

CLARK, KIMERLY M., Ed.D. Evidence-Based Practice Knowledge, Self-Efficacy, and Use among Respiratory Therapy Faculty and Students. (2019).
Directed by Dr. Pamela Kocher Brown. 66 pp.

Evidence-based practice (EBP) is considered a major respiratory therapy competency established by the profession and essential to the clinical decision-making process. Currently, there is a limited understanding of what factors influence the use of EBP among respiratory therapists. The purpose of this study was to assess the factors associated with the use of EBP among respiratory therapy faculty teaching in a large community college system and post-professional students enrolled in a university-based, respiratory therapy baccalaureate degree completion program. Additionally, strategies and resources used to teach EBP by faculty were described. Evidence-based practice knowledge, self-efficacy in knowledge, self-efficacy in use, learning experiences, use in practice, teaching strategies and resources used, and demographics were measured using a researcher-developed survey instrument. A total of 25 faculty and 58 post-professional students responded to the survey. Post-professional students viewed their learning experiences moderately favorable but had varied levels of self-efficacy in knowledge and use of evidence-based practice. Students rated their self-efficacy high in knowledge of assessing the outcome of a treatment ($M = 86.9$, $SD = 16.5$) and in assessing patients' needs, values and treatment preferences for self-efficacy in use of EBP ($M = 92.0$, $SD = 14.2$). Students rated their self-efficacy in knowledge lower regarding the PICO technique ($M = 73.5$, $SD = 27.8$) and interpreting common statistical tests ($M = 50.9$, $SD = 24.6$). Students were more likely to search the research literature six or more times per month compared to critically appraising and using the research literature. The majority of faculty had a more negative view of their learning experiences and also reported varied levels of self-efficacy in knowledge and use of evidence-based practice. Faculty scored their self-efficacy high in knowledge of knowing which type of research study yields the highest level of evidence ($M = 83.9$, $SD = 18.5$) and in assessing patients' needs, values

and treatment preferences for self-efficacy in use of EBP ($M = 90.0$, $SD = 14.0$). In contrast, faculty were less confident in their knowledge regarding using the PICO technique ($M = 67.4$, $SD = 24.9$) and interpreting common statistical tests ($M = 47.4$, $SD = 30.2$). Faculty were more likely to read the research literature six or more times per month compared to conducting critical appraisal. Case studies (87%) were the most common teaching strategy and AARC clinical practice guidelines (87%) were the most common resource used by faculty. All of the steps of EBP were reported as being taught to students, with searching efficiently for the best available evidence used most often (65.2%) and formulating a clinical question was used least often (21.7%). Binary logistic regression was conducted to determine which independent variables were predictors of EBP use in clinical decisions. A test of the full model versus a model with the intercept only was not statistically significant, $\chi^2(4, N = 54) = 7.73$, $p = .10$. Results suggest faculty and post-professional students in this study are knowledgeable and confident regarding EBP but the frequency of using EBP in clinical decisions is limited.

EVIDENCE-BASED PRACTICE KNOWLEDGE, SELF-EFFICACY, AND USE
AMONG RESPIRATORY THERAPY FACULTY AND STUDENTS

by

Kimberly M. Clark

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

Greensboro
2019

Approved by

Committee Chair

APPROVAL PAGE

This dissertation written by KIMBERLY M. CLARK has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____

Committee Members _____

Date of Acceptance by Committee

Date of Final Oral Examination

ACKNOWLEDGEMENTS

The completion of this dissertation and the work leading up to it would not have been possible without the direction and support of the faculty at the University of North Carolina at Greensboro. I would like to acknowledge Dr. Pam Kocher Brown, my dissertation chair, for her advice and encouragement throughout the dissertation process. I thank my committee members, Dr. Diane Gill and Dr. William Karper for their willingness to work with me and for their time and feedback during this process. I would also like to acknowledge Dr. Scott Richter for providing valuable statistical support and guidance. I greatly appreciate the commitment my committee put forth toward helping me complete this project. I would also like to acknowledge my friends and colleagues in the respiratory therapy profession. Without their help, this research study would not have been possible.

TABLE OF CONTENTS

| | Page |
|---|------|
| LIST OF TABLES..... | vi |
| LIST OF FIGURES | vii |
| CHAPTER | |
| I. PROJECT OVERVIEW | 1 |
| Review of the Literature | 2 |
| Evidence-Based Practice in Respiratory Therapy | 3 |
| Evidence-Based Practice in Respiratory Therapy Education | 4 |
| Statement of Purpose | 5 |
| Methods | 6 |
| Study Participants | 6 |
| Measures | 7 |
| Data Collection Procedures | 9 |
| Results | 10 |
| Knowledge, Self-Efficacy, Learning Experiences, and Use of EBP | 10 |
| Faculty Teaching Strategies and Resources | 13 |
| Impact of Factors Associated with Use of EBP | 15 |
| Discussion..... | 16 |
| Knowledge, Self-Efficacy, Learning Experiences, and Use of EBP | 16 |
| Faculty Teaching Strategies and Resources | 18 |
| Impact of Factors Associated with Use of EBP | 19 |
| Conclusion..... | 20 |
| II. DISSEMINATION | 21 |
| NCARE Report and Discussion | 21 |
| NCARE Report and Discussion Introduction | 22 |
| Summary of Findings | 23 |
| Recommendations | 24 |
| Facilitated Discussion..... | 26 |
| III. ACTION PLAN..... | 28 |
| Faculty Report and Discussion..... | 28 |
| Faculty Professional Development and Implementation..... | 30 |
| REFERENCES | 32 |

| | |
|--|----|
| APPENDIX A. IRB APPROVALS..... | 37 |
| APPENDIX B. SURVEY INVITATION EMAILS..... | 39 |
| APPENDIX C. INFORMED CONSENT | 41 |
| APPENDIX D. SURVEY INSTRUMENT – FACULTY VERSION IN QUALTRICS | 43 |
| APPENDIX E. SURVEY INSTRUMENT – STUDENT VERSION IN QUALTRICS | 56 |
| APPENDIX F. FACULTY AT-A-GLANCE HANDOUT | 66 |

LIST OF TABLES

| | Page |
|--|------|
| Table 1. Descriptive Statistics for EBP Knowledge, Self-Efficacy, and Learning Experiences..... | 12 |
| Table 2. Frequency of Engaging in EBP Activities..... | 12 |

LIST OF FIGURES

| | Page |
|--|------|
| Figure 1. List of EBP Strategies and Percentage of Faculty That Use Each Strategy ($n = 23$) | 14 |
| Figure 2. List of EBP Resources and Percentage of Faculty That Use Each Resource ($n = 23$) | 15 |

CHAPTER I

PROJECT OVERVIEW

In an ever-changing and complex health care environment, evidence-based practice (EBP) is at the forefront of providing quality patient care by using the best available evidence, clinical expertise, and considering patient needs and preferences when determining a course of action (Asokan, 2012; Salbach & Jaglal, 2011; & Speck, de Wolf, van Dijk, & Lucas, 2012). Respiratory therapists are important members of the health care team and are expected to assess and quantify the patient's cardiopulmonary status to recommend the best course of treatment supported by the evidence. Unfortunately, EBP is not routinely used in practice (Weng et al., 2014). Similar to other health professions, respiratory therapists have relied on clinical experience, peers, and expert opinion to form the basis of most clinical decisions (Arena, Goldberg, Ingersoll, Larsen, & Shelledy, 2011; Condon, McGrane, Mockler & Stokes, 2016; Keeley, Walker, Hankemeier, Martin, & Cappaert, 2016).

The American Association for Respiratory Care (AARC) established EBP as a core competency needed by respiratory therapists to provide quality patient care (Barnes, Gale, Kacmarek, & Kageler, 2010). However, understanding what is involved in EBP remains unclear among many respiratory therapists (Kacmarek, Barnes, & Durbin, 2012). The extent to which EBP has been incorporated into the education and clinical practice of respiratory therapy has not been well established. This research study was significant because it provided new knowledge on the current state of EBP in respiratory therapy, which established a starting point for improving education and promoting the use of EBP among respiratory therapists.

Review of the Literature

Many health professions have made EBP a desired competency and professional responsibility, which has resulted in the adoption of a similar set of the EBP principles considered essential to the clinical decision-making process (Barnes et al., 2010; Schreiber & Stern, 2005; Thomas, Han, Osler, Turnbull, & Douglas, 2017; Welch et al., 2014). However, there are a number of perceived barriers that impede the implementation of EBP. In previous studies, lack of time to implement the principles of EBP into clinical practice was found to be a significant contributing factor and often perceived as the most important barrier by healthcare professionals (Condon et al., 2016; Hankemeier & Van Lunen, 2013; Heiwe et al., 2011; McCarty, Hankemeier, Walter, Newton, & Van Lunen, 2013; McInerney & Suleman, 2010). However, the lack of self-efficacy, knowledge, and skills documented in studies highlights an important gap regarding the incorporation of the principles of EBP into the education and training of health care professionals (Hankemeier & Van Lunen, 2013; Hankemeier, et al., 2013; McInerney & Suleman, 2010; McEvoy, Williams, & Old, 2010; Salbach, Jaglal, & Williams, 2013; Welch et al., 2011; Weng et al., 2013). To be more specific the lack of self-efficacy in EBP knowledge and skills may potentially have the greatest influence by making the process appear more cumbersome and complex.

Respiratory therapy is among the health professions impacted by the need to incorporate EBP into education and clinical practice. Cook (2003) emphasized the importance that EBP would have in the delivery of respiratory therapy interventions. Evidence-based practice will significantly impact the role of the respiratory therapist, especially with the need to develop, implement, and evaluate protocol-driven patient care (Barnes et al., 2010). Protocol-driven patient care will require respiratory therapists to understand the principles of EBP and make

recommendations for revisions to protocols based on the best available evidence from the literature.

Evidence-Based Practice in Respiratory Therapy

In 2007, the American Association for Respiratory Care (AARC) established a task force and commissioned a series of conferences to look at health care trends, changes in the healthcare workforce, and expected changes in respiratory therapy to meet future healthcare needs (Kacmarek et al., 2009). As a result, EBP emerged as one of the major respiratory therapy competency categories and appears as a sub-competency throughout many of the other identified major competencies. However, research suggests that respiratory therapists are inconsistent in implementing EBP and often lack sufficient skills in critical appraisal, searching the literature, and forming answerable questions (Weng et al., 2014). In addition, even though respiratory therapists were aware of EBP, very few engaged in available educational activities to learn about EBP implementation.

Understanding what is involved in EBP appears to remain unclear among many respiratory therapists. Respiratory therapy department directors play a significant role in developing policy and procedures and setting priorities for the department. Many department directors do not view research activities as a top priority. Most do not understand the connection between EBP and being able to critique published literature and understanding basic statistical tests (Kacmarek et al., 2012). However, department directors expect respiratory therapists to understand EBP in the development and implementation of patient care protocols. This disconnect in understanding the principles of EBP may be a limiting factor in respiratory therapists' research capacity. Engaging in research activities, such as searching, reading, and using research literature, are essential to providing high quality patient care, reduce unnecessary treatments, and advance the scope of practice (Martins & Kenaszchuk, 2013; Salbach et al.,

2013). Applying EBP requires respiratory therapists to recommend goals and the direction of respiratory care for patients and provide evidence supporting various approaches (Barnes et al., 2010). Asokan (2012) recommended that a well-structured curriculum that includes the principles of EBP is needed to prepare graduates to apply practice-related research findings to clinical decisions.

Evidence-Based Practice in Respiratory Therapy Education

Respiratory therapy students must learn to apply the principles of EBP in the didactic and clinical setting by demonstrating their ability to effectively ask, acquire, appraise, and apply evidence to practice as well as assessing patient outcomes (Condon et al., 2016; DeCleene Huber et al., 2015; Welch et al., 2014). Welch et al. (2011) suggested that creating a culture of EBP must start with didactic education. The incorporation of the EBP principles in the curriculum should not be limited to one course but span the entire curriculum in didactic and clinical student learning experiences (Dotson et al., 2015). Higher levels of education, research activities, and engaging in EBP training opportunities are positively associated with increased knowledge and confidence in understanding and using EBP (Salbach et al., 2013; Welch et al., 2011). The majority of the research conducted on assessing knowledge, confidence, and use of EBP has been with clinicians, students, and faculty in baccalaureate and graduate education programs. In contrast, respiratory therapy associate degree programs provide the primary means of entry-level preparation but have been the subject of less research in regard to EBP. There are approximately 420 entry-level respiratory therapy programs in the United States with only 17% at the baccalaureate and graduate degree level (Commission on Accreditation for Respiratory Care [CoARC], n.d). Less than half of respiratory therapists hold a baccalaureate degree or higher (Dubbs, 2009).

Barnes, Kacmarek, and Durbin (2011) surveyed respiratory therapy education program directors to assess the current state of readiness to address the required competencies expected of new graduates and found that three of five EBP competencies were taught significantly less in associate degree programs compared to baccalaureate programs. The competencies included: (a) the ability to critique published research, (b) the ability to explain the meaning of general statistical tests, and (c) the ability to apply EBP to clinical practice. The results of the survey indicated that EBP is being taught at both educational levels but to a much lesser extent in associate degree programs. With a general agreement that EBP is essential to the profession, there are concerns that the majority of respiratory therapists entering the profession and those currently practicing respiratory therapists are not prepared to effectively use EBP as a tool to inform clinical decisions.

Additionally, teaching EBP to students may suffer similar barriers to implementation as it does in clinical practice. A prerequisite for teaching in respiratory therapy education programs is to have experience as a clinician. Clinicians who transition to teaching without sufficient knowledge, experience, and confidence in using EBP in clinical practice may be less likely to teach the principles of EBP to their students. Understanding the knowledge, self-efficacy, learning experiences, and use of EBP of faculty and post-professional students will help identify the current state of EBP in respiratory therapy.

Statement of Purpose

The purpose of this research study was to assess the factors associated with the use of EBP among respiratory therapy faculty teaching in a large community college system and post-professional students enrolled in a university-based, respiratory therapy baccalaureate degree completion program. Therefore, this study investigated the following specific aims:

1. Determine knowledge, self-efficacy, learning experiences, and use of evidence-based practice among faculty and post-professional respiratory therapy students.
 - a. Determine faculty knowledge, self-efficacy, learning experiences, and use of evidence-based practice.
 - b. Determine post-professional students' knowledge, self-efficacy, learning experiences, and use of evidence-based practice.
2. Determine which teaching strategies and resources faculty use to teach the principles of EBP.
3. Determine the relationship of knowledge, self-efficacy, and learning experiences to the use of evidence-based practice among post-professional respiratory therapy students.

Methods

To address the purpose and aims, an online self-administered questionnaire was developed and administered to faculty and students to assess knowledge, self-efficacy, and use of EBP. The data were used to describe the study participants' demographic characteristics, knowledge, self-efficacy, learning experiences, use of the EBP principles, and to determine if knowledge, self-efficacy, and learning experiences influenced the use of EBP principles among study participants.

Study Participants

Faculty currently teaching in associate degree respiratory therapy programs in a large community college system and post-professional students currently enrolled in a respiratory therapy degree advancement program in a large university were recruited to participate in this research study. To facilitate recruitment of study participants, permissions were obtained from the North Carolina Association for Respiratory Educators (NCARE) and the Department Chair

responsible for the respiratory therapy degree advancement program to use their email distribution list for soliciting participation.

A total of 35 faculty and 189 students were invited to participate, with 25 faculty and 58 post-professional students responding to the survey. Data were missing for two faculty and four students leaving 23 faculty and 54 student completed questionnaires. Average years of age for faculty participating in the study was ($M = 45.43$, $SD = 8.14$). The majority of faculty were female (71.4%), held a baccalaureate degree (62%), had 11 or more years of work experience (81%), less than 11 years of teaching experience, and worked in an urban-suburban location (66.7%). Students participating in the study were similar with an average age of 41.7 years ($SD = 8.37$), female (77.8%), had 11 or more years of work experience (54.8%), and worked in an urban-suburban location (79.2%).

Measures

Currently, there are no known published survey instruments to assess knowledge, self-efficacy, learning experiences, and use of EBP among respiratory therapists. The faculty and student survey instruments used in this study were developed based on previously established survey instruments used in nursing, allied health, and on the respiratory therapy EBP competency. The faculty version contained 51 items and the student version was shorter with 40 items. Appropriate permissions were obtained to use and modify identified survey instruments. Items adapted from existing survey instruments that contained items or similar items used in multiple studies by various authors were credited through appropriate citation. The survey instruments contained five sections, with a sixth additional section for faculty only.

Knowledge and confidence in knowledge subscales. Knowledge and confidence in knowledge were measured using six items adapted from evidence-based concepts: knowledge, attitudes, and use (EBCKAU) survey (Manspeaker, Van Lunen, Turocy, Pribesh, & Hankemeier,

2011) and self-reported knowledge items yielding similar content to knowledge items in the EBCKAU (McCluskey & Lovarini, 2005). Multiple-choice item internal consistency was measured using Kuder-Richardson (K20) internal consistency and revealed a .21 (95% CI 0.17 to 0.42) for the overall value. The confidence in knowledge scale corresponded to the multiple-choice items and rated confidence levels on an adapted 11-point rating scale ranging from 0 to 100 percent. Item level scores were averaged to obtain a composite score as a measure of knowledge and self-efficacy in knowledge. Cronbach's alpha was .86 (95% CI 0.81 to 0.90) for the confidence in knowledge subscale.

Confidence in EBP use subscale. Confidence in ability to engage in EBP was measured using the evidence-based practice confidence (EPIC) scale (Salbach & Jaglal, 2011; Salbach et al., 2013). The EPIC scale used an 11-point scale ranging from 0 to 100 percent. Item level scores were averaged to obtain a composite score as a measure of EBP self-efficacy. Internal consistency using Cronbach's alpha was 0.86 (95% CI 0.90 to 0.95).

Learning experiences subscale. Learning experiences were measured using three items regarding educational preparation in selected steps in the EBP process (Delany & Bialocerkowski, 2011; Heiwe et al., 2011; Sangoseni, Hellman, & Hill, 2013). Four items were developed specific to the recommended EBP and respiratory care protocol competencies established by the respiratory therapy profession (Barnes et al., 2010). Response options used a 5-point rating scale ranging from 1 (strongly disagree) to 5 (strongly agree). Internal consistency using Cronbach's alpha for the seven items was 0.88 (95% CI 0.84 to 0.92).

Use of EBP subscale. Use of EBP was measured by the frequency of searching, reading, appraising, and using the research literature (McCluskey & Lovarini, 2005; Salbach et al., 2013). In addition, teaching and preparation for teaching related to EBP was measured (McCluskey & Lovarini, 2005). Response options were \leq 1, 2-5, 6-10, 11-15, and \geq 16 times in one month

(Salbach et al., 2013). Internal consistency of the 11 items using Cronbach's alpha was 0.93 (95% CI 0.90 to 0.95).

Strategies and resources for teaching EBP. Strategies and resources for teaching EBP used by respiratory therapy faculty were assessed using 11 items adapted from DeAngelis, DiMarco, & Toth-Cohen (2013). The survey instrument had 11 items that were mostly structured as a check-all-that-apply format. Response options were modified to reflect respiratory therapy curriculum courses and resources. Two open-ended items were included for faculty to add any additional experiences with incorporating EBP into the curriculum that was not covered by the check-all-that-apply items and any other additional comments.

Participant demographic characteristics. Demographic items were used to capture sociodemographic and practice characteristics including age, gender, educational level, credentials, years of experience in clinical practice, years of experience in teaching, practice setting, and geographical location in the state.

Face validity of the survey instrument was assessed by 10 experts with respiratory therapy related experience, at least 10 years of clinical practice, and familiar with EBP concepts (Sangoseni et al., 2013). Average time to complete the questionnaire was approximately 25 minutes for the faculty version. All respondents indicated that the instructions were clear with only minor suggestions for revisions. All respondents agreed that the survey instrument appeared to be effective in obtaining information about knowledge, confidence, learning experiences, and engaging in activities related to the steps of evidence-based practice.

Data Collection Procedures

Data collection was designed to address the specific aims in this research study. Prior to data collection, study approval was obtained through the Institutional Review Boards at the University of North Carolina at Charlotte and the University of North Carolina at Greensboro

(Appendix A). Faculty and post-professional students were notified by an email invitation requesting their participation (Appendix B). Informed consent was included at the beginning of the questionnaire prior to accessing the items (Appendix C). A modified Dillman approach was used to increase response rates (Dillman, Smyth, & Christian, 2014). Two personalized email correspondences were sent to faculty and student participants over a 3-week period, with the reminder email occurring in the second week.

Data collection took place in January - February of 2019. An online self-administered questionnaire was distributed to collect responses using Qualtrics and data analysis procedures were conducted using SPSS 25.0 statistical software. All of the data used in this study were derived from the questionnaire data collected. There were separate faculty and student versions of the questionnaire to ensure only those items that are relevant to each group were available (Appendices D & E).

Results

Knowledge, Self-Efficacy, Learning Experiences, and Use of EBP

The researcher sought to determine knowledge, self-efficacy, learning experiences and use of EBP among faculty and post-professional students. The total knowledge composite score for faculty was 80.6%, representing 4.84 ($SD = 1.2$) out of a total possible score of 6.0. The majority of faculty (95.7%) correctly identified the first step in EBP, but fewer faculty (56.5%) correctly identifying the purpose of personal experience in the EBP process. Self-efficacy in knowledge and use composite scores were 76.6 ($SD = 18.5$) and 73.2 ($SD = 15.6$) out of 100, respectively. Faculty composite score was highest in their confidence in knowledge for determining the highest quality of evidence (83.9) but they were less confident in their knowledge about using the PICO technique (67.4). In addition, faculty composite scores indicated they were more confident in assessing patient needs, values, and treatment preferences (90.0) compared to

interpreting results obtained from statistical tests such as t-tests and chi-square (47.4) and regression procedures (45.7). Learning experiences composite scores were 2.57 ($SD = 0.88$) out of 5.0, suggesting that faculty reported they did not have favorable learning experiences regarding EBP, with faculty reporting learning the basic concepts of statistical analysis lowest (1.91).

Post-professional students participating in this study had a total composite knowledge score of 79%, representing 4.74 ($SD = 1.0$) out of 6.0. Most students (87%) correctly identified the first step in EBP, the first factor considered in the PICO technique, and assessing the outcome of the treatment. However, fewer students (56.5%) correctly identified the purpose of personal experience in the EBP process. Self-efficacy in knowledge and use composite scores were 79.0 ($SD = 15.5$) and 72.3 ($SD = 14.4$) out of 100, respectively among students. Composite scores were highest in students' confidence in knowledge for assessing the outcome of a treatment (86.9) but lowest in their confidence in knowledge about using the PICO technique (73.5). Students' self-efficacy in use composite scores for assessing patient needs, values, and treatment preferences (92.0) suggested a high level of self-efficacy compared to lower levels of self-efficacy in interpreting results obtained from statistical tests such as t-tests and chi-square (50.9) and regression procedures (53.2). Learning experiences composite scores were 3.14 ($SD = 0.82$) out of 5.0, suggesting that post-professional students reported they had moderately favorable learning experiences regarding EBP, with learning evaluation and treatment of patients using protocols the highest (3.65). Table 1 presents descriptive statistics for EBP knowledge, self-efficacy, and learning experiences among faculty and students.

Frequency of engaging in EBP activities were assessed among faculty and post-professional students. Evidence-based activities included searching, reading, critically appraising, and using the research literature as well as teaching concepts of EBP. The majority of faculty

reported reading the research literature (65.2%) and teaching the concepts of EBP (52.3%) six or more times per month.

Table 1

Descriptive Statistics for EBP Knowledge, Self-Efficacy, and Learning Experiences

| | Total Score Possible | Faculty (<i>n</i> = 23) | Students (<i>n</i> = 54) |
|----------------------------|-------------------------|-----------------------------|------------------------------|
| Content Area | | | |
| Knowledge | 6 | 4.84 (<i>SD</i> = 1.2) | 4.74 (<i>SD</i> = 1.0) |
| Self-Efficacy in Knowledge | 100 | 76.6 (<i>SD</i> = 18.5) | 79.0 (<i>SD</i> = 15.5) |
| Self-Efficacy in Use | 100 | 73.2 (<i>SD</i> = 15.6) | 72.3 (<i>SD</i> = 14.5) |
| Learning Experiences | 5 | 2.57 (<i>SD</i> = .88) | 3.14 (<i>SD</i> = .82) |

However, only 30% of faculty engaged in using the research literature and even fewer (13%) engaged in critical appraisal of the research literature. Students reported searching (59.3%) and reading (53.7%) the research literature compared to only 13% using the research literature and 18% critically appraising the literature six or more times per month. Table 2 presents the frequency of engaging in EBP activities among faculty and students.

Table 2

Frequency of Engaging in EBP Activities

| Item | Faculty (<i>n</i> = 23) | Students (<i>n</i> = 54) |
|----------------------------|-----------------------------|------------------------------|
| Search research literature | | |
| 0-5 times/month | 13 (56.5%) | 22 (40.7%) |
| ≥ 6 times/month | 10 (43.5%) | 32 (59.3%) |
| Read research literature | | |
| 0-5 times/month | 8 (34.8%) | 25 (46.3%) |
| ≥ 6 times/month | 15 (65.2%) | 29 (53.7%) |

Table 2 (continued)

| | | |
|---|------------|------------|
| Critically appraise research literature | | |
| 0-5 times/month | 20 (87%) | 41 (75.9%) |
| ≥ 6 times/month | 3 (13%) | 13 (24.1%) |
| Use research literature | | |
| 0-5 times/month | 16 (69.6%) | 36 (66.7%) |
| ≥ 6 times/month | 7 (30.4%) | 18 (33.3%) |
| Teach concepts of EBP | | |
| 0-5 times/month | 11 (47.8%) | 44 (81.5%) |
| ≥ 6 times/month | 12 (52.3%) | 10 (18.5%) |

Faculty Teaching Strategies and Resources

The researcher sought to determine which teaching strategies and resources faculty used to teach the principles of EBP. Of the 23 faculty who completed the survey, 43.5% reported that they incorporated EBP concepts into at least one course and 21.7% reported including EBP concepts in at least four courses. Having a course that focused exclusively on EBP was reported by only 17.1% of faculty. The majority of faculty reported incorporating EBP concepts in foundational knowledge (56.5%), assessment and evaluation (73.9%), therapeutic and diagnostic (56.5%), clinical skills and clinical intervention labs (60.9%), and clinical practice (65.2%) courses. Case studies (87%), literature reviews (60.9%), and database searches (43.5%) were used most often by faculty as strategies to teach EBP concepts. Figure 1 illustrates the strategies used by faculty to teach EBP concepts.

Resources most commonly used by faculty included AARC Clinical Practice Guidelines (87%), NBRC Exam Matrices (78%), and *Respiratory Care* (65%). All of the steps of EBP were reported as being taught to students with searching for the best available evidence used most often (65.2%) while formulating a clinical question was used least often (21.7%). The majority of faculty reported using different approaches to support the core competency of EBP outlined by

the AARC 2015 and Beyond Initiative ranging from having EBP as a core thread in the curriculum (17.4%) to recognizing both quantitative and qualitative research as contributing to EBP (56.5%). Figure 2 illustrates the resources used by faculty to teach EBP concepts.

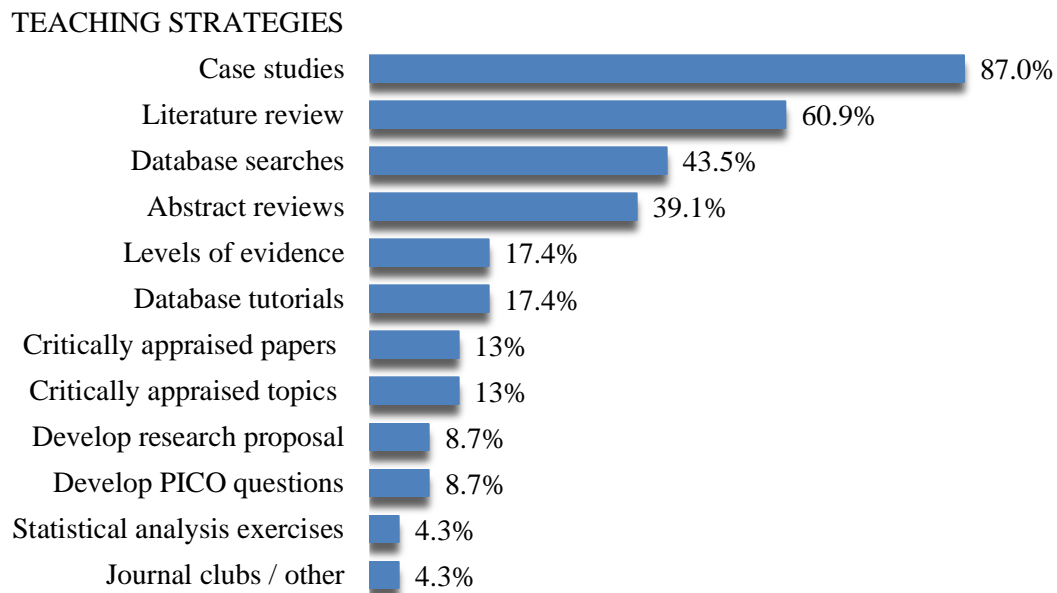


Figure 1. List of EBP Strategies and Percentage of Faculty That Use Each Strategy ($n = 23$).

Faculty had the option to provide additional comments regarding suggestions and experiences about incorporating EBP into the curriculum and other comments in general. There were only a few comments and included 1) incorporating EBP into the curriculum is the best strategy moving forward but it is challenging to cover all of the major content areas within the associate degree time frame and still achieve high pass rates for CoARC accreditation, 2) limited time in the program to formally teach all of the EBP concepts but an attempt is made to teach some of the basic concepts, and 3) a desire to include EBP as a teaching strategy more often with more teaching experience.

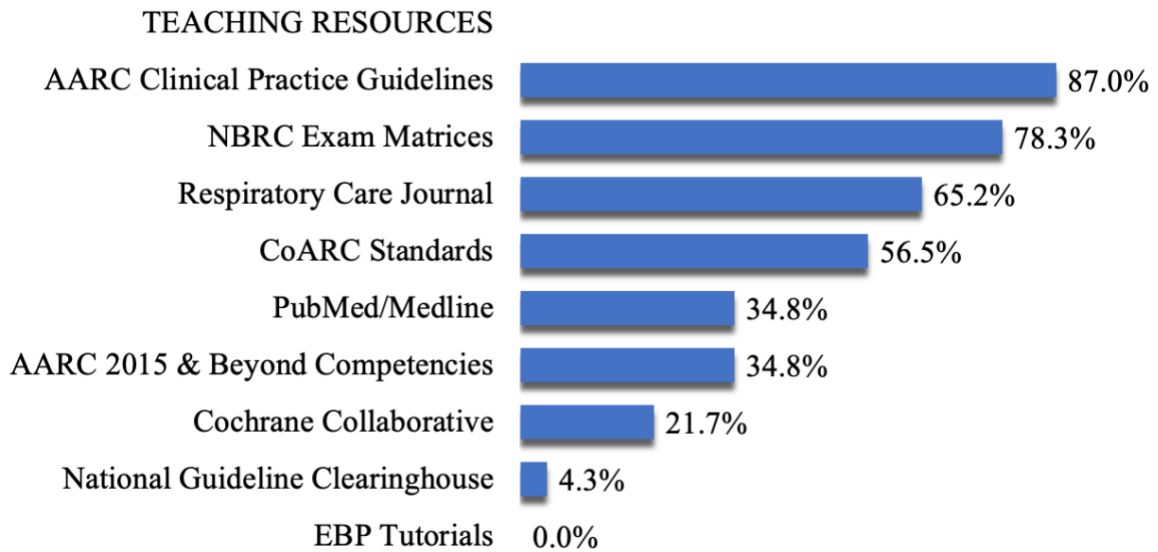


Figure 2. List of EBP Resources and Percentage of Faculty That Use Each Resource ($n = 23$).

Impact of Factors Associated with Use of EBP

The researcher sought to determine the relationship of knowledge, self-efficacy, and learning experiences to the use of EBP among post-professional respiratory therapy students. Scores for knowledge, self-efficacy in knowledge, self-efficacy in use, and learning experiences for EBP were the independent variables of interest. Prior to analysis, the response options were recoded to a dichotomous variable of 0 = 0-5 times/month and 1 = 6 or more times/month (Salbach et al., 2013).

Data were screened for missing data, outliers, and multicollinearity. Binary logistic regression was conducted to determine which independent variables were predictors of EBP use in clinical decisions. A test of the full model versus a model with the intercept only was not statistically significant, $\chi^2 (4, N = 54) = 7.73, p = .10$. The model was able to correctly classify only 39% of those who used EBP in clinical decisions 6 or more times per month and 94% of those who did not, for an overall success rate of 76%.

Discussion

Knowledge, Self-Efficacy, Learning Experiences, and Use of EBP

The first aim was to determine knowledge, self-efficacy, learning experiences and use of EBP among faculty and post-professional students. The purpose of using EBP is to provide quality patient care. However, in order to implement EBP in clinical decisions, respiratory therapists must be knowledgeable and confident in using EBP (DeCleene Huber et al., 2015).

Post-professional students. Post-professional students demonstrated sufficient knowledge and understanding the introductory concepts of EBP. However, knowledge of specific components of the EBP process was not as strong. The definition of EBP includes not only the use of the best available research evidence but also considers clinical experience and expertise and patients' needs, values, and treatment preferences. Students demonstrated less knowledge about the role that clinical experience plays guiding future clinical practice and decision making but displayed a moderate to high level of self-efficacy in knowledge regarding their response. Students reported the most self-efficacy in the use of EBP in asking patients about their needs, values, and treatment preferences, and students reported the least self-efficacy regarding interpretation of statistical tests suggesting they are more likely to rely on patient information for clinical decisions compared to research-based information (DeCleene Huber et al., 2015). Lack of knowledge and self-efficacy in understanding EBP concepts and statistical analysis can be perceived as barriers difficult to overcome (McCarty et al., 2013; Welch et al., 2011; Weng et al., 2013; Weng et al., 2014).

Students indicated positive learning experiences in applying EBP to clinical decisions and the development, application and evaluation of protocols in clinical practice. The AARC (2016) recommended that all entry-level respiratory therapy graduates be competent in explaining the use of EBP in the development and application of respiratory protocols, and in the evaluation

and treatment of patients using respiratory care protocols. The findings of the study suggest that students are engaging in learning experiences that prepare them for these recommended EBP competencies. Students rated their learning experiences less favorably with regards to receiving training on search strategies, critical appraisal, and understanding basic statistical concepts. These findings are consistent with the AARC recommendations that such activities can be acquired following graduation. While these findings are supported by the AARC recommendations, the results indicate a gap in expectations of graduates entering professional practice and what is assumed they will learn following graduation. Weng et al. (2014) reported that even though respiratory therapists were aware of EBP, very few engaged in professional development opportunities for EBP implementation.

Use of EBP in clinical decisions among post-professional students in this study was limited. The majority of students engaged in EBP activities (i.e. searching, reading, and critical appraisal) infrequently, which supports the low use of EBP in clinical decisions. These findings are consistent with previous research with occupational and physical therapists showing that less frequency of engaging in EBP activities corresponded with less use of EBP in clinical practice (Clyde, Brooks, Cameron, & Salbach, 2016; McClusky & Lovarini, 2005; Salbach et al., 2013).

Faculty. Similar to post-professional students, faculty had good knowledge of the introductory concepts of EBP but gaps existed regarding specific components of the EBP process. Faculty had less knowledge about using the PICO technique and understanding the role that clinical experience plays guiding future clinical practice and decision making, which was supported by low to moderate levels of self-efficacy regarding their response. In addition, faculty reported lower self-efficacy in critical appraisal and interpreting statistical tests. The findings are similar to previous research indicating that allied health educators across multiple professions had

lower EBP knowledge, low to moderate self-efficacy in almost all aspects of EBP, with interpreting the results of statistical tests as the lowest (Delany & Bialocerowski, 2011).

Faculty viewed their learning experiences while enrolled in an entry-level respiratory therapy program less favorably compared to post-professional students. Average age and years of experience of students and faculty were similar suggesting that they may have been enrolled in an entry-level program within a similar time period. Faculty perceptions of learning experiences could be explained by reflecting in a greater capacity and having an increased awareness of the education to clinical gap (Manspeaker & Van Lunen, 2011). Even if faculty learned about EBP as a student, a lack of seeing the application in the clinical setting by their clinical instructor and practicing respiratory therapists may be a factor contributing to the negative perception of their EBP learning experiences (DeCleene Huber et al., 2015).

In addition, faculty reported limited use of EBP in their experience as a clinician. However, faculty reported teaching the concepts of EBP regularly. This is interesting considering the relative low frequency of engaging in EBP activities. One possible explanation could be aligned with the AARC's recommendation of teaching students how to apply EBP and the role of EBP in using respiratory care protocols (Barnes et al., 2010). This is supported by previous research indicating that the majority of associate degree faculty teach their students how to apply EBP in clinical decisions and the role of EBP in the development, application, evaluation, and treatment of patients using respiratory care protocols (Barnes et al., 2011).

Faculty Teaching Strategies and Resources

The second aim was to determine which teaching strategies and resources faculty used to teach the principles of EBP. Of the faculty who incorporated EBP concepts into the curriculum, they did so mostly in courses covering assessment and evaluation, clinical intervention labs, and clinical practice. These findings are similar to research conducted in an entry-level occupational

therapy master's program (DeAngelis et al., 2013). Strategies such as using literature reviews and database searches to teach EBP concepts were ranked similar but were reported much less frequently by respiratory therapy faculty. Case studies were used most often by respiratory therapy faculty compared to less use among occupational therapy faculty.

Regarding teaching specific EBP concepts, faculty taught searching for the best available evidence more often compared to how to formulate a clinical question, critically appraise literature, and evaluate outcomes. Developing a relevant and searchable clinical question is a critical first step in the literature search and using the PICO format is an effective strategy (Melnik, Fineout-Overholt, Stillwell, & Williamson, 2010). However, faculty reported using the PICO format as one of the least common strategies, thus raising concerns over the effectiveness of the literature search methodology that is being taught.

Faculty could provide comments regarding suggestions and experiences about incorporating EBP into the curriculum and other comments in general. The common theme that emerged was related to limited time in the associate degree curriculum to teach additional concepts in an already full curriculum. To potentially reduce the barriers, models exist on how to incorporate EBP concepts. Larmon and Varner (2011) integrated EBP and research utilization over several courses throughout the nursing curriculum using various learning activities. Dotson et al. (2015) established EBP competencies and course outcomes that spanned across a 4-semester nursing curriculum. A small proof of concept study demonstrated feasibility of using a clinical research practicum to apply principles of evidence-based protocol-guided respiratory care clinical practice in associate degree respiratory therapy program (Gutierrez, Stevens, & Ricard, 2013).

Impact of Factors Associated with Use of EBP

The third aim was to determine the relationship of knowledge, self-efficacy, and learning experiences to the use of evidence-based practice among post-professional respiratory therapy

students. The findings indicated no statistically significant relationship. The lack of significance could be explained by perceived barriers to using EBP in clinical decisions. Lack of time, support, and resources to implement EBP may provide a possible explanation for these findings (Delany & Bialocerkowski, 2011; Hankemeier & Van Lunen, 2013; McCarty et al., 2013). In addition, respiratory therapists may rely heavily on their clinical experience, colleagues, and expert opinion as common sources to form basis of most clinical decisions (Arena et al., 2011; Condon et al., 2016; Heiwe et al., 2011; Keeley et al., 2016). Knowledge, self-efficacy, and learning experiences may not be enough to overcome perceived barriers to implementing EBP.

Conclusion

The results of this study provided new knowledge about EBP knowledge, self-efficacy, and use among respiratory therapy faculty and post-professional students. In addition, this study identified which teaching strategies and resources faculty most commonly used to teach EBP concepts. While the EBP knowledge, self-efficacy, and learning experiences had minimal influence on the use of EBP, the results of the study provided the foundation for future research in this area.

CHAPTER II

DISSEMINATION

The dissemination of the findings will be delivered as a report to NCARE that will be discussed during the Rocking Chair spring meeting. The report and presentation delivered at the NCARE Rocking Chair meeting will target respiratory therapy associate degree faculty who are primarily program directors and directors of clinical education. The primary goal for dissemination of the findings is to bring awareness of the need to incorporate EBP concepts into the respiratory therapy associates degree curriculum to improve education and promote the use of EBP among respiratory therapists.

NCARE Report and Discussion

Dissemination of the results will include a written report that will be shared with faculty at their annual Rocking Chair spring meeting to get their impressions and feedback regarding the findings. The majority of the allotted 30 minutes will be spent facilitating a discussion on next steps to put the findings into action. Since the faculty group is small, approximately 15, the presentation of the findings will be provided in an aggregate and summarized report that will not reveal any information that could potentially link any individuals to the responses. The report includes a summary of the findings, recommendations, and a one-page at-a-glance handout that highlights key findings and recommendations (Appendix F). The report will be distributed by email to the faculty prior to the scheduled date to allow time for review ahead of the NCARE Rocking Chair meeting.

Discussion of the findings with the faculty is important to understanding the value that faculty place on incorporating EBP concepts into the curriculum. The results obtained from the

EBP teaching strategies section of the questionnaire will provide a discussion point for faculty to share what they are currently doing or not doing with regards to incorporating EBP concepts. Discussion of the findings will focus on identifying current teaching practices that can be duplicated across the respiratory therapy programs. Another important aspect of the presentation will include discussion on challenges that faculty face in their attempts to incorporate EBP concepts into the curriculum. It is important that faculty are knowledgeable and experienced with using current resources and methods to teach EBP (Daly & DeAngelis, 2017). Previous educational and clinical experiences may influence the ability of faculty to be effective in teaching EBP concepts. A plan for professional development will be discussed to ensure that the most current resources and teaching methods are used to incorporate the EBP concepts into leaning experiences (Daly & DeAngelis, 2017).

NCARE Report and Discussion Introduction

Thank you for participating in the EBP research study and allowing me to have some time to get your impressions and feedback on the findings from the study. We will follow up with a discussion on your interest in moving forward with creating a professional development course that focuses on strategies and resources for teaching EBP concepts. The intent of the professional development will be to increase your awareness and use of strategies and resources for teaching EBP in your programs. We will take the results of the study and your feedback to create the content of the professional development course. We can apply for continuing education credit through the AARC or North Carolina Respiratory Care Board (NCRCB) to count toward the annual state licensure requirements. We can briefly review the key findings of the report and move to the discussion part.

Summary of Findings

The AARC identified EBP as a core competency for all respiratory therapists. New graduates of respiratory therapy programs should at least be able to explain use of EBP in the development and application of respiratory care protocols, and be able to evaluate and treat patients using the appropriate respiratory care protocols (Barnes et al., 2010; Barnes et al., 2011). However, a gap exists between what is required of new graduates before entry into practice and what should be acquired after entry into practice with regards to use of EBP. The purpose of this study was to assess the factors associated with the use of EBP among respiratory therapy faculty teaching in a large community college system and post-professional students enrolled in a university-based, respiratory therapy baccalaureate degree completion program. Additionally, strategies and resources used to teach EBP by faculty were described. A total of 25 faculty and 58 post-professional students participated in the survey. Evidence-based practice knowledge, self-efficacy in knowledge, self-efficacy in use, learning experiences, use in practice, teaching strategies and resources used, and demographics were measured using a researcher-developed survey instrument.

Key findings for post-professional students. Post-professional students viewed their learning experiences moderately favorable but had varied levels of self-efficacy in knowledge and use of EBP. Student rated their self-efficacy high in knowledge of assessing the outcome of a treatment (86.9) and in assessing patients' needs, values and treatment preferences for self-efficacy in use of EBP (92.0). Students rated their self-efficacy in knowledge comparatively lower regarding the PICO technique (73.5) and interpreting common statistical tests (50.9). Students were more likely to search the research literature six or more times per month compared to critically appraising and using the research literature. The relationship of knowledge, self-efficacy, and learning experiences to the use of EBP was not significant.

Key findings for faculty. The majority of faculty had a more negative view of their learning experiences and also reported varied levels of self-efficacy in knowledge and use of evidence-based practice. Faculty scored their self-efficacy high in knowledge of knowing which type of research study yields the highest level of evidence (83.5) and in assessing patients' needs, values and treatment preferences for self-efficacy in use of EBP (90.0). In contrast, faculty were less confident in their knowledge regarding using the PICO technique (67.4) and interpreting common statistical tests (47.4). Faculty were more likely to read the research literature six or more times per month compared to conducting critical appraisal.

Strategies and resources for teaching EBP. Case studies (87%) were the most common teaching strategy and AARC clinical practice guidelines (87%) were the most common resource used by faculty. All of the steps of EBP were reported as being taught to students, with searching efficiently for the best available evidence used most often (65.2%) and formulating a clinical question was used least often (21.7%). Faculty provided a few comments regarding suggestions and experiences about incorporating EBP into the curriculum. Only a few comments were provided but the common theme that emerged was related to limited time in the associate degree curriculum to teach additional concepts in an already full curriculum dedicated to the major content required based on accreditation standards and national board exams.

Recommendations

Based on the findings of this study, faculty and post-professional students appear to be knowledgeable and confident regarding EBP but the frequency of using EBP in clinical decisions is limited. While faculty use some teaching strategies and resources to teach EBP concepts, there are opportunities to increase awareness and use of strategies and resources available to develop meaningful learning experiences without creating additional time constraints in the curriculum.

Further considerations for professional development and piloting EBP learning activities in programs wanting to participate will be discussed.

A professional development course for faculty about teaching EBP is a logical next step. Faculty must be knowledgeable about strategies and the most current resources available to teach EBP in their courses; therefore, a potential model for developing course content would include modules covering resources for EBP, strategies for teaching EBP, and incorporating EBP in courses.

Resources for teaching EBP. Resources for teaching EBP should include processed research evidence such as clinical practice guidelines, systematic reviews, and meta-analyses. Perceived barriers to using EBP can be associated with time and the complexity of the process (Heiwe et al., 2011). Processed research literature may reduce the need for the more complex parts of the EBP process of searching, appraising, and interpreting the evidence, thus alleviating some of the issues regarding time and extensive knowledge about the EBP process (Heiwe et al., 2011; Welch et al., 2014). However, it is still important to be somewhat familiar with the fundamental EBP process to effectively provide patient care using the best available evidence (Barnes et al., 2010; Welch et al., 2014). In addition, processed research literature may not always be available to address a defined clinical question and would require following the EBP process.

Strategies for teaching EBP. Various strategies exist to teach EBP concepts. Teaching strategies that are consistent with adult learning and transformative learning theories focus on experiential and clinically relevant learning activities. Courses designed that target EBP concepts should (a) consider the learner's existing knowledge, beliefs, and attitudes regarding EBP; (b) acknowledge the role of social negotiation and collaboration with peers for clinical decision-making to enable professional socialization and interprofessional collaboration through group assignments, small group case discussions, and journal clubs; (c) emphasize relevant and

authentic learning such as case studies and application of processed research evidence to practice; (d) support collaborative learning such as working in small groups to engage in discussion, problem-solving, decision-making, and reflection regarding specific clinical situations; and (e) scaffold learning to build knowledge and skills throughout the curriculum (Hitch & Nicola-Richmond, 2017; Thomas, Saroyan, & Dauphinee, 2011).

Incorporating EBP in Courses. Familiarity and confidence in using strategies and resources for teaching EBP may facilitate the process of developing meaningful learning experiences on using the EBP concepts. Students view learning experiences targeted at EBP concepts as helpful in gaining knowledge and skills (Stube & Jedlicka, 2007). Emphasis should be placed on promoting engagement in EBP through mentoring, role modeling, and creating an environment for EBP (Daly & DeAngelis, 2017).

Facilitated Discussion

A semi-structured discussion containing a series of open-ended questions will be used to gain insight into current practices and perceptions of barriers for teaching EBP. The questions are designed to build on results of the study to further explore current practices, perceptions of barriers, and opportunities to help plan and implement EBP learning experiences. The semi-structured process will allow for deviation from the initial questioning to fully explore ideas and concerns. The following questions are planned for the discussion:

1. Based on the findings, confidence in determining the highest quality of evidence was very good but very few indicated that you use teaching the levels of evidence as a strategy. What process do you use to evaluate the quality of evidence?
2. Teaching students how to search for the best available evidence was reported as being taught by most but teaching how to develop a clinical question and using PICO

technique were used much less. What would be the most help to you in using these strategies to teach students how to conduct an effective literature search?

3. Case studies were reported as the number one strategy for teaching EBP. What do you like most about using case studies to teach EBP?
4. What other types of assignments do you use to teach EBP concepts?
5. What barriers do you encounter when attempting to teach the EBP concepts?
6. What resources would be most helpful to you in teaching the EBP concepts?
7. Are there any other aspects of EBP you would like to discuss?
8. If you are interested in a professional development course, what format would work best? Face-to-face, online, hybrid?

The information obtained from the above questions will be useful in creating the professional development course that is tailored to the needs of the faculty teaching in the respiratory therapy associate degree programs.

CHAPTER III

ACTION PLAN

The intent of the dissertation study was to collect information about EBP knowledge, self-efficacy, and practices among post-professional respiratory therapists currently enrolled in a respiratory therapy baccalaureate degree completion program and faculty teaching in associate degree programs. Additional information was collected intending to describe current teaching practices of the EBP principles among faculty in associate degree respiratory therapy programs. The information collected was used to better understand the current state of readiness of associate degree respiratory therapy programs to ensure their ability to prepare graduates to meet the EBP competency outlined in the 2015 and Beyond initiative (Barnes et al., 2010; Barnes et al., 2011). In addition, the information was used to identify potential opportunities to develop teaching strategies that can be used by faculty to teach students the principles of EBP. The research literature on using and teaching EBP in respiratory therapy is very limited with only a few studies that address capacity for research, teaching EBP in the respiratory therapy curriculum, and use of EBP among respiratory therapists in clinical practice.

Faculty Report and Discussion

Dissemination of the study findings to the faculty in the associate degree respiratory therapy programs during their annual spring Rocking Chair meeting is the short-term goal of the action plan. A critical step in moving forward with the action plan will be to get feedback on their initial impression and any concerns regarding the results. Previous research by Barnes et al. (2011) suggested that associate degree respiratory therapy students received less education and

training on three of the five competencies of EBP which included 1) the ability to critique published literature, 2) the ability to explain the meaning of general statistics, and 3) the ability to apply EBP to clinical practice. The findings from the current survey research study serves as a reference point to determine the degree to which teaching practices are consistent or different with previous published work.

The discussion will focus on current resources and teaching strategies being used, suggestions on ideas for additional learning experiences that can be incorporated into the curriculum, and professional development needs to support teaching the EBP concepts. The goal is to use existing clinical and didactic student learning experiences and enhance them by incorporating EBP concepts to apply in clinical decision making without causing additional burden of trying to create another course or displacing existing content of importance to the programs (Dotson et al., 2015). Larmon and Varner (2011) suggested having students conduct article critiques of peer-review journal articles on specific patient conditions, brief literature reviews on specific topics, and present their literature review findings to peers and faculty to help students make the connection between EBP and its value in clinical practice. Gutierrez et al. (2013) implemented a capstone clinical research practicum in partnership with a clinical affiliate. Respiratory therapy students were selected based on criteria and needing additional clinical hours to graduate with an associate degree. Students received clinical research training from the clinical affiliate and participated in clinical research activities such as collecting data, performing data analyses, presenting findings, and recommending modifications to clinical protocols based on the data and best available evidence. The intent will be to seek input from faculty regarding their needs for using current resources and methods for teaching EBP that can be addressed through a professional development workshop.

Faculty Professional Development and Implementation

Faculty professional development serves as an intermediate goal of the action plan. Identifying faculty's familiarity with resources and methods for teaching EBP concepts will inform content and learning experiences needed in the professional development workshop. The professional development workshop will provide an opportunity to role model the use of EBP to inform teaching strategies and creating student learning experiences to prepare students to engage in EBP (Daly & DeAngelis, 2017). Since the respiratory therapy associates degree curriculum standard in North Carolina does not include a dedicated EBP course, the professional development workshop would focus on building in teaching methods and learning experiences that can be threaded across many courses in the curriculum.

Adult learning theory and transformative learning theory will be used as the guiding framework for delivering the professional development. Adult learning theory refers to the way adults assimilate knowledge, skills, and attitudes with learning focused primarily on self-motivation, self-direction, and previous knowledge and experiences (Abela, 2009; Knowles, Holton, & Swanson, 1998; Taylor & Hamdy, 2013). Transformative learning focuses on experiences and critical reflection (Mezirow, 2003). Transformative learning begins with a disorienting dilemma, which is realizing that you do not know and that there is no immediate remedy to the situation. The disorienting dilemma triggers critical reflection on personal attitudes, assumptions, and beliefs followed by discourse to develop a new interpretation of the meaning of an experience to guide action (Kuennen, 2015; Matthew-Maich, Ploeg, Jack, & Dobbins, 2010; Mezirow, 1994; Taylor & Hamdy, 2013). Faculty teaching in respiratory therapy programs have varying levels of knowledge and experience with EBP. The faculty will participate in experiential learning activities, dialog, reflection, and create a plan of action to incorporate content from the professional development into their own courses (Daly & DeAngelis, 2017).

Following the professional development, an EBP implementation strategy will serve as the long-term goal of the action plan. Implementation of EBP into the respiratory therapy curriculum can be piloted with one or more associate degree programs. Further study will be needed to determine the effectiveness of the implementation. Success of the implementation strategy may lead to wider adoption to include additional programs that will lead to developing best practices in teaching EBP in respiratory therapy associate degree programs. The action plan is designed to target local and state educational needs and potentially serve as a working model that can be incorporated into associate and baccalaureate degree respiratory therapy programs across the country.

Teaching EBP concepts is important in preparing new respiratory therapy graduates, regardless of their degree level, to respond to an ever-changing healthcare environment that experiences advances in medicine, technology, and new approaches to disease management almost daily (Kacmarek et al., 2009). For example, respiratory therapists are becoming more involved in critical care beyond basic ventilator management such as being able to identify patients at risk for developing profound muscle weakness due to inactivity, inflammation, and metabolic disorders that compromise weaning from mechanical ventilation leading to prolonged weakness and extensive recovery periods (Jolley, Bunnell, & Hough, 2016). Respiratory therapists, working with physical therapists, occupational therapists, and nurses, have a vital role in performing early physical mobility to prevent deconditioning and weakness to improve patient outcomes. In addition, chronic disease management that extends beyond the episodic care delivered in hospitals is an expanding role for respiratory therapists. Respiratory therapists must be able to provide up-to-date patient education on proper medication use, nutrition, exercise, and wellness to facilitate self-management in patients with cardiopulmonary disease conditions (Barnes et al., 2010). The use of EBP is needed to assume these expanded responsibilities

REFERENCES

- Abela, J. (2009). Adult learning theories and medical education: a review. *Malta Medical Journal*, 21(1), 11-18. Retrieved from <http://www.um.edu.mt/umms/mmj/PDF/234.pdf>
- American Association for Respiratory Care. (2016). Competencies for entry into respiratory therapy practice. Retrieved from <http://www.aarc.org/education/educator-resources/competencies-entry-respiratory-therapy-practice/>.
- Arena, R.A., Goldberg, L.R., Ingersoll, C.D., Larsen, D.S., & Shelledy, D. (2011). Research in allied health professions: why fund it? *Journal of Allied Health*, 40(3), 161-166.
- Asokan, G.V. (2012). Evidence-based practice curriculum in allied health professions for teaching-research-practice nexus. *Journal of Evidence-Based Medicine*, 5, 226-231. Doi: 10.1111/jebm.12000
- Barnes, T.A., Gale, D.D., Kacmarek, R.M., & Kageler, W.V. (2010). Competencies needed by graduate respiratory therapists in 2015 and beyond. *Respiratory Care*, 55(5), 601-616.
- Barnes, T.A., Kacmarek, R.M., & Durbin, C.G. (2011). Survey of respiratory therapy education program directors in the United States. *Respiratory Care*, 56(12), 1906-1915. Doi: 10.4187/respcare.01259
- Clyde, J.H., Brooks, D., Cameron, J.I., & Salbach, N.M. (2016). Validation of the evidence-based practice confidence (EPIC) scale with occupational therapists. *American Journal of Occupational Therapy*, 70(2), 7002280010p1-9. Doi: 10.5014/ajot.2016.017061.
- Commission on Accreditation for Respiratory Care. (n.d.). Find a CoARC accredited respiratory care program. Retrieved from <http://www.coarc.com/36.html>.
- Condon, C., McGrane, N., Mockler, D. & Stokes, E. (2016). Ability of physiotherapists to undertake evidence-based practice steps: a scoping review. *Physiotherapy*, 102(1), 10-19. Doi: 10.1016/j.physio.2015.06.003
- Cook, D. (2003). Moving toward evidence-based practice. *Respiratory Care*, 48(9), 859-868.
- Daly, M.M. & DeAngelis, T.M. (2017). Teaching evidence-based practice across curricula: An overview of a professional development course for occupational therapy educators. *Occupational Therapy in Health Care*, 31(1), 102-109, Doi: 10.1080/07380577.2016.1227892
- DeAngelis, T.M., DiMarco, T.G., & Toth-Cohen, S. (2013). Evidence-based practice in occupational therapy curricula. *Occupational Therapy in Health Care*, 27(4), 323-332. Doi: 10.3109/07380577.2013.843115.

- DeCleene Huber, K. E., Nichols, A., Bowman, K., Hershberger, J., Marquis, J., Murphy, T.,... Pierce, C. (2015). The correlation between confidence and knowledge of evidence-based practice among occupational therapy students. *The Open Journal of Occupational Therapy*, 3(1), Article 5. Retrieved from <http://dx.doi.org/10.15453/2168-6408.1142>
- Delany, C. & Bialocerkowski, A. (2011). Incorporating evidence in clinical education: barriers and opportunities in allied health. *The Internet Journal of Allied Health Sciences and Practices*, 9(1). Retrieved from <http://ijahsp.nova.edu>
- Dillman, D.A., Smyth, J.D., & Christian, L.M. (2014). *Internet, Phone, Mail, and Mixed Mode Surveys: The Tailored Design Method*, 4th edition, Hoboken, NJ: John Wiley and Sons, Inc.
- Dotson, B.J., Lewis, L.S., Aucoin, J.W., Murray, S., Chapin, D., & Walters, P. (2015). Teaching evidence-based practice (EBP) across a four-semester nursing curriculum. *Teaching and Learning in Nursing*, 10, 176–180. Retrieved from <http://dx.doi.org/10.1016/j.teln.2015.05.004>
- Dubbs, B. H. (2009). AARC 2009 human resources survey. *AARC Times*, 56-60. Retrieved from http://c.aarc.org/members_area/aarc_times/11.09/11.09.056.pdf
- Gutierrez, C.J., Stevens, C., & Ricard, G. (2013). Teaching students to apply principles of evidence-based protocol-guided clinical practice using a hospital-based research practicum. *Respiratory Care Education Annual*, 22, 20-30.
- Hankemeier, D.A. & Van Lunen, B.L. (2013). Perceptions of approved clinical instructors: barriers in the implementation of evidence-based practice. *Journal of Athletic Training*, 48(3), 382-393. Doi: 10.4085/1062-6050-48.1.18
- Hankemeier, D.A., Walter, J.M., McCarty, C.W., Newton, E.J., Walker, S.E., Pribish, S. L.,... Van Lunen, B.L. (2013). Use of evidence-based practice among athletic training educators, clinicians, and students part 1: perceived importance, knowledge, and confidence. *Journal of Athletic Training*, 48(3), 394-404. Doi: 10.4085/1062-6050-48.2.16
- Heiwe, S., Kajermo, K.N., Tyni-Lenne, R., Gudetti, S., Samuelsson, M., Andersson, I., & Wengstrom, Y. (2011). Evidence-based practice: attitudes, knowledge and behavior among allied health care professionals. *International Journal for Quality in Health Care*, 23(2), 198-209. Doi: 10.1093/intjqhc/mzq083
- Hitch, D. & Nicola-Richmond, K. (2017). Instructional practices for evidence-based practice with pre-registration allied health students: a review of recent research and developments. *Advances in Health Sciences Education*, 22(4), 1031-1045. Doi: 10.1007/s10459-016-9702-9
- Jolley, S. E., Bunnell, A. E., & Hough, C. L. (2016). ICU-Acquired Weakness. *Chest*, 150(5), 1129–1140. doi:10.1016/j.chest.2016.03.045

- Kacmarek, R.M., Barnes, T.A., Durbin, C.G. (2012). Survey of directors of respiratory therapy departments regarding the future education and credentialing of respiratory care students and staff. *Respiratory Care*, 57(5), 710720. Doi: 10.4187/respcare.010360
- Kacmarek, R.M., Durbin, C.G., Barnes, T.A., Kageler, W.V., Walton, J.R., & O'Neil, E.H. (2009). Creating a vision for respiratory care in 2015 and beyond. *Respiratory Care*, 54(3), 375-389.
- Keeley, K., Walker, S.E., Hankemeier, D.A., Martin, M., & Cappaert, T.A. (2016). Athletic trainers' beliefs about and implementation of evidence-based practice. *Journal of Athletic Training*, 51(1), 35-46. Doi: 10.4085/1062-6050-51.2.11
- Knowles, M., Holton, E., & Swanson, R. (1998). *The adult learner: The definitive classic in adult education and human resource development*. Houston, TX: Gulf Publishing Company.
- Kuennen, J.K. (2015). Critical reflection: a transformative learning process integrating theory and evidence-based practice. *World Views on Evidence-Based Nursing*, 12(5), 306-308.
- Larmon, B.H. & Varner, L.W. (2011). The integration of evidence-based practice and research utilization in associate degree nursing curriculum: an approach at Mississippi University for Women. *Teaching and Learning in Nursing*, 6, 167-171. Doi: 10.1016/j.teln.2011.04.001.
- Manspeaker S.A. & Van Lunen, B.L. (2011). Overcoming barriers to implementation of evidence-based practice concepts in athletic training education: Perceptions of select educators. *Journal of Athletic Training*, 46(5), 514-522. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418958/>
- Manspeaker S.A., Van Lunen, B.L., Turocy, P.S., Pribesh, S., & Hankemeier, D. (2011). Student knowledge, attitudes, and use of evidence-based concepts following an educational intervention. *Athletic Training Education Journal*, 6(2), 88-98. Retrieved from <http://natajournals.org/doi/abs/10.4085/1947-380X-6.2.88?code=nata-site>
- Martins, C. & Kenaszchuk, C. (2013). Research capacity of respiratory therapists: a survey of views, opinions, and barriers. *Canadian Journal of Respiratory Therapy*, 49(4), 15-19.
- Matthew-Maich, N., Ploeg, J., Jack, S., & Dobbins, M. (2010). Transformation learning and research utilization in nursing practice: a missing link? *World Views on Evidence-Based Nursing*, 7(1), 25-35.
- McCarty, C.W., Hankemeier, D.A., Walter, J.M., Newton, E.J., & Van Lunen, B.L. (2013). Use of evidence-based practice among athletic training educators, clinicians, and students part 2: attitudes, beliefs, accessibility, and barriers. *Journal of Athletic Training*, 48(3), 405-415. Doi: 10.4085/10626050-48.2.19

- McCluskey, A. & Lovarini, M. (2005). Providing education on evidence-based practice improved knowledge but did not change behavior: a before and after study. *BMC Medical Education*, 5(40). <http://www.biomedcentral.com/1472-6920/5/40>
- McEvoy, M.P., Williams, M.T., & Olds, T.S. (2010). Evidence based practice profiles: differences among allied health professions. *BMC Medical Education*, 10(69). Doi: 10.1186/1472-6920-10-69
- McInerney, P. & Suleman, F. (2010). Exploring knowledge, attitudes, and barriers toward the use of evidence-based practice amongst academic health care practitioners in their teaching in a South African university: a pilot study. *World Views on Evidence-Based Nursing*, 7(2), 90-97.
- Melnik, B.M., Fineout-Overholt, E., Stillwell, S.B., & Williamson, K.M. (2010). The seven steps of evidence-based practice. *American Journal of Nursing*, 110(1), 51-53. Doi: 10.1097/01.NAJ.0000366056.06605.d2
- Mezirow, J. (1994). Understanding Transformation Theory. *Adult Education Quarterly*, 44(4), 222-232. Doi:10.1177/074171369404400403
- Mezirow, J. (2003). Transformative Learning as Discourse. *Journal of Transformative Education*, 1(1), 58-63, doi:10.1177/1541344603252172
- Salbach, N.M. & Jaglal, S.B. (2011). Creation and validation of the evidence-based practice confidence scale for health care professionals. *Journal of Evaluation in Clinical Practice*, 24, 794-800. Doi:10.1111/j.1365-2753.2010.01478.x
- Salbach, N.M., Jaglal, S.B., & Williams, J.I. (2013). Reliability and validity of the evidence-based practice confidence (EPIC) scale. *Journal of Continuing Education in the Health Professions*, 33(1), 33-40. Doi: 10.1002/chp.21164
- Sangoseni, O., Hellman, M., & Hill, C. (2013). Development and validation of a questionnaire to assess the effect of online learning behaviors, attitudes, and clinical practices of physical therapists in the United States regarding evidence-based clinical practice. *The Internet Journal of Allied Health Sciences and Practices*, 11(2). Retrieved from <http://ijahsp.nova.edu>
- Schreiber, J. & Stern, P. (2005). A review of the literature on evidence-based practice in physical therapy. *Internet Journal of Allied Health Sciences and Practice*, 2005, 3(4). Retrieved from <http://nsuworks.nova.edu/ijahsp/>
- Speck, B., de Wolf, G.S., van Dijk, N., & Lucas, C. (2012). Development and validation of an assessment instrument for teaching evidence-based practice to students in allied health care: The Dutch Modified Fresno. *Journal of Allied Health*, 41(2), 77-82.

- Stube, J.E. & Jedlicka, J.S. (2007). The Acquisition and Integration of Evidence-Based Practice Concepts by Occupational Therapy Students. *American Journal of Occupational Therapy*, 61(1), 53-61. Doi: 10.5014/ajot.61.1.53.
- Taylor, D.C. & Hamdy, H. (2013). Adult learning theories: implications for learning and teaching in medical education: AMEE Guide No, 83. *Medical Teacher*, 35(11), e1561-e1572. Doi:10.3109/0142159X.2013.828153
- Thomas, A., Han, L., Osler, B.P., Turnbull, E.A., & Douglas, E. (2017). Student's attitudes and perceptions of teaching and assessment of evidence-based practice in an occupational therapy professional Master's curriculum: a mixed methods study. *BMC Medical Education*, 17:64 DOI 10.1186/s12909-017-0895-2
- Thomas, A., Saroyan, A. & Dauphinee, W.D. (2011). Evidence-based practice: a review of theoretical assumptions and effectiveness of teaching and assessment interventions in health professions. *Advances in Health Sciences Education*, 16(2), 253-276. Doi: 10.1007/s10459-010-9251-6
- Welch, C.E., Hankemeier, D.A., Wyant, A.L., Hays, D.G., Pitney, W.A., & Van Lunen, B.L. (2014). Future directions of evidence-based practice in athletic training: perceived strategies to enhance the use of evidence-based practice. *Journal of Athletic Training*, 49(2), 234–244. Doi: 10.4085/1062-6050-49.2.15
- Welch, C.E., Van Lunen, B.L., Walker, S.E., Manspeaker S.A., Hankemeier, D.A., Brown, S.B., ...Onate, J.A. (2011). Athletic training educators' knowledge, comfort, and perceived importance of evidence-based practice. *Athletic Training Education Journal*, 6(1), 5-14.
- Weng, Y., Kuo, K.N., Chiehfang, C., Yang, C., Lo, H., & Chiu, Y. (2014). Profile of evidence-based practice among respiratory therapists in Taiwan. *Respiratory Care*, 59(2), 281-287. Doi: 10.4187/respcare.02611
- Weng, Y., Kuo, K.N., Yang, C., Lo, H., Chen, C., & Chiu, Y. (2013). Implementation of evidence-based practice across medical, nursing, pharmacological and allied healthcare professionals: a questionnaire survey in nationwide hospital settings. *Implementation Science*, 8(112). Doi:10.1186/1748-5908-8-112

APPENDIX A

IRB APPROVALS



OFFICE OF RESEARCH INTEGRITY
2718 Beverly Cooper Moore and Irene Mitchell Moore
Humanities and Research Administration Bldg.
PO Box 26170
Greensboro, NC 27402-6170
336.256.0253
Web site: www.uncg.edu/orc
Federalwide Assurance (FWA) #216

To: Kimberly Clark
Kinesiology, Dept of
Kinesiology, Dept of

From: UNCG IRB

Date: 1/15/2019

RE: Notice of IRB Exemption

Exemption Category: 2.Survey, interview, public observation

Study #: 19-0354

Study Title: Assessing Evidence-Based Practice Knowledge and Self-Efficacy among Respiratory Therapy Faculty and Students

This submission has been reviewed by the IRB and was determined to be exempt from further review according to the regulatory category cited above under 45 CFR 46.101(b).

Study Description:

The research study will assess evidence-based practice (EBP) knowledge, self-efficacy, learning experiences, and activities among respiratory therapy faculty in a large community college system and post-professional students enrolled in a university-based, respiratory therapy degree advancement program. The study will be a cross-sectional, descriptive survey research design using a non-probability sampling. An online self-administered questionnaire will be used to collect data on study participants' demographic characteristics, knowledge, self-efficacy, and use of the EBP principles. In addition, the data will be used to determine if EBP knowledge, self-efficacy, and learning experiences influence EBP activities among study participants.

Investigator's Responsibilities

Please be aware that any changes to your protocol must be reviewed by the IRB prior to being implemented. Please utilize the most recent and approved version of your consent form/information sheet when enrolling participants. The IRB will maintain records for this study for three years from the date of the original determination of exempt status.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at http://policy.uncg.edu/university-policies/research_data/.



OFFICE OF RESEARCH COMPLIANCE
9201 University City Boulevard
319 Cameron Hall
Charlotte NC 28223-0001
(704)-687-1871
Web site: <http://research.uncc.edu/>
Federalwide Assurance (FWA) #00000649

To: Kimberly Clark
Kinesiology

From: Office of Research Compliance

Date: 1/13/2019

RE: Notice of Approval of Exemption with No End Date

Exemption Category: 1.Educational setting,2.Survey, interview, public observation

Study #: 18-0584

Study Title: Assessing Evidence-Based Practice Knowledge and Self-Efficacy among Respiratory Therapy Faculty and Students

This submission has been reviewed by the Office of Research Compliance and was determined to meet the Exempt category cited above under 45 CFR 46.101(b). This determination has no expiration or end date and is not subject to an annual continuing review. **However, you are required to obtain IRB approval for all changes to any aspect of this study before they can be implemented.**

The Investigator Responsibilities listed below applies to this study only. Carefully review the Investigator Responsibilities.

Study Description:

The research study will assess evidence-based practice (EBP) knowledge, self-efficacy, learning experiences, and activities among respiratory therapy faculty in a large community college system and post-professional students enrolled in a university-based, respiratory therapy degree advancement program. The study will be a cross-sectional, descriptive survey research design using a non-probability sampling. An online self-administered questionnaire will be used to collect data on study participants' demographic characteristics, knowledge, self-efficacy, and use of the EBP principles. In addition, the data will be used to determine if EBP knowledge, self-efficacy, and learning experiences influence EBP activities among study participants.

Your approved consent forms (if applicable) and other documents are available online at http://uncc.myresearchonline.org/irb/index.cfm?event=home.dashboard.irbStudyManagement&irb_id=18-0584.

Investigator's Responsibilities:

The above-cited determination has no expiration or end date and is not subject to annual continuing review.

However, the Principal Investigator needs to comply with the following responsibilities:

1. Modifications **must** be submitted for review and approval before implementing the modification. This includes changes to study procedures, study materials, personnel, etc.
2. Data security procedures must follow procedures as approved in the protocol and in accordance with ITS [Guidelines for Data Handling](#).
3. Promptly notify the IRB (uncc-irb@uncc.edu) of any adverse events or unanticipated risks to participants or others.
4. Complete the Closure eform via IRBIS once the study is complete.
5. Be aware that this study is now included in the Office of Research Compliance (ORC) **Post-Approval Monitoring program** and may be selected for post-review monitoring at some point in the future.
6. Reply to ORC post-review monitoring and administrative check-ins that will be conducted periodically to update ORC as to the status of the study.
7. Three years (3) following this Exemption determination, ORC will request a study status update (active/not active).

Please be aware that approval may still be required from other relevant authorities or "gatekeepers" (e.g., school principals, facility directors, custodians of records).

APPENDIX B

SURVEY INVITATION EMAILS

To: [participant email address]
Cc:
Bcc:
Re: Evidence-Based Practice Research Project

Dear: [name],

I am requesting your participation in a dissertation research study as partial fulfillment of my doctoral degree at the University of North Carolina at Greensboro. I also serve as the program director for the MS in Respiratory Care program at UNC Charlotte. My study involves assessing evidence-based practice knowledge, confidence, learning experiences, and activities among respiratory therapists.

Your participation in this survey will contribute to the body of knowledge on evidence-based practice and provide valuable information to assist the efforts of those responsible for developing educational programs and resources to increase the use of evidence-based practice among respiratory therapists.

Participation in the study is voluntary. If you agree to participate, you will be directed to the survey items. Participation in the survey typically takes approximately 15-20 minutes. Your survey responses are anonymous and confidential and will be stored in a secure location with access limited to the project investigators. No responses will be individually identified or reported.

If you have any questions about this study, please do not hesitate to contact me at 704-687-0706 or by email at kmclark1@uncc.edu.

Thank you for your time and consideration.

You may access the survey at the link below:

To: [participant email address]
Cc:
Bcc:
Re: Evidence-Based Practice Research Project

Dear: [name],

Thank you for your time and consideration in participating in my dissertation research survey. If you completed the survey, I greatly appreciate your participation. If you have not completed the survey, I hope you will consider taking 15-20 minutes to complete the evidence-based practice survey.

Your participation in this survey will contribute to the body of knowledge on evidence-based practice and provide valuable information to assist the efforts of those responsible for developing educational programs and resources to increase the use of evidence-based practice among respiratory therapists.

If you have any questions about this study, please do not hesitate to contact me at 704-687-0706 or by email at kmclark1@uncc.edu.

Thank you for your time and consideration.

You may access the survey at the link below:

APPENDIX C
INFORMED CONSENT

Informed Consent

Project Title: Assessing Evidence-Based Practice Knowledge and Self-Efficacy among Respiratory Therapy Faculty and Students

Principal Investigator: Dr. Kimberly Clark, UNC Charlotte

Faculty Advisor: Dr. Pam Kocher Brown, UNC Greensboro

What are some general things you should know about research studies? You are being asked to take part in a research study. Your participation in the study is voluntary. You may choose not to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. There may not be any direct benefit to you for being in the research study. There also may be risks to being in research studies. If you choose not to be in the study or leave the study before it is done, it will not affect your relationship with the researcher, the University of North Carolina at Charlotte, or the University of North Carolina at Greensboro. Details about this study are discussed in this consent form. It is important that you understand this information so that you can make an informed choice about being in this research study.

You can print a copy of this consent form. If you have any questions about this study at any time, you should ask the researchers named in this consent form. Their contact information is below.

What is the study about? This is a research project. Your participation is voluntary. The purpose of this research study is to determine evidence-based practice knowledge, confidence, learning experiences, and activities among respiratory therapists. The study will involve completing a questionnaire that will take approximately 20 minutes.

What are the risks to me? There are no known or foreseeable risks involved with your participation in this study.

Are there any benefits as a result of me taking part in this research? You will not benefit directly by participating in this study. What we learn about factors associated with using evidence-based practice may be beneficial to others.

Will I get paid for being in the study? Will it cost me anything? There are no costs to you or payments made for participating in this study.

How will you keep my information confidential? Your privacy will be protected, and confidentiality will be maintained to the extent possible. Your survey responses are anonymous and confidential and will be stored in a secure location with access limited to the project investigators. No responses will be individually identified or reported. All data will be pooled and reported in aggregate form only. All information obtained in this study is strictly confidential unless disclosure is required by law. Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing.

What if I want to leave the study? You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped.

What about new information/changes in the study? If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.”

What if I have questions? If you have questions, want more information or have suggestions, please contact the principal investigator, Dr. Kimberly Clark, at (704) 687-0706 or by email at k_clark@uncg.edu or the faculty advisor, Dr. Pam Kocher Brown, at (336) 334-5347 or by email at plkocher@uncg.edu.

If you have further questions or concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study, please contact the Office of Research Integrity at UNC Greensboro toll free at (855) 251-2351 and the Office of Research Compliance at UNC Charlotte at (704) 687-1871.

Voluntary Consent by Participant: You can print a copy of this form. By completing this survey, you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing to consent to take part in this study. All of your questions concerning this study have been answered. If you are 18 years of age or older and are agreeing to participate in the study, you may proceed to the survey by clicking on the "Continue" button and advance to the next page. If you do not wish to participate, you can simply exit out of the survey or click on "Do Not Continue" and advance to the end of the survey.

- Continue
- Do Not Continue

APPENDIX D

SURVEY INSTRUMENT – FACULTY VERSION IN QUALTRICS

Knowledge Evaluation: Each multiple choice item has a corresponding confidence level. First, for the multiple choice, select the best answer by clicking directly on your choice. Second, after you choose your answer, click on the radio button that corresponds to how confident you are in that answer on a scale of 0% = no confidence to 100% = complete confidence.

The first step in evidence-based practice is to

- ☐ Search for research literature
- ☐ Critically appraise the current research
- ☐ Define a clinical question
- ☐ Choose a research database

Rate how confident you are in that answer.

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

When defining a clinical question using the PICO technique, which factor should be considered first?

- ☐ Physician preference
- ☐ Patient goals
- ☐ Patient age
- ☐ Personal experience

Rate how confident you are in that answer.

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

When conducting a literature search, which of the following online sources holds the highest quality content?

- ☐ Google Scholar
- ☐ Medline
- ☐ Cochran Database
- ☐ WebMD

Rate how confident you are in that answer.



Which type of research design is considered to have the highest quality of evidence?

- ☐ Case study
- ☐ Cohort study
- ☐ Independent laboratory investigation
- ☐ Randomized control trial

Rate how confident you are in that answer.



A respiratory therapist's personal experience with mechanical ventilation should primarily be used to

- ☐ Develop expertise that can be passed on to students
- ☐ Guide future clinical practice and decision making
- ☐ Provide solid evidence in support of mechanical ventilation
- ☐ Create standard treatment protocols for all patients

Rate how confident you are in that answer.



When assessing the outcome of a treatment you used, what factor would most be likely to lead you to use the treatment again?

- ☐ Patient satisfaction with the outcome
- ☐ Outcome agreement with current literature
- ☐ Short length of treatment time to achieve outcome
- ☐ Outcome achieved consistent with selected goals

Rate how confident you are in that answer.

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Block 2

Confidence in Ability to Use Evidence-Based Practice: For each of the following EBP activities, please indicate how confident you are in your current level of ability on a scale of 0% = no confidence to 100% = complete confidence.

How confident are you in your ability to:

...Identify a gap in your knowledge related to a patient situation (e.g. history, assessment, treatment)?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...formulate a question to guide a literature search based on a gap in your knowledge?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...effectively conduct an online literature search to address the question?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...critically appraise the strengths and weaknesses of study methods (e.g. appropriateness of study design, recruitment, data collection, and analysis)?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...critically appraise the measurement properties (e.g. reliability and validity, sensitivity and specificity) of standardized tests or assessment tools you are considering using in your practice?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...interpret study results obtained using statistical tests such as *t*-tests or chi-square tests?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...interpret study results obtained using statistical procedures such as linear regression or logistic regression?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...determine if evidence from the research literature applies to your patient's situation?



...ask your patient about his or her needs, values, and treatment preferences?



...decide on an appropriate course of action based on integrating the research evidence, clinical judgement, and patient preference?



...continually evaluate the effect of your course of action on your patient's outcomes?



Block 3

Learning Experiences in Evidence-Based Practice: Please indicate your level of agreement or disagreement to the following statements regarding your learning experiences while enrolled in an entry-level respiratory therapy educational program. The entry-level program prepares respiratory therapy students to take the RRT credential examination upon graduation.

I learned the foundations of evidence-based practice in my entry-level respiratory therapy program.



I received formal training in search strategies for finding research relevant to clinical practice in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in critical appraisal of research literature in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I learned basic concepts in statistical analysis in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in applying evidence-based practice to clinical practice in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in using evidence-based practice in the development and application of respiratory care protocols in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in the evaluation and treatment of patients in a variety of settings, using the appropriate respiratory care protocols in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Block 4

Frequency of Engaging in Evidence-Based Practice Activities: Please indicate how many times in a typical month you engage in the following evidence-based practice activities:

Search online databases and websites to answer a clinical question.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Read research-related textbooks, articles, and other documents.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Critically appraise research by reading and interpreting a research article using a critical appraisal checklist.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Use professional literature and research findings in the process of clinical decision making.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Teach or prepare to teach students or health professionals concepts of evidence-based practice.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Block 5

Respiratory Therapy Faculty Teaching Strategies for Evidence-Based Practice:

Please complete the following items in relation to strategies and resources you use to teach evidence-based practice (EBP) in the respiratory therapy program curriculum.

Please provide an estimate of how many courses in your respiratory therapy program curriculum incorporate EBP concepts.

| | 0 | 1-3 | 4-6 | 7-9 | 10+ |
|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Number of Courses | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Are there any courses in your curriculum that focus exclusively on EBP concepts?

- ☐ Yes
- ☐ No
- ☐ Other (please specify)

What types of courses within your curriculum include evidence-based practice concepts? (click on all that apply)

- ☐ Foundational knowledge (cardiopulmonary anatomy and physiology, pathophysiology, pharmacology)
- ☐ Assessment/evaluation
- ☐ Therapeutics and diagnostics
- ☐ Clinical skills/clinical intervention labs
- ☐ Clinical practice
- ☐ Other (please specify)

What evidence-based practice strategies do you use to teach respiratory therapy students in your curriculum? (click on all that apply)

- ☐ Development of PICO questions
- ☐ Critically appraised topics (CAT)
- ☐ Critically appraised papers (CAP)
- ☐ Abstract reviews
- ☐ Journal clubs
- ☐ Database tutorials
- ☐ Case studies
- ☐ Literature review
- ☐ Statistical analysis exercises
- ☐ Database searches
- ☐ Levels of evidence hierarchies
- ☐ Development of a research proposal (research question, relevant literature, sample, design, measurement and data analysis)
- ☐ Other (please specify)

What resources do you use for developing and teaching evidence-based practice concepts in your curriculum? (click on all that apply)

- ☐ AARC 2015 and Beyond initiative major competency areas
- ☐ AARC Clinical Practice Guidelines
- ☐ National Guideline Clearinghouse sponsored by the Agency for Healthcare Research and Quality (<https://www.guideline.gov/>)
- ☐ CoARC Standards for Entry-Level Education
- ☐ NBRC Exam Matrices
- ☐ PubMed/Medline
- ☐ Respiratory Care journal
- ☐ The Cochrane Collaboration (Website, Library, Resources)
- ☐ EBP Education Center of Excellence (http://guides.lib.unc.edu/EBP_Education_COE)
- ☐ Introduction to Evidence-Based Practice (<http://guides.mclibrary.duke.edu/ebmtutorial>)
- ☐ Other (please specify)

In your opinion, the primary objectives for teaching evidence-based practice concepts in the respiratory therapy curricula are to enable students to: (click on all that apply)

- ☐ Choose effective assessment and intervention strategies
- ☐ Develop systematic clinical reasoning processes
- ☐ Improve credibility of the respiratory care profession
- ☐ Communicate effectiveness of respiratory care to other healthcare professionals
- ☐ Communicate effectiveness of respiratory care to consumers
- ☐ Expedite knowledge translation from research to practice
- ☐ Other (please specify)

Which of the following steps of evidence-based practice are taught in your curriculum? (click on all that apply)

- ☐ Formulate a clinical question
- ☐ Search efficiently for the best available evidence
- ☐ Critically analyze evidence for validity and usefulness
- ☐ Integrate best evidence with clinical expertise and patient preferences
- ☐ Evaluate one's performance or outcomes
- ☐ Communicate knowledge to other healthcare professionals
- ☐ Other (please specify)

The AARC's 2015 and Beyond initiative identified evidence-based practice as a major competency area needed by all respiratory therapy graduates 2015 and beyond. How does your curriculum support this aspect of the 2015 and Beyond initiative? (click on all that apply)

- ☐ The mission and vision of the program includes a focus on evidence-based practice
- ☐ Evidence-based practice is a core thread in the curriculum
- ☐ Library resources are sufficient to provide support for students to develop skills in evidence-based practice
- ☐ Students learn to apply interventions from an evidence-based perspective
- ☐ Both quantitative and qualitative research are recognized as contributing to evidence-based practice
- ☐ Other (please specify)

Please include any additional suggestions and/or experiences you would like to share about incorporating EBP into the curriculum:

Please include any additional comments here:

Block 6

Demographic Information: Please choose the response that characterizes you best. This information will be very helpful to us. Your responses are confidential.

Gender

- ☐ Male
☐ Female
☐ Transgender

Please enter your age in years:

What is your entry-level degree for respiratory therapy? (select one)

- ☐ Associate's Degree
☐ Bachelor's Degree
☐ Master's Degree
☐ Other (please specify)

What is your highest degree attained? (select one)

- ☐ Associate's Degree
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Doctoral Degree
- ☐ Other (please specify)

Credentials (select one)

- ☐ CRT
- ☐ RRT
- ☐ CRT/Specialty Credential(s)
- ☐ RRT/Specialty Credential(s)

Please select your years of respiratory therapy experience.

- ☐ < 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ > 20 years

Please select your years of respiratory therapy teaching experience.

- ☐ < 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ > 20 years

Please indicate the percentage of your total time that you spend in each type of activity during an average month. Please be sure that your total time adds up to 100%.

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|----------------|---|----|----|----|----|----|----|----|----|----|-----|
| Patient Care | | | | | | | | | | | |
| Teaching | | | | | | | | | | | |
| Research | | | | | | | | | | | |
| Administration | | | | | | | | | | | |
| Other | | | | | | | | | | | |

Please indicate the region of North Carolina you work (select only one)

- ☐ West
- ☐ Central
- ☐ East
- ☐ Other (if outside NC)

Which of the following best describes the location of your facility in which you work?

- ☐ Rural
- ☐ Urban
- ☐ Suburban

Thank you for participating in this survey!

APPENDIX E

SURVEY INSTRUMENT – STUDENT VERSION IN QUALTRICS

Knowledge Evaluation: Each multiple choice item has a corresponding confidence level. First, for the multiple choice, select the best answer by clicking directly on your choice. Second, after you choose your answer, click on the radio button that corresponds to how confident you are in that answer on a scale of 0% = no confidence to 100% = complete confidence.

The first step in evidence-based practice is to

- ☐ Search for research literature
- ☐ Critically appraise the current research
- ☐ Define a clinical question
- ☐ Choose a research database

Rate how confident you are in that answer.

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

When defining a clinical question using the PICO technique, which factor should be considered first?

- ☐ Physician preference
- ☐ Patient goals
- ☐ Patient age
- ☐ Personal experience

Rate how confident you are in that answer.

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

When conducting a literature search, which of the following online sources holds the highest quality content?

- ☐ Google Scholar
- ☐ Medline
- ☐ Cochran Database
- ☐ WebMD

Rate how confident you are in that answer.



Which type of research design is considered to have the highest quality of evidence?

- ☐ Case study
- ☐ Cohort study
- ☐ Independent laboratory investigation
- ☐ Randomized control trial

Rate how confident you are in that answer.



A respiratory therapist's personal experience with mechanical ventilation should primarily be used to

- ☐ Develop expertise that can be passed on to students
- ☐ Guide future clinical practice and decision making
- ☐ Provide solid evidence in support of mechanical ventilation
- ☐ Create standard treatment protocols for all patients

Rate how confident you are in that answer.



When assessing the outcome of a treatment you used, what factor would most be likely to lead you to use the treatment again?

- ☐ Patient satisfaction with the outcome
- ☐ Outcome agreement with current literature
- ☐ Short length of treatment time to achieve outcome
- ☐ Outcome achieved consistent with selected goals

Rate how confident you are in that answer.

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Block 2

Confidence in Ability to Use Evidence-Based Practice: For each of the following EBP activities, please indicate how confident you are in your current level of ability on a scale of 0% = no confidence to 100% = complete confidence.

...identify a gap in your knowledge related to a patient situation (e.g. history, assessment, treatment)?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...formulate a question to guide a literature search based on a gap in your knowledge?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...effectively conduct an online literature search to address the question?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...critically appraise the strengths and weaknesses of study methods (e.g. appropriateness of study design, recruitment, data collection, and analysis)?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...critically appraise the measurement properties (e.g. reliability and validity, sensitivity and specificity) of standardized tests or assessment tools you are considering using in your practice?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...interpret study results obtained using statistical tests such as *t*-tests or chi-square tests?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...interpret study results obtained using statistical procedures such as linear regression or logistic regression?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...determine if evidence from the research literature applies to your patient's situation?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...ask your patient about his or her needs, values, and treatment preferences?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Confidence Level | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

...decide on an appropriate course of action based on integrating the research evidence, clinical judgement, and patient preference?



...continually evaluate the effect of your course of action on your patient's outcomes?



Block 3

Learning Experiences in Evidence-Based Practice: Please indicate your level of agreement or disagreement to the following statements regarding your learning experiences while enrolled in an entry-level respiratory therapy educational program. The entry-level program prepares respiratory therapy students to take the RRT credential examination upon graduation.

I learned the foundations of evidence-based practice in my entry-level respiratory therapy program.



I received formal training in search strategies for finding research relevant to clinical practice in my entry-level respiratory therapy program.



I received formal training in critical appraisal of research literature in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I learned basic concepts in statistical analysis in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in applying evidence-based practice to clinical practice in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in using evidence-based practice in the development and application of respiratory care protocols in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

I received formal training in the evaluation and treatment of patients in a variety of settings, using the appropriate respiratory care protocols in my entry-level respiratory therapy program.

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Level of Agreement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Block 4

Frequency of Engaging in Evidence-Based Practice Activities: Please indicate how many times in a typical month you engage in the following evidence-based practice activities:

Search online databases and websites to answer a clinical question.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Read research-related textbooks, articles, and other documents.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Critically appraise research by reading and interpreting a research article using a critical appraisal checklist.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Use professional literature and research findings in the process of clinical decision making.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Teach or prepare to teach students or health professionals concepts of evidence-based practice.

| | 0-1 | 2-5 | 6-10 | 11-15 | 16+ |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Frequency (times/month) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Demographic Information: Please choose the response that characterizes you best. This information will be very helpful to us. Your responses are confidential.

Gender

- ☐ Male
- ☐ Female
- ☐ Transgender

Please enter your age in years:

Enrollment status in the BSRT program (select one)

- ☐ First year
- ☐ Second year
- ☐ Other (please specify)

Credentials (select one)

- ☐ CRT
- ☐ RRT
- ☐ CRT/Specialty Credential(s)
- ☐ RRT/Specialty Credential(s)

Please select your years of respiratory therapy experience.

- ☐ < 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ > 20 years

Please select your years of respiratory therapy teaching experience (includes clinical preceptor).

- ☐ < 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ > 20 years
- ☐ Not applicable

Primary practice area (select one)

- ☐ Adult acute/critical care
- ☐ Neonatal-Pediatric acute/critical care
- ☐ Long-term care
- ☐ Rehabilitation
- ☐ Home care/DME
- ☐ Education
- ☐ Management
- ☐ Research
- ☐ Other (please specify)

Please indicate the percentage of your total time that you spend in each type of activity during an average month. Please be sure that your total time adds up to 100%.

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|----------------|---|----|----|----|----|----|----|----|----|----|-----|
| Patient Care | | | | | | | | | | | |
| Teaching | | | | | | | | | | | |
| Research | | | | | | | | | | | |
| Administration | | | | | | | | | | | |
| Other | | | | | | | | | | | |

Please indicate the region of North Carolina you work (select only one)

- ☐ West
- ☐ Central
- ☐ East
- ☐ Other (if outside NC)

Which of the following best describes the location of your facility in which you work?

- ☐ Rural
- ☐ Urban
- ☐ Suburban

Thank you for participating in this survey!

APPENDIX F

FACULTY AT-A-GLANCE HANDOUT

Evidence-Based Practice At-A-Glance

Key Findings

The purpose of this study was to assess the factors associated with the use of EBP among respiratory therapy faculty teaching in a large community college system and post-professional students enrolled in a university-based, respiratory therapy baccalaureate degree completion program. Additionally, strategies and resources used to teach EBP by faculty were described. Findings from the study suggest that faculty and post-professional students are knowledgeable and confident regarding EBP but the frequency of using EBP in clinical decisions is limited.

- Post-professional students viewed their EBP learning experiences favorable but had varied levels of self-efficacy in knowledge and use of EBP.
- The relationship of knowledge, self-efficacy, and learning experiences to use of EBP was not significant for post-professional students.
- Faculty viewed their EBP learning experiences somewhat negatively and had varied levels of self-efficacy in knowledge and use of EBP.
- Case studies were the most commonly used teaching strategy and the AARC clinical practice guidelines were the most commonly used resources.

Importance of Teaching EBP in Respiratory Therapy

The AARC identified EBP as a core competency for all respiratory therapists. New graduates of respiratory therapy programs should at least be able to explain use of EBP in the development and application of respiratory care protocols, and be able to evaluate and treat patients using the appropriate respiratory care protocols.

A gap exists between what is required before entry into practice and what can be acquired after entry into practice.

Recommendations

A professional development course for faculty about teaching EBP is recommended. Faculty must be knowledgeable about strategies and the most current resources available to teach EBP in their courses to prepare students to be evidence-based practitioners.



Resources for teaching EBP should include processed research evidence such as clinical practice guidelines, systematic reviews, and meta analyses to reduce the burden of time and the complex EBP process. Strategies for teaching EBP should include case studies, application of processed research evidence to clinical practice, and small group case discussions to facilitate problem-solving, decision-making, and reflection regarding specific clinical situations.