

Occupational and Physical Therapists' Knowledge and Perceived Confidence Working in the Intensive Care Unit

Author(s)

Kayla J. Smith, OTD, OTR/L

Author Contact Information

Contact: Kayla Smith

Email: kjarrett7@gmail.com

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Abstract

The benefits of early mobility in the intensive care unit (ICU) are well documented and supports early mobilization of patients in a critical care setting. Unfortunately, only 45% of United States hospitals implement interdisciplinary early mobility teams as a standard practice of care (Bakhru, McWilliams, Wiebe, Spuhler, & Schweickert, 2016). Reasons for not maintaining full time, early occupational and physical therapy intervention teams can be related to perceptions from therapists, physicians, and other healthcare providers' limited knowledge and confidence in how and when to implement therapy intervention in the ICU environment. For this evidence-based study, a self-paced online training course was developed to educate occupational and physical therapy practitioners in the acute care setting on early therapeutic intervention in the ICU. Participants completed both a pretest and posttest knowledge assessment and confidence survey asking questions related to their knowledge and perceived confidence when implementing therapy interventions in the ICU. Results show that participants had an increase in their knowledge and perceived to be more confident after the online learning intervention. Therefore, the use of online learning for healthcare providers may prove to be a valued method for increasing and maintaining practitioners' competency and confidence in their clinical skills while in the ICU.

Keywords: occupational therapy, intensive care unit, online learning, knowledge, confidence, early mobility

Introduction and Background

As occupational therapy continues to grow and strives to meet Vision 2025 of providing effective solutions for all people to promote health and well-being, there is an increased need to effectively educate occupational therapy practitioners in all health care settings (AOTA Vision 2025, 2018). Occupational therapists can achieve the American Occupational Therapy Association's Vision 2025 by taking a more active role in early intervention in the intensive care unit (ICU). Literature supports early mobilization with patients in the critical care setting. This evidenced-based study determined if therapists in the acute care setting become more knowledgeable and confident with implementing therapy intervention in the ICU setting after completion of online education modules.

According to Hashem, Nelliott, & Needham (2016), historically, research on early mobilization dates back to 1899 after noticeable improvement in patients' recovery following early mobilization intervention. More recently, an article published by Lai et al., (2017) identified that those who were mechanically ventilated and receiving therapy within three days of intubation documented shorter mechanical ventilation and length of stay in the ICU. In a multi-discipline study conducted by Anekwe, et al. (2017), out of 138 participants (i.e. Medical Doctors, Physical Therapists, Occupational Therapists, Respiratory Therapists, and Nurses) 42% perceived that they were knowledgeable and well trained to care for those in the critical care setting. Of those participants, 65.2% reported feeling familiar with early mobilization. However, only 40.6% produced correct responses to reasons for ICU acquired weaknesses. These statistics show that there is a need for improvement in knowledge of how to care for and implement early

mobilization for the patient that is critically ill in the ICU. Anekwe et al. (2017) concluded that barriers to early mobilization are due to perceived barriers in training, decreased knowledge of potential benefits, and high variables related to what is appropriate for early mobilization.

Additionally, academia has identified the need for more competent therapists in the ICU. Occupational and physical therapy students report feeling more confident and prepared for the ICU setting after using a high-fidelity simulation on how to care for patients in the acute and ICU settings (Gibbs, Dietrich, & Dagnan, 2017; Ohtake, Lazarus, Schillo, & Rosen, 2013; Thomas, Rybski, Apke, Kegelmeyer, & Kloos, 2017). This type of education is relevant to veteran and novice therapists who have not had experience in the ICU setting. If current practicing therapists are not knowledgeable in demands of the ICU, it may produce a perception of limited support for new therapists trying to practice in the critical care setting. It may also contribute to burn out within new therapists (del Pozo, 2019). As students in occupational and physical therapy graduate programs become more knowledgeable of caring for patients that are critically ill, it is likely their patient caseload will have greater complexity (Knecht-Sabres, Kovic, Wallingford, & St. Amand, 2013; Thomas et al., 2017). The more challenging the caseload, the more physically and mentally taxing this can be for novice therapists. If burnout occurs, therapists may be ill-equipped to provide support, supervision, and assist the new graduate, due to their own lack of knowledge of the ICU. While increasing therapists' knowledge and confidence in the ICU may seem daunting, there can be methods to address competency and promote confidence.

One method identified to improve access to evidence-based practice education is through online education forums (Jacobs, Doyle, & Martin, 2013). Researchers have indicated online learning is an effective method for providing education on knowledge-based information for healthcare professionals (Ens, Janzen, & Palmert, 2017; Frith, Hubbard, James, & Warren-Forward, 2017; Hart et al., 2008; Hills, Robinson, Kelly, & Heathcote, 2010; Kobewka et al., 2014; Liaw et al., 2015; Macneill et al., 2014; Maloney et al., 2011; Powers & Candela, 2016; Wilson et al., 2017). Furthermore, literature reveals that when comparing pretest and posttest scores after online learning, results demonstrate statistical improvement (Ens et al., 2017; Hart et al., 2008; Liaw et al., 2015; Wilson et al., 2017). Evidence also supports online education for improving confidence among healthcare provider personnel (Ens et al., 2017; Hills et al., 2010; Powers & Candela, 2016; Wilson et al., 2017). According to the qualitative data found in the literature, participants indicate overall improved confidence in relation to the online education intervention (Ens et al., 2017; Hills et al., 2010; Powers & Candela, 2016; Wilson et al., 2017).

After implementing online education modules to physicians, nurses, and healthcare professionals, improved knowledge and confidence of the subject matter occurred (Ens et al., 2017; Frith et al., 2017; Hart et al., 2008; Hills et al., 2010; Kobewka et al., 2014; Liaw et al., 2015; Macneill et al., 2014; Maloney et al., 2011; Powers & Candela, 2016; Wilson et al., 2017). Additionally, when comparing online education with face-to-face learning, there was no reported statistical difference in participant understanding of the material (Maloney et al., 2011). Research also identified that participants typically found value in online education, rating their

experiences positively (Kobewka et al., 2014; Hills et al., 2010; Liaw et al., 2015). Participants who completed the online education responded to open-ended qualitative questionnaires positively reporting benefits such as individualized learning times/settings, as well as reduced geographical barriers, time away from patient care, and cost to the practitioner as reasons for selecting online education (Frith et al., 2017; Hills et al., 2010; Macneill et al., 2014; Maloney et al., 2011). Researchers identified that web-based education improved knowledge and was generally viewed by participants as an effective method for knowledge education (Ens et al., 2017; Hills et al., 2010; Hart et al., 2008; Kobewka et al., 2014; Liaw et al., 2015; Wilson et al., 2017). Overall, the researchers have found online education is a useful tool for educating healthcare practitioners.

This study was initiated in part due to a recognized need at a large hospital in the Southern United States to increase occupational and physical therapy role within the ICU. Furthermore, an online platform was selected as the intervention delivery method as online learning is deemed a feasible method for educating healthcare professionals, particularly those who work in a fast paced environment (Ens et al., 2017; Frith et al., 2017; Hart et al., 2008; Hills et al., 2010; Kobewka et al., 2014; Liaw et al., 2015; Macneill et al., 2014; Maloney et al., 2011; Powers & Candela, 2016; Wilson et al., 2017). Finally, this researcher wanted to know if using an online learning series would increase the knowledge and confidence of occupational and physical therapists when working in the ICU.

Theoretical Format

The guiding theoretical frame of reference for this evidence-based study was the Person-Environment–Occupation-Performance (PEOP) model. There are four variables that characterize the PEOP model: the person’s intrinsic factors, extrinsic influences, meaningful task, and performance (Christiansen & Baum, 2005; Themes, 2016; Willard & Schell, 2014). This model's purpose is to identify how a person’s internal and external factors influence how they successfully perform occupations. The PEOP model was selected for this project as it addressed therapists’ intrinsic factors of knowledge and perceived confidence when working in the ICU. Furthermore, the model looks at addressing extrinsic factors such as resources and training in relation to the ICU. When these intrinsic and extrinsic criteria are out of balance, decreased optimal performance of the person’s occupation occurs. In this evidence-based study the intrinsic and extrinsic imbalance occurred when therapists’ knowledge and confidence impacted their perceived ability to implement early mobility in the ICU setting. The online education modules intervention was implemented as a way to correct this imbalance between occupational performance and intrinsic/extrinsic factors by providing a resource to increase therapists’ knowledge and perceived confidence regarding equipment and interventions specific to clientele receiving therapy services in the ICU.

Methodology

This evidence-based study was a level III pretest and posttest mixed-method design. The PEOP Model was used as the guiding theoretical frame of reference. Participants were selected from a convenience sample of occupational and physical therapists working at a 900+ bed hospital in the southeast United States. A convenience sample was selected due to the intervention course design reflecting some site-specific

safety guidelines. Participants were included in this evidence-based study if they were licensed occupational and physical therapy practitioners as well as occupational and physical therapy students practicing in the acute care setting. Those excluded from the study were occupational therapy assistants and occupational therapy assistant students as none were employed or studying at the hospital during the time of the study. Additionally, speech language pathologist and rehabilitation aids were excluded due to the focus of this evidence-based studies intervention content.

Instrument

The knowledge-based assessment, confidence survey, qualitative survey, and demographic questions for the pretest and posttest were both developed by this primary investigator. A pilot study of the knowledge assessment and confidence survey was conducted by two occupational therapists prior to implementation. Based on feedback from the pilot study adjustments were made to improve question validity. Qualtrics® Experience Management™ was utilized to facilitate pretest and posttest assessment and surveys in an online format. Links to the knowledge assessment and confidence survey were shared with participants in the first and last intervention presentation. After the intervention, participants were provided with the same knowledge-based assessment (Appendix A) and confidence survey (Appendix B) for comparison of pretest and posttest assessments. Additionally, participants were requested to complete a three-question qualitative improvement survey at the end of the intervention that was created by the primary investigator.

Procedures

Institutional Review Board (IRB) approval was received from the site facility for October 2018 to October 2019. Written consent was obtained by all participants prior to participation. Participation in the study was voluntary and conducted outside of their scheduled work time. Participants who wished to not participate in the study were still provided with the online education modules, but their data was not collected or included in this evidence-based study. Additionally, to maintain confidentiality, those who did participate in the study were asked to provide a four-digit code based on their mothers birth month and year. All information collected was stored in a locked filing cabinet and a password protected computer.

The intervention took place over a total of 12 weeks from November 2018 to February 2019. There were six instructional educational modules that took 30 to 45 minutes to complete individually. Information in the modules covered the evidence supporting early mobility, environment, safety, common diagnoses, and general therapeutic intervention ideas to utilize when in the ICU (Appendix C). Included within the presentations were links to videos to provide an additional resource and offer a multimedia learning experience for various learning styles. Microsoft PowerPoint® presentation modules were sent through participants' provided e-mail addresses collected at the time of consent. Allowing for flexibility in the participants' learning, all modules were sent at the start of the intervention to permit participants time to complete the educational series at their own pace (Table 1). Using sound evidence, learning modules and learning module objectives (Appendix C) were created using information from acute care textbooks, evidence-based practice articles, and this authors three

years of experience working in the ICU. Articles were obtained from CINHALL, PubMed, and Google Scholar. Additionally, there were site specific guidelines and content that were utilized to develop the objectives and modules

Table 1
Project Intervention Schedule

Week	Intervention	Assessment	Time Commitment
1	Introduction of evidence supporting ICU intervention; Pretest confidence survey and knowledge assessments.	Pretest Confidence Survey	5 minutes
		Pretest Knowledge Assessment	15 minutes
		Introduction	25 minutes
		Total Time: 45 minutes	
2	Lines, leads, drains, and common ICU machinery	None	30 minutes
3	Pulmonary: Common diagnosis, precautions, and therapy interventions.	None	30 minutes
4	Cardiac: Common diagnosis, precautions, and therapy interventions.	None	30 minutes
5	Neurology: Common diagnosis, precautions, and therapy interventions.	None	30 minutes
6	Review of the previous modules and posttest survey and knowledge assessments.	Posttest Confidence Survey	5 minutes
		Posttest Knowledge Assessment	15 minutes
		Review	25 minutes
		Total Time: 45 minutes	

Note. Total time commitment was 3.5 hours

Data Analysis

Data were analyzed by using a computer processing system, Microsoft Excel® version 2016, with the use of the statistical analysis data packet application.

Demographic responses were analyzed using descriptive statistics. Qualitative data were analyzed using an inductive approach and Microsoft Excel® version 2016 was used as the code book to identify common themes. Participants' information was coded using a standard numbering method to identify respondents uniquely. Information collected from the pretest and posttest assessments and surveys were compared to determine if there were any changes in participants' knowledge and perceived confidence after completing the online intervention. The qualitative survey was utilized to determine what participants found helpful and areas for educational module improvement. After a review of the available literature, standardized assessments were not available to meet this evidence-based study's needs. Therefore, the pretest, posttest, and qualitative assessments and surveys were all researcher-developed.

Results

There were 22 participants who completed and returned the informed consent. Of those 22 participants, 1 participant completed the pretest but not the posttest, 1 completed the posttest but not the pretest, and 5 of the participants did not complete the pretest or the posttest. Therefore, data were collected and analyzed from 15 participants who completed the pretest and posttest knowledge assessment, confidence survey, demographic questions and qualitative survey. Demographics of participants consisted of six occupational therapists, six physical therapists, two physical therapy assistants, and one physical therapy student. Participants also indicated various levels of experience, age ranges, and hours worked per week (Table 2).

Table 2*Demographics of Participants*

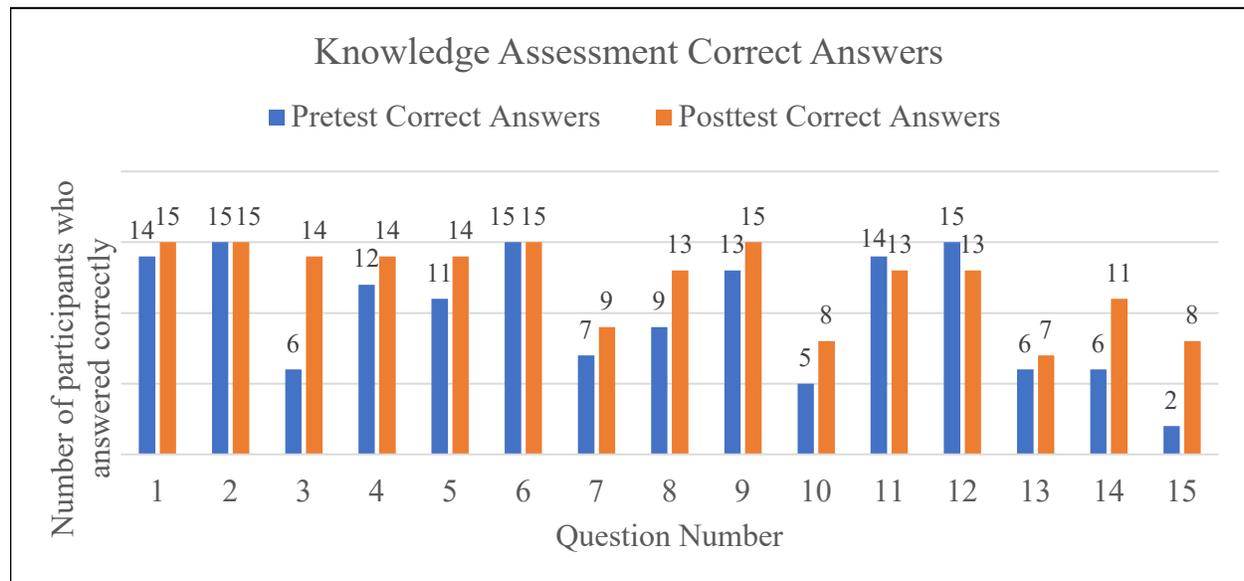
Gender	Age	Hours Employed	Profession	Years' Experience
Male 1 (6.7%)	20-29 3 (20%)	Full Time 12 (80%)	Occupational Therapists 6 (40%)	0-6 Months 1 (7%)
Female 13 (86.7%)	30-39 3 (20%)	Part Time 2 (13.1%)	Physical Therapists 6 (40%)	1-5 Years 4 (27%)
Unspecified 1 (6.7%)	40-49 5 (33%)	Student 1 (6.7%)	Physical Therapists Assistant 2 (13%)	5-10 Years 3 (20%)
	50-59 2 (13%)		Physical Therapy Students 1 (7%)	10-20 Years 3 (20%)
	60+ 2(13%)		Occupational Therapy Students 0 (0%)	20+ Years 3 (20%)

In the knowledge assessment, participants pretest and posttest questions were compared, to see if questions were answered correctly more frequently after the online learning intervention (Figure 1). Correct answer responses improved for 11 of the 15 questions in the posttest (Appendix A). The greatest change was identified in question three which was educational content specific to transcranial doppler precautions therapists needed to be familiar with before initiating therapeutic interventions. The

pretest showed six participants selected the correct answer; however, in the posttest, 14 participants answered correctly.

Figure 1

Participants Knowledge Assessment Accuracy



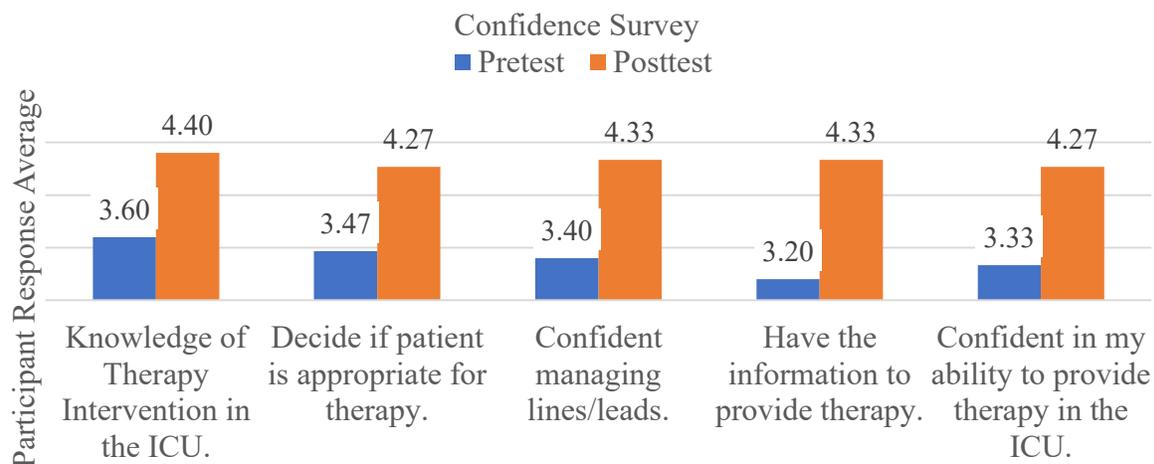
Anomalies were found when comparing the pretest and posttest knowledge assessment correct answer scores. When participants were asked about mobilizing a patient with a chest tube and what lines and leads could be safely removed for therapeutic intervention, all participants answered correctly in both the pretest and posttest assessment. This may have occurred due to participants prior knowledge and experience working with patients that have a chest tube and lines and leads. Participants were also asked about appropriate intensity levels for therapeutic intervention with increased oxygen support as well as what items are needed for someone with a left ventricular assist device to safely shower. For these two questions, a greater number of participants answered correctly in the pretest than in the posttest.

Changes from pretest to posttest may have occurred due to participants' misinterpretation of the question, not recalling the information from the education module, question construct, or self-report errors (i.e. guessing the errors). Despite these variances, overall results showed improvement from pretest to posttest in participants' knowledge in 11 of the 15 questions.

The confidence survey utilized a Likert style questionnaire scale of 1-5 with one strongly disagree to five strongly agree (Appendix B). Participants were asked questions related to how confident they felt with implementing therapy intervention in the ICU. Data from the pretest and posttest confidence surveys were compared to determine if there was an improvement in perceived confidence after completion of the education modules (Figure 2).

Figure 2

Participant Perceived Confidence Working in the ICU



When analyzing the confidence survey, results indicate that all participants rated perceived confidence higher in the posttest responses than in the pretest confidence survey. The greatest improvement was noted in participants' perception of feeling more

confident in their ability to carry out therapeutic intervention in the ICU with greater access to resources, with pretest scores average response of 3.2 and posttest average response of 4.3. It was also noted that participants' perception in their ability to carry out interventions in the ICU improved from the pretest results of 3.33 to an average response of 4.27 in the posttest.

Table 3

Qualitative Themes and Participant Responses

Question	Themes	Participant Response
Q1. What areas of this education did you find helpful and why?	<ol style="list-style-type: none"> 1. Therapy intervention parameters, protocols and precautions in all modules were helpful. 	<ul style="list-style-type: none"> • Participant 0362: "Having the information, in general, is a huge help for someone like myself who is not in the ICU setting on a daily or even monthly time frame. It allows for me to have time to think through chart reviews with my own clinical knowledge, and this information will allow me to clinically problem-solve more easily!" • Participant 0828: "ICU parameters for all diagnoses, vent settings, and explanation of nomenclature such as RASS were beneficial."
Q2. Was having all six education modules available at one time help or overwhelming and why?	<ol style="list-style-type: none"> 1. All modules available allowed completion of the learning at my own pace. 2. Fit my schedule. 	<ul style="list-style-type: none"> • Participant 0141: "I liked having access to all modules at one time. That way, I could work at my own pace".
Q3. What would you change about this education and why?	<ol style="list-style-type: none"> 1. More information on ICU medications. 2. Working videos. 3. Additional resources such as end of module quizzes and handouts. 4. Correct answers for the posttest. 	

What areas of this education did you find helpful and why?, (Q2) Was having all six education modules available at one time helpful or overwhelming and why?, (Q3) What would you change about this education and why? At the conclusion of the project, 6 of the 15 participants responded to the qualitative survey (Table 3).

Themes identified in participants qualitative responses' were positive and indicated the education modules were beneficial to therapists. The education perceived to be most helpful was the information focused on parameters, precautions, and protocols that was incorporated throughout each education module. Additionally, participants indicated that having the six education modules at one time was favorable as it allowed flexibility in completing the education modules and was complimentary to their learning needs.

To improve the education modules participants suggested including mini learning quizzes at the end of each module, additional information specifically related to medications used in the ICU, and learning videos that were operational. Another theme that emerged in question three was participants would have liked the answers to the knowledge assessment. Answers for the knowledge assessment were not shared with participants to reduce bias in participant pretest and posttest responses.

Discussion and Conclusion

The results of this mix-methods study showed participants did increase their knowledge and perceived confidence in working with clients in the ICU. Additionally, the participants felt the education was beneficial and was feasible for completion with their schedules. The results of the study has similarities with prior evidence that reports online learning is effective in improving knowledge, confidence, and is typically well

received by learners. Therefore, the results of this study add are supportive of prior available literature that supports online education for increasing knowledge and confidence among occupational and physical therapy practitioners.

While outcomes match with prior research, there are additional suggestions that there is a need for occupational and physical therapists to consider how they are prepared to implement early mobility in the ICU. Therapists are trained in their respective fields; however, the ICU can be a stressful and unique environment to gain confidence and knowledge for therapy presence, role, and safety. Providing an additional resource to support knowledge and confidence may help therapists feel better prepared to provide therapy services in this practice area. With the growing number of persons hospitalized in the ICU, it is imperative that occupational and physical therapists have the knowledge and confidences in their environment to carry out skilled interventions safely and progressively (The Society of Critical Care Medicine's, n.d.).

Based on outcomes of this study, it is recommended that this educational module program be considered as part of the orientation process for newly hired occupational and physical therapists, as well as for occupational and physical therapy students in an acute care rotation prior to implementing therapeutic intervention in the ICU. Also, it is suggested that the education modules be reviewed by expert therapists of the acute care setting to ensure content and construct validity are present as well as make sure information is current and accurate specific to protocols, equipment and technology, ethics, and standards of care.

Furthermore, this evidence-based study aligns with AOTA's Vision 2025 and the necessity to address the needs of all populations in all settings for greater

independence. Clients receiving care in the ICU are often perceived as too sick to participate (Parker, Sricharoenchai, & Needham, 2013). As occupational therapists, it is our job to address this population and engage them in meaningful activities. In many cases, the sooner therapists initiate skilled intervention in the ICU, the greater opportunity patients will have to regain independence and improve quality of life (Lai et al., 2017).

Limitations

Limitations exist in this evidence-based study. First, not all learning videos were operational throughout the project. When this occurred, the researcher would look for a replacement by searching for videos with similar content and key phrases as the initial video. Additionally, videos were not embedded into the education module, but provided as a link and utilized as an optional supplemental resource. This could have impacted participants' ability to view the content as links may have been broken.

Next, the internet server some participants may have attempted to access the learning videos on may not have allowed the videos to play due to enhanced security features required to maintain privacy within the hospital setting. Another limitation to this evidence-based study is that it was initiated over major holidays, potentially causing attrition that otherwise would not have occurred if presented at a different time of year. Additionally, the study was intended to last six weeks; however, due to the holidays, the evidence-based study was extended for an additional six weeks. Attrition could have also occurred due to the time commitment requested to complete the education modules.

Furthermore, this evidence-based study was based on a convenience sample; therefore, results may not translate to a larger population, and further research is recommended. Finally, the evidence-based study measurement tools were developed by the researcher. While steps were taken to prevent author bias in creation of the measurement tools by using available literature, facility approved standards, and a small pilot study these measuring tools were not standardized.

Future Research

In conclusion, these online education modules offered to occupational and physical therapy practitioners aided in improving their knowledge and perceived confidence when implementing therapy interventions in the ICU. Additionally, online education has been deemed a feasible method for educating therapy professionals in the healthcare environment. It is recommended that this educational material be utilized as part of the orientation process for occupational and physical therapy practitioners and students who intend to work in an ICU environment.

This evidence-based study was designed to increase the immediate knowledge and confidence of occupational therapists when implementing therapeutic interventions in the ICU. Furthermore, it was developed to provide therapy practitioners with a tangible resource to utilize while implementing therapeutic interventions in the critical care setting. Further research is recommended to determine if long term effects of the education modules cause lasting change in therapists' knowledge, perception of confidence, and service delivery in the ICU. Additionally, future research is needed to develop a standardized method to assess knowledge and confidence of occupational and physical therapy practitioners when working in the ICU. Finally, the sample size of

this evidence-based study was based on a convenience sample and too small, further research is recommended to determine if the education will translate to a larger population.

Implications for Occupational Therapy

By using these online education modules, occupational therapists may be more prepared to implement skilled therapeutic interventions in the ICU setting which correlates with AOTA's Vision 2025 to promote health and wellness to all populations. Currently, patients recovering in the ICU are at an increased risk for occupational deprivation along with lasting health implications related to being hospitalized in an ICU setting (Parker, Sricharoenchai, & Needham, 2013). With skilled intervention provided by occupational therapists, patients are less likely to be re-hospitalized and have long term chronic health disparities associated with prolonged stays in the ICU (Lai et al., 2017; Parker, Sricharoenchai, & Needham, 2013). Another option would be to use these education modules as a continuing education course, allowing occupational and physical therapy practitioners' access to this information for licensure credit. Lastly, a continuing education course would address possible ethical concerns related to decreased knowledge and confidence while implementing skilled therapy intervention in the ICU.

There is also a need to address the implementation of early therapeutic intervention in the ICU in hospital settings. While literature supports early therapy intervention as safe and feasible, not all hospitals utilize an early mobility or early rehabilitation team in the ICU. Further research is recommended to identify the need for increased ICU education in occupational and physical therapy didactic coursework,

continuing education, ethical related courses for licensure, and new employee orientation where such education modules may not yet be established.

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Appendixes

Appendix A. Pretest and Posttest Knowledge and Assessment

Pretest and Posttest Knowledge Assessment

Q1	Charlotte is an 84-year-old female with a history of Myasthenia Gravis. She was admitted to the hospital six days ago and has just finished her IVIG treatment. Unfortunately, Charlotte was intubated three days ago for decreased oxygen saturation and airway protection. Therapy has been consulted to initiate intervention. Upon reviewing the chart, you note that she has a RASS of -4 and an FIO2 of 30%. Is Charlotte appropriate for therapy intervention today?
Q2	It is contraindicated for a patient with a chest tube placed for pleural effusion of the lungs to mobilize out of bed with therapy.
Q3	A patient is having regular transcranial dopplers (TCDs) now for five days. Previous velocities have been reading below 100. However, today's reading shows an increase in the Right MCA from 60 to 85 and a change in the L MCA from 90 to 110. Since there was only an increase of 25 in the R MCA and 20 in the L MCA this patient is okay to see for therapy after clearing with the midlevel and monitoring for any neurological changes during the intervention.
Q4	A patient in the Neuro ICU has recently gone for a hemispherectomy. They have returned to the unit and are post op day one. The doctor has consulted OT and PT to initiate therapy intervention and has an order written for out of bed. On arrival, you notice the patient does not have a helmet. This patient is still appropriate for therapeutic intervention to the edge of bed without their helmet.
Q5	Ann is a 54-year-old female admitted four days ago with arm and chest pain. Prior to admission, her medical history indicates she is on dialysis three days a week and has h/o CHF, Type II Diabetes, and morbid obesity. Per the MD note, she was found to have an acute myocardial infarction and is status post CABG x, "4. There were complications after her procedure, and she is now in the cardiovascular ICU. On arrival, Ann is connected to CRRT. Ann is appropriate for bed level therapy only.
Q6	What are two lines or leads attached to the patient that can be removed by therapists for transfers in the ICU?
Q7	A patient is in the medical ICU after being diagnosed with acute respiratory distress syndrome (ARDS) and sepsis from a recent hip replacement two weeks ago. The patient was intubated on arrival to the ED three days before therapy consultation. After reviewing the chart, you have made a note of the patient's respiratory status and their current medications. The patient most appropriate for therapy is the patient with.
Q8	A patient has recently had an LVAD placed and is to start therapy. What are three precautions to remember when assisting the patient with functional mobility?

Q9	<p>Mark is a 66-year-old male with a history of COPD, hypertension, smokes 2PPD, and has type II diabetes He was admitted to the ICU two days ago for difficulty breathing, coughing, nausea, and headache. Since his admission, he has not been out of bed due to feeling weak and having a headache. Mark's doctor has decided to consult therapy services to prevent ICU acquired weakness (ICUAW). On arrival to Mark's room, you notice his oxygen saturation levels are in the low 80's, he is complaining of difficulty breathing with a cough, and elevated heart rate. Mark's symptoms indicate possible _____ and may need immediate medical attention.</p>
Q10	<p>A patient in the Neuroscience ICU has recently had an EVD placed for edema and CSF evacuation. What are the ICP parameters when working with this patient?</p>
Q11	<p>If a patient is on bi-pap at 50% FIO2, what is the most appropriate level of therapy intervention?</p>
Q12	<p>A patient with a recent LVAD placement is learning how to prepare his battery pack for a shower. What items are needed for the patient to safely complete the showering task?</p>
Q13	<p>Josie is an 84 year old female admitted 24hrs ago for left side facial and hemi body weakness, left inattention, no sensation on the left, and following no commands. Her initial NIH was a 16, and imaging showed a clot in the Right MCA. Neurosurgery was consulted and decided a thrombectomy was needed. How long after the sheath is pulled does the patient have to lay flat?</p>
Q14	<p>When walking a patient with a trach in the ICU, what oxygen delivery device is most likely needed?</p>
Q15	<p>OT and PT have been consulted to work with a patient in the Neuro ICU. On arrival, the patient received tPA. The patient initial CT scan showed a right MCA infarct. The patient's NIH is currently a 12 and the follow-up CT shows a new hemorrhage. Who would you speak too prior to initiating your intervention?</p>

Appendix B. Pretest and Posttest Confidence Survey Questions

Pretest and Posttest Confidence Survey Questions

Q1	I believe I have the knowledge to carry out therapy interventions with patients that are critically ill.
Q2	I feel confident in my ability to decide if a patient is appropriate for therapeutic intervention or not based on a review of specific information found in the chart.
Q3	I believe that I confidently manage lines and leads when working with patients in the ICU.
Q4	I believe I have the information I need to provide therapeutic interventions in the ICU confidently.
Q5	I feel confident in my ability to provide therapeutic intervention to patients in the ICU.

Appendix C. Learning Modules and Objectives

Learning Modules and Objectives

Learning Module	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Therapy in the ICU Introduction	Participants will have a better understanding of the evidence supporting early therapy intervention in the ICU.	Participants will identify why early intervention is important in the ICU.	Participants will identify the roles of the interdisciplinary team in the ICU.		
Common Lines, Machines, and Drains in the ICU	Learners will be able to identify common lines, leads, drains, and machines found in the ICU.	Learners will be able to discuss general precautions associated with lines, leads, drains, and machines in the ICU			
Pulmonology	Participants will be able to identify basic pulmonary anatomy.	Participants will be able to differentiate common pulmonary diagnoses.	Participants will be able to identify different oxygen sources and supply systems.	Participants will identify common pulmonary terminology.	Participants will be able to discuss and summarize pulmonary related therapy applications.

Cariology	Participant s will be able to identify basic cardiac anatomy.	Participan ts will be able to differentiate common cardiac diagnoses .	Participants will be able to identify difference between LVAD and ECMO.	Participants will be able to identify cardiac ICU related interventions.	
Neurology	Participant s will be able to identify basic neurology anatomy.	Participan ts will be able to identify different neurology related medical interventions.	Participants will identify neurology related terminology.	Participants will be able identify neurology related therapeutic intervention strategies.	
Review	Participant s will identify key points made throughout the previous learning modules.	At the end of this module participant s should complete the learning survey and assessment.			

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