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Evaluation of a Training Method to Improve Knowledge and Confidence of Prone Positioning

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Abstract

Background: Prone positioning improves oxygenation and reduces mortality in patients with severe acute respiratory distress syndrome (ARDS). It has been suggested that clinicians' knowledge and skills in placing a patient in the prone position are essential to avoid complications related to the procedure. Simulation-based education (SBE) has been effectively used for medical training. This study was designed to determine whether SBE can increase participant knowledge and confidence with placing a patient in the prone position. **Methods:** Simulation was used in this pre-test/post-test study designed to teach intensive care unit (ICU) clinicians how to perform prone positioning safely. A group of thirty-six clinicians including respiratory therapists, nurses, and physicians completed a knowledge pre-test and an affective survey designed to evaluate confidence in the use of the prone position. The educational intervention consisted of discussion, video demonstration, and practice simulation sessions. Standardized patients (SPs) with modified endotracheal tubes, vascular lines, and catheters secured with tape were used to simulate critically ill patients. Following the educational intervention, post-testing was completed using the same test and affective survey tools. Pre- and post-intervention results were compared. **Results:** Post-test knowledge scores increased by 32% ($P < 0.001$). Overall rating of participant confidence also improved significantly after the intervention. **Conclusions:** Following the educational intervention, clinician knowledge of prone positioning increased, and confidence associated with performing the procedure improved significantly. In institutions where sufficient resources are available discussion, video demonstration, and simulation may be used effectively to teach intensive care unit (ICU) clinicians how to perform prone positioning safely.

Key words: acute respiratory distress syndrome, prone position/positioning, simulation training, patient simulation, program evaluation, medical education

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Introduction

Research has identified divergent evidence of effectiveness associated with prone positioning in the management of acute respiratory distress syndrome (ARDS). Though not always associated with a reduction in patient mortality,[1-2] oxygenation may improve significantly when patients with ARDS are placed in a face-down position while receiving mechanical ventilation.[3-6] This beneficial effect on oxygenation was identified over 30 years[4-5]ago and was further confirmed in numerous randomized controlled trials.[7-8] Meta-analyses by Sud et al and Gatinoni et al identified a survival advantage associated with placing severe ARDS patients in the prone position.[7,9] In 2013, Guerin et al published results of the Proning Severe ARDS patients (PROSEVA) trial that demonstrated a survival advantage to using prone positioning in the setting of severe ARDS. The PROSEVA study included patients who had been mechanically ventilated for 12 to 24 hours and had met the criteria for severe ARDS according to the American-European Consensus Conference. Following randomization, patients were placed either in the prone group or the supine group. The investigators reported that the 28-day mortality in the prone group was 16%, whereas in the supine the group, the mortality was 32.8% ($P < 0.001$).[10]

After the PROSEVA trial was published, members of the critical care team at our institution assessed our practice of using the prone position in patients with ARDS. It was noted that the maneuver was not being implemented, primarily due to lack of clinician training and previously published evidence showing no effect on mortality. Subsequently, the literature was reviewed to find an evidence-based method to teach clinicians the maneuver. Our literature review did not identify studies that evaluated methods to teach the implementation of prone positioning and managing patents in the prone position. According to the literature, lack of training may lead to detrimental events during the turning process.[3,10] Complications such as migration of the endotracheal tube into the main stem of the bronchus and accidental extubation have been associated with inexperience with the use of prone positioning.[10] Therefore, as an effort to provide the best quality of care, we sought to develop an evidence-based strategy to teach clinicians how to safely and effectively utilize prone positioning in the intensive care unit.

Simulation-based education (SBE) has been utilized by a range of health care disciplines including emergency medicine, surgery, anesthesia, and pharmacy.[11-13] Multiple studies have demonstrated that SBE methods are effective in facilitating the development of competence with various clinical skills.[13-15] SBE methods enhance clinical and communication skills through approximate duplication of real-life environments. The specific method of integrating standardized patients (SPs) into training increases realism, which may enhance learning effectiveness.[15-16]

We designed a study to use SPs to train respiratory therapists (RTs), nurses, and physicians to implement and manage patients in the prone position. The primary purpose of this study was to evaluate the effectiveness of simulation training in improving ICU clinicians' knowledge and confidence associated with prone positioning.

Methods

Employees at a 664-bed, Midwestern medical center (Rush University Medical Center) received email invitations to participate in the study if they had a primary assignment that included the direct care of critically ill patients. Clinicians were enrolled regardless of prior training and experience with prone positioning. The study used a convenience sample of 36 self-identified ICU clinicians, including RTs, nurses, and physicians. Institutional Review Board approval was obtained and informed consents were signed by the participants prior to conducting the study.

Prior to the intervention, the participants provided demographic data (age, gender, profession) and answered questions related to their health care career, including years of experience in the profession, number of patients they had placed in the prone position, and number of patients with ARDS they had taken care of in the recent year.

The participants' baseline knowledge of the use of prone positioning was assessed using a written 17-question test (see Appendix A).

Participants were asked to rate their confidence with various aspects of prone positioning on a 5-point Likert scale (see Appendix B). Aspects of prone positioning, included initiation criteria, physiologic effects, preparation and turning procedures, duration of pronation, performing CPR, conditions that require a return to the supine position, and contraindications and complications of prone positioning. Confidence ratings on the scale ranged from (1) "not at all confident" to (5) "completely confident". Following baseline assessment, the study investigators reviewed a prone positioning protocol with the participants and discussed frequently asked questions (FAQs).

Study Procedures

The intervention consisted of discussion, video demonstration, and simulation training. The session started with a discussion about the unit's prone positioning protocol. The protocol was printed out for each participant and included reviewing the policy and procedure for placing a patient in the prone position (see Appendix C). The participants then watched an instructional video of the procedure that accom-

panied the Guerin et al study.[10] The video demonstrated the actual procedure of turning a patient to the prone position. This video served as the basis of the procedure used in this study. Additional practice sessions were provided, if needed, until proficiency was demonstrated based on a psychomotor skills competency checklist (Appendix D).

Steps were taken to simulate critical care conditions. For example, our study included various sizes of standardized patients to provide a training experience that was representative of our patient population. The simulated patients were asked to remain still and make no movements while participants were practicing. We used tape to attach a central line, radial arterial catheter, urinary catheter, electrocardiograph (ECG) leads, intravenous line (IV), and endotracheal tube to each simulated patient. Though beds designed for prone positioning are available, we opted to train utilizing manual prone positioning during this study. Previous studies have demonstrated the safe use of manual prone positioning[9-10]and there can be a significant delay in obtaining a prone positioning bed.

Study participants were instructed to avoid dislodging any of the lines or catheters during the turning process. Study participants switched roles throughout the hands-on portion of the training. Each participant practiced the role of managing the airway at the head of the bed and moving the patient to the prone position. Practice was continued until proficiency in each role was demonstrated. A checklist was used to ascertain all steps of the protocol were completed (see Appendix D). If participants did not complete a step or completed it incorrectly, they were given the opportunity for extra practice. The study investigators determined competency by ensuring all steps on the checklist were completed and participants performed the procedure without further instructions.

Researchers re-administered the knowledge test and confidence survey (Appendices A and B) after participants completed the training, Results of the knowledge test and the confidence survey were used to evaluate changes in the participants' knowledge and confidence.

Measurement Tools

All instruments and tools were developed by a committee that involved 2 critical care physicians and 2 respiratory care program faculty members. The protocol for prone positioning was created by members of the study team and was reviewed by respiratory care department and critical care unit leadership. The average clinical experience for each reviewer was over 10 years. The protocol content was primarily obtained from the PROSEVA study.

The protocol included:

1. Indications
2. Contraindications of prone positioning
3. Pre-prone preparation
4. Guidelines/instructions for the turning maneuver and post-prone care
5. Criteria for switching to supine

The FAQ document was created by the study team with input from critical care nursing representatives. FAQs addressed issues that were not covered in the protocol, for example, skin care and the prevention of pressure ulcers.

Data Analysis

The paired t test was used to determine any difference between mean values for the pre-test and post-test knowledge scores (computed as a total percentage). *P* value of $< .05$ was used to determine any statistical significance between the two means. The pre-test and post-test confidence survey results were compared using Wilcoxon signed-rank test. The total rating of all items was used to compare pre- and post-difference. The medians for each survey item were also analyzed.

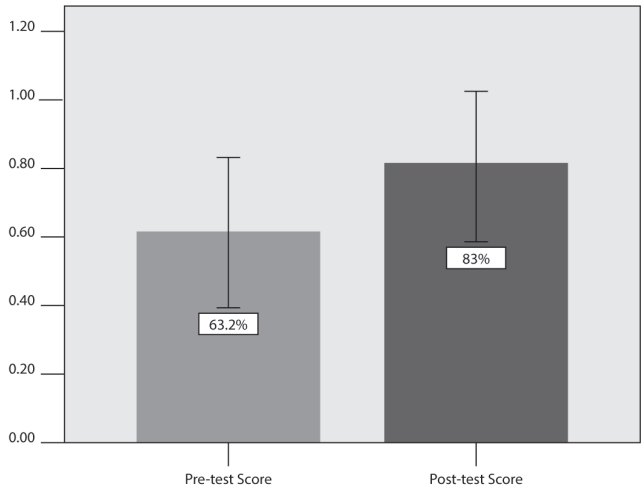
Table 1. Descriptive Statistics

Age, mean ± SD y	33.8 ± 7.3
Male	17
Female	19
Health profession	
MD	17
RT	13
Nurse	6
No. of years' experience	
0-5	18
6-10	11
11-15	3
>15 years <35	4
No. of ARDS patients	
0-50	23
51-100	7
>100	5
No. of patient participants placed on prone position	
0-5	34
5-10	2

Results

After obtaining consent, all but one participant received the intervention and completed the entire study. Participants' descriptive statistics are shown in Table 1. The majority of the participants (66.7%) had never placed a patient in the prone position. Experience with specialty beds that are designed to place patients in the prone position versus manual turning was not specified in the question related to the participants' experience with the use of the prone position. The percentage of participants who had 0-5 years of critical care experience was 50%, while the percentage of those who had 6-10 years of critical experience was 30.6%. The pre-test mean knowledge score for all participants was 63.2 (SD ± 10)%. The post-test mean knowledge score for all participants was 83.3 (SD ± 11)% (Fig. 1). After the intervention, the average score for all participants improved by 31%, a statistically significant increase ($P < .001$). Statistically significant increases in participant rated confidence were noted for all items on the post-test confidence survey (see Table 2).

Figure 1. Pre-test and post-test knowledge score means



Discussion

Discussion, video demonstration, and simulation improved ICU clinician knowledge and confidence with prone positioning. Although numerous complications have been described with using prone positioning, these complications are rare when performed by trained clinicians.[10] Effective educational intervention may mitigate these adverse events.

Our review of the literature did not identify studies that used simulation, discussion, and video demonstration to train clinicians in prone positioning. Our utilization of SPs may have contributed to the improved confidence levels because it created a training experience that closely mimicked an actual

Table 2. Pre and post self-rated confidence (n = 36)

	Pre-median (IQR)	Post-median (IQR)	*P*
1. Identifying a patient that may benefit from prone positioning.	2 (2,3.75)	3.5 (3,4)	*P <0.001*
2. Discussing the proposed mechanisms of action and physiologic changes associated with improved oxygenation when placing a patient in the prone position.	3 (2,3)	3 (3,4)	*P <0.001*
3. Stating the possible complications.	2 (2,3)	3 (3,4)	*P <0.001*
4. Identifying contraindications.	2 (2,3)	3 (3,4)	*P <0.001*
5. Preparing the patient to be placed in the prone position.	2 (1,2)	4 (3,4)	*P <0.001*
6. Placing the patient in the prone position without dislodging their lines and/or tubes.	2 (1,2)	4 (3,4)	*P <0.001*
7. Knowing how long to leave a patient in prone position.	2 (1,2)	4 (3,4)	*P <0.001*
8. Providing patient care.	1.5 (1,2)	4 (3,4)	*P <0.001*
9. Performing CPR.	1 (1,2)	3 (3,4)	*P <0.001*
10. Communicating the plan of care.	2 (2,3)	4 (3,4)	*P <0.001*

Confidence ratings on the scale ranged from (1) "not at all confident" to (5) "completely confident"

critical care situation. It is unknown whether similar increases in knowledge and confidence could be demonstrated using mannequins or other types of simulators. When compared to virtual web-based patients, SPs were not superior in improving comfort levels associated with treating patients with common stress and anxiety disorders.[16] Other studies have described the reduced realism of mannequins, which may limit learning.[17]

Previous studies have demonstrated the effectiveness of simulation training. Keleekai et al found similar results to our study when using simulation to improve registered nurses' knowledge, confidence, and skills of peripheral IV catheter insertion.[18] A study by Wenk et al demonstrated falsely high ratings of self-confidence with simulation training that were attributed to preconceived positive attitudes towards simulation.[19] Since we also used simulation as a training method, our method and the level of realism we created could have resulted in overestimation of confidence. While we did not collect feedback from participants about their evaluation of the study, it is possible that participants misjudged the training effects and overestimated their confidence. Alternatively, improved confidence could contribute to successful clinical procedures. Jacobson et al demonstrated this finding in a study that linked high self-rated confidence to successful peripheral IV catheter insertion.[20] O'Brien et al also showed that medical interns had high confidence during actual cardiac arrest situations following simulation training.[21]

Our study had several limitations. We used a small convenience sample from a single center in the Midwest. Second, the environment was not a realistic simulation of an actual ICU environment. A typical patient requiring the prone position would possibly have multiple IV stands, whereas we only had one for each simulated patient. Using high-fidelity simulators that feature complex physiologic responses could have created more realistic scenarios. The SPs did not fully simulate the critically ill ICU population because they do not suffer the same consequences if a mishap occurs. For example, the lines were only taped to the simulated patients as opposed to actual insertion in real patients. This could have contributed to additional comfort while performing as the clinicians might not have been as concerned as when turning a patient with multiple IV lines. Also, the SPs may not have been as challenging to turn as obese patients, as we had only 1 volunteer out of 4 that weighed approximately 250 lbs. Further research is needed to explore the improvement in actual clinical performance as a result of this training.

Conclusion

In institutions where these resources are available discussion, video demonstration, and simulation with standardized patients may increase ICU clinician knowledge and confidence with prone positioning.

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Appendix A

Data Collection Form

Prone Positioning Knowledge Test

Subject ID:_____ **Date:_____**

Read each question carefully, and then choose the single best answer.

1. Which of the following are indications for prone positioning?
   - I. Endotracheal intubation and mechanical ventilation for less than 36 hours
   - II. Endotracheal intubation and mechanical ventilation for greater than 36 hours
   - III. Mild to moderate acute respiratory distress syndrome (ARDS)
   - IV. Severe ARDS
     - a. I and III
     - b. II and III
     - c. I and IV
     - d. II and IV

2. Prone positioning can be performed by which method and/or device?
   - I. Manual prone positioning
   - II. RotoProne™ Therapy System bed
   - III. The Freedom Bed™
   - IV. Lateral rotation with patient assistance
     - a. I
     - b. I and II
     - c. I, II, and III
     - d. I, II, III, and IV

3. Which of the following would be considered a contraindication of prone positioning?
   - a. PaO2:FIO2 ratio of < 150 mm Hg
   - b. FIO2 of ≥ 0.60
   - c. Intracranial pressure > 30 mm Hg
   - d. PEEP of ≥ 10 cm H2O

4. Which of the following are contraindications of prone positioning?
   - I. Hemodynamic instability
   - II. Recent facial trauma or surgery
   - III. Recent tracheal surgery or sternotomy
   - IV. Pregnancy
     - a. I
     - b. I and II
     - c. I, II, and III
     - d. I, II, III, and IV

5. Which staff member(s) is/are required to be at the bedside when a patient is placed in the prone position?
   - I. Registered Nurse
   - II. Respiratory Therapist
   - III. Physician
   - IV. Physical Therapist
     - a. I
     - b. I and II
     - c. I, II, and III
     - d. I, II, III, and IV

6. Generally, how many people are required to place a patient in the prone position?
   - a. 1or 2
   - b. 3 or 4
   - c. 5 or 6
   - d. 7 or 8

7. When rolling a patient into the prone position, the direction of the rotation of the patient is determined by:
   - a. Side of patients dominate hand
   - b. Side of mouth the endotracheal tube is secured
   - c. Side of the central lines
   - d. It does not matter

8. When rolling a patient into the prone position, the patient is moved to the sagittal plane and kept there to facilitate:
   - a. Placement of defibrillation pads
   - b. Moving cardiac electrodes from chest to back
   - c. Enhanced lung perfusion
   - d. Decreased fluctuations in intracranial pressure

9. Once a patient is rotated to the full prone position, where are the upper limbs placed?
   - a. Under the face
   - b. Alongside the body
   - c. Draped off the bed
   - d. Behind the back

Appendix A (cont.)

10. Once the patient is in full prone position, the bed should be placed in:
    a. Reverse Trendelenberg position (10-20 degrees)
    b. Trendelenberg position (10-20 degrees)
    c. Reverse Fowler's (45 degrees)
    d. Recovery position

11. Once the patient is in full prone position, the head and neck of the patient should be turned alternately from left to right or right to left every ____ hour(s).
    a. 1
    b. 2
    c. 3
    d. 4

12. Once the patient is in full prone position, the patient should be prone for at least ___ consecutive hours.
    a. 4
    b. 8
    c. 12
    d. 16

13. After the patient has been in prone position for the minimum amount of time, how many hours should the patient remain in the supine position?
    a. 1-2
    b. 2-4
    c. 4-6
    d. 6-8

14. A patient in a pressure control mode of mechanical ventilation is noted to have a decrease in exhaled tidal volumes when returned to the supine position. What is the most likely cause of this finding?
    a. Increase in lung compliance
    b. Decrease in airway resistance
    c. Increase in airway resistance
    d. Failure to re-calibrate mechanical ventilator after the turn

15. You are caring for a patient in the prone position. You notice a 25% deterioration in PaO2:FIO2 ratio during the prone session. What is your next action?
    a. No action is required; this is expected.
    b. Increase the FIO2 and rotate the patient laterally.
    c. Increase the PEEP and continue prone therapy.
    d. Stop the prone session and place the patient supine.

16. Which of the following are complications that may cause an immediate interruption of prone treatment?
    I. Nonscheduled intubation
    II. Cardiac arrest
    III. Hemoptysis
    IV. PaO2:FIO2 ratio increase of 25%
    a. I and II
    b. II
    c. I, II, and III
    d. I, II, III, and IV

17. Once the patient is in full prone position, which mechanical ventilation strategy is most appropriate?
    a. ARDSNet (low tidal volume)
    b. CMV + Autoflow strategy
    c. High Frequency Oscillatory Ventilation (HFOV)
    d. Airway Pressure Release Ventilation (APRV)

Appendix B

Please provide a response for each of the situations listed below.

Background information:

1. Health Profession (Please circle): RN, RRT, MD

2. Number of years in the profession: _____

3. Age: _____

4. Gender (Please circle): Male Female

5. Estimated number of patients with ARDS t hat you have cared for: _____

6. Estimated number of patients that you have placed in the prone position: _____

Indicate how confident you feel about addressing each of the following items:

1. Identifying a patient that may benefit from prone positioning.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

2. Discussing the proposed mechanisms of action and physiologic changes associated with improved oxygenation when placing a patient in the prone position.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

3. Stating the possible complications or risks associated with prone positioning.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

4. Identifying contraindications to placing patients in the prone position.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

5. Preparing the patient to be placed in the prone position.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

6. Placing the patient in the prone position without dislodging their lines and/or tubes.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

7. Knowing how long to leave the patient in the prone position and/or stopping prone positioning.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

8. Providing patient care such as patient positioning, skin care concerns, and reducing facial edema, while the patient is in the prone position.
   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

Appendix B (cont.)

9. Performing CPR on patients that are in the prone position.

   - ☐ Not at all confident
   - ☐ Have some confidence
   - ☐ Confident
   - ☐ Very confident
   - ☐ Completely confident

10. Communicating the plan of care for an ARDS patient with the medical team (i.e., optimizing PEEP/FIO2, unconventional strategies such as prone positioning).

    (If a physician, your comfort level with communicating the plan to other physicians and/or non-physicians, i.e., nursing, respiratory therapy)

    (If a respiratory therapist, your comfort level with communicating the plan to physicians and other non-physician providers, i.e., nursing)

    (If a nurse, your comfort level with communicating the plan to physicians and other non-physician providers, i.e., respiratory therapy)

    - ☐ Not at all confident
    - ☐ Have some confidence
    - ☐ Confident
    - ☐ Very confident
    - ☐ Completely confident

Appendix C

Protocol for prone positioning

Objective

- To establish safety measures for prone positioning of mechanically ventilated patients

Policy

- Prone positioning may be used in the intensive care unit in an attempt to improve arterial oxygenation and pulmonary mechanics in patients with acute lung injury or acute respiratory distress syndrome (ARDS).
- Proning may be performed manually or with the Roto-Prone™ Therapy System bed, which may be ordered by an ICU physician.

Indications

Patients who meet the following criteria:

- Endotracheal intubation and mechanical ventilation for ARDS for less than 36 hours
- Severe ARDS defined as :

I. PaO2:FIO2 ratio of <150 mm Hg

II. FIO2 of ≥ 0.6

III. PEEP of ≥10 cm H2O of water

Contraindications

I. Increased intracranial pressure (ICP) >30 mm Hg or cerebral perfusion pressure <60 mmHg (CPP = MAP-ICP)

II. Recent tracheal surgery or sternotomy

III. Recent facial trauma or surgery

IV. Spine instability

V. Deep venous thrombosis treated for less than 2 days

VI. Recent cardiac pacemaker insertion

VII. Unstable bone fractures

VIII. Hemodynamic instability; mean arterial pressure <65 mm Hg

IX. Pregnancy

X. Chest tube with air leaks (anterior)

XI. Patient weight > 350 lbs

Procedure

REQUIRES THE FOLLOWING STAFF:

a. Registered nurses (prepare the patient)

1) Securing the lines, tubes, and drains

2) Monitoring vital signs

3) Turning of the patient

4) Positioning of the patient

NOTE: An inflatable mattress or air bed is preferred, but not required, for the procedure.

b. Respiratory therapist

1) Suctioning

2) Ventilator manipulation

3) General assistance

c. Physician (Available if problems arise)

NOTE: Other staff may be needed depending on the size of the patient.

Guidelines for the prone positioning:

1. People required: 3-4 (one person dedicated to the management of the head, endotracheal tube, and ventilator circuit).
2. The person at the head of the bed coordinates the steps of the procedure and secures the airway.
3. The other people stand on either side of the bed.
4. The decision for which direction for the rotation should give priority to the side of the central lines (central lines go upward rather than rolled on to).
5. Check that the length of the vascular lines and the ventilator circuit is appropriate in order to prevent tension during the turn.
6. Endotracheal and gastric tubes must be secured.
7. The patient is moved horizontally to the side opposite the direction of the rotation.
8. The patient is moved in the sagittal plane and kept there while the cardiac electrodes are moved to their back and a new bed sheet is set.
9. The patient is rotated to the full prone position and the upper limbs are placed alongside the body.
10. Place pillows for positioning under the patient's chest, pelvis, and lower legs.

Appendix C (cont.)

ONCE THE PATIENT IS PRONE:

- Reverse Trendelenberg: slight degrees of reverse Trendelenberg (10-20 degrees) are often well tolerated and may be useful in certain patients during prone positioning.
- Turn the head and neck of the patient alternately from left to right every 2 hours.
- Leave the patient in the prone position for at least 16 consecutive hours, then 2-4 hours in the supine position.
- Reassess the position and function of all lines and tubes.
- Reposition and recalibrate all pressure transducers.
- Reassess cardiac rhythm and hemodynamic status.
- Check for significant changes in exhaled tidal volumes (pressure control modes) or increases in airway pressures (volume control modes). When these changes are present, troubleshoot possible causes such as ETT malposition or kinking, need for suctioning, chest tube malfunctions, etc. If no obvious mechanical problem is found, pressure or tidal volume may need to be adjusted according to ARDSNet protocol.
- Assess the need for sedation/analgesia.
- Reconnect nasogastric/feeding tubes.

The criteria for stopping prone treatment are any of the following:

1. Improvement in oxygenation defined as: PaO2:FIO2 ratio of ≥150 mm Hg with PEEP of ≤10 cm H2O and FIO2 of ≤0.6; in the prone group, these criteria have to be met in the supine position at least 4 hours after the end of the last prone session.
2. PaO2/FIO2 ratio deterioration by more than 20% during prone session
3. Complications causing interruption of prone treatment include:
   - Inadvertent extubation
   - Main-stem bronchus intubation
   - Endotracheal tube obstruction
   - Hemoptysis needing evaluation/procedures
   - Oxygen saturation <85% on pulse oximetry or a PaO2< 55 mm Hg for more than 5 minutes when the FIO2 is 1.0
   - Cardiac arrest
   - Heart rate <30 beats per minute for more than 1 minute
   - Systolic blood pressure < 60 mm Hg for more than 5 minutes despite vasoactive agent support
   - Any other life-threatening reason for which the clinician decides to stop the treatment.

Adjustments to mechanical ventilation: Follow ARDS-Net protocol.

Appendix D
Prone positioning checklist

	Turning
☐	People required: 3-4 (one person dedicated to the management of the head, endotracheal tube, and ventilator circuit).
☐	The person at the head of the bed coordinates the steps of the procedure.
☐	The other people stand on either side of the bed.
☐	The decision for which direction for the rotation gives priority to the side of the central lines (central lines go upward rather than rolled on to).
☐	Check that the vascular lines and ventilator circuit length are appropriate.
☐	Endotracheal and gastric tubes are secured.
☐	The patient is moved horizontally to the side opposite the direction of the rotation.
☐	The patient is moved in the sagittal plane and kept there while the cardiac electrodes are moved to their back and a new bed sheet is set.
☐	The patient is rotated to the full prone position and the upper limbs are placed alongside the body.
☐	Place pillows for positioning under the patient's chest, pelvis, and lower legs.
	Immediately after the turn
☐	Turn the head and neck of the patient alternately from left to right every 2 hours.
☐	Reverse Trendelenberg: slight degrees of reverse Trendelenberg (10 - 20 degrees) are often well tolerated and may be useful in certain patients during prone positioning.
☐	Leave the patient in prone position up to 16 hours, then 2-4 hours in the supine position.
☐	Reassess the security and patency of all tubes/lines.
☐	ETT distance Cuff leak Pressure points around ETT and securement device Check for any kinks in tubing Breath sounds, ventilator parameters Lifting team to assist RRT to establish airway patency. The head and shoulders may need to be lifted and supported in order for ventilator tubing to hang freely.
☐	Reassess SpO2, blood pressure, cardiac rhythm, and breath sounds.
☐	Reassess ETT/Trach leak. (May adjust cuff volume, head position, and delivered Vt to assure adequate ventilation.)
☐	Uncap/reattach capped off lines/NGT/NJT.

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Respiratory Therapy Department Directors' Preferences Regarding the Educational Background of New Graduate Staff Respiratory Therapists

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Abstract

Introduction: Health care is constantly changing and evolving, and the practice of respiratory therapy (RT) is developing along with it. Changes in RT practice and education are reflected in the "2015 and Beyond" conferences, the revised AARC position statement on RT education, and the revision to CoARC Standard 1.01. The purpose of this study was to describe RT department directors' current and future preferences regarding the educational preparation of new graduate staff RTs. **Methods:** An online survey was developed. Questions addressed current and future preferences for the educational background of new graduate staff RTs and reasons for these preferences. Members of the Vizient RT network were invited to participate. The study was approved as exempt by the IRB. **Results:** An email invitation was sent to 288 members and 70 completed the survey. Seventy percent currently preferred to hire new graduates with a baccalaureate degree in respiratory therapy. Fifty-one percent of participants believed graduates with their preferred educational background provide value to the department and 44% – 48% indicated these graduates communicate effectively, work effectively on the health care team, provide evidence-based quality patient care, and are prepared for professional advancement. Over 80% of participants believed they will prefer to hire therapists with baccalaureate degrees in the next 5 years. **Conclusion:** A large majority of participants prefer to hire new graduates with baccalaureate degrees, which they believe provides value to their department. It appears that there is a desire for more baccalaureate degree-prepared RTs entering the workforce to better match the expanding roles and responsibilities of RTs both now and in the future.
Key Words: respiratory therapy education

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Introduction

The American Association for Respiratory Care (AARC) convened three "2015 and Beyond" conferences from 2008 - 2010 aimed at documenting the advancing roles and responsibilities of Respiratory Therapists (RTs) along with the education, training, and competencies necessary to realize advances in the profession.[1-3] The second publication from these conferences detailed the competencies needed by new graduate RTs entering the workforce in order to meet the demands of the newly identified roles and responsibilities. The authors identified 7 main competency areas that new graduate RTs must possess in order to provide safe and effective care to patients. These included diagnostics, disease management, evidence-based medicine and respiratory care protocols, patient assessment, leadership, emergency and critical care, and therapeutics.[2]

The third and final "2015 and Beyond" conference was focused on developing plans to address necessary changes to the professional education process that would allow graduates to achieve the needed competencies, skills, attitudes, and attributes previously identified. Recommendations included promoting the baccalaureate degree as the minimum education level for entry to practice.[3] Data presented during the final conference included results from a survey of respiratory therapy education program directors regarding the ability of the current respiratory therapy education system to meet the future competency needs. Participants were asked to identify which of the specific competencies within the 7 main competency areas were included in their curriculum. Results indicated that a larger percentage of baccalaureate degree programs included competencies related to evidence-based medicine, respiratory care protocols, leadership, disease management, and emergency care as compared to associate degree programs. Participants were also asked their beliefs about the necessary educational level to practice as an RT. While there was little agreement on the educational level required to enter practice, approximately 71% of participants felt the baccalaureate degree would be necessary for career advancement in respiratory therapy.[4]

Respiratory therapy department managers and directors were also asked to provide opinions via survey on the importance of the competencies identified in the second conference as reference material for the third conference.[5] Respiratory therapy department managers and directors were asked to provide their opinions on the academic preparation of future RTs. The results were similar to that of the previously mentioned survey of educators in that there was no consensus on a preference for either an associate degree or a baccalaureate degree for new graduates, but 70.1% of participants believed a baccalaureate or graduate degree was important to progress the practice of respiratory therapy.

Following the "2015 and Beyond" conferences, the AARC published a revised position statement on respiratory therapy education, specifically stating that entry-to-practice education for RTs should be at the baccalaureate or graduate level[6]. In addition, it called for all newly accredited educational programs to award a minimum of a baccalaureate degree. Subsequently, the Commission on Accreditation for Respiratory Care (CoARC) revised Standard 1.01 to require any new respiratory therapy education program seeking accreditation to award a minimum of a baccalaureate degree (https://www.coarc.com/News-and-Events/News/CoARC-Board-Final-Approved-Revision-to-Standard-1.aspx,Accessed August 13, 2018).

Since the conclusions from the third "2015 and Beyond" conference, the revised AARC position statement on respiratory therapy education, and the revision to CoARC Standard 1.01, there are no reports of respiratory therapy department managers' and directors' views regarding this change in the educational background of staff RTs. The purpose of this study was to describe respiratory department managers' and directors' preferences, and reasons for these preferences regarding the educational preparation and background of new graduate staff respiratory therapists, as well as their current and anticipated hiring practices.

Methods

Study Sample

Standard online survey research methods were utilized to conduct this study. The study protocol was approved as exempt by The Ohio State University Institutional Review Board. A sample of convenience of 288 respiratory therapy department leaders throughout the United States were invited to participate. The participants were chosen because of their hospital's membership in Vizient, the nation's largest member-owned health care services company. Hospitals who are members of Vizient collaborate to improve quality and business practices to help deliver exceptional, cost-effective care. The respiratory therapy network within Vizient has representative membership from 40 states and the District of Columbia, and includes a variety of hospital types, including academic medical centers, children's hospitals, and community hospitals. The respiratory therapy network members frequently share data and resources to establish best practices. Members include respiratory therapy department managers, directors, supervisors, and others in self-defined leadership roles. All Vizient respiratory therapy network members received an invitation to participate in our study.

Data Collection

A recruitment email was sent to the potential participants. The recruitment email included a link directing the participants to the descriptive on-line survey, described efforts to ensure confidentiality and security of responses, and offered to share results with those that chose to participate. Two reminder recruitment emails were sent prior to the survey deadline.

Questionnaire Development

The electronic survey was developed by the researchers and pilot tested with several respiratory therapy department leaders prior to distribution to determine the time to complete, clarity, and ease of use. A review of the literature informed development of the questions used in the survey instrument. The survey included 19 questions that were designed to assess participant and facility demographics; current hiring preferences and practices and the reasons for these preferences; and beliefs about future hiring practices and reasons for these beliefs. A screening question was utilized to ensure participants were responsible for hiring respiratory therapy staff in their respective department.

Data Analysis

Data were downloaded to a statistical software program (SPSS 24.0, SPSS, Chicago, Illinois). Percentages and frequency distributions were calculated to determine current and future hiring preferences and beliefs. Chi-square analysis was completed to determine if differences existed in hiring preferences based on facility demographics, with an a priori alpha level of 0.05. Additionally, the researchers analyzed responses to open-ended questions for common themes.

Results

Participant Demographics

Two hundred and eighty-eight recruitment emails were sent to the sample of convenience. Forty-three emails were returned for various reasons. Seventy-five participants responded to the survey and five participants were screened out of completing the survey because they were not responsible for hiring staff RTs for their department. Seventy participants remained and completed all questions on the instrument, resulting in a 28.6% response rate.

Eighty-one percent of participants indicated their role in the respiratory therapy department was either director or manager. When asked specifically about their respiratory therapy education, 39 participants (52%) stated they had earned an associate degree, and 30 participants (40%) stated they had earned a bachelor's degree. However, when asked about the highest degree they had earned, 30 (40%) stated a bachelor's degree and 36 (48%) stated a master's degree. Participant and facility demographics are summarized in Table 1.

Table 1. Participant and Facility Demographics

Demographic Information	Value
Participants contacted (*n*)	288
Returned/undeliverable/unavailable messages (*n*)	43
Participants initiated/completed survey (*n*)	75/70
States represented (*n*)	25 (plus D.C.)
Respiratory Therapy Department role (*n*, %) (*n* = 74)	
Director	32 (42.7%)
Manager	28 (37.3%)
Educator	6 (8.0%)
Coordinator	4 (5.3%)
Lead Therapist	2 (2.7%)
Staff Therapist	1 (1.3%)
RT education (*n*, %) (*n* = 74)	
Associate Degree	39 (52.0%)
Baccalaureate Degree	30 (40.0%)
Master's Degree	5 (6.7%)
Highest degree earned (*n*, %) (*n* = 74)	
Associate's Associate Degree	5 (6.7%)
Baccalaureate Degree	30 (40.0%)
Master's Degree	36 (48.0%)
Doctoral Degree	3 (4.0%)
Respiratory Therapy Department size (Staff FTEs) (*n*=73)	
Mean (SD)	83.85 (49.08)
Range	2 - 225
Hospital size (number of beds) (*n* = 75)	
Mean (SD)	590.21 (319.12)
Range	0 - 1400
Location of Facility (*n*, %) (*n* = 75)	
Urban	58 (77.3%)
Suburban	9 (12%)
Rural	8 (10.7%)
Type of Facility (*n*, %) (*n* = 75)	
Teaching	63 (84%)
Community	7 (9.3%)
Children's	4 (5.3%)
LTAC	1 (1.3%)

Table 2. Current New Graduate Staff RT Education Preference by Degree Type

Hiring Preference	% of responses (n = 68)
Associate	7.4
Bachelor's	70.6
Master's	0
No preference	22.1

Table 3. Reasons for New Graduate Staff RT Education Hiring Preference

Reason for Hiring Preference	% of responses (n = 70)
Provides value to the department	51.4
Prepared to work effectively with he health care team	48.6
Prepared for professional advancement	47.1
Educational degree is appropriate to meet department needs	45.7
Provides graduates with skills necessary to provide evidence-based respiratory care	45.7
Communicate effectively	44.3
Provides graduates with skills necessary to provide quality patient care	44.3
Provides graduates with skills necessary to provide safe patient care	38.6
Graduates are available in my area	27.1
Orientation/on-boarding is timely and cost-effective	18.6
No preference	17.1

(Participants were able to select more than one reason)

Educational Preferences

Participants were asked what respiratory therapy education background they prefer when hiring new graduate staff RTs. Forty-eight (70.6%) of the participants indicated the bachelor's degree as the preferred educational background, five (7.4%) indicated associate degree, 0% indicated master's degree, and fifteen (22.1%) indicated no preference. As a follow-up question, participants were asked to indicate the reasons for their current hiring preferences when hiring new graduate staff RTs. Reasons selected by more than 40% of respondents include providing value to the department, being prepared to work effectively with the health care team, prepared for professional advancement, appropriate to meet department needs, able to provide evidence-based respiratory care, ability to communicate effectively, and provide quality patient care. Reasons selected by fewer than 40% of respondents include availability of graduates in the area and timely/cost-effective orientation. Twelve (17.1%) participants indicated no preference. See Table 2 and Table 3 for additional information.

Table 4. Degree Advancement Incentives Offered

Degree Advancement Incentives Offered	% of responses (n = 28)
Tuition reimbursement/assistance	35.7
Eligibility for specific roles or job descriptions	21.4
Clinical ladder opportunities	18.6
Pay differential	18.6
Difference in patient care assignment	2.9

(Participants were able to select more than one incentive)

Current Hiring Practices

Approximately 65.2% of the staff RTs employed by the participants' departments had an associate degree in respiratory therapy, 30.1% had a baccalaureate degree, and 4.2% had a master's degree. Only 5% of participants required new graduate RTs with an associate degree to complete a baccalaureate degree within a specific time frame following being hired. In addition, 40% of respondents indicated that the represented facilities offered incentives for degree advancement for RT staff therapists. The most common incentive was tuition reimbursement or assistance. Other responses are included in Table 4.

Hiring Intentions in Five Years

When asked about future hiring intentions, 54 participants (80.6%) indicated they believe they will prefer to hire new graduates with a baccalaureate degree in the next five years, compared to 13 (19.4%) participants who specified they expect to prefer to hire new graduates with an associate degree (Table 5). As a follow-up, participants were asked to indicate why this will be their preferred degree for new graduate RTs in the future. The majority of participants indicated that changes in expectations in clinical practice (52.9%) and changes in the health care environment (50%) would contribute to their degree preference. Many participants also contributed other reasons for their future hiring preference, including departmental or AARC standards, changes in therapist compensation, and availability of graduates of their preference in the area.

Table 5. Hiring Intentions for New Graduate Staff RTs in the Next Five Years

Projected Hiring Preference in 5 Years	% of responses (n = 67)
Associate	19.4
Bachelor's	80.6
Master's	0

Differences Based on Facility Demographics

Chi-square analysis revealed no statistically significant differences in hiring preferences based on facility demographics, specifically respiratory therapy department size (staff FTEs), hospital size (number of beds), and location or type of facility.

Discussion

There is no doubt health care continues to change and evolve, with emphasis being placed on quality health care services, patient safety, and cost-effective care. The practice of respiratory therapy is evolving as well, and knowledge of the preferences for educational preparation of new graduates by those who are responsible for hiring RTs can help shape future directions. Results of this study indicate that the large majority of participants prefer baccalaureate degree preparation for new graduate staff RT hires both now and in the near future.

The findings of this study are closely related to those of others. Becker[7] et al conducted a similar study in 2003 and found that while only 36% of respondents preferred a baccalaureate degree when hiring new graduates, 70% of respondents preferred a baccalaureate degree when hiring experienced RTs. Barnes et al[4] found that approximately 71% of educators felt the baccalaureate degree would be necessary to progress in respiratory therapy practice and Kacmarek et al[5] found that 70.1% of respiratory therapy department managers and directors had the same belief. Based on the results of these studies, it appears there may be a shift in preference toward the baccalaureate degree at entry-to-practice. This could be related to the expanding competencies for the RT as reflected in the second "2015 and Beyond" conference and to the expanding expectations for practice required by respiratory therapydepartments.[2,3] These findings also support the conclusion from the third "2015 and Beyond" conference stating that the baccalaureate degree should be the entry-to-practice degree in the future.[3]

The most commonly cited reasons for preferring the baccalaureate degree for new graduate RTs were related to providing value to the respiratory therapy department, teamwork, professional advancement, and effective communication skills. These reflect priorities that will likely contribute to moving the practice of respiratory therapy forward in their facility and in health care in general.[3] Few participants specified that their preferred educational background resulted in a shorter or more cost-effective onboarding or orientation, indicating that their preference is less frequently based on economic factors alone. It is also important to note their preferences for educational background did not always match the availability of graduates in their area. This indicates that there may be a need to expand the number of baccalaureate degree programs to meet the current and future employment needs of respiratory therapy departments.

Given that a majority of participants preferred to hire new graduates with a baccalaureate degree, it is somewhat surprising that so few required those with an associate degree to advance their education. However, many participants indicated that incentives are available for degree advancement. The most frequently reported incentive was tuition reimbursement or assistance, which was usually an incentive available to all qualified employees of the facility. Encouraging staff RTs to take advantage of this incentive can help mediate the costs associated with continuing their education. Departmental incentives were less common, but could be developed by managers and directors to demonstrate the value they place on degree advancement. A large majority responded with a preference to hire baccalaureate-prepared new graduate therapists in the next 5 years. It appears that the participants anticipated that the health care environment will continue to change and that expectations for RTs will continue to advance necessitating entry-to-practice education at the baccalaureate level. This could be related to the findings by Barnes et al[4] indicating that baccalaureate degree programs are more likely to include competencies related to evidence-based medicine and respiratory care protocols, leadership, and disease management preparing respiratory therapy graduates for an evolving practice. This finding also supports the AARC position statement on respiratory therapy education advocating establishment of the baccalaureate degree as the entry-to-practice degree[6] and supports expanding the number of baccalaureate degree program offerings.

Limitations

This study was subject to several limitations. The sample of respiratory therapy department directors was one of convenience, using the Vizient network group. In addition, the results and conclusions are subject to non-response bias since respondents may differ significantly from non-respondents, and are limited by a moderate (28.6%) response rate. All participant and facility demographics were self-reported, which may be subject to inaccuracies due to a lack of direct knowledge. Several questions had missing data points because study participants were not required to respond to every survey item. Participants were also not required to rank their reasons for their preferences, which would have been beneficial in the interpretation of the findings. Finally, participants were provided with the opportunity to receive the aggregate results as an incentive to participate, which may have impacted recruitment and participation.

Conclusions

A large majority of participants reported a preference to hire new graduates with a baccalaureate degree, because they believe these graduates provide value to their department and possess valuable skills that include teamwork, communication, ability to advance, and providing evidence-based respiratory care. The preference for hiring new graduate RTs with a baccalaureate degree is expected to continue in the future, largely due to the continuing evolution of respiratory care practice and to continuing changes in the health care environment. These conclusions support several other recommendations, specifically the "2015 and Beyond" conferences[1-3] and the AARC's position statement on respiratory therapy education[6] advocating for establishing the baccalaureate degree as the entry-to-practice degree for respiratory therapy and increasing the number of baccalaureate degree educational programs to meet future employment needs.

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New Faculty Mentoring in Respiratory Care Programs

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Abstract

Introduction: The purpose of this study was to identify mentoring practices of new faculty members in Commission on Accreditation for Respiratory Care (CoARC) accredited respiratory care programs in the U.S. and to identify the perceptions of program directors regarding the observed impact of program mentoring practices. **Methods:** The method for the study was quantitative non-experimental survey research. The survey instrument was an electronic questionnaire titled Respiratory Care Faculty (RCF) Mentoring Survey. The 25-item survey was divided into three dimensions: mentoring practices, mentor/mentee relationship, and perceptions of the impact of new faculty mentoring. Of the 410 possible program director participants, 126 (30%) responded to the survey. Data from the survey were used to analyze three primary research questions on four independent variables (12 total research questions). **Results:** Testing of the null hypotheses associated with the 12 research questions resulted in three significant findings and 9 findings that were not significant. Significant findings included female program directors reported greater opportunities for mentoring within their programs and greater levels of expectation concerning mentoring as compared to male program directors. Program directors from associate degree programs also reported a higher level of expectation concerning mentoring than program directors in bachelor's degree programs. There was overwhelming agreement regarding the potential impact and benefit of mentoring new faculty to improve job performance, reduce turnover, improve job satisfaction, and organizational commitment. **Conclusion:** The results of this study may benefit administrators and educators in respiratory care in efforts to support new faculty who possibly feel underprepared or overwhelmed in the new role. Because other allied health fields of study are similar in nature to respiratory care, the findings of the study could have potential implications across a range of health-related professions.
Key words: mentoring, higher education faculty, respiratory care

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Introduction

Higher education is not a traditional career path for most respiratory therapists (RTs).[1] During the transition from clinician to educator, a new identity has to be developed. The individual is used to being an expert in the clinical role and may now be considered a novice in the academy. This experience can be unsettling and present a new challenge to the novice educator, whereas assisting faculty to acclimate to academia may reduce novice faculty turnover.

In 2009, the American Association for Respiratory Care (AARC) reported 75% of faculty from Commission on Accreditation for Respiratory Care (CoARC) accredited programs will retire by the year 2020.[2] Mentoring can be used as a strategy to ensure faculty development, retention, and success. In CoARC's "Accreditation Standards for Entry into Respiratory Care Professional Practice," the agency affirms that the postsecondary academic institution where the respiratory care program is housed is responsible for the continued professional growth of program faculty. As evidence of compliance, sponsoring institutions' policies should demonstrate opportunity and support for professional development activities.[3] Retaining faculty would be essential with the potential loss of many valued members of the professoriate.

The Bureau of Labor Statistics reported a 12% expected growth for respiratory therapists from 2014 to 2024 in the "Occupational Outlook Handbook."[4] With the anticipated growth in the profession, respiratory care educators will be charged with meeting the increase in student demand. The "AARC Respiratory Therapist Human Resource Survey" from 2014 noted a 19% growth in the number of respiratory therapists between 2009 and 2014.[5] With looming retirements of seasoned faculty and the increased demand for RTs, there is a continuing need for new respiratory therapy faculty members across the country. Helping new faculty meet the challenges of teaching becomes a high priority for program administration. Several studies have reported new faculty members can feel overwhelmed in their new role.[1,6] Program directors have reported difficulty in recruiting new faculty to respiratory care programs because often respiratory therapists lack teaching experience and the necessary academic credentials.[7] Limitations in available faculty subsequently may limit the number of respiratory care students that can be accepted into programs. Practitioners who enter the academy often have the potential to return to clinical practice if the transition has not been positive. Greater faculty retention and job satisfaction could be achieved through the structured support and guidance afforded by peer mentoring. Mentoring has the ability to impact job satisfaction, self-efficacy, faculty turnover, job performance, and organizational commitment.[6,21,23,25,26] The first year of teaching, even with expert level content knowledge and experience within a field of respiratory therapy, can be challenging. Prior clinical expertise may be the impetus for accepting a position in higher education; however, it may not prepare the new faculty member for teaching and research endeavors.

Mentors, whether formally assigned or informally developed, help protégés achieve self-defined goals and an appropriate work-life balance.[8] Mentors should possess traits such as being accessible, approachable, and encouraging.[9] With the feelings of loneliness, isolation, and stress associated with transitioning into a new role, mentoring can help facilitate new faculty socialization by helping to connect with colleagues. From a leadership perspective, mentoring can create a culture of investing in people and their continued success within the program.[10] This investment can foster collegiality and respect among and between the communities of scholars. New faculty often do not know what is expected of them. It is the responsibility of both the institution and the faculty member themselves to ensure the transition into new roles is a smooth one. The process of socialization pertains to both new members of an organization and current members as they take on new roles for which they are unfamiliar. Socialization involves making sense of a new role through an examination of one's own prior experiences and through the current context and culture of an organization. In order for faculty to experience professional growth and career development, they must know what is needed to survive and excel in the organization.

The experiences in the first year of teaching have been reported to be a determining factor in faculty retention or exodus.[11,17] The use of mentoring can be a source of support and guidance for novice educators along with promoting collegiality among colleagues and a fulfilling career. While leaders in the field of respiratory care recognize the importance of mentoring, a broad-scale study regarding program-mentoring practices could not be identified in a search of the literature. The purpose of this quantitative, non-experimental survey research study was to identify current mentoring practices of new faculty members in CoARC accredited respiratory care programs in the U.S. Furthermore, the researcher sought to identify the perceptions of program directors regarding the observed impact of mentoring on program faculty.

Methods

The methods for the study were quantitative non-experimental survey research. To determine the mentoring practices of CoARC accredited respiratory care programs and to identify perceptions of program directors regarding the potential impact of mentoring, the following questions guided this study:

1. Is there a significant difference in the mean scores for Dimension 1 (Mentoring Practices) on the Respiratory Care Faculty (RCF) Mentoring Survey (see Appendix A) among CoARC accredited respiratory care programs by demographic region (Northeast, Midwest, South, or West), type of degree awarded (associate degree, bachelor's degree, or master's degree), program director's academic rank (i.e., instructor, assistant professor, associate professor, professor, other), or gender of the program director?
2. Is there a significant difference in the mean scores for Dimension 2 (Mentor/Mentee Relationship) on the RCF Mentoring Survey among CoARC accredited respiratory care programs by demographic region (Northeast, Midwest, South, or West), type of degree awarded (associate degree, bachelor's degree, or master's degree), program director's academic rank, or gender of the program director?
3. Is there a significant difference in the mean scores for Dimension 3 (Perceptions of Mentoring Impact) on the RCF Mentoring Survey among CoARC accredited respiratory care programs by demographic region (Northeast, Midwest, South, or West), type of degree awarded (associate degree, bachelor's degree, or master's degree), program director's academic rank (instructor, assistant professor, associate professor, professor, other), or gender of the program director?

Instrumentation

Program directors from each of the accredited programs listed on the CoARC database received the electronic Respiratory Care Faculty Mentoring Survey (Appendix A). The questions included in the survey were developed from two sources. The primary researcher requested and received permission to use portions of a previous instrument (The Health Sciences Faculty Mentoring Survey).[12] The remaining survey items were derived from a significant review of the literature and knowledge of CoARC accredited respiratory care programs. The survey was piloted prior to the final distribution of the instrument to potential participants.

Face and content validity were established by using a group of five educators, who did not serve as program directors, to review the survey for appropriateness. The survey items were evaluated for readability, relevance, accuracy, and clarity. After consideration of the group's suggestions, several questions were reworded or omitted for reader clarification. After data collection from the pilot group, a factor analysis was run on SPSS (IBM SPSS Statistics for Windows, version 23, IBM Corp., Armonk, NY, USA) to determine the number of dimensions for the survey and help to establish construct validity of the instrument. The dimensions were found to be 1) mentoring practices, 2) the mentor/mentee relationship, and 3) perceptions of mentoring impact. The three dimensions served as the dependent variables. Split-half reliability methodology was used to measure internal consistency reliability. The entire survey was administered to participants in the pilot group then the total score for each set was computed. Subsequently, the split-half reliability was obtained by determining the correlation between the two total set scores. A Spearman-Brown correction was applied to estimate the reliability of the entire instrument.

The demographics portion of the survey was used to gather data on the region of the accredited program, type of degree awarded by the program, academic rank of the program director, gender, degree level of program director, number of faculty members in program, and availability of tenure-track positions at the institution. The perceptions section of the RCF Mentoring Survey used a six-point Likert-type scale to measure the program director's agreement to a set of statements regarding the effects of mentoring on new faculty job performance, rate of faculty turnover, job satisfaction, and organizational commitment. Each rating in the Likert scale was assigned a number for statistical analysis, wherein 1 = disagree strongly, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, and 6 = agree strongly. The mentoring practices dimension also included a Likert-type scale to measure the participants' agreement to a set of statements, a ranking of responses for topics of mentorship discussion, and an open-ended question concerning barriers to mentoring implementation. Each rating in the Likert scale for Dimension 1 (mentoring practices) was assigned a number for statistical analysis, wherein 4 = never, 3 = occasionally, 2 = usually, and 1 = always.

Sample

The target population for this quantitative study was respiratory care program directors in the U.S. during the spring semester (March-May) of 2017. The participants were selected because of their knowledge of the characteristics of additional program faculty. Nonprobability sampling was used. All program director information was located on the public access website for the Commission on Accreditation for Respiratory Care (CoARC). Emailing a survey to these participants was both convenient and purposeful because of the known contact information,

anticipated willingness to divulge current mentoring practices, and intimate knowledge of the programs they oversee. According to the 2015 "Report on Accreditation in Respiratory Care Education," there were 420 accredited respiratory care programs in the United States (85% associate degree level, 14% bachelor's degree level, and 1% master's degree level).[13]

Data Collection

After receiving approval from the Institutional Review Board at East Tennessee State University, an email was sent to all program directors listed on the CoARC database. A cover letter (Appendix B) describing the purpose of the study, directions for completing the electronic survey, and a link to the survey site was sent to potential participants. Completion of the survey was considered consent for participation. A deadline was included in the correspondence to incentivize a timely survey completion. The instrument did not obtain any identifiable measures; therefore, participants could remain anonymous. Reminder emails were sent as necessary to increase the likelihood of participation with the last email reminder sent 1 month before survey participation closed.

Data Analysis

Data collected from the electronic survey were imported into IBM SPSS for analysis. Several of the survey items resulted in simple percentages. The first component of the survey yielded demographic findings for the study participants concerning degree type, gender, and length of service as program director. Additionally, a series of one-way analysis of variance (ANOVA) and t-tests for independent samples were conducted on the survey items that corresponded to the aforementioned dimensions. All analyses were performed using an alpha level of .05.

Results

Descriptive data from demographic regions revealed 16.1% (n = 18) of programs were located in the Northeast, 24.1% (n = 27) were located in the Midwest, 45.5% (n = 51) in the South, and 14.3% (n = 16) in the West. The majority of respondents served as program directors in programs that awarded an associate degree (69%), followed by bachelor's degree (17.7%), and master's degree (0.9%). Nine programs (8%) reported awarding both associate and bachelor's degrees and 5 programs (4.4%) reported awarding both bachelor's and master's degrees. Gender characteristics of the program directors were as follows: 63.4% (n = 71) female and 36.6% (n = 41) male. The majority of program directors held a master's degree (59.8%), followed by a doctorate degree (22.3%), and lastly, a bachelor's degree (17.9%). The reported academic rank of respondents varied: 23% were ranked as associate professor, 22.1% ranked as instructor, 16.8% ranked as assistant professor, and 15.9% were ranked as full professor. The remaining 22.1% of the sample reported not conforming to the ranking system provided and listed titles such as program director, department chair, and college dean.

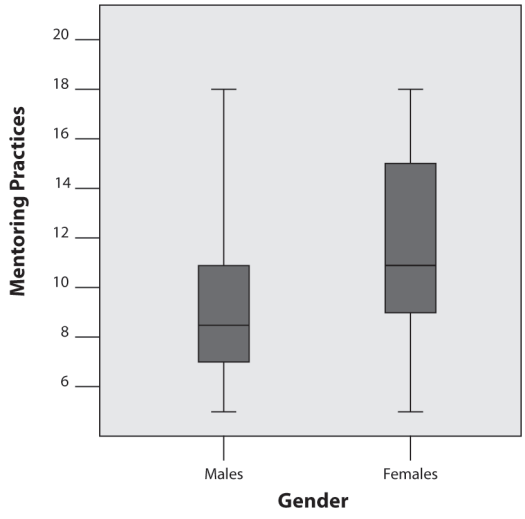
The top three reported number of full-time faculty members in the respondents' programs were two (54.6%), three (22.2%), and four (7.4%). The number of reported part-time faculty members in the accredited programs were one (27.8%), four (13.9%), and two (12.7%). The remaining number of part-time faculty widely varied between 0 and 36. Concerning availability of tenure track positions at the respondents' institutions, 39.3% (n = 44) reported there were tenure track positions and 58.9% (n = 66) reported there were not. Two respondents were not sure. Participants were asked to report what types of orientation new faculty were required to undergo. Just over 80% reported an institutional orientation, 37.2 % reported a college specific orientation, 35.4% reported a department orientation, and 51.3% reported a program orientation. One respondent reported not having a required orientation for new faculty. The location of the mentor, if assigned to new faculty, was reported to be in the mentee's department (n = 38), in the mentee's college or school (n = 20), at the mentee's institution (n = 15), and outside the mentee's institution (n = 1). Thirty-two percent (n = 35) of respondents reported not having a mentor assigned to new faculty. Topics new faculty members most requested to discuss with his or her mentor was predominantly teaching pedagogy followed by work-life balance, service expectations, promotion and tenure, and research. Other topics that were provided by respondents included program outcomes, curriculum, policies and procedures, resources, and student issues.

Data were gathered from 126 program directors of the 410 who were sent the invitation to participate in the study, resulting in a 30% response rate. Testing of the null hypotheses associated with the 12 research questions resulted in 3 significant findings and 9 findings that were not significant. The dependent variables were the three dimensions on the survey: mentoring practices, the mentor/mentee relationship, and perceptions of mentoring impact among respiratory care programs. Independent variables were demographic region of the respiratory care program, level of degree awarded by the respiratory care program, academic rank of the program director, and gender of the respiratory care program director.

Mentoring practices (Dimension 1) were not significantly affected by the demographic location of the accredited

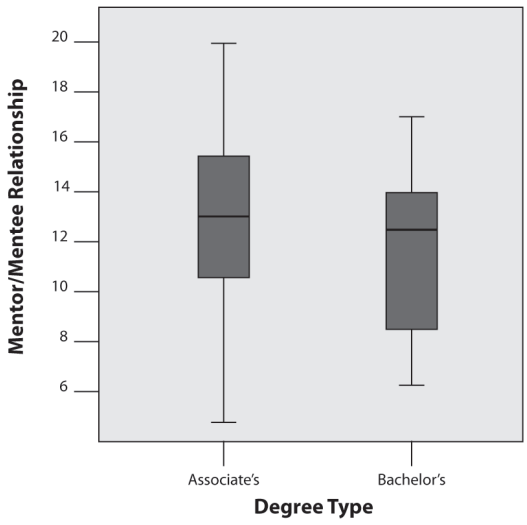
respiratory care program, the type of degree awarded by the program, or the academic rank of the program director. However, female program directors reported significantly greater opportunities for new faculty mentoring when compared to male program directors. An independent-sample t-test was conducted to evaluate whether the mean scores for mentoring practices differed based on the gender of the program director. Dimension 1 (Mentoring Practices) was the test variable and the grouping variable was male or female. The test was significant, $t(85) = 2.52$, $P = .014$. Female program directors (M = 11.71, SD = 4.10) reported significantly greater opportunities for new faculty mentoring when compared to male program directors (M = 9.47, SD = 3.83). The 95% confidence interval for the difference in means was -4.01 to -.47. The $\eta 2$ index was .07, which indicated a large effect size. Figure 1 shows the distribution for the two groups. Opportunities for new faculty mentoring included the following survey items: 1) the program offers new faculty mentoring, 2) clinical-only faculty members participate in mentoring, 3) part-time faculty members participate in mentoring, 4) full-time faculty members participate in mentoring, and 5) a formal mentor is assigned to a new faculty member.

Figure 1. Mean Mentor Practice for Program Directors by Gender



The mentor/mentee relationship (Dimension 2) was not significantly affected by the demographic location of the program or the academic rank of the program director. Conversely, both respondents from associate degree programs and female program directors reported greater levels of expectation in regard to new faculty mentoring. An independent-sample t-test was conducted to evaluate whether the mean scores for characteristics of the mentor/mentee relationship differed based on type of degree awarded by the program. The test variable was Dimension 2 (Mentor/Mentee Relationship) on the RCF Mentoring Survey (questions 15-18) and the grouping variable was type of degree awarded by the program (associate degree or bachelor's degree). The master's degree programs did not yield a large enough number, so they were omitted from analysis. The test was significant, $t(85) = 2.40$, $P = .018$. Respondents from associate degree programs reported significantly greater levels of expectation in regard to new faculty mentoring (M = 13.32, SD = 3.42) when compared to bachelor's degree programs (M = 11.21, SD = 3.28). The 95% confidence interval for the difference in means was .37 to 3.86. The $\eta 2$ index was .06, which indicated a medium effect size. Figure 2 shows the distributions for the two groups.

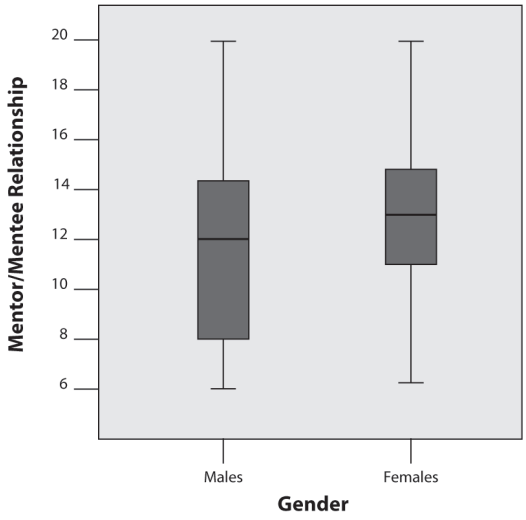
Figure 2. Mean Mentor/Mentee Relationship Scores for Type of Degree Awarded by Program



An independent-sample t-test was conducted to evaluate whether the mean scores for the mentor/mentee relationship differed based on the gender of the program director. Dimension 2 (Mentor/Mentee Relationship) was the test variable and the grouping variable was male or female. The test was significant, $t(98) = 2.12$, $P = .037$. Females (M = 13.18, SD = 3.30) reported significantly greater levels of expectations in regard to new faculty mentoring, than did males (M = 11.66, SD = 3.69). The 95% confidence interval for the difference in means was -2.96 to -.097. The $\eta 2$ index was .04, which indicated a small effect size. Figure 3 shows the distribution for the two groups. Expectations of new faculty mentoring

included the following survey items:
1) the development of informal relationships,
2) set number of meetings per academic year, 3) documenting and/or discussing academic interests with a mentor, and 4) documenting and/or discussing short- and long-term goals with mentor.

Figure 3. Mean Mentor/Mentee Relationship Scores for Program Directors by Gender



Perceptions of mentoring impact (Dimension 3) was not significantly affected by the demographic location of the program, type of degree awarded by the program, academic rank of the program director, or gender of the program director. Perceptions of mentoring impact included the following survey items: 1) enhances new faculty job performance, 2) can prevent new faculty turnover, 3), improves new faculty job satisfaction, and 4) increases new faculty organizational commitment.

Discussion

Findings for programs by geographic region paralleled those from both the South (45.5% v. 42%) and Midwest (24.1% v. 25%). However, the Northeast region (16.1% v. 14%) and the West (14.3% v. 19%), did not align with reported programmatic statistics. Though the specific percentages were not exact, the proportion of programs by degree offered (associate, bachelor's, or master's) did resemble that of the CoARC annual report.[13] The majority of respondents in the study were female (63.4%), which corresponds to Ziegler's findings of 60% of females in the profession of respiratory care.[14] The majority of program directors also reported having a master's degree (59.8%), which aligns with the 54-56% reported by CoARC for the highest degree earned by key personnel.[13] The majority of respondents (23%) ranked as an associate professor, 15.9% ranked as a full professor, and 22.1% considered themselves administrative (program director, department chair, or college dean). This could indicate a sufficient amount of high-ranking faculty in accredited respiratory care programs who can serve as mentors. Falzarano and Zipp found the majority of mentors in their study ranked at the associate professor level.[15]

The majority (58.9%) of respondents indicated a lack of available tenure-track positions at their respective institution. This may explain why promotion and tenure was only the fourth highest rated topic of discussion between mentor and mentee. Over 80% of respondents reported some form of mandatory orientation (institution, college, department, or program) for new faculty. Orientations have been suggested as an effective means to recruit, retain, and increase preparedness of new faculty.[1,16-17] One respondent stated, "The biggest barrier is the lack of orientation within academia. Coming from a hospital environment to academia is a shock when it comes to orientation to your position." Though the majority of respondents indicated an assigned mentor was from within the mentee's department, 32% of respondents reported not having a mentor assigned to new faculty. However, respondents also reported informal mentoring relationships developed always (24.3%), usually (28.2%), or occasionally (8.7%), when no formal mentor was assigned. This finding is encouraging considering Schrodt et al stated that informal mentoring relationships could be more beneficial than assigned, more formal interactions.[18]

Similar to the findings of Pinto Zipp et al, teaching pedagogy was the predominant topic of discussion between mentees and mentors.[12] This finding corresponds with others who have reported feelings of lack of preparation in the role as an educator when transitioning from clinical practice.[19-22] The same number of respondents reported that clinical-only faculty members always versus occasionally (34%) participated in mentoring. Prior studies have reported a disconnect from the clinical faculty member's institution due to a lack of proximity.[21-23] Part-time clinical faculty members may be potential applicants when full-time faculty positions come available and full-time clinical faculty can experience emotional exhaustion. Emotional exhaustion may present as feeling drained or having a lack of energy. Clinical faculty often have significant non-productive time driving to sites and not having access to campus resources; the need to better invest in the enculturation of these faculty members into academia is apparent.[24] The majority of respondents (27%) reported mentors and mentees not being expected to meet a set number of times per academic year. This finding may

correspond with the prevalence of informal mentoring relationships in the study. However, those who reported having to meet regularly indicated once a year to weekly. Regular meetings between the mentor and mentee aids in tracking the progress of the new faculty member and maintaining a personal relationship with the individual.

The majority of respondents indicated an agreement or strong agreement to the potential impact of mentoring on new faculty job performance, faculty turnover, faculty job satisfaction, and faculty organizational commitment. Mentoring may help reduce feelings of isolation and anxiety in new faculty members resulting in fewer turnovers.[25] The presence of mentoring may also bring feelings of job security.[26] The lack of tenure-track positions found in this study may prove to be detrimental to programs considering the new generation of faculty members who seek advancement opportunities in their careers.

When participants were asked what barriers to mentoring implementation they have witnessed in respiratory care programs, 42% (n = 35) responded with "a lack of time." The majority of accredited programs only employ two full-time faculty members (a program director and director of clinical education) and rely heavily on part-time clinical faculty who often have additional employment. These findings correspond to others who reported a lack of time as the biggest challenge to new faculty mentoring.[15,12] Finding senior faculty who were committed to serving as a mentor also surfaced as a barrier to mentoring implementation. A few respondents stated senior faculty were not always available and were not always good role models or committed to the professional and personal growth of the new faculty member.

The feedback from program directors reflects that not all senior faculty members have the desire or skill to serve as effective mentors.[17,22,27] Supportive senior faculty can increase new faculty job satisfaction.[25] Horizontal hostility has no place in academia and recruiting experienced faculty (i.e., newly tenured) rather than more seasoned faculty (approaching retirement) to serve as mentors may be an effective means of implementation. Novice educators desire to feel a sense of commonality with colleagues, which may be difficult to achieve with senior faculty because they cannot as closely identify with the frustrations of being a new educator. Though there are certainly barriers to mentoring implementation, respondents also reported positive experiences with mentoring. Respondents reported mentoring could be a rewarding experience, strengthen the relationship among faculty, increase confidence in the new faculty member, and serve as motivation for new faculty to become a mentor to others in the future. Constructive and fulfilling mentoring relationships have the ability to cultivate a cycle of continued mentoring in future generations of respiratory care faculty and students.

The results of this study may benefit administrators and educators in respiratory care in efforts to support new faculty who may feel underprepared or overwhelmed in the new role. Because other allied health fields of study are similar in nature to respiratory care, the findings of the study could have potential implications across a range of health-related disciplines. Educators, who are comfortable in their roles and made to feel valued by the institution, will likely be more productive and committed to the program. The study may also have additional benefits to specific members of the academy — women and clinical faculty — considering the likelihood of these subpopulations having less access to mentoring.

Conclusions

This study was an examination of mentoring practices in accredited respiratory care programs. Significant findings included that female program directors reported greater opportunities for mentoring within their programs and greater levels of expectations concerning mentoring when compared to male program directors. This may be because women often accrue more psychosocial benefit from mentoring and actively seek greater guidance when trying to achieve an appropriate work-life balance.[28] Associate degree programs also reported a higher level of expectation in regard to mentoring when compared to bachelor degree programs This may be because the minimal degree required of faculty for associate degree programs is a bachelor's degree which results in less new faculty socialization and preparation than a graduate program does. There was overwhelming agreement concerning the potential positive impact and benefit of new faculty mentoring on job performance, turnover, job satisfaction, and organizational commitment.

Recommendations for Further Research

A study on respiratory care clinical faculty members and perceptions of mentoring may help to fill a gap in the literature because this population could benefit from mentoring yet have historically been underrepresented in these types of relationships. Furthermore, a study on the effectiveness of mentoring in respiratory care programs may aid in the development of best practices for future programs and faculty to emulate. A study regarding female faculty retention in allied health programs of study may yield additional information as to the motivation for leaving the academy and potentially returning to clinical practice. Lastly, a survey of health science administrators (academic deans) concerning perceptions of new faculty support may highlight areas of improvement needed in new faculty investment and success.

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Appendix A

Respiratory Care Faculty Mentoring Survey

Demographic Information

1. Select the region that best describes the location in which your accredited respiratory care program is housed.
   - ☐ Northeast (MA, RI, NH, ME, VT, CT, NJ, NY, PA)
   - ☐ Midwest (OH, IN, MI, WI, IL, IA, MN, SD, ND, MO, KS, NE)
   - ☐ South (DC, DE, MD, VA, WV, NC, SC, GA, FL, AL, TN, MS, KY, LA, AR, OK, TX)
   - ☐ West (MT, CO, WY, ID, UT, AZ, NM, NV, CA, HI, OR, WA, AK)

2. Select the degree that is awarded by your accredited respiratory care program (check all that apply).
   - ☐ Associate degree
   - ☐ Bachelor's degree
   - ☐ Master's degree

3. Please select the option that best indicates your academic rank.
   - ☐ Instructor
   - ☐ Assistant Professor
   - ☐ Associate Professor
   - ☐ Full Professor
   - ☐ Other, _____

4. What is the highest degree level you have earned?
   - ☐ Bachelor's degree
   - ☐ Master's degree
   - ☐ Doctoral degree

5. To which gender do you most identify?

   _____

6. How many faculty members does your respiratory care program employ?
   - ☐ _____ Full-time faculty
   - ☐ _____ Part-time faculty

7. Does your respiratory care program offer tenure-track faculty positions?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure

8. In what type of orientation are new faculty members required to participate (check all that apply)?
   - ☐ Institution orientation
   - ☐ College-specific orientation
   - ☐ Department orientation
   - ☐ Program orientation
   - ☐ None

Dimension 1: Mentoring Practices

Always=1 Usually=2 Occasionally=3 Never=4

9. Your respiratory care program offers new faculty mentoring.

   Always Usually Occasionally Never

10. Clinical-only faculty members in your respiratory care program participate in mentoring.

    Always Usually Occasionally Never N/A

11. Part-time faculty members in your respiratory care program participate in mentoring.

    Always Usually Occasionally Never N/A

12. Full-time faculty members in your respiratory care program participate in mentoring.

    Always Usually Occasionally Never N/A

13. A formal mentor is assigned to a new faculty member in your respiratory care program.

    Always Usually Occasionally Never N/A

Appendix A (cont.)

Respiratory Care Faculty Mentoring Survey

14. If a formal mentor is assigned, where does the mentor work?

- ☐ Mentee's department
- ☐ Mentee's college or school
- ☐ Mentee's institution
- ☐ Outside the mentee's institution
- ☐ Not applicable

Dimension 2: Mentor/Mentee Relationship

Always=1 Usually=2 Occasionally=3 Never=4

15. If no formal mentor is assigned, do informal mentoring relationships develop?

Always Usually Occasionally Never N/A

16. Mentors and mentees are expected to meet together a set number of times per academic year.

Always Usually Occasionally Never N/A

If yes, please indicate the number of times.

_____

17. New faculty members are expected to discuss or document academic interests with a mentor.

Always Usually Occasionally Never N/A

18. New faculty members are expected to discuss or document both short- and long-term career goals with a mentor.

Always Usually Occasionally Never N/A

19. What topics do new faculty members most wish to discuss with their mentor? (Please rank, with one (1) being the most frequent topic of new faculty member discussion.)

_____ Work/Life balance
_____ Promotion/Tenure
_____ Pedagogy/Teaching
_____ Research
_____ Service
_____ Other

For Dimension 3 of the survey, please choose the option that best describes your agreement to the preceding statement regarding perceptions of mentoring impact.

Dimension 3: Perceptions of Mentoring Impact

Disagree strongly=1 Disagree=2 Somewhat disagree=3
Somewhat agree=4 Agree=5 Agree strongly=6

20. Mentoring enhances new faculty job performance.

Disagree strongly Disagree Somewhat disagree
Somewhat agree Agree Agree strongly

21. Mentoring prevents new faculty turnover.

Disagree strongly Disagree Somewhat disagree
Somewhat agree Agree Agree strongly

22. Mentoring improves new faculty job satisfaction.

Disagree strongly Disagree Somewhat disagree
Somewhat agree Agree Agree strongly

23. Mentoring increases new faculty organizational commitment.

Disagree strongly Disagree Somewhat disagree
Somewhat agree Agree Agree strongly

The final two questions are open-ended so that respondents can provide examples of personal experiences with mentoring.

24. What barriers to mentoring implementation have you witnessed in your respiratory care program?

_____
_____

25. What experiences have you had with mentoring in higher education?

_____
_____

Appendix B

Informed Consent Letter

New Faculty Mentoring in Respiratory Care Programs

Dear Participant:

My name is Kristen McHenry, and I am an Assistant Professor and Cardiopulmonary Science Program Director at East Tennessee State University. I am working on my doctoral degree in higher education leadership and policy analysis. In order to meet degree requirements, I must complete a dissertation. The name of my research study is New Faculty Mentoring in Respiratory Care.

The purpose of this study is to identify current mentoring practices of new faculty members in CoARC accredited respiratory care programs in the U.S. I would like to give a brief online survey to Respiratory Care Program Directors using Qualtrics. It should only take about 10 minutes to finish. You will be asked questions about mentoring practices and your perceptions of mentoring. Because this study deals with mentoring practices and perceptions, the risks are minimal. However, you may also feel better after you have had the chance to express yourself about mentoring in your institution. This study may benefit you or others by supporting new respiratory care faculty in higher education.

Your confidentiality will be protected as best we can. Because we are using technology no guarantees can be made about the interception of data sent over the Internet by any third parties, just like with emails. We will make every effort to make sure that your name is not linked with your answers. Qualtrics has security features that will be used: IP addresses will not be collected and SSL encryption software will be used. Although your rights and privacy will be protected, the East Tennessee State University (ETSU) Institutional Review Board (IRB) (for non-medical research) and people working on this research (individual or department) can view the study records.

Taking part in this study is voluntary. You may decide not to take part in this study. You can quit at any time. You may skip any questions you do not want to answer or you can exit the online survey form if you want to stop completely. If you quit or decide not to take part, the benefits or treatment that you would otherwise get will not be changed.

If you have any research-related questions or problems, you may contact me, Kristen McHenry, at 423.547.4917. I am working on this project with my faculty advisor, Dr. Jim Lampley. You may reach him at 423 439.7619. Also, you may call the chairperson of the IRB at ETSU at (423) 439-6054 if you have questions about your rights as a research subject. If you have any questions or concerns about the research and want to talk to someone who is not with the research team or if you cannot reach the research team, you may call an IRB Coordinator at 423/439-6055 or 423/439-6002.

Sincerely,

Kristen McHenry MS, RRT-ACCS

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Effectiveness of an Interdisciplinary Asthma Education Workshop for a Pediatric Clinic

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Abstract

Background: Clinical staff providing care for children with asthma need to relay accurate and appropriate asthma education messages to patients and caregivers. Despite the presence of evidence-based practice and guidelines, gaps in their implementation persist in clinical practice. We implemented an asthma education workshop and evaluated whether it changed clinical staff's asthma education abilities by increasing comfort using the asthma action plan (AAP), confidence in providing the proper metered-dose inhaler (MDI) + spacer instructions, and asthma knowledge. **Methods:** A convenience sample of nurses, certified medical assistants, care coordinators, and social workers in an urban pediatric clinic completed the one-hour asthma education workshop as part of a quality improvement project. The participants completed surveys pre-and post-workshop and at 1-month or 2-month intervals. A 5-point Likert-scale was used to assess the clinician's comfort explaining the AAP and confidence in teaching inhaler technique. Asthma knowledge was measured using responses to eight multiple-choice questions. A MDI + spacer checklist was used to evaluate inhaler technique. Wilcoxon Signed Rank tests were used to assess the knowledge, comfort, and confidence measures and tested at alpha = .05. **Results:** Comfort with explaining the AAP significantly improved immediately after the workshop, ($Z = -3.25$, $P = .001$). Confidence with MDI + spacer instruction improved between the post-workshop and the 1- or 2-month assessment ($Z = -3.36$, $P = .001$). All scores remained stable between the workshop and the 1- or 2-month assessment score ($Z = -1.34$, $P = .180$). The 22 participants showed significantly improved asthma knowledge scores post-workshop, ($Z = -2.93$, $P = .003$); measures of asthma knowledge remained stable between the post-workshop and the 1- or 2-month assessments, ($Z = -1.51$, $P = .131$). No clinical staff achieved a perfect MDI + spacer checklist score at 1 or 2-months post-workshop. **Conclusion:** Clinicians' comfort explaining the asthma action plan, confidence teaching MDI technique, and asthma knowledge can be improved using a one-hour workshop. Additional sessions are required to achieve perfect MDI + spacer technique.
Key words: asthma education, inhaler technique, asthma action plan

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Introduction

Asthma affects approximately 1 in every 11 children in the United States. However, asthma is disproportionately distributed among African-American (13.4%) and Hispanic (8.0%) children, in comparison to White (7.4%) children. Children living in lower-income households at 100% below poverty level are also negatively impacted according to the Centers for Disease and Control and Prevention (https://www.cdc.gov/asthma/most_recent_data.htm Accessed February 6, 2017).

The ultimate goal in providing comprehensive asthma care and asthma self-management education is to enhance the quality of life for the patient. Education breaks down barriers to help empower both patients and their families. Engaging patients and their caregivers in understanding the pathophysiology, symptoms, triggers, treatment, and management of asthma begins with dedicated and competent health care providers.[1] Evidence-based practices were released more than 15 years ago, yet their implementation in actual clinical practice remains.[2] A pediatric outpatient clinic evaluated their health care providers' knowledge of pediatric asthma and asthma management using a survey instrument. Survey responses identified knowledge gaps in asthma pathophysiology, medication administration, and treatment, causing researchers to conclude that there was an urgent need for additional asthma education among health care providers.[3]

Both evidence-based programs and strategies have been developed to improve the asthma knowledge of health care providers. They include the Physician Asthma Care Education (PACE) and high-fidelity patient simulation (HFS).[2,4] The PACE program was developed by the National Institutes of Health with the goal to enhance pediatric asthma education skills, reduce ED visits and hospitalizations, and improve patient satisfaction. Overall, participants have been positively impacted by the interactive style and the level of sophistication in the content presented.[2] The strategy of using HFS also provides an interactive style to improve team and problem-solving skills and instill confidence among the participants.[4,5] Utilizing non-traditional learning strategies may help reduce the gaps in health care providers' understanding of asthma.[6]

A local pediatric collaborative that serves Medicaid beneficiaries cares for a population of children with a 20% asthma prevalence.[7] The level of asthma knowledge among collaborative members was previously unknown, thus a needs assessment was conducted. Feedback from the needs assessment guided the development of the asthma education workshop. An interprofessional team including respiratory therapists, a pharmacist, and a registered nurse developed the workshop. We completed an assessment of the resulting asthma education workshop to identify changes in the clinical staff's comfort teaching the AAP, confidence providing MDI + spacer instruction, and asthma knowledge. Longitudinal data were also collected to evaluate participants' ability to demonstrate and explain proper inhaler technique.

Methods

Study Population

A convenience sample of health care professionals from a pediatric collaborative participated in the asthma education workshop (Appendix A). The targeted study participants included an interprofessional team of nurses, certified medical assistants (CMAs), care managers, and social workers. A local institutional review board reviewed the project and determined it to be quality improvement. Health care professionals who declined and/or were unable to participate in the workshop or were not affiliated with the collaborative were excluded from the study.

Data Collection Instruments

A questionnaire was developed by respiratory therapists and a pharmacist to evaluate the asthma education workshop. This questionnaire addressed demographic information, assessments of comfort using the AAP, confidence in providing the proper MDI + spacer instructions, and asthma knowledge. Demographic information focused on each participant's professional role, years of clinical experience, and years working with pediatric asthma. A 5-point Likert scale was used to rate each participant's comfort in explaining the AAP, confidence in explaining the AAP, and confidence instructing a patient on how to properly use the MDI with a spacer. The scale anchors ranged from strongly agree to strongly disagree. Asthma knowledge was assessed with eight multiple-choice questions that aligned with the workshop's learning objectives. The knowledge score was generated by taking the sum of these eight questions. Three asthma educators concluded that the questionnaire's text and keyed responses had face validity relevant to the workshop's objectives.

In addition to the asthma knowledge questionnaire, we also assessed each participant's MDI + spacer technique through a checklist that had both content and face validity determined by experienced asthma educators from the Chicago Asthma Consortium. Checklists are recommended by the Global Initiative for Asthma (GINA) guidelines to assure comprehensiveness and consistency (www.ginasthma.org Accessed February 6, 2018). The asthma inhaler technique checklist for MDI +

spacer contained a total of 13 steps. Participants earned 1 point for each correct inhaler technique in the correct order. After each completed assessment, the points earned were added together to compute the total score. Each participant had up to four attempts to perform all 13 steps correctly.

Data Collection Procedures

The research team conducted a needs assessment regarding asthma knowledge with members from the collaborative through small group meetings (see Figure 1). The planning team reviewed the findings and developed the learning objectives and activities for the workshop (see Figure 2) and implemented the workshop in the Fall of 2016.

The asthma education workshop was delivered in one hour. The study team collected demographic information, comfort and confidence ratings, asthma knowledge ratings, and inhaler technique assessments pre- and post-workshop. The participants were divided into three small groups based on profession to be able to answer additional questions relevant to each profession. The participants rotated through the three stations at 15-minute intervals to discuss asthma medication indications, proper inhaler technique, and the asthma action plan/triggers. Written handouts were provided to participants that included practice scenarios for applying the AAP, charts of common asthma medications, trigger remediation strategies, and step-by-step instructions on proper inhaler technique with and without the spacer. The MDI + spacer checklist was used to assess each participant's pre-workshop inhaler technique skills. If a participant scored less than 13, he or she received feedback and the skill was repeated until a perfect score was obtained,

Figure 1. Needs Assessment Questions

Needs Assessment Questions
1. What information about asthma would you like to know about?
2. What issues, concerns, or questions have you run into with patients and did not know the answers?
3. How can you help empower patients to take charge of their asthma management and care?
4. What barriers seem to inhibit patients from properly managing their asthma?
5. Do your patients perceive conflicting information about asthma from their different health care providers?
6. What is an asthma action care plan and how confident are you in explaining the importance of it to a patient or caregiver? Which parts?
7. Do patients have questions about how to take their medication and how often?
8. How confident are you in assisting patients or caregivers with their medication questions?
9. What is a peak flow meter and how can this device help patients?
10. How can you determine if a patient's asthma is under control?
11. What are asthma triggers and how can patients avoid them?
12. What day of the week are you available?
13. What time of day are you available?
14. What chunk of time can you spend participating at a workshop?
15. Where is the best location to hold a workshop?
16. Are there other individuals that you feel would be interested in this type of program?
17. What are your learning preferences?

Figure 2. Asthma Workshop Objectives/Activities for Social Workers, Nurses, and Certified Medical Assistants

1. Asthma Inhaler Technique
a. Objectives: After completion of the training, the learner will
i. Feel confident instructing a patient on how to properly use his or her metered dose inhaler.
ii. Feel confident instructing a patient on how to properly use his or her metered dose inhaler with a spacer.
iii. Demonstrate proper inhaler technique with a MDI and MDI plus spacer.
iv. Recognize which type of inhaler is being used.
v. Explain how a spacer improves medication deposition.
b. Activities:
i. The educator should first demonstrate the proper inhaler technique. Checklist and step-by-step diagrams should be provided to each participant.
ii. Next, the participants pair up with a partner and teach each other the proper inhaler technique.
1. The peer that is being taught should use a checklist to make sure that their partner is not skipping or incorrectly performing any of the steps.
2. The educator should monitor the interactions and provide feedback as needed.
iii. Provide a nebulizer and highlight the parts: compressor (not available), tubing, nebulizer.

Figure 2. Asthma Workshop Objectives/Activities for Social Workers, Nurses, and Certified Medical Assistants (cont.)

iv. It is important to allow time for group discussion at the end of the activity to engage the students and answer any further questions or concerns.
v. Supplies:
1. Placebo inhalers (MDI & Diskus)
2. Sample chambers
3. Checklists for MDI, MDI + spacer, Diskus
4. Instructions for MDI and MDI + spacer
5. Sample nebulizer
6. Image with different types/brands of inhalers
2. Medication Administration
a. Objectives: After completion of the training, the learner will
i. Compare the reasons for use of controller medications vs. quick-relief medications.
ii. Describe the pathophysiology of asthma.
iii. Review how different classes of asthma medications relieve asthma symptoms.
iv. Review counseling points associated with common asthma medications.
b. Activities:
i. The educator will provide a set of notecards to each group. Each notecard will have a different medication written on it.
1. The educator will have the students organize the notecards into different categories such as quick-reliever medications vs. long-term controller medications and which medications are beta-2 agonists and which medications are cholinergic.
ii. It is important to allow time for group discussion at the end of the activity to engage the students and answer any further questions or concerns.
iii. Supplies:
1. Airway models
2. Handout with medication information
3. Notecards with medication names
4. Comparison of medications
3. Asthma Action Plan and Asthma Triggers
a. Objectives: After completion of the training, the learner will
i. Feel confident explaining how to use an asthma action plan.
ii. Describe the goals of an asthma action plan.
iii. Describe asthma symptoms.
iv. Describe ways to reduce exposure to different asthma triggers.
b. Activities:
i. Asthma Action Plan: The participants will identify the recommended action in an asthma action plan (AAP) based upon a scenario.
1. The participants will role play (educator/patient) and explain to their partner how to utilize the AAP.
2. The educator can provide guidance during the exercise and feedback at the end to help students understand the importance of a written asthma action plan.
3. It is important to allow time for group discussion at the end of the activity to engage the students and answer any further questions or concerns.

Figure 2. Asthma Workshop Objectives/Activities for Social Workers, Nurses, and Certified Medical Assistants (cont.)

iii. Supplies:
1. Airway models
2. Handout with medication information
3. Notecards with medication names
4. Comparison of medications
iii. Asthma Triggers:
1. The EPA's Asthma Home Environment Checklist will be sent to participants in advance of the training.
2. Questions about triggers will be solicited and addressed.
iv. Supplies:
1. EPA Asthma Home Environment Checklist

or 3 post-workshop attempts were made. The frequency of repetitions it took to achieve perfect MDI + spacer technique was also recorded.

Data Analysis

Demographic information was analyzed to describe participant role diversity, years of clinical experience, and years of pediatric asthma experience (see Table 1).

Table 1. Demographic Characteristics, *n* (%)

Professional Role	
Certified Medical Assistant	9 (40.9)
Clinical Nurse	5 (22.7)
Triage Nurse	2 (9.0)
Social Worker	3 (13.6)
Care Coordinator	3 (13.6)
Not specified	0 (0.0)
Years of Clinical Experience	
Less than 2 years	3 (13.6)
3-5 years	6 (27.2)
6-10 years	9 (40.9)
11-15 years	1 (4.5)
16-20 years	1 (4.5)
Not specified	2 (9.0)
Years Working with Pediatric Asthma	
Less than 2 years	9 (40.9)
3-5 years	2 (9.0)
6-10 years	7 (31.8)
11-15 years	1 (4.5)
16-20 years	2 (9.0)
Not specified	1 (4.5)

*N = 22

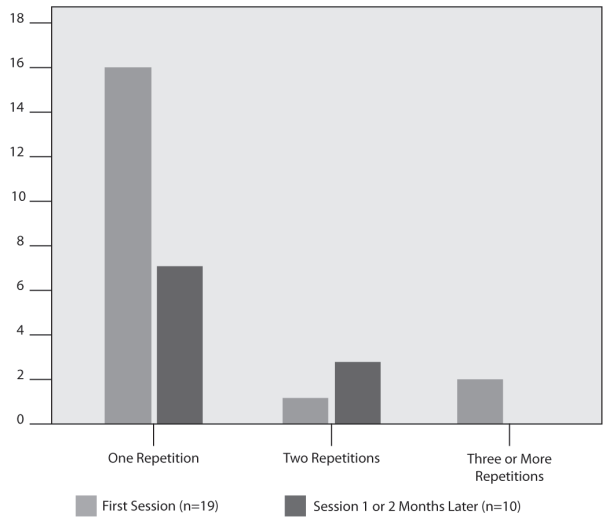
The Wilcoxon Signed Rank test was used to assess comfort explaining the AAP, confidence in providing the proper MDI + spacer instruction, and changes in asthma knowledge. The test analyzed the paired set of data from each participant based on the pre-and post-workshop scores. The alpha-level was 0.05. The statistical software used to analyze the data was IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY, USA).

Results

Fifteen of 22 participants completed the 1-month follow up session. Four of 22 participants completed the 2-month follow up session. The median clinical experience range of all participants was 6-10 years while the median range for working with pediatric asthma was 3-4 years (see Table 1).The comfort with explaining AAP significantly improved immediately after the workshop ($Z = -3.25$, $P = .001$). The scores remained stable from the post-workshop and the 1- or 2-month assessment score ($Z = -.82$, $P = .414$). Confidence with MDI + spacer instruction scores improved between pre- and post-workshop ($Z = -3.36$, $P = .001$). Scores remained stable between post-workshop and the 1- or 2-month assessment score ($Z = -1.34$, $P = .180$). The Wilcoxon Signed Rank test also showed significant improvement in asthma knowledge scores between pre-and post-workshop ($Z = -2.93$, $P = .003$); and remained stable between post-workshop and the 1- or 2-month assessment score ($Z = -1.51$, $P = .131$). No one was able to perform all MDI + spacer steps correctly on the first attempt post-workshop and during the second assessment one or two months later (see Figure 3). The majority were able to achieve perfect technique after one repetition.

The CMA participants provided unsolicited positive feedback after the workshops. During the first follow-up session, several CMAs stated that they received more requests from providers to perform inhaler education and became more engaged in asthma care.

Figure 3. Frequency of Repetitions to Achieve Perfect MDI + Spacer Technique



Discussion

CMAs have a direct role in patient care and frequent communication with other health professionals in the clinical setting. CMAs were the largest group in attendance, followed by the nurses in the collaborative. Offering an asthma education workshop to all collaborative members provided everyone the opportunity to deliver more consistent asthma information to patients.

A variety of learning strategies were implemented during the asthma education workshop. The demonstration and return demonstration of the inhaler technique was associated with an increase in confidence and competence with inhalers. Participants at the AAP station received sample action plans and applied the components to a scenario. The participants in our study shared their ideas and experiences in small groups as they rotated through the stations. This appeared to be a successful learning strategy.

The small group setting described in this study has been used elsewhere. For example, simulation-based education has been used to improve knowledge and confidence in using the AAP. In work with 26 resident physicians, simulation produced findings similar to ours in that there was a significant improvement in the pre-and post-test scores (44.8% to 80.4%). Overall, feedback was positive, but the residents found learning how to properly use the MDI + spacer was one of the most important skills learned.[8] Confidence in performing or conducting a task comes from having a strong foundation in the knowledge and practice. For patients to receive high quality asthma patient care and education, health care providers need to be knowledgeable about asthma and utilize evidence-based guidelines in creating and collaborating with patients to develop a personalized asthma action plan. Thus, a pre-and post-test for our study was developed specifically to evaluate health care provider asthma knowledge and confidence. While many asthma questionnaires have been published, most target patient or caregiver asthma knowledge, lack validity, and are not up to date with current asthma management guidelines and/or tested on a small sample of subjects.[8,9] The development of a reliable and valid tool for assessing health care provider asthma knowledge can be beneficial in assessing current education needs, gauging the implementation of guidelines, and understanding the impact from training.[9]

Inhalers are the primary method of delivering medications to treat asthma, but without proper technique, intrapulmonary drug deposition is unreliable. Even with proper technique, only about 10% of the medication will reach the periphery of the lungs.[11] Improper inhaler technique for both MDIs and dry powder inhalers (DPIs) has been noted among many health care providers including nurses, respiratory care providers, and pharmacists.[10] Providers are expected to learn independently or simply when on the job.[11,13] The inhaler checklists are valuable education tools for patients and caregivers, even health care professionals. While confidence in instructing a patient on how to use the inhaler improved at our follow-up sessions, participants struggled in performing the correct inhaler steps on the first attempt. Even with having well-established asthma management guidelines, asthma remains poorly controlled for individuals lacking the mastery of good inhaler technique.[10]

The evaluation of learning in clinical education settings differs from traditional classroom settings. A reinforcement model has been used in clinical settings to teach skills. This model utilizes a step-wise approach to measure and analyze the application of reinforcement in the promotion of learning and long-term retention. The reinforcement model initially appeared to be more labor intensive, by requiring frequent exposure through activities and evaluations, but participants gained more confidence in their abilities and retained content material several months after the initial evaluation.[12] Previous studies have shown that the skill required to demonstrate proper MDI + spacer technique could be improved from a single educational session. However, without the necessary reinforcement, retention of the skill was lost in as little as 2–3 months.[13] Based on these findings, we would recommend more time being spent on enhancing the participants' inhaler technique because these skills require more frequent exposure and practice.

After the completion of the workshop, we discovered that the participants had an easier time retaining the asthma knowledge information in comparison to demonstrating proper MDI + spacer technique — a skill. Previous research has found that knowledge presented at an educational workshop was retained after 3 months.[14] There was a lack of evidence to suggest that a small-group problem solving format improved knowledge retention in comparison with traditional didactic lecture format.[14,15] However, there was higher satisfaction among physicians when information was presented in a small group setting. With busy schedules, the level of enjoyment or sense of importance are relevant factors in knowledge retention.[15] We found that the CMAs embraced the inhaler education and became champions for inhaler education after the workshop. Local champions demonstrated more competence in asthma education and reported improved patient follow-up, use of the action plan, and severity of classification and spirometry use.[16] Additionally, several participants requested a certificate of completion from the asthma education program. While this was not originally considered during the initial planning, it showed that the participants' valued the learning experience.

Our study had several limitations. The one-hour asthma education workshop was held during the regular work week and was coordinated with the clinic staffs' monthly meeting. Two workshop dates were offered to help improve attendance and accommodate a larger group. Rotation among the three education stations was adjusted due to time constraints. Each station was allotted up to 15 minutes, with another 15 minutes for the completion of both the pre-and post-test. Due to the number of participants and amount of information provided at each station, additional time would have been beneficial to allow more time to answer questions and further discussion on each topic. We were also unable to review the answers from the asthma knowledge questionnaire pre-and post-test until the follow-up sessions due to time constraints. Second, we made our best efforts to provide consistent education at the one-hour asthma education workshops, which were offered one month apart from each other. Even though the same checklist was used, different evaluators conducted the inhaler technique assessment due to scheduling constraints. Lastly, we were unable to re-evaluate all participants at the 1- or 2-month follow-up sessions due to scheduling challenges. Each follow-up session was conducted during the regular work week and set up either individually or in small groups. Duration of each follow-up session varied from one month to two months because of the participants' clinical demands.

Conclusions

The clinic staff had improved comfort explaining the AAP, greater confidence teaching MDI + spacer technique, and a better understanding of asthma knowledge at the one- or two-month follow-up session. Although participants could not perform perfect MDI + spacer technique on the first attempt post-workshop, they achieved perfect technique in fewer attempts. MDI + spacer training requires more intensive interventions to improve technique. Clinic staff from all disciplines improved their asthma management skills and could deliver a more consistent asthma message to patients. For this reason, the enhanced comfort and confidence may help all clinic staff to be more engaged in providing asthma care. Further investigation will be required to determine the long-term impact of this education on patient asthma outcomes.

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Appendix A

Asthma Education Program

1. Professional role: _____

2. Years of clinical experience _____

3. Years working with pediatric asthma _____

Select the most appropriate number for each statement that corresponds most closely to your desired response.

1. I feel comfortable explaining how to use an asthma action plan.

- ☐ 1. Strongly Disagree
- ☐ 2. Disagree
- ☐ 3. Neutral
- ☐ 4. Agree
- ☐ 5.Strongly Agree

2. I feel confident that I can instruct a patient how to properly use a MDI inhaler.

- ☐ 1. Strongly Disagree
- ☐ 2. Disagree
- ☐ 3. Neutral
- ☐ 4. Agree
- ☐ 5.Strongly Agree

3. I feel confident that I can instruct a patient how to properly use a MDI inhaler + spacer.

- ☐ 1. Strongly Disagree
- ☐ 2. Disagree
- ☐ 3. Neutral
- ☐ 4. Agree
- ☐ 5.Strongly Agree

Please select the "best" response for each statement or question below.

4. Which of the following descriptions best describes good asthma control

- ☐ No nighttime awakenings occur due to asthma symptoms
- ☐ Chest tightness only three days/week.
- ☐ Long-term controller medications are not prescribed.
- ☐ Wheezing only occurs with exercise.

5. Which of the following statements is true regarding an asthma action plan?

- ☐ An asthma action plan describes how each medication works.
- ☐ An asthma action plan identifies asthma triggers common to all people.
- ☐ An asthma action plan describes the steps to take to get and keep asthma under control.
- ☐ An asthma action plan evaluates how often asthma symptoms change.

6. Which of the statements about asthma symptoms is true?

- ☐ All people wheeze when they have asthma symptoms.
- ☐ Shortness of breath (dyspnea) is an asthma symptom.
- ☐ Asthma symptoms normally occur daily.
- ☐ Asthma symptoms are less severe in patients who are obese.

7. Which of the following is the best way to reduce asthma triggers?

- ☐ Clean mold in the bathroom with bleach.
- ☐ Spray dusting cleaner onto surfaces and wipe.
- ☐ Remove pets from the bedroom.
- ☐ Avoid exercise.

8. The statement regarding long-term controller medications, which of the following is true?

- ☐ Long-term controller medications should be taken only when symptoms are present.
- ☐ Long-term controller medications are prescribed for all patients with an asthma diagnosis.
- ☐ Long-term controller medications must be taken for two weeks to obtain their maximal benefit.
- ☐ Long-term controller medications should be stopped 2 weeks after symptoms have improved.

Appendix A (cont.)

9. Persistent asthma symptoms are most affected by which of the following?

- ☐ Bronchoconstriction (squeeze)
- ☐ Inflammation (swelling)
- ☐ Mucus production (secretions/snot)
- ☐ Decrease is muscle size (lack of hypertrophy and hyperplasia)

10. Which statement about asthma medications is true?

- ☐ Quick-reliever medications reduce inflammation.
- ☐ A spacer does not increase the amount of medication that goes into the lungs for most patients.
- ☐ Long-term controller medications work best if taken daily.
- ☐ Long-term controller medications relax the "squeeze" (bronchoconstriction).

11. Which of the following is an important counseling point for patients with asthma?

- ☐ Always shake your MDI inhaler before use.
- ☐ Rinse mouth/ brush teeth after using inhaled corticosteroid (ICS).
- ☐ Use Flovent HFA every day as prescribed.
- ☐ All of the above.

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Using Standardized Patients as Part of a Preclinical Simulation

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Abstract

Background: Standardized Patient Encounters (SPEs) prepare health professions students for entry to clinical practice. The goal of the SPE is to provide an environment in which learners might practice communication and patient assessment skills, while receiving a comprehensive evaluation of performance. **Methods:** This research used a validated evaluation tool to score the bachelor's and master's level respiratory therapy student's ability to conduct an organized but sensitive interview of a patient and complete a full assessment of the pulmonary status of a patient. We provided students with learning objectives and resources four weeks prior to the SPE. Resources included: two patient scenarios, a two-hour lecture that used videos of previous SPEs, and the evaluation tool. Students (self-evaluation), faculty, and Specialized Patients (SPs) used the same rubric to assess the student performance during the SPE. **Results:** A total of 47 students admitted to the Respiratory Care Program in 2016 participated in the SPE. There were no significant differences ($P = 0.12$) between the Bachelor of Science in Respiratory Care (BSRC) and Master of Science in Respiratory Care (MSRC) scores from the evaluations nor between the overall assessment scores by faculty, SPs, and students. The items where students scored highest were "professional appearance and presentation of information during the interview" and "organization of the interview." There were significant differences in scoring among groups for the following three areas: student introduction of self and role (SP 86.23% vs. faculty 94.02%; $P = 0.006$); listening to the patient (SP 92.03% vs. students 88.03%; $P = 0.001$); closure of the interview (SP 97.1% vs. faculty 88.6%; $P = 0.006$). Overall, students felt the SPE was useful in preparing them for entry to clinical rotations. **Conclusion:** A SPE can be an integral part of preclinical education for students. The students valued the SPE experience and increased their confidence and skills in preparation for entry to clinical rotations.

Key words: standardized patient, patient simulation, simulated patients, preclinical simulation, respiratory therapy education, standardized patient encounter

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Introduction

Standardized Patient Encounters (SPEs) have been used in health education since the mid -1960s. In medical schools across the United States, SPEs are widely used in their curriculum as an integral component of student training. They are designed to improve clinical skills and to prepare the medical student for clinical care along with preparing them for the United States Medical License Examination (USMLE) Step 2 Clinical Skills. SPEs can predict future clinical practice performance and provide an objective measure of how students interact with patients.[1,2] Multiple studies of SPEs in nursing education programs demonstrate improvement in clinical and communication skills.[1,3] On the other hand, the use of SPEs in respiratory care education is relatively new and not well utilized.[4,5]

SPEs provide students the opportunity to develop reasoning skills and to bridge the gap between didactic learning and clinical practice.[6,7] They also provide students a semi-real patient experience that reproduces significant aspects of the authentic clinical setting and reduces dependence on the random occurrence of less frequent clinical experiences.[7-10] The SPE provides a context to examine the student's knowledge and assessment and intervention skills regarding readiness for the clinical setting without replacing clinical time. It also provides them with the opportunity to use their clinical and non-clinical skills and to optimize patient care and safety prior to clinical placement.[1,2]

Standardized patients (SPs) are human actors who have been educated and trained to simulate symptoms in a standardized manner that are relevant to a specific set of learning goals. An effective SP presents the totality of the patient experience including: history, symptoms, body language, mental status, and responses to learner actions and communications (https://www.aspeducators.org/standards-of-best-practice, *Accessed February 15, 2018*). In addition, SPs are trained to evaluate student performance and provide pertinent feedback.[3]

Following SPEs, student interactions with the standardized patient are examined to evaluate the learner's ability to conduct an organized but sensitive patient interview and complete a full patient assessment. A 360-degree evaluation is accomplished by asking faculty, SPs, and student (self-evaluation) to use the same evaluation rubric to score performance on each area of the patient encounter. This type of evaluation, also known as multisource feedback, is an assessment technique focused on evaluations of an individual's performance from multiple perspectives, self-evaluation, peers, or superiors.[11] This type of evaluation is common in medical and nursing literature.[12-14]

Our review of the literature did not identify studies on the use of standardized patients as a preclinical assessment tool in respiratory care education. The purpose of this study was two-fold. First, compare interview and assessment scores between students enrolled in Bachelor of Science in Respiratory Care and Master of Science in Respiratory Care programs. Second, compare the scores between faculty, SPs, and students (self-evaluation) to achieve a 360-degree evaluation.

Methods

The data for this study was obtained during a series of SPEs performed at the University of Texas Health Science Center at San Antonio, Clinical Skills Center. The Institutional Review Board at the University of Texas Health Science Center at San Antonio approved the study. The SPE is used as part of a non-graded, preclinical experience designed to enhance student confidence and competence in preparation for their first clinical rotation. Study participants included students enrolled in the BSRC and MSRC programs in 2016.

The SPE occurred two to three weeks prior to beginning clinical rotations and encompassed several activities that included student and SP preparation, faculty scoring interrater reliability, evaluation rubric, student survey, and debriefing. These are described in detail in the following paragraphs.

Student Preparation

The modules for the SPE are housed in an online learning management system associated with the Patient Assessment Course. However, focused education and training occurs four weeks immediately prior to the SPE. This preparation includes the activities outlined in Table 1.

Standardized Patient Preparation

Each SP used for the Standardized Patient Encounter was trained by a professional Clinical Skills Center coach to be a patient, answer the questions the learners ask, and to "act sick" by taking on the demeanor of the patient scenario (Appendix A). The SP coach was provided with the same case scenario "cough and shortness of breath" script shared with students prior to the SPE. The script contained all the questions and answers necessary to complete the interview. Each SP responded to the student's questions as indicated on the script. The SP was trained by the professional Clinical Skills Center coach to evaluate the student using the evaluation rubric.

Table 1. Standardized Patient Encounter Preparation

Activity	Description
Patient Interview and Physical Examination	Lecture and laboratory sections covered as part of the Patient Assessment Course
Standardized Patient Encounter Modules	Specific units posted online for the SPE: • Objectives of the SPE • Do's and don'ts • Sample videos of previous SPEs • Case scenario cough and shortness of breath scripts (Appendix A) • Evaluation rubric (Appendix B)
Laboratory Practice	Students practiced the cough and shortness of breath case scenarios, interviewed their peers following the script for each case and practiced the physical exam of the chest the same as what is expected during the SPE. Faculty provided corrective guidance and students were required to repeat errant performance.
Tour of the Clinical Skills Center	During the visit to the Center, students are informed: • Where to wash hands, seating arrangement, to take notes, and where to stand during physical exam • When they would hear announcements for time left, and when the SPE has concluded

Faculty Scoring Using Interrater Reliability

Interrater reliability was determined prior to the first day of the SPE. Faculty participating as evaluators during the activity were asked to watch two videos from previous SPEs, then asked to score each rubric item on a scale of 1 to 3 (Appendix B). Scores were compared as a group and interrater reliability was ensured by all faculty scoring performance scores with a margin of error of 0.14 (mean score 2.12; range 2.00-2.14).

Day of the Encounter

Minutes prior to the standardized patient encounter, faculty were randomly assigned a group of students to evaluate. All students remained in a waiting area until they were called to begin the SPE. During this time, they could review the scripts associated with their assigned SP. During the SPE, students had 15 minutes to perform the patient interview, write notes on paper, and complete the physical examination of the chest. An announcement was made when they had 5 minutes left for the SPE and when they were to leave the room and chart their findings. During the SPE, faculty wore headphones to hear the interview, while observing the student-SP interaction through a one-way glass (Figure 1). Faculty were provided with a checklist (Appendix A) to confirm that all items pertaining to the interview were covered by the student during the SPE as well as the rubric (Appendix B) for grading the activity.

Evaluation Rubric

A validated 16-item rubric was selected to gauge student interviewing and physical assessment skills during the SPE (Appendix B). This rubric was used by the student for self-evaluation and used by the faculty and SP to evaluate the student. The rubric specifically evaluated categories that included: student professional appearance and presentation of information during the interview; introduction of themselves to the patient; timeline of chief complaint; eliciting the patient's story; organization of the interview; types of questions; pacing; transitional statements; listening; summarizing; lack of jargon; nonverbal facilitation; comfort during physical examination; organization of the physical exam; and closure of the interview (Appendix B). Each item in the

Figure 1. Students conducting the patient interview (A) and the physical exam (B), while being observed and evaluated by faculty (C).

categories was evaluated on a scale of 1 (minimum) to 3 (maximum) as seen in Appendix B.

360-Degree Evaluation

After the SPE, students completed the self-evaluation, and the faculty and SP completed the evaluation of student performance to provide a 360-degree evaluation. Scores on eight items of the rubric were selected for comparison (faculty vs. students vs. SP). The eight items were selected by faculty consensus to be the best representation of the scope of practice for respiratory therapists (Table 2).

Table 2. Rubric items used for comparisons among group

Rubric Item	Description of Maximum Score (3)
Introduction	The interviewer introduces him/herself, clarifies his/her role. Appropriately uses patient name or inquires how to address patient.
First Impression	Interviewer greets patient in a personable and professional manner. Interviewer uses good eye contact and establishes an initial connection.
Appearance and Presentation	The interviewer always speaks in a clear, easily understood voice. Well groomed, dress and adornment professional and in keeping with the clinical setting. Wears an identification badge. Presents self in a professional manner.
Types of Questions	Questions are asked in a clear, unambiguous manner. There are no leading questions or multiple part questions. The patient is never in doubt how to answer.
Listening	Interviewer is attentive to patient's story. Does not repeat questions, unless clarification or summarization of prior information is necessary.
Nonverbal Facilitation Skills	The interviewer puts the patient at ease and facilitates communication by using nonverbal facilitation skills such as: Relaxed open body language, appropriate facial expression and eye contact, appropriate physical contact and respect of personal space.
Comfort During Physical Examination	The interviewer is attentive to the patient's physical and emotional comfort. Alerts you to particularly private or sensitive maneuvers. Uses gowns or drapes properly. Appropriate exam table etiquette.
Closure of the Interview	At the end of the encounter, the interviewer presents learner level appropriate closure to the patient (e.g., thanks the patient for their time, summarizes the information obtained, discusses possible diagnoses, and/or specifies future plans).

Perceived Value Survey

An 8-item anonymous questionnaire was distributed to the students and completed immediately after the SPE. This questionnaire was designed to evaluate their overall perception of the SPE (preparation, realism, value, and potential impact on future interaction with patients). The questionnaire is provided in Appendix C.

Debriefing Session

Scores and comments from SP were provided to faculty by the Clinical Skills Center a few days after the SPE. This information was shared with students during a debriefing meeting, which was also designed to receive additional feedback from students regarding challenges encountered and ways to improve future SPEs.

Statistical Methods

SPSS data analysis software 22.0 (IBM, Armonk NY) was used to calculate descriptive statistics. A t-test was used to compare scores on the SPE between BSRC and MSRC students, as well as differences among scores provided by faculty, SPs, and students (360-degree evaluation). Significant difference was defined at $P < .05$.

Results

A total of 47 students admitted to the Respiratory Care Program in 2016 participated in the SPE. On the 16 items of the practitioner interviewing skills rubric the overall score given by faculty was 89.6% (±7.65%; range: 67% -100%). There was no significant difference between the BSRC and MSRC students ($P = 0.12$). On the eight items selected for the 360-degree evaluation the overall score by faculty, SPs, and students was 92.34%, 93.48%, and 94.86%, respectively ($P > 0.05$). No significant differences were found among the groups.

The items where students scored the highest were professional appearance and presentation of information during the interview (95.5%) and organization of the interview (96.83%). The areas where performance was below 90% included types of questions (88.03%), comfort during physical examination (88.37%), and closure of the interview (88.6%). There were only significant differences in the score for introduction of self to patient (SPs 86.23% vs. faculty 94.02%; $P = 0.001$) and closure of the interview (SP 97.1% vs. faculty 88.6% $P=0.006$). This information is displayed in Figure 2.

The overall performance of each group's documentation of the interview and physical examination was 56.7% (SD 16.9%; range 27.8%-91.7%). There was no significant difference in the score between MSRC and BSRC students (MSRC 56.9%, +/-16.9%, range 28%-92%; BSRC 56.7%, +/-13.5%, range 36.1%-77.8%) ($P = 0.45$). The areas of best documentation for the MSRC students were history of present illness, review of systems, and past medical history. The areas of best documentation for the BSRC students were family history, health maintenance, and social history. Specific questions regarding improvement of the chief complaint, weight changes, health screening, drug allergies, diet, stress

Figure 2. 360-degree evaluation results by SP, faculty and students

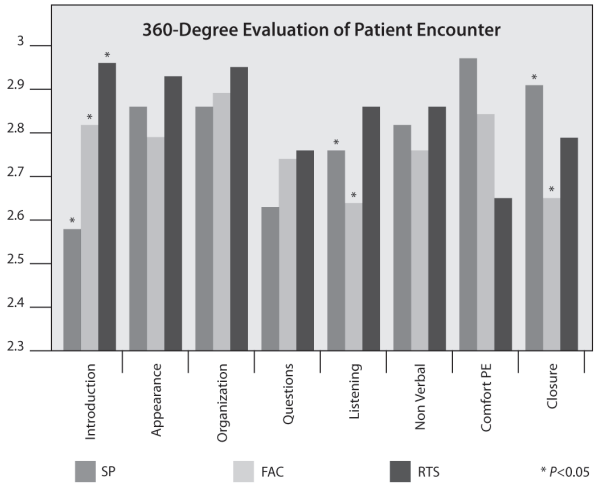
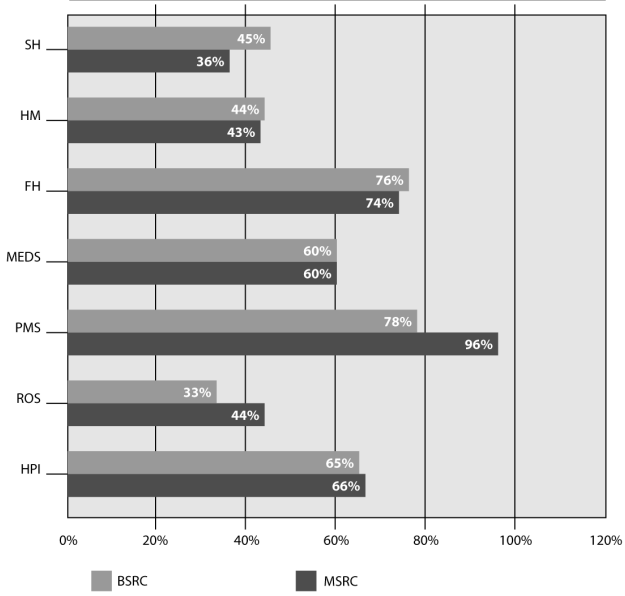


Figure 3. Comparision of MSRC vs. BSRC patient interview and documentation



SH: social history; HM: health maintenance; FH: family history; MEDS: medications; PMH: past medical history; ROS: review of systems; HPI: history of present illness.

level, and marital status were asked by less than 20% of the students participating in the SPE. Figure 3 displays a comparison of the 7 areas of the interview evaluated between BSRC and MSRC student.

Results from the post-encounter student survey identified overall positive student satisfaction (Table 3). The vast majority of students reported receiving enough preparation for the SPE (87.7%) and that they adequately prepared for the activity (95.4%). All surveyed students reported practicing with peers prior to the SPE. Regarding value of the experience, students reported that the encounter was realistic and positive (97.7%) and that it will provide future benefit in their encounters with patients (92.2%).

Discussion

Standardized patient encounters have been used in health care education to evaluate student communication and clinical skills.[1,3] Many respiratory care program patient assessment courses have been taught in a similar traditional manner teaching physical assessment skills by having students taking part in peer physical examinations, where students practice and validate assessment on one another. The issue with peer physical examinations is that

Table 3. Post-encounter student survey results

	Disagree or Strongly Disagree	Neutral	Agree or Strongly Agree
The patient encounter should be a component of the preclinical check off.	4.3%	4.3%	91.5%
The patient encounter should be incorporated into the Patient Assessment Course in the Fall of the junior year.	0.0%	4.3%	95.7%
This patient encounter will improve my interaction with patients in the future.	4.3%	4.3%	91.5%
The patient encounter was a positive experience.	0.0%	0.0%	100.0%
The standardized patient was very realistic.	0.0%	2.1%	97.9%
I practiced with a peer prior to the patient encounter.	0.0%	0.0%	100.0%
I adequately prepared for the patient encounter.	0.0%	4.3%	95.7%
I received enough preparation for the patient encounter.	0.0%	12.8%	87.2%

peers are healthy and students lack opportunities to assess abnormal findings. An alternative to the peer assessment is the use of SPs to provide realistic experiences that respiratory therapy students can use to develop and demonstrate patient interview and physical assessment skills. The use of SPs in a safe environment can provide a bridge between the didactic and clinical practice for respiratory therapy students.

The value survey results revealed that the students' experience with the SPs was positive. The students also stated the SPE should continue to be used as part of the preclinical and patient assessment courses. These findings are consistent with a number of studies that show preclinical evaluation using SPEs have been shown to improve clinical skills.[1,7]

Although a significant number of students reported they received adequate preparation for the encounter, performance in only two of the seven sections of the interview (past medical history and family history) is >75%. Questions about health maintenance (exercise, diet, sleep, etc.) and social history (family support, hobbies, and sexual activity) may provide important information on health-related quality of life of patients with respiratory disease. It could also impact how the patient will follow treatment at home. Both groups of students scored below 50% in these areas. Interestingly there were differences between the BSRC and MSRC interview (chief complaint, history of present illness, review of symptoms, etc.) skills, although none of these differences reached statistical significance.

The 360-degree evaluation found that there was not a significant difference between scores given to students by faculty and SPs in 6 out of the 8 areas evaluated. While faculty felt that students applied introduction skills well, SPs did not have a similar impression. This finding emphasizes how often health care professionals may fail in adequately introducing themselves, clarifying their role, and appropriately using a patient's name or inquiring how to address a patient. The majority of SPs considered that at the end of the encounter, the student presented learner level appropriate closure to the patient indicated by thanking the patient for their time, summarizing the information obtained, discussing possible diagnoses, and/or specifying future plans. This is a particular skill that requires attention when considering the respiratory therapist as a potential physician extender or advanced practitioner. The results of this study suggest that the interrater reliability training for faculty and SPs was on target. These results support findings by MacLean et al that indicate SPs' interrater reliability is correlated with faculty scores and SPs provide meaningful feedback to students.[15] On the other hand, students scored their own performance significantly higher in 7 out of the 8 items selected from the rubric.

Although qualitative data was not included in the analysis, the debriefing provided a summary of the experience observed by faculty, students, and SPs. Evidence supports the importance of debriefing following standardized patient experiences.[2] Debriefing allows the student to reflect on their experience and extend their learning. This evaluation of the experience revealed that students saw the SPE as a positive experience.

Further research is needed to evaluate if the use of SPs for preclinical competencies translates into increased competency in the clinical setting. This type of research focused on students' patient interview and physical assessment skills has an impact on patient health outcomes. In addition, future research would benefit from the use of the interprofessional team physical assessment and interviewing skills. Research has shown the benefits of SPEs, which may justify the significant costs associated with the use of the SPs and the skills center.

Limitations

This study has several limitations. First, it used a single patient case for the SPE. The argument could be made however, that two simulated cases (cough and shortness of breath) were used and are representative complaints of patients with lung disease. Second, the study was conducted with students from accredited BSRC and MSRC respiratory care programs. Therefore, similar studies in other respiratory care programs are needed. Third, while students are likely to respond enthusiastically to patient simulation and SPEs, student perceptions should not be substituted for objectively measured outcomes in this type of quantitative research. Finally, although a significant number of students reported they received adequate preparation for the encounter, performance in only two of the seven sections of the interview were performed at the threshold level of competence (>75%). This finding suggests that student reports may not reliably reflect competency.

Conclusion

Educators are often looking for ways to improve teaching and ensure students are prepared to provide safe and competent patient care. The use of SPEs in

respiratory care education is limited, yet our findings suggest the use of a SPE as a preclinical experience increases students' perception of preparedness for entry to clinical rotations, while also increasing students' confidence.

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Appendix A

Case 1
Doorway Information

Opening Scenario
John/Jane Lennox, a 60 year old, comes to the ER complaining of cough and shortness of breath.

Vital Signs
BP: 140/80 mmHg
Temp: 100°F (37.3°C)
RR: 24/minute
HR: 90/minute, regular

Nurses Notes
Mr./Mrs. Lennox, 60 yo m/f, has come to the emergency room due to increasing cough and shortness of breath. Upon arrival, Respiratory Therapy gave him a breathing treatment per protocol. He is more comfortable now, but still having SOB.

Examinee Tasks
15 MINUTES:
1. Take a focused history.
2. Perform a focused physical exam relative to the patient's CC (do not perform rectal, genitourinary, or female breast exam).
3. Explain your clinical impression and workup plan to the patient.

10 MINUTES:
4. Write the patient note after leaving the room.

Checklist/SP Sheet
PATIENT DESCRIPTION
Patient is a 60 yo.

Notes For The SP
- OPENING STATEMENT: "I have a terrible cough and it's making it difficult for me to breathe."
- Cough as the examinee enters the room.
- Continue coughing every 3-4 minutes during the encounter.
- Hold a tissue in your hand. Don't show it to the examiner unless he/she asks you.
- If asked about sputum, ask the examiner, "What does 'sputum' mean?"
- During the encounter, pretend to have a severe attack of coughing. Note whether the examinee offers a glass of water or a tissue.

CHALLENGING QUESTIONS TO ASK
"Will I get better if I stop smoking?"

Sample Response
"Well, we still have to sort out exactly what's making you sick. Stopping smoking should help your chronic cough, and over the long term it will significantly decrease your cancer risk."

Examiner Checklist
ENTRANCE:
- ☐ Examinee knocked on the door before entering.
- ☐ Examinee introduced him/herself by name.
- ☐ Examinee identified his/her role or position.
- ☐ Examinee correctly used patient's name.
- ☐ Examinee made eye contact with the SP.

HISTORY:
- ☐ Examinee showed compassion for your illness.
- ☐ Examinee offered you a glass of water or a tissue during your severe bout of coughing.

SYMPTOM #1	PRODUCTIVE COUGH (YELLOW SPUTUM)
☐ Onset	Over the last 2-3 days
☐ Progression of the cough	Much more forceful than previous cough. Increased coughing spells (4-5 times a day)
☐ Alleviating factors	OTC cough syrup (Robitussin) helps a little, not much
☐ Exacerbating factors	Activity of any kind
☐ Sputum production ☐ Amount ☐ Color ☐ Blood	Yes 1-2 teaspoonfuls Yellowish mucus No
☐ Associated symptoms	Have had a cough (Sx #2) now for about a year, but this one is worse.
SYMPTOM #2	**DRY COUGH**
☐ Onset	Over the last year
☐ Description of the cough	Mostly dry (no sputum) but worse in the morning and when bad is productive of clear, mucus-like sputum.
☐ Frequency	Often, but does not interfere with most activities (see below, under SOB)
☐ Time of day	Worse in AM, but then several short coughing spells throughout the day
☐ Alleviating factors	Nothing really
☐ Exacerbating factors	Activity of any kind and cold air. I really noticed this reaction to cold air while visiting my wife's relatives in Minnesota this past winter.
☐ Associated symptoms	Shortness of breath

Appendix A (cont.)

SYMPTOM #3	SHORTNESS OF BREATH
☐ Onset	Slowly increased over the last 2-3 years, worse over the last 3 days.
☐ How bad?	Sometimes I have to stop what I am doing to "catch my breath."
☐ Frequency	Every time I increase my activity level or have a coughing spell
☐ Alleviating factors	Stopping activity
☐ Exacerbating factors	Exercise, especially lately, I have noticed that just walking around the house can get me SOB.
☐ Associated symptoms	Fever to 101.5 and sweats for the last 3 days
☐ Past medical history	High blood pressure, 7 years, treated by my primary MD Seasonal allergies (hay fever), worse in spring and summer
☐ Current medications	Lisinopril 20 mg every morning for high BP Over-the-counter allergy medication as needed Took 2 Tylenol extra strength 2 hours ago for fever.
☐ Family history	*Father:* deceased, age 63, lung cancer *Mother:* deceased, age 80, "old age" *Siblings:* Brother, 62, recent heart procedure where they put a balloon in his arteries (angioplasty), high blood pressure
HEALTH MAINTENANCE AND PREVENTION	
☐ Medication allergies	None
☐ Health screening	*Male:* Up to date; see primary care MD (twice per year) to check high BP; had "breathing tests" in March at last routine visit due to the complaint of shortness of breath (don't remember the results) *Female:* Up to date; see primary care MD (twice per year) to check high BP; had "breathing tests" in March at last routine visit due to the complaint of shortness of breath (don't remember the results). Up to date on well woman exam, no problems.
☐ Exercise	Get little exercise due to SOB.
☐ Sleep	Usually, no problems. Over last 2-3 days, the increased cough has awakened me at times. Specifically, I do not need to sleep on several pillows to breathe.
☐ Diet	Regular
☐ Weight change	No
☐ Hobbies	Own, no model making
☐ Tobacco ☐ Duration ☐ Amount	Yes I have smoked for the past 40 years. 1½-2 packs a day.
☐ Alcohol use	Never
☐ Illicit drug use	Never
☐ Sexual activity	Decreased over last year due to SOB.

SOCIAL HISTORY	
☐ Occupation	Retired, worked in a print shop
☐ Marital status	Married 40+ years
☐ Children	Use your own
☐ Life stressors	Nothing out of the ordinary. You have started to worry about the cough and SOB, but not to the extent that you have sought medical treatment for it.

PHYSICAL EXAMINATION:

- ☐ Examinee washed his/her hands.
- ☐ Examinee asked permission to start the exam.
- ☐ Examinee used respectful draping.
- ☐ Examinee did not repeat painful maneuvers.

EXAM COMPONENT	MANEUVER
☐ Head and neck exam	Inspected mouth, throat, lymph nodes
☐ CV exam	Auscultation
☐ Pulmonary exam	Auscultation, palpation, percussion
☐ Abdominal exam	Auscultation, palpation
☐ Extremities	Inspection

CLOSURE:

- ☐ Examinee discussed initial diagnostic impressions.
- ☐ Examinee discussed initial management plans.
- ☐ Examinee asked if the patient had any other questions or concerns.

Sample Closure:

Mr./Mrs. Lennox, your cough and shortness of breath may be due to a lung infection that can be treated with antibiotics. I will suggest to your primary doctor that we need to obtain some blood and sputum tests as well as a chest x-ray in order to identify the source of your problem. In addition, we may find it necessary to conduct more sophisticated tests in the future. Do you have any questions for me?

Appendix B

Evaluation of Medical Interviewing Skills

1. ITEM 1: Introduction

- ☐ There is no introduction of self at all or uses inappropriately familiar or informal variation of your name.
- ☐ Incomplete identification of self (name or role missing) or patient.
- ☐ The interviewer introduces him/herself, clarifies his/her role. Appropriately uses patient name or inquires how to address patient.

2. ITEM 2: First Impression

- ☐ Interviewer begins interview in an impersonal manner. Initial eye contact is lacking.
- ☐ Greeting is less personable. Initial eye contact may be brief.
- ☐ Interviewer greets patient in a personable and professional manner. Interviewer uses good eye contact and establishes an initial connection.

3. ITEM 3: Appearance and Presentation

- ☐ The interviewer's speech is frequently unclear and patient has difficulty understanding or hearing him/her. Poorly groomed — inappropriate clothing for setting or dirty or disheveled clothing/lab coat. No identification badge. Presents self excessively casually.
- ☐ One or two points are not present or could use minor improvement.
- ☐ The interviewer always speaks in a clear, easily understood voice. Well groomed, dress and adornment professional and in keeping with the clinical setting. Wears an identification badge. Presents self in a professional manner.

4. ITEM 4: Timeline of Chief Complaint

- ☐ Interviewer fails to obtain information necessary to establish a timelin.
- ☐ Interviewer obtains some of the information necessary to establish a timeline.
- ☐ Interviewer obtains information from the patient in chronological order. Asks first about how the problem began, then asks what happened next, and continues until the present.

5. ITEM 5: Eliciting the patient's story

- ☐ Interviewer does not begin with an open-ended question, instead employs only specific or direct questions to gather information.
- ☐ The interviewer begins with an open-ended question, follows by more specific or direct questioning, but fails to explore additional symptoms/problems in the same manner.
- ☐ The interviewer begins information gathering with an open-ended question, followed by more specific or direct questions. Additional symptoms/problems are explored in the same manner.

Example:
Interviewer encourages the patient to tell the story of the illness. Begins with open questions/statements, followed by less open questions/statements, followed by closed questions. Example of a good open question to begin: "Can you tell me about your illness?" A follow up open-ended but more specific statement would be "Tell me about your pain." Closed questions are the most specific type of questions and usually require a brief answer like "Yes" or "No" (i.e., "Did you experience any nausea or vomiting?" or "Was the pain sharp or dull?"

6. ITEM: Organization of Entire Interview

- ☐ Interviewer asks questions that seem disjointed and unorganized. Interview jumps from element to element with no seeming order.
- ☐ Interview is organized for the most part, with only one or two lapses in revisiting an interview element after seeming to complete it.
- ☐ Questions in the body of the interview follow a logical order to the patient. Interviewer takes an orderly approach, introducing an interview element and completing it before beginning another.

Appendix B (cont.)

7. ITEM 7: Types of Questions

- ☐ Questions are confusing or difficult to answer. The interviewer may ask many leading questions or multiple part questions.
- ☐ The questions are typically clear, but may occasionally confuse you. The interviewer uses a few leading questions or multiple part questions.
- ☐ Questions are asked in a clear, unambiguous manner. There are no leading questions or multiple part questions. The patient is never in doubt how to answer.

Example:

Leading questions:
"Your child has never had diarrhea, has he?"
"You want your child to have a tetanus shot, don't you?."
Answer is implied.

Multiple part questions: "
Do you have chest pain, shortness of breath, or leg swelling?"
"Do you drink or smoke?" Patient doesn't know which question to answer and often will only answer one.

8. ITEM 8: Pacing

- ☐ The interviewer frequently interrupts the patient and/or there are uncomfortable pauses which break the flow of the interview. Flow is not conversational.
- ☐ The pace of the interview is comfortable most of the time, but the interviewer occasionally interrupts the patient and/or allows delays to break the flow of the interview.
- ☐ The interviewer is attentive to the patient's responses. The interview has a conversational flow and progresses smoothly with no awkward pauses. Allows silence while the patient prepares response or experiences emotional reaction.

9. ITEM 9: Transitional Statements

- ☐ The interviewer progresses from one interview element to another in a confusing, random or disconcerting manner. Patient feels uncertain as to the purpose and sequence of the questions. No transitional statements are made.
- ☐ The interviewer sometimes introduces interview elements with effective transitional statements, but fails to do so at other times or may transition abruptly.
- ☐ The interviewer always utilizes transitional statements when progressing from one interview element to another, which assures the patient that the information being sought is necessary and important. *(e.g., "Now I'm going to ask you some questions about your family.")*

10. ITEM 10: Listening

- ☐ Interviewer is inattentive, frequently repeats questions seeking information previously provided. Interviewer misunderstands what you say. Does not acknowledge (or allow for) attempts to add or correct information. Makes assumptions.
- ☐ The interviewer occasionally repeats questions
  OR
  Summary may contain inaccurate information. Interviewer may not seek verification, but will accept correction.
- ☐ Interviewer is attentive to patient's story. Does not repeat questions, unless clarification or summarization of prior information is necessary.

11. ITEM 11: Summarizing

- ☐ The interviewer fails to summarize the data obtained or data is completely inaccurate.
- ☐ The interviewer summarizes the data but not consistently or completely
  OR
  Summarizes at the end of the encounter, but summary is incomplete or contains inaccuracies.
- ☐ The interviewer summarizes the data obtained at the end of each element and/or at the end of the encounter to verify/clarify the information. Summary is complete and accurate.

Appendix B (cont.)

12. ITEM 12: Lack of Jargon

- ☐ The interviewer uses difficult medical terms (jargon) throughout the interview.
- ☐ The interviewer occasionally uses medical terms (jargon) during the interview, failing to define the medical terms for the patient unless specifically requested to do so by the patient.
- ☐ The interviewer asks questions, provides information and gives directions in language that is easily understandable. Content is free of difficult medical terms (jargon). Language used is appropriate to the patient's level of education.

13. ITEM 13: Nonverbal Facilitation Skills

- ☐ The interviewer makes no attempt to put the patient at ease. Body language is negative or closed. An annoying mannerism (foot or pencil tapping) intrudes on the interview. Eye contact is not attempted or is uncomfortable. Stands\sits too distant or too close. Facial expression may be lacking or incongruent with situation.
- ☐ The interviewer makes use of nonverbal facilitation skills, but could be more consistent
  OR
  One or two skills are not used effectively.
- ☐ The interviewer puts the patient at ease and facilitates communication by using nonverbal facilitation skills such as:
  Relaxed, open body language; appropriate facial expression and eye contact; appropriate physical contact and respect of personal space.

14. ITEM 14: Comfort During Physical Examination

- ☐ Interviewer isn't attentive to patient's physical and emotional comfort. Does not inform you before performing exam maneuvers. Rough treatment or causes unnecessary pain. Leaves you unnecessarily exposed or undraped. Lacking exam table etiquette.
- ☐ Interviewer is somewhat attentive to patient's physical and emotional comfort. Explains most, but not all maneuvers. Notices and corrects inadequate draping. May have inconsistent exam table etiquette.
- ☐ The interviewer is attentive to the patient's physical and emotional comfort. Alerts you to particularly private or sensitive maneuvers. Uses gown or drapes properly. Appropriate exam table etiquette.

Exam table etiquette:
Offers to help onto and off of table, assisting when necessary. Pulls out leg rest when patient lies down.

15. ITEM 15: Organization of Physical Examination

- ☐ Physical examination is disjointed and unorganized. Exam jumps from one body area to another area and back with no seeming order. Patient required to make multiple, repeated positional changes throughout examination.
- ☐ Physical examination is organized for the most part, with only one or two lapses in revisiting an area of the body after seeming to complete it. Patient experiences one or two repeated position changes.
- ☐ Physical examination follows a logical order. Interviewer takes an orderly approach, examining one area of the body and completing it before beginning another. Patient experiences minimal position changes.

16. ITEM 16: Closure of the Interview

- ☐ At the end of the encounter, the interviewer gives NO closure (leaves the room without wrapping up in any way) and/or leaves the patient without any sense of what to expect from the visit.
- ☐ At the end of the encounter, the interviewer only presents partial closure to the patient
  OR
  Provides closure more appropriate for a lower level learner.
- ☐ At the end of the encounter, the interviewer presents learner level appropriate closure to the patient (*e.g., thanks the patient for their time, summarizes the information obtained, discusses possible diagnoses, and/or specifies future plans.)*

Learner level appropriate examples of closure:

MS1: Thank the patient.
MS2: Thank the patient. Summarize to show that you heard what the patient said.
MS3: Thank the patient. Summarize and include information about whether or not you have a sense of a differential diagnosis and assure the patient that there will be further evaluation and treatment.
MS4: Thank the patient. Summarize and give probable diagnoses, alternates on the differential, and specify plan from here (evaluation, treatment, and follow up.)

Appendix C

Post-Encounter Student Survey

1. The patient encounter should be a component of the preclinical check off.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

2. The patient encounter should be incorporated into the Patient Assessment Course in the Fall of the junior year.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

3. This patient encounter will improve my interaction with patients in the future.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

4. The patient encounter was a positive experience.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

5. The standardized patient was very realistic.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

6. I practiced with a peer prior to the patient encounter.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

7. I adequately prepared for the patient encounter.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree

8. I received enough preparation for the patient encounter.

   ☐ Strongly disagree
   ☐ Disagree
   ☐ Neutral
   ☐ Agree
   ☐ Strongly agree