (CRT) or Registered Respiratory Therapist (RRT) credential. As licensed respiratory care practitioners, this population will have contact with patients who are current tobacco users and can benefit from the cessation conversation conducted by the respiratory therapist and subsequent referral to the formalized tobacco cessation program.

"Clinician Training on Tobacco Dependence for Respiratory Therapists"

The training intervention includes the AARC's "Clinician's Guide to Treating Tobacco Dependence"[6] as required reading along with 3.5 hours of content including: the epidemiology of tobacco use; nicotine pharmacology and principles of addiction; non-nicotine pharmacology; nicotine replacement therapy; assisting patients with quitting; motivational interviewing; special populations; teens; patients with cardiac disease; pregnancy; difficult questions; reimbursement; systems; and pharmacology. The training also includes a pre-course knowledge test, in-course self-assessment quizzes for every chapter, and one post-course knowledge test. With an expected completion time of 5 hours for all videos, quizzes, and tests, this course is approved for 5.0 continuing respiratory care education (CRCE) credits by

the AARC. Successful completion is defined as completion of all course artifacts and at least a 70% passing score on the post-course knowledge test.

The training includes additional case scenario vignettes that were created to supplement the national "Rx For Change"[7] program previously developed for pharmacists. The training vignettes provide the learner with the opportunity to view, assess, and evaluate the content which models appropriate behavior in a variety of care settings relevant to the RT. The "Rx For Change" program includes one RT-specific interaction. The researchers developed four new scenarios for the environments common to and uniquely relevant to RTs: initiating the 5 A's conversation during the assessment of the teen with asthma, after extubation for coronary bypass surgery, during the delivery of breathing treatments for chronic obstructive pulmonary disease, and during a consultation with a mother who is pregnant and her toddler is in the hospital with an asthma exacerbation. Two trigger tape (reaction) videos were developed in order to use the "Rx for Change" trigger tape videos for our proposed online platform. The participants watched selected trigger tapes and then critically evaluated and selected an appropriate reaction statement. The learner was then directed to watch a scripted reaction to the trigger statement.

Prior to widespread distribution of the program, the AARC conducted a pilot test to a targeted group of practicing RTs from six different states. A pre- and post-survey assessing the attitudes and behaviors related to tobacco dependence counseling by RTs to participants was distributed during this pilot test.

The pre- and post-training evaluation measures were derived from several similar interventions described in the literature.[8-10] Participants were asked to rate their perceived effectiveness and preparedness regarding performing tobacco cessation interventions. They were also asked to self-report their ability and self-efficacy to counsel patients using the AAR method and to indicate the frequency with which they perform each of the steps in the method. In addition, participants were asked to indicate the impact the training would likely have on their practice specifically related to implementing the AAR method.

The pre-intervention evaluation was delivered within the course through the learning management system prior to the participant engaging in content. After completing the pre-intervention evaluation, the participant progressed in a predetermined fashion through the educational course. One to two months following course completion, the participants completed the post-survey to measure self-reported counseling behaviors and self-efficacy for tobacco dependence counseling and to assess the impact of the training on practice.

Characteristics of the Population

Sixty currently practicing RTs from the top six tobacco using states (Indiana, Oklahoma, Kentucky, Missouri, Mississippi, and West Virginia), as identified by the CDC, were targeted for participation in the Continuing Respiratory Care Education (CRCE) program. The nature of the CRCE program requires that they be currently practicing, and a licensed RT.

Participants and Recruitment

The AARC identified participants for the study. The researchers provided the AARC with links to electronic pre- and post-training surveys to send to participants. A participant-generated unique code was used to link pre- and post-training surveys by participant. The code consisted of the last 4 digits of the participant's phone number and the last 2 digits of the participant's home zip code. The researchers did not have access to contact information of participants in the pilot project, so the privacy of the participants was maintained.

Results

Sixty participants were enrolled in the "Clinician Training on Tobacco Dependence for Respiratory Therapists" online course. Forty-eight participants completed the course. The average pre-course knowledge test score was 62.1% and the average post-course knowledge test score was 84.6%. All but one participant demonstrated an increase in the post-course knowledge test score over the pre-course knowledge test score. In addition, > 96% of participants answered "yes" to the following questions:
• Was this AARC educational activity an effective learning experience?
• Did you achieve the learning objectives for this AARC educational activity?
• Was the content of this AARC educational activity presented without bias of any commercial product or drug?
• Would you recommend this course to others?

Sixteen participants completed both the pre- and post-course survey. All 16 participants were female, the mean age was 40.1 years, and they had been working as an RT for a mean 9.8 years. The majority of participants had earned the RRT credential and had completed an associate degree in respiratory therapy. In addition, most had not received any previous formal tobacco cessation training and were never smokers themselves. See Table 1 for additional details on study participant characteristics.

In the time between the pre-training survey and post-training survey, none of the participants experienced important changes to their job expectations that would im-

Table 1
Participant characteristics

Gender	
Female [n (%)]	16 (100%)
Age (mean ± SD)	40.1+9.6
Years as an RT (mean ± SD)	9.8+6.0
RT work hours per week (mean ± SD)	35.6+8.5
Credential	
CRT [n (%)]	5 (31.3%)
RRT [n (%)]	11 (68.8%)
RT degree	
Associate [n (%)]	14 (87.5%)
Bachelor's [n (%)]	2 (12.5%)
Previous formal tobacco cessation training	
None [n (%)]	9 (56.3%)
In RT education [n (%)]	3 (18.8%)
In person CE [n (%)]	4 (25.0%)
Tobacco use	
Never [n (%)]	9 (56.3%)
Former [n (%)]	4 (25.0%)
Current (cigarettes) [n (%)]	3 (18.8%)

pact their ability to assist patients with quitting tobacco, and none of the participants experienced substantial changes to the number of hours they worked per week as an RT. Two of the 16 participants did complete in-person formal tobacco cessation training outside of the "Clinician Training on Tobacco Dependence for Respiratory Therapists" program between the time of the pre- and post-surveys.

Consistent with the AAR focus in the clinicians' training, participants were asked to indicate how many patients they asked about tobacco use, advised to quit, and referred to counseling or to the National Network of Tobacco Cessation Quitlines (1-800-QUIT-NOW) both pre- and post-training. Mean responses to each item were increased from pre to post. The mean number of patients that were asked about their smoking behavior increased by 53.9% and the mean number of patients advised to quit smoking increased by 64.5%. Even more significant increases were realized in patient referrals for assistance with quitting smoking. Patient referrals to smoking cessation counseling increased by 136.6% from pre- to post-training, and referrals to the National Network of Tobacco Cessation Quitlines increased by 267.6%. See Table 2 for more information about use of the AAR model pre- and post-training.

In addition to providing information about the numbers of patients to whom they provided the AAR brief intervention, participants were also asked to describe their intentions to routinely implement the specific aspects of the AAR model. While a relatively large number of the participants indicated they routinely asked, advised, and referred patients pre-training, increases were seen pre to post in all of these activities. The largest increase was seen in the number of participants that currently routinely refer patients to the National Network of Tobacco Cessation Quitlines, with a 57.1% increase from pre to post training. Table 3 provides specific details regarding participants' intentions to ask, advise and refer both pre- and post-training.

In addition to questions about their smoking cessation counseling behaviors, participants were also asked to provide information about their counseling competency, overall ability to help patients quit, overall self-efficacy related to smoking cessation counseling before and after completing the "Clinician Training on Tobacco Dependence for Respiratory Therapists." Participants were asked to rate their counseling skills and their overall ability to help patients quit using tobacco on a scale of 1 to 5, with 1 being poor and 5 being excellent. Mean counseling competency and ability to help patients quit increased slightly from pre- to post-training and was rated as good to very good both pre- and post-training. Mean counseling competency was 3.69+.81 pre-training and 3.75+.9 post-training. Mean overall ability to help patients quit was 2.81+1.2 pre-training and 3.00+.81 post-training.

Table 2
Use of the AAR model pre- and post-training

In the past week, how many patients did you…	Pre (mean + SD)	Post (mean + SD)	% change in mean
Ask whether they smoke?	11.13+16.5	17.13+16.0	53.9%
Advise to quit smoking?	7.94+10.0	13.06+11.8	64.5%
Refer to smoking cessation counseling?	3.25+5.5	7.69+10.4	136.6%
Refer to the National Network of Tobacco Cessation Quitlines (1-800-QUIT-NOW)?	2.38+5.1	8.75+12.1	267.6%

Table 3
Participants' intentions to routinely implement AAR

Please describe your intention to routinely implement the following smoking cessation activities	Pre (n)	Post (n)	% change in n
Asking all (or almost all) patients whether they smoke?			
Already do	10	13	30%
Considering doing in the next few weeks	5	2	-60%
Considering doing in the next few months	1	1	0%
Not considering doing this	0	0	0%
Advising all (or almost all) currently smoking patients to quit			
Already do	9	11	22.2%
Considering doing in the next few weeks	6	4	-33.3%
Considering doing in the next few months	1	1	0%
Not considering doing this	0	0	0%
Discussing and providing currently smoking patients with materials for calling the National Tobacco Quitline (1-800-QUIT-NOW)			
Already do	7	11	57.1%
Considering doing in the next few weeks	8	3	-62.5%
Considering doing in the next few months	1	2	100%
Not considering doing this	0	0	0%

Table 4
Counseling skill confidence and self-efficacys

Please rate your degree of confidence by indicating a number from 0-10. How confident are you that you…	Pre (mean ± SD)	Post (mean ± SD)
Can routinely ask patients whether they use tobacco?	8.00±2.4	9.00±1.5
Can sensitively suggest tobacco cessation to patients who use tobacco?	7.56±2.0	7.81±2.0
Know the appropriate questions to ask patients when providing tobacco cessation counseling?	6.44±2.1	6.87±2.1
Can provide/enhance motivation to patients who want to quit?	7.19±2.1	7.06±2.1
Have sufficient knowledge to discuss smoking cessation medications and appropriate use?	6.13±2.6	7.25±2.2
Know when a referral to a physician is appropriate?	5.50±2.3	7.44±1.8
Are able to provide adequate counseling when time is limited?	5.44±2.7	6.56±2.6
Can help patients learn how to cope with situations or triggers that might lead them to relapse to using tobacco?	5.44±2.7	6.81±2.4
Can encourage patients who are not ready to quit to think about quitting in the near future?	7.19±2.3	7.00±2.4
Can discuss smoking cessation with pregnant women?	6.63±2.4	7.06±2.7
Can counsel the parents of pediatric patients to quit smoking?	6.44±2.7	6.94±2.6
Can include a family member in a discussion about tobacco cessation?	6.50±2.6	7.25±2.2
Can counsel adolescents about tobacco use?	6.69±2.7	7.00±2.7
Overall self-efficacy	6.55±2.1	7.18±1.9

Table 5

Importance of barriers to using AAR

Potential Barrier	Mean ± SD
Lack of available time	3.81±.66
Lack of training	3.87±1.2
Discomfort in asking patients about tobacco use	2.88±1.2
Lack of perceived importance of cessation counseling as applicable to the RTs job	3.44±1.4
Lack of confidence for counseling patients about quitting	3.69±1.0

Participants rated their confidence on a scale of 0 to 10, with 0 being not confident at all, 5 being moderately confident, and 10 being extremely confident on 13 individual items. The combined mean for these individual ratings represents the participants' overall self-efficacy for smoking cessation counseling.[10] The mean self-efficacy rating increased slightly from pre-to post-training, with a pre-training mean of 6.55±2.1 and post-training mean of 7.18±1.9. In addition, means for 11 of 13 individual items increased from pre to post, and the remaining 2 items only decreased by less than .2 on a scale of 0-10. Details of individual item ratings are included in Table 4.

Barriers to implementing the AAR smoking cessation counseling model as part of the participant's routine workflow was assessed post training. Participants were asked to rate the importance of 5 potential barriers to using the AAR model on a scale of 1 to 5, with 1 being not important at all and 5 being extremely important. Lack of available time, lack of training, and lack of confidence for counseling patients about quitting all had means above 3.5 on a 5-point scale, indicating that they were perceived as very important barriers. Means for each barrier are presented in Table 5.

Finally, participants were asked to indicate if they believed that the "Clinician Training on Tobacco Dependence for Respiratory Therapists" would increase both the number and the quality of tobacco cessation counseling sessions. Fifteen of 16 participants indicated they believed the training would increase the number of counseling sessions and all 16 participants indicated that the training would increase the quality of the counseling sessions.

Discussion

Participants in this study substantially increased the number of patients they asked about smoking, advised to quit smoking, and referred to smoking cessation services, including 1-800-QUIT-NOW. Data suggests nearly 70% of smokers want to quit and that advice to quit from a health care provider has a positive impact on quitting success.[1] RTs regularly encounter smokers in a variety of practice settings and are in a unique position to provide an effective, brief tobacco cessation intervention with every patient interaction. Training health care providers in the brief tobacco intervention, or AAR model, has been demonstrated to increase self-efficacy and referral rates in community pharmacies and dental clinics.[10-11] The substantial increase in the number of patients asked, advised, and referred post-clinician training, coupled with the increases in knowledge and intentions to continue to ask, advise, and refer, indicate that RTs completing the clinician training would likely be able to positively impact the smoking cessation rates of the patients with whom they interact.

Participants' rating of smoking cessation competency, counseling confidence, and counseling self-efficacy increased only slightly following the clinician training. This small increase may be due in part to the nature of the clinician training, in that it focused more on making appropriate referrals and less on providing evidence-based smoking cessation counseling. This could also be attributed to the fact that ten of the thirteen counseling skill confidence statements were rated between a six and an eight on a 10-point scale on the pre-survey, indicating that participants had a moderately high level of confidence in their counseling ability before completing the clinician training.

Important barriers to implementing the AAR model of smoking cessation intervention were identified by participants. Therapists having lack of time emerged as a barrier, which was not surprising considering the current administrative climate in respiratory therapy. RTs may view their workload as overwhelming and staffing reductions may be perceived as barriers to initiating the brief tobacco intervention. The researchers purposefully scripted the video vignettes to demonstrate that the AAR conversation can take place within the context of a breathing treatment or disease education session. Integration of the AAR conversation within the timeframe of regularly scheduled respiratory care not only capitalizes on the existing respiratory therapist/patient relationship, but also contributes to the growing reputation of the RT as a wellness advocate. However, it is also concerning that participants identified lack of available time as a barrier despite the fact that the AAR model takes less than one minute to implement at the bedside. This may be a reflection of the lack of emphasis placed on the RT's role in prevention of pulmonary disease. It may also reflect on the lack of understanding of the important short-term and long-term benefits to the patient and to the health care system when patients quit smoking. Altogether, this presents an important opportunity to advocate for expanding roles for RTs as hospital department managers and hospital and health system administrators. It is however, encouraging to note that participants also perceived that lack of training and

lack of confidence for counseling patients about quitting was an important barrier, as the goal of the clinician training is to provide targeted training to increase confidence in utilizing the AAR model.

Additional barriers included lack of training and lack of confidence for counseling patients to quit. It is hoped that the clinician training piloted in this study will address these concerns and results do indicate there were slight increases in counseling competency, overall ability to help patients quit smoking, and counseling self-efficacy.

It is also positive to note that, despite identifying important barriers, participants strongly believed that the clinician training would increase both the number of counseling sessions and the quality of these counseling sessions. This online platform provides a convenient mechanism through which to provide the clinician training. The convenience of the training, combined with the perceived importance and projected outcomes, further strengthens the rationale for adoption of the training by educators and managers in respiratory therapy. As hospitals strive to meet The Joint Commission's Tobacco Treatment Core Measures, the AARC will provide bulk package opportunities for respiratory therapy department managers to provide the training to their staff RTs.

It is recommended that a larger-scale study be conducted to continue to explore the utility of the training. Future efforts are needed to build on the successes of this pilot and to directly address the only *slight* increases in ratings of counseling skills and confidence.

Limitations

Though this study was a pilot, the number of participants who completed both the pre-course and post-course survey was small. And even though the results were substantial, especially those related to the increasing numbers of patients asked about tobacco use, advised to quit, and referred to additional counseling, it is difficult to determine whether the results were statistically significant with this small sample size.

Conclusions

Respiratory therapists have a significant opportunity to positively impact smoking cessation rates and the overall health of their patients. However, RTs need access to customized training designed to adequately prepare them for the cessation conversation, to help them develop the knowledge, skills, and attributes necessary to successfully implement a brief tobacco cessation intervention. The training developed in this project has been shown to be effective, feasible, and accessible. This pilot data suggests that RTs trained in brief tobacco dependence interventions can con-

tribute to a reduction in tobacco use through increased evidence-based advice and referral.

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Life Satisfaction: A Mixed-Method Study of Recent Respiratory Care Graduates

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Abstract

Background: Respiratory care is an aging profession with many veteran therapists contemplating retirement within the next five years; replacing retiring therapists with new graduates is critical to the stability and vitality of the profession. We sought to discover the current levels of life satisfaction among a cohort of recent RCP graduates and to determine whether salary, position, credentials, or other factors were associated with life satisfaction. **Methods:** This descriptive mixed-methods pilot study used a convenience sample of BSRC graduates from a medium-sized public university in Texas. Study subjects were assessed one-year post graduation. The mixed-methods survey instrument contained Diener's Satisfaction With Life Scale (SWLS) and questions designed to assess factors associated with life satisfaction. The participation rate was 17 (n=17), which represented 39.5% of two consecutive cohorts of respiratory therapist graduates (n=43). Descriptive statistics were used to analyze quantitative data and common themes were identified for qualitative data. **Results:** Analysis of quantitative survey data revealed that SWLS scores were not significantly related to salary or the type of credentials. Qualitative data revealed common themes: patient care, co-worker interactions, and education were most frequently identified as contributing to life satisfaction. **Conclusions:** The majority of respondents were satisfied with life and their work. The most satisfied respondents enjoyed patient interactions and care. Salary levels were not found to be associated with life satisfaction and work in this study and may represent a unique characteristic of the millennial generational group.

Key words: recent graduates, Satisfaction With Life Scale (SWLS), respiratory therapists, respiratory care practitioner (RCP), job satisfaction, millennials, Generation Y.

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Introduction

The entry and retention of new graduates into the practice of respiratory care is vital to the profession. The respiratory care profession has an aging workforce with an average age of 47 years, and according to the recent American Association for Respiratory Care's (AARC) Respiratory Therapist Human Resource Study 2014,[1] many experienced therapists are considering retirement by the year 2020. The demand for respiratory care practitioners (RCPs) is expected to grow by 19% between 2012 and 2022, creating more than 22,000 new positions.[2] When RCPs leave the profession, through retirement or seeking different careers, hospital systems incur considerable costs to fill positions.[3] Against this backdrop, it is not surprising that the retention of new graduates is of paramount importance to respiratory care department managers.[4]

Job satisfaction has a strong link to employee retention. Employees who are satisfied with their jobs are more likely to remain, employees who are not, will often leave.[5,6] When people are dissatisfied with their jobs they experience greater levels of worklife unhappiness, career dissatisfaction, and burnout.[7] Among health care workers in general, factors having a negative effect on job satisfaction are stress, mal-alignment of one's life goals with workplace objectives, staffing, patient acuity, and management style.[8] Because job satisfaction can affect work and life satisfaction the two components are often studied together.[9-12]

Recent studies investigating job and life satisfaction among RCPs are limited and are nonexistent for new graduates. Past studies[15, 16, 17, 18, 19] have shown that job satisfaction in respiratory care is related to the level of effective supervision and management style. The 2014 AARC Respiratory Therapist Human Resource Survey reported that job satisfaction among RCPs was associated with: (1) staffing and management concerns, (2) compensation and benefits, (3) workload, (4) opportunities for advancement, and (5) participative decision making.[1]

In this study, researchers examined the relationship between life satisfaction and the work-related experiences of graduate respiratory therapists. *Life satisfaction* is a broader term than job satisfaction, although elements of one's worklife (i.e. salary, job security, and advancement prospects) can affect life satisfaction.[7] The overall assessment of feelings and attitudes about one's life ranging from positive to negative is believed to represent life satisfaction.[13] Life satisfaction may also be influenced by a desire to change one's life, satisfaction with the past, satisfaction with future prospects, and the view of significant others towards one's life.[14] The purpose of this study was to determine if salary, credentialing status (advanced credentials), or job title was associated with life satisfaction in recent graduates from a Bachelor of Science in Respiratory Care (BSRC) program in Texas.

Methods

Research Design

This was a descriptive pilot study using mixed-method design. The Satisfaction With Life Scale (SWLS)[13] was used to assess life satisfaction (see Figure 1). The SWLS assesses satisfaction with people's lives as a whole.[20] It is a five-item instrument designed to measure global cognitive judgment of one's life and has been shown to be a valid and reliable measure of life satisfaction across age groups and in varied applications.[21] Each item is scored from 7 (strongly agree) to 1 (strongly disagree); summing each question produces a point total corresponding a level of life satisfaction ranging from extremely satisfied to extremely dissatisfied (see Figure 1).

A supplemental questionnaire was used to obtain information regarding salary levels, credentialing status, job title, specific job-related satisfiers and detractors, feelings about the value of the BSRC degree, and future plans (see Figure 2). The 18-item survey form was designed to collect quantitative and qualitative data representing a mixed-methods

Figure 1
Satisfaction With Life Scale

Instructions: Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.)

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree
- _____ In most ways, my life is close to my ideal.
- _____ The conditions of my life are excellent.
- _____ I am satisfied with my life.
- _____ So far, I have gotten the important things I want in life.
- _____ If I could live my life over, I would change almost nothing.

Scoring: sum up scores on each item

- 31-35 Extremely satisfied
- 26-30 Satisfied
- 21-25 Slightly satisfied
- 20 Neutral
- 15-19 Slightly dissatisfied
- 10-4 Dissatisfied
- 5-9 Extremely dissatisfied

Figure 2
Survey instrument

RC Graduate Worklife Satisfaction

Demographics:
1. Gender: Male Female
2. Age: 20-25 26-30 31-35 36-40
3. Status: Married Single Divorced
4. Children: Yes No

Employment:
1. Current position (title): _____
2. Current salary $_____ Hours worked weekly _____
3. Place of employment: Hospital Home Care College/University Clinic
   Other_____

Scholastic Achievements:
1. Current degree:
2. Degree in progress:
3. Credentials held:

Job Satisfaction: Contentment (or lack of it) arising out of interplay of the employees' positive and negative feelings toward his or her work.

How satisfied are you with your job? (choose one)
1. Very dissatisfied   2. Dissatisfied   3. Somewhat dissatisfied
4. Indifferent   5. Somewhat satisfied   6. Satisfied
7. Very satisfied

In the past year, what has happened to your level of job satisfaction?
1. Gone down   2. Stayed about the same   3. Gone up

Worklife Satisfaction: Quality of Worklife refers to the level of happiness or unhappiness with one's career. Those who enjoy their careers are said to have a high quality of worklife, while those who are unhappy, or whose needs are otherwise unfulfilled are said to have a lower quality of worklife.

Satisfaction With Life Scale (SWLS)
Please rate the following items from: 1 (strongly disagree) to 7 (strongly agree)

1. In most ways, my life is close to my ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far, I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

In the last year, what has happened to the quality of your worklife?
1. Gone down   2. Stayed about the same   3. Gone up

Questions:
1. What two things contribute the most to your satisfaction with the quality of your worklife?
2. What two things contribute the least to your satisfaction with the quality of your worklife?
3. What are your future plans/goals?
4. Do you plan to leave the respiratory care profession? If so, why?
5. Looking back, do you still believe that getting a BSRC degree was the right choice for you? Why or why not?
6. How long do you intend to practice respiratory care?
   1-5 years   5-10 years   10-20 years   20 or more years

---

design. The study subjects were graduates of a small BSRC program located in Texas and represented two consecutive cohorts (2014-2015). The 2014 graduates were surveyed via a mailed-out questionnaire (a consent form was included) and administrative assistants received the completed documents by return mail. The signed consent forms were filed by the assistants and survey forms were provided to researchers for analysis (researchers were blinded to the survey authors). Participants from the 2015 class were surveyed through an online questionnaire. Follow-up emails were sent to recipients to ensure participation and timely completion. Data collection occurred between June-September 2015 and August-September 2016. Return rate was 39.5% (17 of 43 eligible). The study was approved by the Institutional Review Board.

Instrument

The instrument contained six sections including: demographics; employment (salary, job title, and location); scholastic achievements (current degree, degree in progress, credentials); job satisfaction (1 item Likert-type scale); Satisfaction With Life Scale; and the following questions: 1) How long do you intend to practice respiratory care (choices from 1 to 20 years or more)? 2) What two things contribute <u>most</u> to your satisfaction with the quality of your worklife? 3) What two things contribute <u>least</u> to your satisfaction with the quality of your worklife? 4) What are your future plans/goals? 5) Do you plan to leave the respiratory care profession? If so, explain why, and 6) Looking back do you believe that getting the BSRC degree was the right choice for you? Explain why or why not. The survey instrument was reviewed for face and content validity by faculty not involved in the research. Faculty then completed the survey to establish an average time for completion and to determine the logic of question sequencing.

Study Population

All graduates from consecutive graduating classes (2014-2015) from a BSRC program were eligible for the study, thus representing a convenience sample (Table 1). The study participants were predominately female (14 of 17, 82%), with a much smaller proportion of male subjects (3 of 17, 18%). Married participants made up 35% of the study group and the majority of participants reported having no children (13 of 17, 76%).

Results

Quantitative Data

Quantitative data were measured using the descriptive statistics in Minitab 17 (mean, SD, and coefficient of correlation); correlational assessments utilized Spearman's rho correlation. All subjects reported a job title of Respiratory

Therapist. Average hours worked were 38.9 (SD ± 4.3), with an average salary of 48779.22 (SD ± 11183.67). The majority worked in a hospital (16 of 17, 94%). All study subjects currently hold a Bachelor of Science in Respiratory Care degree with one reporting a graduate degree in progress (1 of 17, 6%) another was working on an additional bachelor's degree (1 of 17, 6%). Six subjects are also credentialed as a Neonatal/Pediatric Specialist (NPS) (6 of 17, 35%).

Job satisfaction was assessed using a single question containing a 7-point Likert-type scale with possible responses from 1 (very dissatisfied) to 7 (very satisfied). The average score on job satisfaction was 5.82 (SD ± 0.98) which indicated that respondents were satisfied with their jobs. Study participants scored an average of 28.24 (SD ± 4.4) on the SWLS, reflecting a level of *satisfied* with life (Table 2). In order to address the main study questions, the SWLS score was compared to salary and number of credentials earned (Table 3). Because all respondents currently have the same job title, no comparison to SWLS scores was attempted. The SWLS score was compared to reported salary and numbers of individual credentials, using a Spearman's rho correlation. Results for SWLS and salary were R = -0.271 and p value = 0.292; for SWLS and credentials R = 0.228 and p value = 0.380. The results showed no correlation between salary, numbers of credentials, and SWLS score.

Qualitative Data

Qualitative data was derived through analytic inductive analysis of individual comments of the respondents' experiences during the first year of practice using the supplemental

Table 1
Demographics

Subject	Sex	Age	Status	Hours weekly	Salary annual	Credentials
1	M	20-25	S	44	45360	RRT-NPS
2	F	20-25	M	40	43000	RRT
3	F	20-25	M	36	47736	RRT
4	F	20-25	M	36	30000	RRT
5	F	20-25	S	30	47970	RRT
6	F	26-30	S	35	48485	RRT-NPS
7	F	20-25	M	42	48048	RRT-NPS
8	M	20-25	S	42	42000	RRT-NPS
9	F	20-25	M	36	59904	RRT
10	F	26-30	M	40	55000	RRT-NPS
11	M	20-25	S	40	50000	RRT
12	F	20-25	S	40	53040	RRT-NPS
13	F	26-30	S	40	66500	RRT
14	F	26-30	S	40	41600	RRT
15	F	26-30	S	36	42588	RRT
16	F	26-30	S	35	31200	RRT
17	F	20-25	S	50	76800	RRT

Table 2
Satisfaction with Life Scale (Scores)
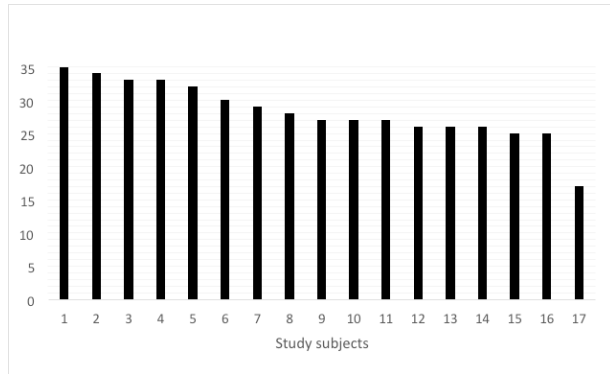
questionnaire which contained structured and open-ended questions. Interpretation of the emerging themes enabled the researchers to draw meaning from the data, leading to a deeper understanding about the participants' life satisfaction as new respiratory therapists. The qualitative data yielded themes pertaining to life satisfaction including: patient care, co-workers, and education.

Patient Care

Several participants commented on the questionnaire that patient care contributed most to their quality of life and work satisfaction. Comments frequently noted that seeing patients get better and the ability to help people contributed most to their quality of work life. Representative comments included:

> *"Helping the really sick intubated patients get better and educating those to prevent them from becoming intubated and very sick."*

> *"I love what I do and I feel like I make a difference in people's lives."*

> *"I love being able to work with patients, and also I love the respiratory profession."*

> *"I love having direct patient care."*

> *"I love helping people. Yes, it is hard and it challenges me every day but I am glad and thankful to work as a RT."*

Co-workers

Another theme identified from the questionnaire was that co-workers contributed to their life satisfaction. Participants frequently expressed that co-workers made their job satisfying and rewarding. They enjoyed working as part of the health care team. The participants noted:

> *"Working with great co-workers"*

> *"People I work with/co-workers."*

> *"I enjoy the people I work with and what I do."*

> *"Enjoy management and fellow employees."*

Education

The final theme identified was that education contributed to life and work satisfaction. Participants felt that education is very important and contributes greatly to life satisfaction. Most participants were very satisfied with their bachelor's degree and feel that it has helped them to achieve more rapid advancement into critical care areas and supervision (e.g. team leader). A few participants expressed plans to further their education in the field of respiratory care. However, several participants commented they plan to further their education and leave the field. Representative comments are noted below:

> *"Having a BSRC has gotten me a job, opened up doors for more opportunities, and has let me become a vital part in the healthcare setting that I have always wanted."*

> *"Although I have only been working a little over a year my co-workers who have been working several years ask me for my advice daily. I feel my education has given me an edge because I have that extra knowledge."*

Table 3
Comparison of Satisfaction with Life Scale (score) with Salary

Variable	Total count	Mean	SEM	SD	Minimum	Median	Maximum
Salary (US dollars)	17	48755	2797	11531	30000	47970	76800
SWLS	17	28.24	1.07	4.40	17.00	27.00	35.00

"I believe having a BSRC degree made me a better therapist and has helped me work my way up in a short amount of time."

"I would like to gain a master's degree and maybe teach someday."
"I plan to go back to school and get a Masters in Healthcare Administration. Take up the business side of healthcare."

"I plan to broaden my current RT skills and go to anesthesia assistant school to work in an OR somewhere."

"I want to be an RT but may also want to do nursing."

Discussion

This study was designed to assess life satisfaction in a cohort of recent BSRC graduates and to obtain information regarding factors that enhance or detract from the worklife experience. The primary study questions assessed the relationship between life satisfaction, salary, and the number of NBRC credentials earned. The study was not designed to be a job satisfaction study, but looked at job satisfaction as one of the features that could affect the worklife balance and thus affect life satisfaction. For the purposes of this study, life satisfaction should be considered as a cognitive global expression of how satisfied the respondent is with life as a whole. Feelings of life satisfaction are closely related to the concept of *well-being*. Various definitions of well-being include the presence of generally positive emotions (e.g., happiness, contentment) and the absence of negative feelings (e.g., anxiety, depression). Well-being is also believed to include satisfaction with one's physical, economic, social, and worklife.[22]

The results of this study show that respondents are generally satisfied with both job and worklife balance: Mean scores were 28.24 reflecting a level of satisfied based on the Satisfaction With Life Scale (see Figure 1). The single question on the survey measuring job satisfaction also indicated that subjects were satisfied with their work. The findings are in alignment with the 2014 AARC Respiratory Therapist Human Resource Survey, which reported that among the RCPs surveyed, the majority of respiratory care professionals were satisfied with their jobs.[1] In our study group, life satisfaction was not associated with salary or total number of credentials. The lack of significant association between salary and life satisfaction was unexpected. Salary has been reported as a source of job dissatisfaction among RCPs in past studies,[15, 16] and in the 2014 AARC Respiratory Therapist Human Resource Survey, salary was the most frequently mentioned cause of job dissatisfaction.[1]

In other research concerning income and life satisfaction, persons with higher incomes have been shown to experience higher levels of well-being and life satisfaction than persons with low income, a pattern that holds across different cultures. Satisfaction with one's standard of living is a strong predictor of well-being, as is comparison of salary level with one's social group.[23]

Although correlations have been found to exist between income and life satisfaction between individuals, the associations are less clear when within-person associations are examined.[24] Within person designs examine the changes in life satisfaction of an individual as their income changes over time. Such studies are difficult to undertake as they are generally longitudinal in design and compared to the positive associations generated in between-persons designs, have tended to produce mixed results. In an early 10-year longitudinal study of a probability sample of nearly 5,000 U.S. adults, similar levels of life satisfaction were found between persons whose incomes increased and those whose income decreased.[25] In two recent European studies, within person income change was positively, though weakly, associated with affective and cognitive well-being in one study, while the second study reported little change in life satisfaction as respondents' income increased.[26,27]

Life phases may also be a predictor of the effect of income on life satisfaction. Cheung and Lucas found the effects of income on life satisfaction, when compared across the lifespan, to be strongest at mid-life.[24] They suggested that the demands of life are greatest during mid-life as a result of the need to balance the demands of career, marriage, and family, thus the effects of income on life satisfaction and well-being will be stronger. The argument is persuasive. In our sample, the majority of respondents were young (i.e., less than 30), childless, and unmarried with roughly one year of experience in respiratory care, whereas the average experience level of therapists completing the 2014 AARC Respiratory Therapist Human Resource Survey was 17 years with an average age of 45. It would be interesting to learn when respiratory therapists' views concerning compensation levels in the field begin to affect job satisfaction. It is possible that salary is not a concern for this cohort at this time but may become more important as they mature into the practice of respiratory care and as social groups and family demands change.

Theme analysis of the qualitative data showed that this study group found patient care, supportive co-workers, and educational opportunities to be key satisfiers. These findings may be explained, in part, by the age of the respondents. All members of the study group would qualify as members of the millennial age group, also known as Generation Y, a generational group that is generally considered to include persons born between 1980 and 1999. Understanding this group of workers is important, as they currently make up

about 20% of the health care workforce and they are believed to comprise as much as 48% of the total workforce.[28,29] Millennials have been described as being team-oriented, determined, technologically adept, and possess a desire to learn. Moreover, this generational group is characterized as having a reward orientation that is geared towards performing worthwhile and meaningful work, not salary.[28,29] Such qualities, if found in millennial therapists, would explain the increased value of patient care activities, satisfaction with supportive co-workers, and enjoyment of the educational opportunities afforded by a career in respiratory care that we found in our study group. The totality of these qualitative findings suggests patient care, co-workers, and education contribute to life satisfaction among recent respiratory care graduates. The qualitative aspect of the study provided rich insight into the experiences of new graduate BSRC respiratory therapists.

Limitations

There were several limitations to this pilot study. The sample was a convenience sample of BSRC graduates of a small liberal arts university in Texas and the results cannot be generalized to all respiratory therapy graduates. A further limitation is that perceptions of life satisfaction are self-reported, thus the information is subjective and therefore may not represent the target population.

Conclusions

In this study, life satisfaction among a cohort of recent BSRC graduates was measured and compared to salary level and additional NBRC credentials. The results of data analysis showed that among this sample neither salary nor additional credentials were associated with life satisfaction scores. Theme analysis of qualitative data revealed that study subjects found that patient-care experiences, supportive co-workers, and education contributed to life and work satisfaction. Study results concerning relationships between salary and life satisfaction may have been affected by the age of the study subjects and the length of time in the profession. A longitudinal study with a larger sample could provide more insight into the relationship between respiratory therapists' salary levels and worklife satisfaction.

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So Now You Are a Teacher – Now What?

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Introduction

First-time faculty in the health sciences encounter distinct challenges during their initial years teaching students. Most teachers in the health sciences receive limited formal education on the science of teaching.[1] Education-related research finds that teacher competence and the teacher-student relationship are key factors for students' academic success.[1] Many novice faculty members struggle in isolation to acquire the needed skills to be an effective instructor. Often, it is the expert clinician that is chosen to fill a faculty position and the transition from clinician to instructor can be filled with uncertainty and insecurities. However, as the new instructor becomes acclimated to teaching, the profession can be rewarding and fulfilling. Academia has perks that other professions do not have, such as job security (with tenure), flexible hours, the changing rhythms of the school year, and the opportunity to be creative and mentor others.

As the novice teacher enters the classroom as a new work environment, the responsibility of course instruction, student management, and balancing other academic demands such as research, service, and scholarly activity will be a new experience. To ease the transition from novice to expert, a new teacher should locate a willing mentor who has the experience to guide and assist with challenges that arise. Along with locating a mentor, the novice should have a clear understanding of the expectations of the program director and school administration for the position. Asking peer faculty to reflect back on what they wished they knew about teaching when they first started can also be insightful.

Considering the journey of the new teacher, this article will address several areas of concern: course management, student management, faculty support, and responsibilities outside of the classroom. These concerns are typical of the challenge of beginning a career in education.

Course Management

Course planning and management are the instructor's most concerning issues. Being assigned a course that a novice teacher has never planned or taught will require not only a great deal of time, but significant pre-planning. Typically, courses are assigned to individuals who have the experience or expertise in the content area or familiarity with the subject. However, new faculty can be faced with teaching unfamiliar material. This offers a special challenge that can be overcome with a little research and diligence.

Once the new instructor has been assigned a course, the first step is for him or her to become familiar with the subject matter. This may require self-study and reviewing major concepts found in the course. The saying "to teach is to learn twice" is appropriate for any new teacher who is improving their knowledge of a subject to be taught. Once the material is reviewed, course content needs to be planned. Referring to previous syllabi to determine what has been
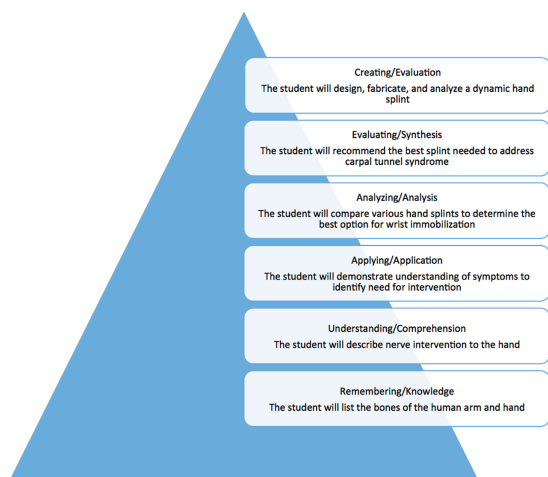
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Figure 1
Objectives and Bloom's Taxonomy

Examples of objectives

Remembering: define, identify, list, match, select, memorize, recall	Identify the role of occupational therapy with home modifications. Recall neurological disorders commonly treated by OT.
Understanding: explain, describe, paraphrase, summarize, classify, discuss	Describe various adaptive equipment that can be used in the bathroom for safety. Describe the clinical signs and symptoms of Parkinson's disease.
Applying: solve, illustrate, modify, demonstrate, interpret	Demonstrate the use of 3 equipment options for safe tub transfers. Use current evidence to support the selection of assessment tools for Parkinson's disease.
Analyzing: compare, contrast, classify, infer, categorize, differentiate	Compare and contrast the options to provide best choice for clients' needs. Compare and contrast the signs and symptoms of Parkinson's disease to other disorders of the basal ganglia.
Evaluating: order, critique, judge, decide, discriminate, recommend	Recommend the best option for modifications given the clients ability and financial resources. Determine and discuss interventions within the scope of practice for OT.
Creating: design, plan, formulate, invent, hypothesis	Design the bathroom modification to include the chosen equipment. Design a home program to address safety factors common to people with Parkinson's disease.

Bloom's Taxonomy and helpful terms for writing objectives

Bloom's Level	Questions
Remembering/Knowledge: facts, terms, basic concepts	Who, what, why, which, choose, find, how, define, label, match, list, recall
Understanding/ Comprehension: understanding facts by <<INCOMPLETE – MISSING WORDS>>	Explain, illustrate, outline, compare, relate, rephrase, summarize
Applying/Application: solve problem by applying knowledge	Solve, illustrate, modify, demonstrate, utilize, choose, construct, develop.
Analyzing/Analysis: breaking down information into parts	Compare, contrast, categorize, classify, dissect, examine, inspect, infer, differentiate, distinguish
Creating: design, plan , formulate, invent, hypothesis	Order, critique, judge, decide, discriminate, recommend, modify, change, predict, discuss, elaborate
Creating/Evaluation: present and defend opinion based on criteria	Defend, design, plan, formulate, invent, hypothesize, deduct, influence, conclude, determine, evaluate, justify

taught in the past can be helpful as well reviewing the course textbook and its table of contents. Once the course content is chosen, it is typically divided up by the number of class meetings. At this point, the instructor should define exactly what the students need to know and understand for each class session. Often this information is displayed as course objectives. Course objectives are statements of what is to be learned in measurable terms. The course objectives will then guide the planning of lectures, the teaching strategy, and how the material will be evaluated. Setting course objectives establishes a map for the instructor and students to follow. These objectives clearly state what is to be learned and tested in the course. Objectives should be written in a manner in which achievement can be measured and identify the appropriate level of difficulty. Using a taxonomy such as Bloom's Taxonomy in developing objectives is recommended to adequately cover course content. Examples of items written at the various levels of Bloom's Taxonomy are shown in Figure 1.

Once the course content and objectives are determined, a syllabus can be created. A well-designed syllabus is an essential tool in course management. It will provide the student with essential course information such as student expectations, institution/academic policies, learning objectives, and course content. Establishing

Figure 2
Higher education course syllabus components

Syllabus – communicates who, what, where, when, and how of the course.
The format of syllabus content may change but the following components are to be included:

1. Course name, course number, and semester
2. Course location (*room*) and time (*days & times*)
3. Professor (*instructor*) name, office hours, office location, contact information (phone, email)
4. Textbooks, journal articles, and other required supplies. and where to obtain/purchase posted to Moodle or Blackboard, etc.
5. Course description – the basic content and overreaching objective
6. Course relationship to program or discipline
7. Course objectives – (3-8) written in a manner that reinforces student responsibility for learning: *By the end of the course the student will…*
   a. Some disciplines may include educational standards required by their accreditation body in addition to the course objectives.
8. Student responsibilities – expectations related to policies, attendance, participation, professional behaviors. It may be helpful to provide examples of what you expect as professional behavior or in-class behavior.
   a. *Student manuals – these typically address areas such as academic integrity, accommodations for students with disability, attendance, dress guidelines, policy for grade appeal. The syllabus can refer to specific policies in the manual rather than restating them.*
9. Assignments and percent of overall grade
   a. *May include grading scale for clarity*
10. Detailed schedule – weekly schedule (break down into specific class sessions *if multiple classes per week*). Many courses include a caveat of potential adjustments to schedule.
11. Schedule includes topic for the class, assigned readings, and learning activities (sample below).
    a. *Learning activities: group work, presentation, guest speaker, field trip*

Week	Date	Topic	Reading	Instructor	Assignment due

It is helpful to review the syllabus during the first class to prevent misunderstandings and to provide examples of your expectations.

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course policies is a key step in classroom management. Policies pertaining to academic integrity, grading, testing, attendance, and other expectations will help prevent problems or misunderstandings. A syllabus serves as a contract between the instructor and student. If a student chooses to appeal a grade or has an issue with any aspect of the course, the syllabus will be the document to address these types of issues. Figure 2 contains common components of a syllabus for higher education.

Issuing the syllabus prior to the first day of class provides students with an overview of the course and content. A hard copy or an electronic copy posted on an online learning management system such as Blackboard or Moodle will allow students easy access to the document. In addition, going over the entire syllabus on the first day of class assures that students are informed and will view the syllabus as a working tool for the course. Another key element of the syllabus is the scheduling of assignments and exams. Reading assignments and other related information should also be included in the course schedule (which is typically given in a weekly format). It is the experience of the authors that some students will not read the document unless some policy is in place requiring them to read it. Often students

must acknowledge they have read the syllabus by signing a form stating such to ensure they have read the document.

A teacher's syllabi will evolve in time as he or she becomes more experienced with classroom management. Referring to the syllabus weekly provides students with an overview of course progression, and identifying objectives that have been covered provides the students a sense that the instructor is organized and has prioritized learning outcomes. The review can provide additional explicit teaching of objectives and expectations to the students.

Allied health programs, such as respiratory therapy or occupational therapy, have curricula that require students to move through courses in a sequential manner. Faculty should not work in isolation and new instructors should be aware of how their course content fits into the curriculum and where redundancy in content may occur. Sharing of syllabi within the department is critical to assure essential program content is presented and built on.

Student assessment or evaluation can be another challenge for the new instructor. One evaluation method is the administration of an examination. Constructing an examination to accurately measure student learning can be one of the most daunting tasks a teacher undertakes. Studies

show that instructor written test items often contain flaws and item writers need to adhere to common guidelines on item construction.[2] A general approach to writing test items includes focusing on meaningful content that has been taught while avoiding trivial facts and matching the test items to the course objectives associated with the content being tested. The anatomy of a typical multiple-choice test item includes the stem which states the problem to be solved and a lead-in question that prompts the student to choose the correct answer. Including the rationale or explanation of why the answer is correct along with references or evidence from the literature will assist the instructor with developing future tests.[2] In addition, maintaining a course test item bank allows items to be easily accessed, revised, and used from year to year. Many textbooks provide faculty resources including written text questions. How to construct a good test item is beyond the scope of this article, but resources for best practice in item writing are readily available.

Another major decision the instructor must make is selecting the correct teaching strategy for any given lesson. Although lecture is the predominant teaching method in most classrooms, emerging educational technology options such as flipped classroom, online formats, and virtual reality are becoming popular. New teachers should use whichever teaching methods they feel comfortable with that assure effective teaching. Once comfortable with one strategy, the teacher should continue to experience alternative strategies to have a repertoire of different approaches to teaching. Commonly, novice teachers rely on lecturing with Microsoft PowerPoint® slides. An effective lecture presentation requires skill and experience along with designing effective PowerPoint® slides. Faculty often misuse PowerPoint® by creating slides with too many words or reading the slide to students or both. Novice instructors need to become aware of some of the major learning theories and apply the right principles to lecture and PowerPoint® slide development. Resources for PowerPoint®, flipped classroom, and other approaches may be available from textbook authors or publishers.

Despite the growth of educational technology, the use of traditional lecture remains a predominant teaching strategy. Although each student will have a preference for teaching strategies, there is little research on the effectiveness of one strategy or another for student success. For example, a lecture can be a passive learning experience for the student. If students are unengaged or are not involved with active learning techniques, little learning can occur. A well-planned lecture with deliberate student engagement can be just as effective as any other method of instruction.[3] Studies show that students become engaged when the teacher is enthusiastic and uses active learning strategies.[4]

Student Management

Interacting with students as a teacher whether in a classroom, laboratory, or clinical setting can be one of the most rewarding experiences of being in education. Motivated students who are willing to learn make teaching a pleasure. The authors have had such students. However, in every class, there will be those students who have different needs, lack motivation, or an adversarial attitude toward teachers. Teachers often are in the position to be more than just student mentors but also counselors, surrogate parents, or disciplinarians. As a teacher, being a content expert is important, but having the psychosocial skill set to deal with a diverse group of students is imperative.

Educational research finds that having effective communication skills are of primary importance to be a successful teacher.[1] Skills and personal characteristics of teachers that are preferred by students include:

1. Being well acquainted with course content
2. Showing enthusiasm for teaching.
3. Speaking clearly.
4. Making eye contact with students.
5. Being accessible outside of class for questions.
6. Showing respect for students.

These traits can develop over time as teachers become more experienced and deliberate in their teaching approach.

Having well developed, clearly stated course policies – as outlined in the syllabus – is imperative in helping to manage students. Holding all students to the same standard and accountability to course policies allows the teacher to be fair and equitable. Identifying academic misconduct and addressing it as soon as it occurs is important for the new teacher to address. Disciplining or correcting student behavior can also be challenging for the teacher. However, if policies are in place and are followed, unacceptable behavior or concerning issues can be easily addressed.

Some students may enter higher education without the traditional academic skills.[5] New teachers may find that some students need to be taught how to study, take notes, locate relevant information, or methods to avoid plagiarism.[1] Students' reliance on technology and the need for instant information can also lend itself to challenges with student management.

Faculty Support and Activities Outside the Classroom

All faculty need support from program directors, school administrators, and each other. Teaching can lead to a feeling of isolation if faculty do not interact with each

other or become involved with school activities. As discussed earlier, new faculty are encouraged to find a willing mentor among the faculty and get to know faculty across their program and other faculty in the college or university. Camaraderie and shared scholarly activity are what make productive faculty, which in turn, results in better students.

Most institutions of higher education have guidelines for promotion and tenure. Faculty typically seek promotion from the rank of instructor to full professor with or without tenure. Each level of promotion has deliberate criteria in the areas of teaching, research, scholarly activity, and service. A new faculty member should meet with their program director and develop a long-term plan outlining the steps to be eligible for promotion across the ranks their institution provides. Early insight into this process will assist the faculty member to be better prepared for getting promoted.

Beyond the classroom, most colleges or universities expect faculty to participate in faculty development, become involved with their professional association, and seek out community service. These activities will often play a role in the criteria used for faculty promotion. Research and scholarly writing can also be challenges facing new faculty. Here is where a seasoned faculty member with research experience and publications can be a great help in helping the new faculty member establish a research plan.

Conclusion

In summary, a new teacher is faced with a number of responsibilities and opportunities. Responsibilities include designing courses with meaningful learning outcomes, incorporating teaching strategies and instructional technology, conducting student assessment, motivating and engaging students, and addressing behavior issues and problems that arise in the classroom. Teachers have opportunities to mentor students to be future health care providers and experience scholarly endeavors. Being career oriented in academia opens up new opportunities that include seeking a terminal degree, doing research, and publishing. Time and effort are needed to become a master teacher with notable success in teaching, research, scholarly activity, and service. With dedication and commitment, teaching can be rewarding profession.

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