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Sedation Assessment and Management in the Intensive Care Unit

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by

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Executive Summary

Nursing management of sedation medications in critical care patients is a complex responsibility, and studies have shown that proper use of sedation protocols can lead to improved patient outcomes. A knowledge gap among critical care nurses in the performance of Richmond Agitation Sedation Scale (RASS) assessments was identified within a critical care unit during the 2019 annual skills day. Inaccurate RASS assessments may lead to inaccurate sedation management according to the current unit protocol and evidence from the literature, and therefore may impact patient outcomes. This project aims to improve a clinical practice within an intensive care unit. The objective is to increase the number of staff nurses who perform and score RASS assessments accurately, determine how accurate RASS assessments can impact certain patient outcomes, and to provide suggestions on how to standardize education of RASS assessments for nurses in the intensive care unit. A baseline audit was completed in the form of an in-person observation of nurses performing RASS assessments on the unit. The baseline audit revealed 36% of nurses accurately performed RASS assessments on patients. Baseline internal data was compiled that included ICU length of stay for ventilated patients, time on the ventilator, and mortality among ventilated patients. A multi-faceted education series was provided to all critical care nurses. The education series was completed in May 2021. One month following the completion of this education series, a second audit of nurses, which mirrored the first audit, was completed to determine if a change in clinical practice occurred. The post-intervention audit revealed that 60% of nurses accurately performed RASS assessments on patients. Lastly, a post-intervention assessment of ICU length of stay for ventilated patients, time on the ventilator, and mortality for ventilated patients was completed. The results showed that along with an improvement in accuracy of RASS assessments, there was also a change in patient outcomes.

Introduction

Patients in the intensive care unit (ICU) often experience agitation or discomfort related to mechanical ventilation (Taran, Namadian, Faghihzadeh, & Naghibi, 2019). Sedation for mechanically ventilated patients is frequently required to maintain comfort, decrease agitation, and help with ventilator synchrony (Taran et al., 2019). Continuous sedation infusions can lead to over sedation, which has been tied to a longer length of stay in the ICU, an increased length of time on the ventilator, increased incidences of delirium, and increased hospital costs (Taran et al., 2019). Additionally, deep sedation has been associated with increased morbidity and mortality in ICU patients (Gong, Yang, Liu, Zhou, & Ma, 2019). Under sedation can lead to patient distress, ventilator intolerance, hemodynamic disturbances, and self-extubation (Ramoo Abdullah, Tan, & Wong, 2016). Providing adequate sedation remains a challenge for ICU nurses because the amount of sedation medication required varies with different patient conditions (Ramoo et al., 2016).

Sedation protocols and scoring systems have shown an earlier achievement of spontaneous breathing, improved ventilator weaning, and reduced stay in the ICU (Taran et al., 2019). The use of sedation protocols and scoring systems are vital in order to properly manage sedation. The Richmond Agitation Sedation Scale (RASS) is a valid and reliable sedation assessment tool used in critical care patients (Sessler et al., 2001). The scale is a ten-point scoring system that is used to determine level of sedation. There are five levels of sedation, ranging from -1, drowsy, to -5, unarousable (Sessler et al., 2001). A score of zero denotes the patient is alert and calm (Sessler et al., 2001). There are four levels of agitation, ranging from +1, anxious, to +4, combative (Sessler et al., 2001). The RASS is the current unit protocol and will

continue to be used in this project by the nurses to assess the sedation level of their patients in the critical care unit.

The RASS scale demonstrated interrater reliability and criterion, construct, and face validity (Ely et. al, 2003). This scale was the first of its kind to be validated to have the capability to detect changes in patient sedation over successive days in the ICU (Ely et al., 2003). Its ability to detect change in sedation against level of consciousness has proven its effectiveness and its ability to help the nurse correlate doses of sedation and analgesia medications with patient RASS score (Ely et al., 2003).

In numerous studies, the use of sedation protocols in conjunction with reliable sedation assessment scales, such as the RASS, have shown to reduce the risk of over sedation in ICU patients receiving mechanical ventilation. The evidence suggested that using sedation protocols along with RASS assessments can lead to improved patient outcomes, such as decreased mortality, shorter ICU and hospital length of stay, and fewer incidences of tracheostomies (Minhas, Velasquez, Kaul, Salinas, & Celi, 2015). Additionally, fewer days on the ventilator, fewer sedation medications used, and lower associated care costs have been shown using a sedation protocol and RASS assessments to manage sedation in mechanically ventilated patients (Taran et al., 2019).

Nurses are deeply involved in managing the sedation of critically ill patients (Borkowska et al., 2018). The clinical problem is that RASS assessments are inconsistently or improperly performed by nurses (Pop, Dervay, Dansby, & Jones, 2018). Despite implementation of sedation weaning protocols, studies have shown there is a large knowledge deficit among nurses surrounding performance of RASS assessments, RASS goals, and documentation of RASS assessments (Pop et al., 2018). Another study showed a low adherence to the sedation weaning

protocol, finding that 65% of mechanically ventilated patients were still considered deeply sedated compared to the target sedation goal of lightly sedated (Gong et al., 2019).

In the intensive care unit at a large urban Midwest hospital, a current policy has been active that involves using a sedation protocol along with RASS to manage sedation in patients receiving sedation medication. However, despite the protocol being in place, a 2019 knowledge skills assessment revealed a knowledge deficit that showed over 65% of ICU nurses inaccurately performed RASS assessments during a simulation-based annual skills day competency check-off. The data supports the fact that there is a knowledge gap and a need for change on this unit. The data also unveiled the lack of uniform education for incoming nurses on how to accurately perform RASS assessments and manage sedation. It also supported the idea that nurses are inaccurately performing RASS assessments on patients in the ICU and potentially mismanaging sedation as a result. This scholarly project seeks to answer whether a multi-faceted educational series for critical care nurses has an impact on closing the knowledge gap surrounding accurate RASS assessments, and as a result, impacting patient outcomes.

Nursing management of sedation in critical care patients is a complex responsibility, and studies have shown that proper use of sedation protocols can lead to improved patient outcomes. A knowledge gap among nurses in the performance of RASS assessments was identified. The impact of inaccurate RASS assessments was determined to have a potential impact on sedation management, and therefore impact patient outcomes.

Problem Statement

(P) In critical care nurses, (I) does a multifaceted education series (C) compared to current education practice (O) affect nurses' ability to accurately perform a RASS assessment and therefore impact patient outcomes?

Background and Significance of the Problem

The literature review for this scholarly project focused on three main topics, protocolized sedation management, nursing knowledge deficit surrounding sedation management, and using simulation as a teaching method, all of which were search terms derived from the developed PICO question. Databases searched included OneSearch, Cochrane Library, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The literature search yielded three systematic reviews of randomized controlled trials, six single randomized controlled trials (RCT), three case control/cohort studies, and three qualitative studies.

Protocolized sedation management is the practice of using approved sedation assessment scales to follow an algorithm while managing sedation in critical care patients (Abdar et al., 2013). Non-protocolized sedation management is the use of subjective measures such as vital signs, provider orders, and personal judgement to manage sedation (Abdar et al., 2013). The literature was reviewed to determine if following a sedation protocol had any impact to patient outcome.

A systematic review of RCTs studied the effects of protocolized versus non-protocolized sedation in mechanically ventilated patients (Minhas, Velasquez, Kaul, Salinas, & Celi, 2015). The results of the systematic review revealed that patients who were managed with protocolized sedation management had a significantly lower mortality, lower ICU and hospital stay, and lower incidences of receiving tracheostomies (Minhas et al., 2015). Minhas et al. (2015) reported a 15% reduction in mortality, a 1.73 day reduction in ICU length of stay, a 3.55 day reduction in hospital length of stay, and a 31% lower incidences of a tracheostomy in patients who were managed with protocolized sedation. The high-quality level of evidence derived from this systematic review of RCTs substantiates the use of standardized protocols in the sedation

management of mechanically ventilated patients in leading to improved patient outcomes. Supporting the findings of Minhas et al. (2015), a second systematic review found a significantly lower hospital length of stay in patients who were managed under a sedation protocol (Aitken et al., 2018).

Taran et al. (2019) conducted a single blind randomized controlled trial examining the effects of using a sedation protocol on clinical outcomes. Specifically, this study used the RASS assessment in their protocol to assess and manage sedation (Taran et al., 2019). Taran et al. (2019) found that patients receiving protocolized sedation met their target RASS more frequently, received fewer sedative drugs, and had a shorter average length of stay in the ICU. These findings are consistent with the findings of Minhas et al. (2015). In addition, Taran et al. (2019) found duration of mechanical ventilation was shorter and cost of the patient stay was significantly less in patients who received protocolized sedation.

Three single randomized controlled trials examined the effects of using protocolized sedation on the dosages of drugs used to sedate patients. Abdar et al. (2013) examined the amount of sedation used and level of consciousness between a group receiving protocolized sedation management and a group receiving standard sedation management. The results revealed that the group receiving protocolized sedation management used a significantly lower dose of sedatives, a higher level of consciousness, and a closer RASS score to target (Abdar et al., 2013). A second RCT found a significant reduction in Fentanyl use in patients who received protocolized sedation management (Yousefi, Toghyani, Yazdannik, & Fazel, 2015). A third RCT found that patients in the intervention group who received protocolized sedation had fewer days of opioid exposure than patients in the control group (Curley et al., 2015). The findings of these

RCTs suggest that following a protocol to manage sedation can lead to lower use of sedative drugs and opioids, which benefits the patients and can lead to a lower cost of care.

A study from Harborview Medical Center in Seattle, Washington revealed significant results after the implementation of an updated ICU analgesia and sedation protocol, which consisted of an increased patient assessment and reduced benzodiazepine exposure (Dale et al., 2014). Patients in the updated protocol cohort had 1.22 more RASS assessments per day by the ICU nurses than the baseline cohort using the previous protocol (Dale et al., 2014). The average RASS score was higher in the updated protocol compared to the baseline protocol indicating that there was a decreased level of sedation used. Dosages were noted to decrease by 34% (Dale et al., 2014). The clinical outcome results also computed that patients had a 4-hour reduction in duration of mechanical ventilation and a 1 day increase in the average ventilator free days (Dale et al., 2014).

The second area of focus was to search for evidence of a knowledge gap among nurses about how to assess and manage sedation. Two qualitative studies found supported the notion of a knowledge gap. The first study examined nurses' comfort with pain, agitation, and delirium assessments (Maximous et al., 2018). Data was collected via a retrospective chart review and also a nurse survey (Maximous et al., 2018). The study found a care gap in pain, agitation, and delirium assessments 59% of the time, meaning the assessments were being performed inconsistently or incorrectly (Maximous et al., 2018). A second qualitative study looked at compliance with RASS assessments and how frequently patients are achieving target RASS goals in the emergency room (Pop et al., 2018). Pop et al. (2018) revealed that RASS assessments were completed within 1 hour of stating sedation 56.8% of the time. Additionally, only 18.9% of patients were able to achieve their target RASS goal (Pop et al., 2018). Although

these studies are low-quality evidence, the evidence supports the knowledge deficit among nursing staff.

The third area of the literature review was to review effective ways to teach the nursing staff. The search targeted articles that looked at simulation as a teaching method for healthcare professionals as well as nurses' perceptions and knowledge of sedation management. A systematic review examined the role of training medical students through simulation in neonatal resuscitation (Huang et al., 2019). Huang et al. (2019) discovered a significant improvement in skill performance and a moderate benefit in resuscitation knowledge after the simulation intervention. A case control study examined a mock code performance and self confidence among nursing following a simulation intervention (Morton, Powers, Jordan, & Hatley, 2019). The study found a significant improvement in time to defibrillation after the simulation intervention (Morton et al., 2019). Both of these studies support simulation as an effective method of teaching health care professionals.

In summary, there is substantial, high-quality level evidence which suggested that when standardized protocols are used in the sedation management of mechanically ventilated patients, improved patient outcomes may result. The cumulative evidence as shown in the Literature Synthesis Table (Appendix A) also suggests that nursing knowledge deficits may play an integral role in the inaccurate assessments and impaired management of patients under sedation. In turn, this could lead to increased occurrences of adverse patient outcomes and increased hospital costs. Lastly, simulation-based education and training has been shown in the literature to be an effective method of training healthcare professionals, improving their clinical knowledge, decision making, response times, and clinical performance of care related tasks. An evidence-based, tailored education program designed to improve nursing assessment and management of

patients receiving sedation medications may be an effective way to reduce the identified knowledge deficit in critical care nurses at this institution. The evidence-based quality improvement project was designed to improve an educational process, nursing knowledge, and overall assessments and care of patients receiving sedation medications in the intensive care unit.

Project Description and Design

Theoretical Framework

Lippitt's Theory of Change is the theoretical framework that guided this DNP project. Lippitt focuses on seven phases of implementing change that involve assessment, planning, implementation, and evaluation (Mitchell, 2013). The initial part of the project is considered the assessment, which involves the first three phases of the theory. The first phase is where project management begins because the need for change and the problem are identified (Mitchell, 2013). In phase one, a timeline is established and a draft of the plan for change is developed (Mitchell, 2013). Additionally, the literature review begins in this phase to further the project manager's knowledge of the problem (Mitchell, 2013). Phase two is assessing motivation and capacity for change (Mitchell, 2013). While assessing motivation and capacity for change, the change agent must be in communication with those affected by the change (Mitchell, 2013). In the communication process, it is possible that resistance will be encountered and must be met with increased driving force of the change, in accordance with the Forcefield Analysis (Mitchell, 2013). Increased driving force could be in the form of education of why change is necessary. Phase three is assessing the change agent's resources and motivation (Mitchell, 2013). Change agents must be objective and have the resources necessary to implement change (Mitchell, 2013).

Following the assessment part of Lippitt's Theory of Change comes planning (Mitchell, 2013). Selecting progressive change objectives is the fourth phase. Progressive change objectives are a more final plan, detailing cost, timeline, and methods (Mitchell, 2013). Broad strategies are developed that ensure those affected by change are going to adapt the change and not resist (Mitchell, 2013). Phase five is to choose the appropriate role of the change agent (Mitchell, 2013). Change agents are highly involved in the change process and must be able to engage staff and manage resistance (Mitchell, 2013). Change agents do not necessarily have to be managers and may be more effective as an objective individual (Mitchell, 2013).

Phase six in Lippitt's Theory of Change involves implementing and maintaining change (Mitchell, 2013). In this phase, the change agent emphasizes communication, teamwork, and feedback to ensure change is implemented (Mitchell, 2013). Ongoing training of the change and effective communication increase the chance that change will actually be implemented and maintained (Mitchell, 2013). Finally, phase seven is beginning to terminate the relationship with the change agent. Implementation of change has been complete, and the change agent must find a way for the unit to maintain change without the agent (Mitchell, 2013). This phase also involves follow up in the form of a survey or something to provide feedback to the change agent (Mitchell, 2013).

Project Purpose and Objectives

This scholarly project is intended to improve a clinical practice within an intensive care unit. A process improvement goal provides a framework for decision making as the project progresses (Moran, Burson, & Conrad, 2020, p. 136). The first objective of this project is to increase the number of staff nurses who perform and score RASS assessments correctly based on an educational intervention. The second objective is to obtain information regarding patient

outcomes that could be impacted by sedation levels and accurate RASS assessments. The third objective, if the project shows a clinical change, is to provide suggestions on how to standardize education of RASS assessments and sedation management for nurses on the unit.

Methods

The methods for this DNP project are aligned with Lippitt's Theory of Change. The first phase is to identify a problem. The RASS assessment tool is an approved sedation scale used in a Midwest urban intensive care unit. The problem was identified when data retrieved at a 2019 critical care skills day for this ICU stated that 65% of ICU nurses were unable to accurately perform the RASS assessments. The data presented a need for change because with inappropriate RASS assessments, patients could be receiving inadequate or excessive sedation. Phase two assesses the need and motivation for change. A baseline audit was completed in the form of an in-person observation of nurses performing RASS assessments on the unit on both day shift and night shift. The audit provided quantitative pre-intervention data. In conjunction, a pre-intervention assessment of internal data including ICU length of stay for ventilated patients, ventilator days, and mortality of ventilated patients was completed. The data was collected retrospectively for three months prior to the intervention. The students were the change agents for this scholarly project. Unit managers and educators were used as resources to assist students with developing and implementing the planned change. Prior to beginning the project, full administrative support was obtained as evidenced by the Statement of Administrative Support (Appendix B).

The next phase involved planning the intervention. The educational intervention was virtual due to COVID-19. The students developed a 15-minute pre-recorded educational series that was distributed to the unit in the form of a Quick Response (QR) code. The video consisted

of two sections. The first portion was the teaching portion, and the second portion was interactive. In the interactive portion, the students recorded 4 different RASS scenarios. After each scenario, participants were asked to select the RASS score they believe correlates with the scenario. To support the education provided in the video, fliers with educational information about RASS were distributed throughout the unit. In conjunction with unit management, the educational video was mandatory for all nurses to watch and participation was tracked via the QR code. The QR code used to watch the video can be seen in Appendix K. Nurses completed the educational intervention in May 2021.

Upon completion of the educational intervention, a post-intervention audit was completed, and post-intervention patient outcome data was collected. The post-intervention audit provided quantitative data on how clinical practice has changed. The post-intervention audit mirrored the pre-intervention audit. Post-intervention patient data including ventilator days, ICU length of stay, and mortality rates for ventilated patients evaluated the effectiveness of the clinical practice change. The post-intervention data was collected three months after the intervention was complete. The last phase of the framework was the termination of the relationship by the change agents. If improvement is shown in the post-intervention audit and patient outcomes, the education series will be suggested to be implemented as a part of the unit's yearly required skills day.

Data Collection

The first step in data collection involved completing a baseline audit in the form of an in-person observation of nurses performing RASS assessments on the unit. A total of 33 nurses were observed between day shift and night shift. Nurses were observed performing the RASS assessment during his or her shift. Next, the RASS score the nurse gave the patient was obtained

and recorded. The students then compared the performance of the RASS assessments and the given RASS score with the protocol to determine accuracy. If the RASS assessment was performed inaccurately, the students indicated what was inaccurate about the assessment. The pre-intervention audit revealed that 36% of nurses performed the RASS assessment according to the protocol. The detailed results of the pre-intervention audit can be seen in Appendix C. In conjunction with the nursing audit, a pre-intervention assessment of ICU length of stay for ventilated patients, time on the ventilator, and mortality rates of ventilated patients was collected (Appendix D). Patient data was collected for the fiscal year to date, June, and July 2020.

The participation rate for the educational intervention was retrieved using data from the QR code for the RASS video. Out of approximately 100 nurses on the unit, 80 nurses participated in the educational intervention. Detailed information about QR code scans and participation can be seen in Appendix G.

The second part of the data collection began after the educational intervention. One month after all nurses completed the mandatory educational video, a second audit took place. The second audit of nurses followed the same format as the first audit. 35 nurses were observed performing RASS assessments between day shift and night shift. Nurses were observed performing the RASS assessment during his or her shift. The RASS score the nurse gave the patient was obtained and recorded. The students then compared the performance of the RASS assessments and the given RASS score with the protocol to determine accuracy. If the RASS assessment was performed inaccurately, the students indicated what was inaccurate about the assessment. In the case of inaccurate RASS assessments, additional education was provided to the nurse at the bedside. The goal of the second audit was to determine if the number of accurate RASS assessments increased following the intervention. The post-intervention audits revealed

60% of nurses accurately performed RASS assessments according to the protocol. The detailed results of the post-intervention audit can be seen in Appendix F. In conjunction with the post-intervention nursing audit, post-intervention patient data was collected. Patient data was collected for three months after the intervention was complete, which was June, July, and August 2021. The data looked at ICU length of stay for ventilated patients, ventilator days, and mortality rates for ventilated patients. The detailed results can be seen in Appendix H.

Ethical Considerations/Protection of Human Subjects

Following the review and determination by the OhioHealth Nursing Review Committee (OH NRC), the OH NRC approved proposal was submitted as part of an application to the Otterbein University Institutional Review Board (IRB) for approval prior to initiating this DNP Final Scholarly Project. Approval was obtained from the Otterbein University IRB (Appendix E), and the official IRB determination document was submitted to the OH NRC for record-keeping. As previously mentioned, no names or unique patient/staff identifiers was requested, collected or stored. No personal health information (PHI) was collected. All collected information was fully de-identified prior to storage into a password-protected, secure spreadsheet. Only de-identified aggregate data will be shared outside of OhioHealth Grant Medical Center with Otterbein University Nursing Department Faculty and Students as part of dissemination of the DNP Final Scholarly Project Report presentation (in partial fulfillment of the requirements for the degree: Doctor of Nursing Practice at Otterbein University).

Project Timeline

It is important that a timeline for the DNP project is developed to ensure completion of the project (Moran, Burson, & Conrad, 2020, p. 214). The project timeline is a visual representation of the tasks to be completed in an organized manner (Moran et al., 2020, p. 330).

Development of the timeline requires the collaboration of the students, project team leader, and organizational facilitators of the project. Summer 2020 involved the development of the project proposal, an oral presentation, and the project proposal defense. Following approval of the OhioHealth Nursing Review Committee, an IRB application was submitted. The IRB approved the proposal with waiver of written consent in October 2020.

In November of 2020, the first set of data collection began and was completed in February 2021. Collaboration with the nurse educators occurred in Fall 2020 to develop the content to be included in the educational intervention. The educational sessions began in April 2021 and was completed by May 2021. The educational intervention was virtual due to COVID-19. One month after the education sessions, June 2021, the second set round of audits were completed. Three months after the educational intervention, the second set of patient data was collected.

In Fall of 2021, data collection was complete. The students then determined if a clinical practice change has occurred as determined by both sets of post intervention data. Defense of the final scholarly project and a poster presentation took place in the Winter 2021.

Budget

The scholarly project budget is minimal. A personal computer with a free software program was used to record the educational video. Indirect expenses include the educators' time, the nurses' time, and the students' time. The educators spent approximately 5 hours assisting with this project. Each nurse (80) spent approximately 30 minutes in the educational intervention. The students spent approximately 300 hours on this scholarly project. The educators time and the nurses time are not added expenses to the hospital, as this project was

incorporated into a mandatory training event. There were no variances from the original budget set forth for this scholarly project.

Outcomes and Evaluation

Data Analysis

Upon completion of data collection, a qualitative comparative analysis was used to analyze the two sets of data. The data was placed into an excel spreadsheet, summarized, and characteristics of the data was described in aggregate form. In analyzing the data, the objectives set forth in this project were evaluated. The first objective was to determine if nurses' ability to accurately perform a RASS assessment improved following the educational intervention. The second objective was to determine if patient outcomes were impacted by a new approach to educating nurses about sedation assessments. Finally, the students will suggest a standardized way to educate oncoming nurses about performing RASS assessments.

Outcomes and Evaluation

In order to evaluate whether nurses' ability to accurately perform a RASS assessment improved following the intervention, pre- and post-intervention audits were completed and compared. The pre-intervention audit showed that 36% of nurses accurately performed the RASS assessments. The post-intervention audit showed that 60% of nurses accurately performed the RASS assessment, which was an increase of 24% from the pre-intervention audit. A detailed summary of pre-intervention audit can be seen in Appendix C. A detailed summary of the post-intervention audit can be seen in Appendix F. An aggregate summary of this data can be seen in Appendix J.

In order to evaluate whether there was a clinical practice change that impacted patient outcomes, pre- and post-intervention patient data was compared. Three different metrics

evaluating patient outcomes were compared: ICU length of stay for ventilated patients, days on the ventilator, and mortality for ventilated patients. Three months of data was collected and averaged out for comparison. Pre-intervention data showed the average length of stay in the ICU for ventilated patients was 4.7 days. Post-intervention showed the average length of stay in the ICU for ventilated patients was 4.8 days. Average length of stay for ventilated patients did not show an improvement following the educational intervention.

Next, length of time on the ventilator was compared. Pre-intervention ventilator time was 2.89 days. Post-intervention ventilator time was 2.54 days. The post-intervention days on the ventilator showed an improvement of 0.35 days on average.

Finally, mortality for ventilated patients was compared. Pre-intervention ventilated patient mortality showed an average of 27.2%. Post-intervention ventilated patient mortality showed an average of 26.6%. The post-intervention ventilated patient mortality rate decreased by 0.6%.

Detailed information about pre-intervention patient data can be seen in Appendix D. Detailed information about post-intervention patient data can be seen in Appendix H. An aggregate summary of pre- and post-intervention patient data can be seen in Appendix I.

Upon evaluation of the data, a clinical practice change has occurred in nurses. There was a 24% improvement in accuracy of RASS assessments following the educational intervention. There was also an improvement in two of three patient data metrics measured. It is possible that with the improvement of accuracy of RASS assessments, patient outcomes were positively impacted, however; it is hard to determine if there is a direct correlation, or if patient outcomes improved from various other factors. Since the project showed a clinical practice change in nurses, the students have suggested a way to standardize education about RASS. The students

suggest incorporating RASS education into yearly education day and to provide RASS education to all onboarding nurses.

Barriers

As anticipated, several barriers were encountered during the completion of this scholarly project. Identifying potential barriers helps create solutions for overcoming those barriers prior to attempting to implement a project (Moran et al., 2020, p. 367). Resistance to change was met while implementing this project. Resistance to change was a barrier that was anticipated, and additional steps were taken to overcome the resistance. Effective communication and teaching the nurses the significance of this project helped to buffer the resistance that was met.

Another barrier that was encountered was organizational culture. Due to stressful staffing circumstances, higher than average turnover rate, and a high stress working environment, it was difficult to attempt to spark interest in making a change. Many nurses felt that they did not have the time to listen and be educated about RASS assessments when they were caring for sick patients in a high stress environment. It was difficult trying to balance respecting the nurses' time but also keeping in mind the purpose of the project. While performing audits, the environment and stress level in the ICU was assessed. If it was a busier than usual day, the number of audits performed was limited, and the students came back at a later date to ensure education could still be provided. This required more visits to the unit than originally anticipated, but it was important to respect the nurses' time and working conditions.

COVID-19 posed many challenges to completing this scholarly project. First, due to COVID-19, annual education day that normally is held in person was postponed multiple times and eventually canceled all together. This required the students to come up with another delivery method for the educational intervention. Since the goal was to educate all nurses on the unit, the

students collaborated with management and educators to ensure adequate participation. Together, the students and educators made a virtual education series that was mandatory for all nurses to complete on their own time.

Also, in part due to COVID-19, the turnover rate of nurses was high in the ICU during the time of this scholarly project. Due to a large number of new nurses, the ability to audit the same nurses pre- and post-intervention was sometimes not possible. As a result, the post-intervention audit data could have been skewed.

Despite the many challenges encountered while implementing this scholarly project, the barriers were overcome with effective communication and persistence. Without the drive for change, stagnation can occur, which can jeopardize the future of an organization. It was the responsibility of the students to overcome barriers and drive the need for change. The students had help from management due to a shared vision and effective leadership, which helped to create a readiness to change on the unit. Unit management helped to drive the importance of this project among the nursing staff.

Conclusions and Recommendations

In summary, the assessment and management of sedation in critically ill patients is an intricate practice that is the responsibility of intensive care nursing staff. A knowledge gap was identified in the intensive care unit at a large urban Midwest hospital surrounding the practice of nurses performing RASS assessments on patients receiving sedation medications. This project sought to answer whether a multi-faceted approach comprising of an educational series and evidence-based recommended strategies on policy and practice change can improve nursing practice and patient outcomes of mechanically ventilated patients in the intensive care unit. The findings of this scholarly project can serve as a beginning point for a greater understanding of the

importance of clinical knowledge, education, policy, and nursing practice impacts on outcomes of mechanically ventilated patients in the intensive care unit. It can also provide support for future evidence-based practice and quality improvement projects involving multidisciplinary healthcare professionals to include nurses, physicians, respiratory therapists, unit managers, and executive leaders striving to improve clinical practices and patient health outcomes.

A clinical practice change occurred as shown by improved RASS assessments after the educational intervention. Additionally, two of the three patient data metrics improved following the educational intervention; however, it is difficult to directly correlate improvement in patient outcomes with an increased number of accurate RASS assessments. In light of the positive impact the education had on the accuracy of RASS assessments, the students shared the results with unit educators and management. The students also recommended that RASS education is incorporated into yearly education and provided to all new hires during onboarding.

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Article 1

Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Abdar, M., Rafiei, H., Abbaszade, A., Hosseinrezaei, H., Abdar, Z., Delaram, M., & Ahmadinejad, M. (2013). Effects of nurses' practice of a sedation protocol on sedation and consciousness levels of patients on mechanical ventilation. *Iranian Journal of Nursing and Midwifery Research*, 18(5), 391-395. Retrieved from https://eds-b-ebscohost-com.ezproxy.otterbein.edu/eds/detail/detail?vid=2&sid=b72ce797-97cc-4e12-8e1c-c1a69e1891f4%40pdc-v-sessmgr02&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#AN=939	Not specified	Patients randomly allocated into two groups. Control group received routine ICU sedation management. Intervention group managed with a sedation protocol. RASS was used to determine sedation and Glascow Coma Scale (GCS) was used to determine level	**N=132** Inclusion: ICU patients on mechanical ventilation for at least 48 hours, score of >7 on GCS, age 15-48, lack of underlying problems of heart, lung, kidney, or liver, and absence of allergy to morphine or midazolam	**IV1:** Protocol based or **IV2:** non-protocol-based sedation management **DV:** RASS score, GCS score, and amount of sedatives used	P<0.05 to determine statistical significance.	Descriptive statistics, Pearson correlation, and independent *t*-test were used to analyze data.	Patients in the intervention group received lower doses of sedatives and pain medicine. The intervention group had significantly closer RASS scores to goal and significantly higher GCS scores	Level II: RCT	This study showed that patients receiving protocol-based sedation management were less likely to be considered deeply sedated. The study supports the need for protocol driven sedation management in ICU patients.

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Article 2									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Aitken, L. M., Bucknall, T., Kent, B., Mitchell, M., Burmeister, E., & Keogh, S. (n.d.). Sedation protocols to reduce duration of mechanical ventilation in the ICU: a Cochrane Systematic Review. *Journal of Advanced Nursing*. 72(2), 261–272. https://doi.org/10.1111/jan.12843	Not specified	Systematic review of RCTs. Search strategies used according to the Cochrane Handbook for Systematic Reviews of Interventions to find articles comparing management with and without protocol-directed sedation in ICU patients	**N=3323** participants (864 adults and 2459 children)	**IV1**: protocol-directed sedation management **IV2:** usual sedation care **DV**: mechanical ventilation duration and ICU/hospital death rate	**Primary outcome**: mechanical ventilation duration, ICU or hospital death rate **Secondary outcomes**: ICU length of stay, hospital length of stay, total dose of sedation in mg, adverse events within ICU, incidences of delirium in ICU, memory function after hospital discharge using any validated measure, psychological recovery after discharge, cognitive recovery after hospital discharge, quality of life after hospital discharge, and incidences of tracheostomy within ICU.	Mean difference or standardized mean difference and 95% confidence interval for summary statistics. Risk ratio and 95% confidence interval for dichotomous data. If studies were homogenous, a meta-analysis was conducted using a fixed-effect model. Where heterogeneity existed, a random-effects model was used. Analyses were considered significant at the alpha = 0.05 level	Hospital length of stay was significantly reduced in patients who received protocol-directed sedation. Combined ICU mortality outcome was not statistically significant between protocol-directed sedation and usual care group (p=0.08).	Level I: Systematic Review	Methodological quality of the studies was moderate, quality of the overall evidence was low due to conflicting results. Potential biases exist in the review process

Article 3									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Curley, M. A., Wypij, D., Watson, R. S., Grant, M. J., Asaro, L. A., Cheifetz, I. M., … RESTORE Study Investigators and the Pediatric Acute Lung Injury and Sepsis Investigators Network (2015). Protocolized sedation vs usual care in pediatric patients mechanically ventilated for acute respiratory failure: a randomized clinical trial. JAMA, 313(4), 379–389. Doi:10.1001/jama.2014.18399	Not specified	Unblinded multicenter cluster-randomized clinical trial. All PICUs implemented the same pediatric-specific standard, valid, and reliable pain, sedation, and iatrogenic withdrawal assessment instruments.	**N=2449** The study took place among 31 pediatric ICUs. Inclusion criteria: 2 weeks to 17 years of age receiving mechanical ventilation for acute airways and/or parenchymal lung disease. Exclusion criteria: length of mechanical stay altered by sedation management (example, only ventilated post-op)	**IV1**: nurse-implemented goal-directed sedation protocol (intervention) **IV2:** usual sedation management (control) **DV**: ventilator days, time to recovery from acute respiratory failure, duration of weaning from mechanical ventilation, neurological testing, PICU and hospital	Statistical significance determined at P<0.05	Primary analysis compared duration of mechanical ventilation on intervention group vs control group using Kaplan-Meier curves and proportional hazards regression adjusting for age group. Secondary outcomes were analyzed by logistic, multinominal logistic, cumulative logit, linear, and Poisson regression accounting for PICU as a cluster variable using	Duration of mechanical ventilation was not statistically significant between groups (p=0.61). Patients in intervention group received fewer days of opioid exposure and sedative classes without an increase in inadequate pain or sedation management.	Level II: RCT	Limitations: cluster-randomized design. The intervention group enrolled more patients <2 years of age and more patients with bronchiolitis (normally difficult to sedate). Selection bias may have occurred because trial was unblinded. Strength: large sample size The study supports the use of protocol-directed

				LOS, in-hospital mortality, sedation-related adverse events, measure of sedative exposure, and occurrence of iatrogenic withdrawal		generalized estimating equations for binary, nominal, ordinal, continuous, and rate variables. A two-sided 0.05 level test was used.			sedation management
Article 4									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Dale, C. R., Kannas, D. A., Fan , V. S., Daniel , S. L., Deem , S., Yanez III, D., ... Treggian , M. M. (2014, March). Improved Analgesia, Sedation, and Delirium Protocol Associated with Decreased Duration of Delirium and Mechanical Ventilation. *AnnalsATS*, 11, 367-374. Http://dx.doi.org/10.1513/AnnalsATS.201306-210OC	Not specified	observational before (n = 703) and after (n = 780) cohort study of mechanically ventilated patients in a 24-bed trauma-surgical intensive care unit	Inclusion: All patients admitted to the Trauma and Surgical ICU at Harborview Medical Center who received mechanical ventilation in the ICU, regardless of the admitting service, were included in the study. Exclusion: Patients who died before arrival in the ICU and patients	IV1= was the duration of mechanical ventilation. DV= days of delirium; the frequency of patient assessment with the RASS and CAM-ICU instruments; benzodiazepine dosing; durations of mechanical ventilation, ICU	Multivariable linear regression was used for the primary analysis. To investigate the relationship between cohort and risk of VAP over time, a Cox proportional hazard model was constructed with the same prespecified potential	P values were two-sided, and $P < 0.05$ was considered statistically significant.	Patients in the updated protocol cohort had 1.22 more RASS assessments per day $P < 0.01$and 1.15 more CAM-ICU assessments per day $P < 0.01$) than the baseline cohort. Hourly benzo dose decreased by 34.8% $P < 0.01$). Median duration of mechanical	Level 2= retrospective cohort study	Limitations- it is a single-institution, retrospective cohort study involving a trauma and surgical patient population.

			who did not require mechanical ventilation	stay, and hospitalization; and hospital mortality and ventilator associated pneumonia rate. Multivariable linear regression was used for the primary analysis. To investigate the relationship between cohort and risk of VAP over time, a Cox proportional hazard model was constructed with the same prespecified potential			ventilation decreased by 17.6% (95% CI, 0.6–31.7%; P = 0.04) . A 12.4% reduction in median duration of ICU stay nd a 14.0% reduction in median duration of hospitalization No significant association with mortality (odds ratio, 1.18; 95% CI, 0.80–1.76; P = 0.40) was seen.		
Article									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**

Huang, J., Tang, Y., Tang, J., Shi, J., Wang, H., Xiong, T., … Mu, D. (2019). Educational efficacy of high-fidelity simulation in neonatal resuscitation training: A systematic review. *BMC Medical Education*, *19*(323). http://dx.doi.org/10.1186/s12909-019-1763-z	Not specified	Systematic Review performed based on PRISMA guidelines	**N=15 studies** Inclusion criteria: studies that investigated the role of high-fidelity simulation in neonatal resuscitation training, the training was followed by the Neonatal Resuscitation Program standard, clinical trial studies, outcome assessment focusing on individual or team resuscitation performance. Exclusion criteria: reviews or non-trials, studies written in a non-English or non-Chinese language, comparisons that did not include high-fidelity simulation, studies without control groups	**IV1:** simulation-based training method **IV2:** traditional training **DV:** Neonatal resuscitation knowledge, overall skill performance	$P < 0.05$ indicated statistical significance.	95% CI used to facilitate direct comparison of results. Fixed effect model used when heterogeneity was detected across studies. If not, a random effect model was used. Data statistically heterogeneous if $P<01$.	A large benefit was shown when using high-fidelity simulation in skill performance compared to traditional training. A moderate benefit was shown when using high-fidelity simulation in neonatal resuscitation knowledge compared to traditional training	Level I: Systematic Review	Performance bias existed in all RCTs because participant blinding to simulation is impossible. Study supports high-fidelity simulation as a method of teaching. Study recommends debriefing session after simulation as a way to best retain knowledge long term.
Article 6									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**

Maximous, R., Miller, F., Tan, C., Camargo, M., Ross, K., Marshall, C., ... Tsang, J. (2018). Pain, agitation, and delirium assessment and management in a community medical-surgical ICU: results from a prospective observational study and nurse survey. BMJ Open Quality, 7. http://dx.doi.org/10.1136/bmjoq-2018-000413	Not specified	A prospective observational study was conducted to review the practice of pain, agitation, delirium (PAD) assessment and management A nurse survey was conducted to examine nurses' perceived comfort with PAD assessment and management	Inclusion criteria: All patients admitted to the ICU for >24 hr were admitted to the study. The nurse survey was sent to all ICU nurses. Number of participants not provided	**IV**: current pain, agitation, delirium management **DV:** nurses' perceptions, PAD assessments, and target RASS scores, satisfaction with PAD management by other nurses and physicians	Outcomes: practice of PAD assessment and management in the ICU, nurses' perceived comfort surrounding PAD assessment and management, and satisfaction with PAD management by other nurses and physicians	Data was collected prospectively by reviewing patients' medical charts daily. Basic demographic and clinical information in addition to specific process and outcome measures surrounding PAD were collected, recorded and anonymized in an Excel spreadsheet.	Delirium assessment was the most significant gap in care. Agitation assessment using RASS was conducted 78% of the time, and delirium assessment using CAM-ICU was conducted 39% of the time. The nurse survey revealed nurses are least comfortable with delirium management.	Level VI: Qualitative study	Strengths of the study include the combination of a prospective observational cohorts and a nurse survey with >98% response rate. Limitations of this study include the reliance on nursing charting practice to reflect actual clinical practice and the lack of formal validation of the nurse survey. Low quality evidence but supports a knowledge gap in nursing staff around PAD assessments
Article 7									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**

Mehta, S., Meade, M., Burry, L., Mallick, R., Katsios, C., Fergusson, D., … Cook, D. (2016). Variation in diurnal sedation in mechanically ventilated patients who are managed with a sedation protocol alone or a sedation protocol and daily interruption. *Critical Care*, 20(233). Doi: 10.1186/s13054-016-1405-3	Not specified	Secondary analysis of an RCT. Compared dosages of sedation during the day and night to evaluate association between nighttime and daytime sedation and opioid consumption and spontaneous breathing trials	**N=423 patients** Inclusion criteria: ICU patients requiring mechanical ventilation >48 hours and were receiving continuous sedation and/or opioids Exclusion criteria: admitted after cardiac arrest, traumatic brain injury, receiving neuromuscular blockades, or patients without a commitment to maximal therapy	**IV1:** Daytime use of opioid and sedatives **IV2:** Nighttime use of opioid and sedatives **DV:** Occurrences of SBT, success of SBT, extubation	p value < 0.05 considered statistically significant.	Two sided statistical tests used. 95% confidence intervals. Equivalent doses were calculated for benzodiazapines and opioids.	Nighttime benzodiazepine and opioid doses were significantly higher. Sedation scores similar during the day and at night. Increases in nighttime drug doses were independently associated with failure to meet SBT screening criteria, SBT failure, and the decision not to extubate the patient despite successful SBT	Level II: RCT	Strengths: protocolized sedation management, multicenter representation, hourly documentation of sedation and pain scores Limitations: observational design of the secondary analysis This study showed that an increase in sedation and opioid levels was closely correlated with longer time on the ventilator
Article 8									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**

Minhas, M., Velasquez, A., Kaul, A., Salinas, P., & Celi, L. (2015). Effects of protocolized sedation on clinical outcomes in mechanically ventilated intensive care patients: A systematic review and meta-analysis of randomized controlled trials. *Mayo Clinic Proceedings*, *90*(5), 613-623. http://dx.doi.org/ttp://dx.doi.Org/10.1016/j.mayocp.2015.02.016	Not specified	Systematic review and meta-analysis was guided by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement	**N= 6 RCTs** Inclusion criteria: RCTs that studied effect of protocolized sedation versus usual care in mechanically ventilated patients over 18 years old and reported one of the following outcomes: mortality, duration of mechanical ventilation, ICU or hospital LOS, incidences of tracheostomy, reintubation, self-extubation, and delirium	**IV1:** Protocolized sedation management **IV2:** Non protocolized sedation management **DV:** mortality, duration of mechanical ventilation, ICU or hospital LOS, incidences of tracheostomy, reintubation, self-extubation, and delirium	P<0.05 was considered significant	Risk ratios, number needed to treat for dichotomous outcomes and weighted mean differences for continuous outcomes, 95% confidence intervals.	The protocol-driven sedation management groups has statistically significantly lower mortality, shorter ICU and hospital LOS, and lower incidences of tracheostomies. Duration of mechanical ventilation, reintubation, self extubation, and delirium did not show statistical significance	Level I: Systematic review of RCTs	Strengths: first systematic review of its kind Limitations: results not applicable to specialty ICUs, patients with severe illness, or children. The study supports protocol-driven sedation management with evidence for better patient outcomes.

Article 9

Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Morton, S. B., Powers, K., Jordan, K., & Hatley, A. (2019). The effect of high-fidelity simulation on medical-surgical nurses' mock code performance and self-confidence. *MedSurg Nursing*, *28*(3). Retrieved from https://pdfs.semanticscholar.	Not specified	Quasi-experimental pilot study to study effects of high-fidelity simulation on nurses' mock code performance	**N= 37 nurses** Inclusion criteria: medical surgical nurses. Exclusion criteria: nurses working in specialty areas	**IV:** Mock code simulation **DV1:** mock code performance including: determining unresponsivenes	P<0.05 to determine statistical significance	Descriptive statistics used Paired-samples *t*-tests used to evaluate changes in performance	Statistically significant improvement in time to defibrillation and self-confidence was noted after simulation	Level III: quasi-experimental study	Limitations: small sample size and one hospital setting limited generalizability of findings. The study suggests that simulation can

Org/2ec5/c73d23a1dff6f6af520ba47f0193c0b6aa44.pdf		and self-confidence. Mock code simulation was created, and primary data collected. Self-confidence was measured using the National League for Nursing student Satisfaction and Self-Confidence in Learning instrument.		s, checking pulse, calling code, placing bed in CPR mode, initiating CPR, retrieving code cart, assigning timekeeper, delivering rescue breaths, applying backboard, turning on AED and following prompts, and performing defibrillation. **DV2:** self-confidence					help improve performance and self-confidence around skills and scenarios for nurses
Article 10									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Pop, M. K., Dervay, K. R., Dansby, M., & Jones, C. (2018). Evaluation of Richmond Agitation Sedation Scale (RASS) in mechanically ventilated in the emergency department. *Advanced Emergency Nursing Journal*, *40*(2), 131–137.	Not specified	This study was conducted as a retrospective chart review designed to assess RASS goal implementation in mechanically	**N=39 patients** Patients who were intubated in route to the hospital. Inclusion criteria was: 18 years or older, 24 hours or more on the ventilator, receiving	**IV**: RASS goal implementation using early goal directed sedation (EGD) **DV**: provider RASS goal setting,	Retrospective chart review performed	Descriptive statistics used to evaluate data	RASS assessments were done inconsistently. 56.8% of patients were evaluated by a nurse within one hour of sedation	Level VI: Qualitative study	Limitations: small sample size, power analysis was not performed, documentation process limitations, Strengths: provided insight of

https://doi.org/10.1097/TME.000000000000 0184		ventilated patients in the emergency department, compliance with RASS, and RASS goal achievement.	continuous sedation and/or analgesia during the first 48 hours of admission, hospital stay of 6 days or more. Exclusion criteria: tracheostomy, ICU stay <48 hours, readmission within 30 days, terminal conditions, pregnancy, existing neurological injury	compliance with the assessment tool, achievement of target RASS goals, appropriateness of sedation assessment according to hospital protocol, appropriate sedative selection, time to extubation, length of stay in hospital, 180-day mortality.			start. 18.9% of patients achieved their RASS goal in the emergency department. Findings support provider and nursing knowledge deficit regarding RASS goal setting and proper documentation of RASS		knowledge deficit among clinicians.
Article 11									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**

Ramoo, V., Abdullah, K. L., Tan, P. S., Wong, L. P., Chua, Y. P. (2014). Intervention to improve intensive care nurses' knowledge of sedation assessment and management. British Association of Critical Care Nurses, 21(5). Doi: 10.1111/nicc.12105	Not specified	Quasi-experimental design with a pre- and post-test. The pre-test was carried out prior to education series and the post-test was carried out 3 months after educational intervention	**N=66 nurses** Target population: registered nurses working in the ICU with >6mo experience in critical care. Study carried out at a 14-bed general ICU in Malaysia	**IV1:** educational intervention for nursing staff **IV2:** Nurses' demographics **DV**: post-test/nursing knowledge of sedation	Statistical significance of $p<0.05$ selected	Independent t-test used to assess effects of demographic characteristics. Data collected in a questionnaire during pre and post intervention phases. Post intervention data was collected 3 months after the intervention.	Statistically significant difference in knowledge between pre-intervention and post-intervention phases ($p=0.00001$).	Level VI: Qualitative Study	Limitations: conducted in a single ICU in a single hospital. Strengths: findings support use of educational intervention to improve nurses' knowledge of sedation assessment and management Although low-quality evidence, the article supports the use of an education series to promote knowledge among nurses of sedation management in critical care patients.
Article 12									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in**

									your practice
Taran, Z., Namadian, M., Faghihzadeh, S., & Naghibi, T. (2019). The effect of sedation protocol using Richmond Agitation-Sedation Scale (RASS) on some clinical outcomes of a mechanical ventilated patients in intensive care units: A randomized clinical trial. *Journal of Caring Sciences*, *8*(4), 199-206. http://dx.doi.org/10.15171/jcs.2019.028	Not specified	The study was a randomized single-blind clinical trial to determine the effects of using protocol-driven sedation management versus non-protocol driven sedation management.	Intervention group N=40 Control group N=39 Exclusion criteria: alertness and extubation criteria for less than 24 hours, modifying a prescribed drug by the responsible physician, discontinuation of medication, transfer to OR for surgery, GCS below 5, starting a continuous infusion of a sedative. Inclusion criteria: having an endotracheal tube, need for mechanical ventilation, no addiction history, age 15-65, RASS higher than 3, and GCS between 5-13	**IV1:** protocol directed sedation management **IV2:** non-protocol directed or usual sedation management **DV:** Clinical outcomes, length of stay in ICU, duration of mechanical ventilation, frequency of ideal RASS scores (-1 to +1)	p-value < 0.05 to determine statistical significance	Fisher's exact test was used and suggested that RASS scores of the intervention group who used the sedation protocol were significantly in the ideal range (P<0.001) Mann-Whitney U-tests and Kruskal-Wallis tests used to examine the difference in overall sedation management scores and self-confidence scores	Ideal RASS scores were achieved in the intervention group significantly more than in the control group. Frequency of the interventions significantly higher in the intervention group. Reduced number of sedative drugs used in intervention group. Length of stay in ICU was lower, duration of mechanical ventilation was lower in intervention group. General clinical outcomes (death or transfer to general ward) was not significantly different between control and intervention group	Level II: RCT	Strength of the study was implementing sedation during the total duration of mechanical ventilation. A limitation of the study was insufficient power of generalizability and its external validity, since it was conducted in only one ICU. Another limitation is the impossibility of following up on the recovery patients. Potential biases include Hawthorne Effect. The blindness of the research assistants who performed the intervention and the record of all the clinical outcomes by the researcher could partly control the effect of tis factor. The study supports the use of protocol-directed

									sedation management
Article 13									
Author Year Title County Funding	**Theoretical basis for study**	**Design/ Method**	**Number Characteristics Exclusion criteria Attrition**	**Independent variables IV1 = IV2 = Dependent variables**	**What scales used – reliability info (alphas)**	**What stats used**	**Statistical findings or qualitative findings**	**Level =**	**Strengths Limitations Risk or harm if implemented Feasibility of use in your practice**
Yousefi, H., Toghyani, F., Yazdannik, A., & Fazel, K. (2015). Effect of using Richmond Agitation Sedation Scale on duration of mechanical ventilation, type and dosage of sedation on hospitalized patients in intensive care units. *Iranian Journal of Nursing and Midwifery Research*, *20*(6). http://dx.doi.org/10.4103/1735-9066.170008	Not specified	Randomized clinical trial to determine how using RASS assessments can affect duration of mechanical ventilation, and types and doses of sedatives used	**N=64 patients** (32 in control and 32 in intervention groups)	**IV1**: using RASS scores to manage sedation **IV2:** GCS scores to manage sedation **DV**: duration of mechanical ventilation, type and dosage of the sedative used	Validity and reliability of this scale were established among 120 patients (alpha = 95%). Statistical significance set at $p<0.05$	Independent and paired *t*-tests with a significance of 0.05 were used for comparisons	No significance in consumption of versed and morphine in the intervention group Significantly less fentanyl was used in the intervention group Significantly less time on the ventilator for the intervention group	Level II: RCT	This study showed that the use of RASS assessments decreased the length of stay on the ventilator for patients in the ICU. It also related to lower consumption of Fentanyl.

Appendix B
Statement of Administrative Support

Key Stakeholders

- Cindy Vermillion – Administrative Nurse Manager
- Jessica McCartney – Clinical Nurse Manager
- Cindy Thompson – Unit Educator
- Christine DiSilvestri – Unit Educator

Statement of Administrative Support

I acknowledge and support the practice change implementation the students will be conducting in the ICU/CCU at Grant Medical Center. Together we have discussed the plan for implementation and the interventions that will take place on the unit.

x Cynthia G Vermillion Date 10/9/20
Signature

x Cynthia G. Vermillion, ANM
Print name and role

Appendix C
Pre-Intervention Observational Checklist

APPENDIX B. OBSERVATIONAL/AUDIT CHECK LIST *(PRE-INTERVENTION RN RASS OBS)*					
Observation Date: Day/ Night Shift RN	Performance of RASS Y/N	Accurate performance in accordance with	If inaccurate, why?	RASS score according to protocol	RASS score obtained from nurse
1) D/E 11/2	Y	No	Straight to touch	-5	-5
2) D/E 11/2	Y	No	Thought RASS was CAM ICU	0	0
3) D/E 11/2	Y	No	straight to touch	-4	-1
4) D/E 11/2	Y	Yes		-1	-1
5) D/E 11/2	Y	No	straight to touch	-1	-1
6) D/E 11/2	Y	No	Straight to touch	-1	-1
7) D/E 11/2	Y	Yes		-2	-2
8) D/E 11/2	Y	No	straight to touch	-5	-5
9) E/N 11/2	Y	No	straight to touch	-5	-5
10) E/N 11/2	Y	Yes		-2	-2
11) D/E 11/3	Y	Yes		-5	-5
12) D/E 11/3	Y	Yes		-5	-5
13) D/E 11/3	Y	Yes		0	0
14) D/E 11/3	Y	No	straight to touch	-1	-1
15) D/E 11/3	Y	No	straight to touch	-3	-2
16) D/E 11/3	Y	Yes		-1	-1
17) D/E 11/3	Y	No	straight to touch	-3	-1
18) E/N 11/23	Y	Yes		-1	-1
19) E/N 11/23	Y	No	straight to touch	-3	-2
20) E/N 11/23	Y	No	straight to touch	-3	-1
21) E/N 11/23	Y	No	straight to touch	-3	-1
22) E/N 11/23	Y	No	Doesn't know the protocol	-4	-2
23) E/N 11/23	Y	No	Straight to touch	-4	-2
24) E/N 11/23	Y	No	Combined GCS with RASS	-3	-5
25) E/N 11/23	Y	Yes		0	0
26) E/N 11/23	Y	Yes		-1	-1
27) E/N 11/23	Y	Yes		-3	-3
28) E/N 11/23	Y	No	straight to touch	-3	-1
29) E/N 11/23	Y	No	straight to touch	-3	-1
30) E/N 11/23	Y	Yes		-5	-5
31) D/E 12/29	Y	No	straight to touch	-5	-5
32) D/E 12/29	Y	No	straight to touch	-3	-1
33) D/E 2/11	Y	No	straight to touch	-4	-2

Appendix D
Pre-intervention Patient Data

METRIC	DEFINITION	Unit		FYTD 21	Jul 20	Aug 20
Acute Respiratory Failure Length of time on the ventilator	Length of time (LOT) on the ventilator for patients with Acute Respiratory Failure (refer to definition page) MEDIAN	ICU/CCU	LOT on vent (days)	2.92	3.01	2.75
METRIC	**DEFINITION**	**Unit**		**FYTD 21**	**Jul 20**	**Aug 20**
Acute Respirtory Failure Volume & Mortality	Acute Respiratory Failure patient population (refer to definition page)	ICU/CCU	# of Patients expired	60	22	38
			# of Patients	218	99	119
			% expired	27.5%	22.2%	31.9%
METRIC	**DEFINITION**	**Unit**		**FYTD 21**	**Jul 20**	**Aug 20**
CC LOS	ARF Critical Care LOS (Median)	ICU/CCU	CC Days (median)	4.7	4.8	4.5

Appendix E
IRB Approval Letter

OTTERBEIN UNIVERSITY

INSTITUTIONAL REVIEW BOARD

__X__ Original Review
_____ Continuing Review
_____ Amendment

Dear Dr. Ballard,

With regard to the employment of human subjects in the proposed research:

HS # 20/21-21
Ballard, Garvey, Dyer & Sribanditmongkol: Sedation Assessment and Management ...

THE INSTITUTIONAL REVIEW BOARD HAS TAKEN THE FOLLOWING ACTION:

✓ Approved	____ Disapproved
____ Approved with Stipulations*	✓ Waiver of Written Consent Granted
✓ Limited/Exempt/Expedited Review	____ Deferred

* Once Stipulations stated by the IRB have been met by the investigator, then protocol is APPROVED.

1. As Principal Investigator, you are responsible for ensuring that all individuals assisting in the conduct of the study are informed of their obligations for following the IRB-approved protocol.
2. It is the responsibility of the Principal Investigator to retain a copy of each signed consent form for at least four (4) years beyond the termination of the subject's participation in the proposed activity. Should the Principal Investigator leave the university, signed consent forms are to be transferred to the IRB for the required retention period.
3. If this was a limited, exempt, or expedited review, there is no need for continuing review unless the investigator makes changes to the proposed research.
4. If this application was approved via full IRB committee review, the approval period is one year, after which time continuing review will be required.
5. You are reminded that you must promptly report any problems to the IRB, and that *no procedural changes may be made without prior review and approval.* You are also reminded that the identity of the research participants must be kept confidential.

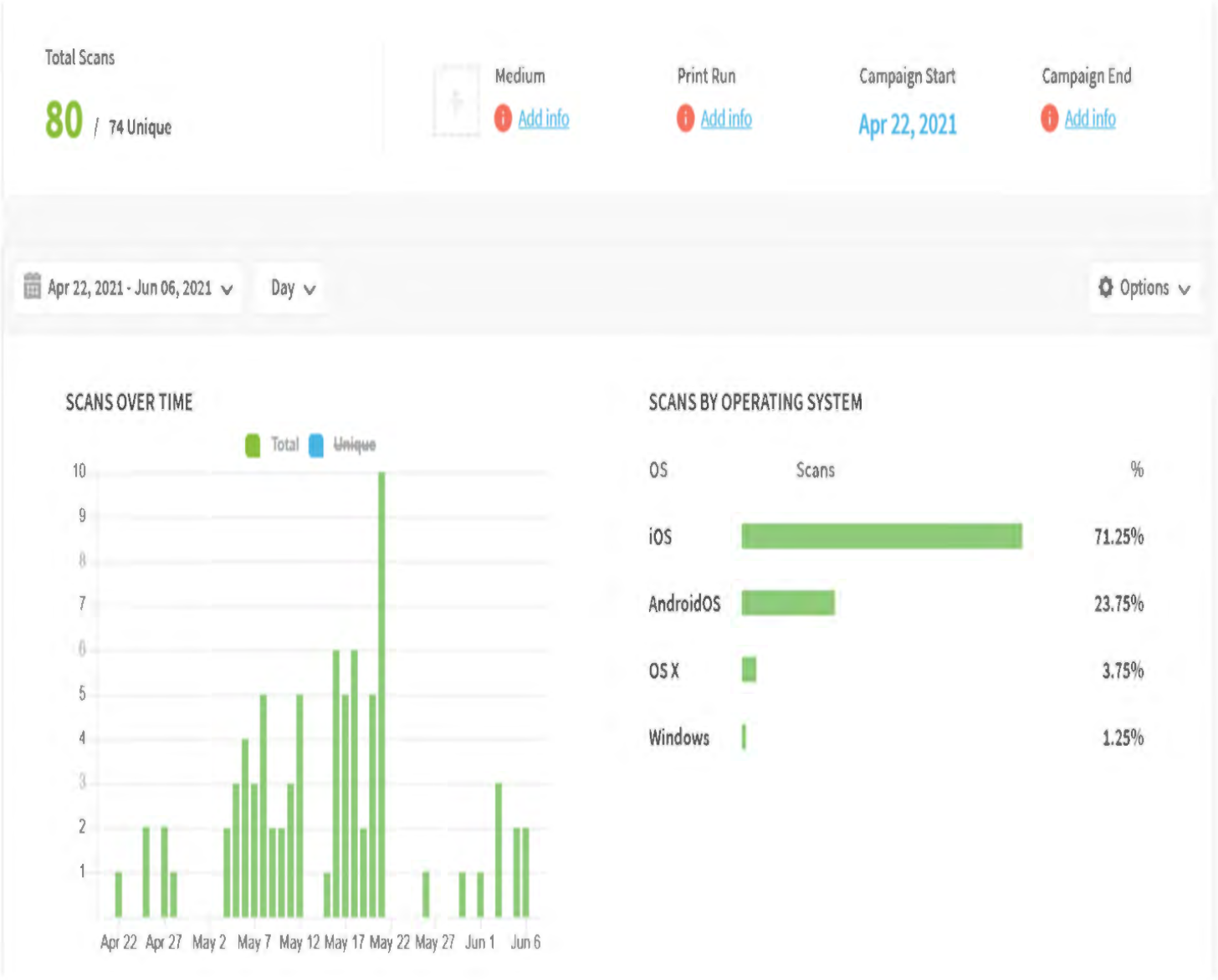
Date: 29 October 2020 Signed: Meredith C Garvey
Chairperson

(Revised January 2019)

Appendix F
Post-Intervention Observational Checklist

Observation Date: Day/ Night Shift RN	Performance of RASS Y/N	Accurate performance in accordance with the protocol Y/N	If inaccurate, why?	RASS score according to protocol	RASS score obtained from nurse
1) D/E 6/02	Y	No	straight to touch	-4	-1
2) D/E 6/02	Y	No	straight to touch	-4	-1
3) D/E 6/02	Y	Yes		-1	-1
4) D/E 6/02	Y	No	straight to touch	-4	-1
5) D/E 6/02	Y	Yes		-2	-2
6) D/E 6/09	Y	Yes		-4	-4
7) D/E 6/09	Y	No	straight to touch	-4	1
8) D/E 6/09	Y	Yes		-2	-2
9) D/E 6/09	Y	No	confused with CAM-ICU	n/a	n/a
10) D/E 6/09	Y	No	straight to touch	-4	-2
11) D/E 6/09	Y	Yes		-1	-1
12) D/E 6/17	Y	No	straight to touch	-4	-1
13) E/N 6/17	Y	Yes		-2	-2
14) E/N 6/17	Y	No	straight to touch	-4	-1
15) E/N 6/17	Y	Yes		-1	-1
16) E/N 6/17	Y	No	straight to touch	-4	-1
17) D/E 6/24	Y	Yes		1	1
18) D/E 6/24	Y	Yes		-2	-2
19) D/E 6/24	Y	No	straight to touch	-4	-1
20) D/E 6/24	Y	Yes		0	0
21) E/N 6/25	Y	Yes		-5	-5
22) E/N 6/25	Y	Yes		-3	-3
23) E/N 6/25	Y	No	straight to touch	-4	-1
24) E/N 6/25	Y	Yes		2	2
25) D/E 7/02	Y	Yes		-1	-1
26) D/E 7/02	Y	No	straight to touch	-4	-1
27) D/E 7/02	Y	Yes		-3	-3
28) D/E 7/02	Y	Yes		-2	-2
29) D/E 7/02	Y	Yes		-2	-2
30) D/E 7/02	Y	No	straight to touch	-3	-1
31) D/E 7/02	Y	Yes		0	0
32) D/E 7/02	Y	Yes		-4	-4
33) D/E 7/02	Y	Yes		-5	-5
34) D/E 7/02	Y	No	confused with CAM-ICU	n/a	n/a
35) D/E 7/02	Y	Yes		-1	-1

Appendix G
QR Code Participation Data



Appendix H
Post-Intervention Patient Data

METRIC	DEFINITION	Unit		21-Jun	21-Jul	Aug 21
Acute Respiratory Failure Length of time on the ventilator	Length of time (LOT) on the ventilator for patients with Acute Respiratory Failure (refer to definition page) MEDIAN					
		ICU/CCU	LOT on vent (days)	2.54	2.41	2.68
METRIC	**DEFINITION**	**Unit**		**21-Jun**	**21-Jul**	**Aug 21**
Acute Respirtory Failure Volume & Mortality	Acute Respiratory Failure patient population (refer to definition page)					
		ICU/CCU	# of Patients expired	28	28	31
			# of Patients	107	122	101
			% expired	26.2%	23.0%	30.7%
METRIC	**DEFINITION**	**Unit**		**21-Jun**	**21-Jul**	**Aug 21**
CC LOS	ARF Critical Care LOS (Median)		CC Days (median)			
		ICU/CCU		4.2	4.9	5.2

Appendix I
Summary of Pre- and Post-Intervention Patient Data

Summary of pre/post intervention patient data

(based off cumulative average of months)

	PRE-INTERVENTION DATA	POST-INTERVENTION DATA
Length of time on ventilator	2.89 days	2.54 days
% of expired patients on ventilator	27.2%	26.6%
Average length of stay in critical care	4.7 days	4.8 days

Appendix J
Summary of Pre-and Post-Intervention Nurse Audits

Summary of pre/post intervention nurse audits

(% of nurses who accurately performed RASS assessment)

PRE-INTERVENTION AUDIT	POST-INTERVENTION AUDIT
36%	60%

Appendix K
RASS Video QR Code