Improving Protocol Adherence in the Intensive Care Unit

By

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Abstract

Purpose

This paper will discuss a scholarly project that attempts to discern if post-shift review of protocols could improve protocol adherence in ventilated ICU patients.

Methods

To answer this question, we designed a brief questionnaire aimed at nurses caring for ventilated patients that was designed to inquire about various elements of the ABCDE (The Awakening and Breathing Coordination, Delirium monitoring and management, and Early mobility) protocol bundle that would be administered at the end of each nursing shift for a period of three months.

Results

Our results showed that the questionnaire improved elements of the ABCDE bundle compliance in regards to pain control charting (increased by 11%), sedation interruption charting (increased by 12%), and early mobility charting (increased by 18%), while it had no impact on oral care charting or weaning trial charting.

Implications

From a regulatory agency compliance standpoint, this project shows that an effective method to increasing bundle compliance involves purposeful and specific post-shift reminders through questionnaires or check lists.

Contents

Improving Protocol Adherence in The Intensive Care Unit

Protocols have become an important aspect of the care that governs the intensive care unit (ICU) throughout the world. These protocols are born out of driving evidence that validates their use as beneficial to patients and are based on the care of varying conditions or diagnoses. Although many of these protocols and strategies exist to improve patient outcomes and decrease length of stay, adherence to these protocols and policies is a constant struggle for ICUs across the US for a variety of reasons. The 390-bed hospital in the northern Midwest that was chosen for this project achieves adequate adherence in some quarters, but fails in other quarters when it comes to protocol bundle compliance. Failure to adhere to these protocols can be harmful to patients and lacks appropriate utilization of available evidence. Adherence to a protocol can be improved, however, through purposeful, technical, and educational methods that focus on nursing interventions, technical updates, and electronic medical record (EMR) charting (Bounds et al., 2016). Increasing adherence to the multitude of policies that govern practice in the ICU will improve patient outcomes and decrease length of stay (Schaller et al., 2016). Creating a simple, standardized way to chart and track adherence of these protocols will hopefully aid in highlighting problem-areas and simplify EMR charting of these protocols for nursing staff. Major protocols and processes that will be focused on in this project include ventilator associated pneumonia (VAP), early mobility, sedation vacations (SV), sleep promotion, and pain control. These factors created the desire and need to further investigate issues surrounding ICU protocol adherence in the form of this paper.

Background and Significance

Years of research have been pivotal in developing strategies to improve patient outcomes and decrease costs for facilities. Several of those strategies that are used on a daily basis in the

ICU are those centered around VAP prevention, early mobility, SV, sleep promotion, and pain control.

Ventilator Associated Pneumonia

Ventilator associated pneumonia is the most common health-care associated infection that can develop in an ICU patient (Wolfensberger, Meier, Clack, Schreiber, & Sax, 2018). Because roughly 33% of all ICU patients are mechanically ventilated, VAP prevention is an important part of everyday care in the ICU (Bilodeau, Gallagher, & Tanguay, 2018). Nosocomial infections occur roughly 2-5 times more often in ICU patients than in other in-patient areas and with VAP being the most common of these infections, the severity of this issue is simple to see (Dakshinamoorthy, 2018). It is estimated that VAP may contribute to 60% of all deaths that result from nosocomial infections. Because VAP contributes to an increased length of time on the ventilator, the cost of this infection goes well beyond other nosocomial infections due to of cost of ICU care and interventions (Wolfensberger et al., 2018). Although some facilities have pointed to delayed transfer from emergency department to the ICU as a potential cause of VAP or increased length of stay (LOS) in general, the evidence does not support this, meaning the ICU is fully responsible for these interventions (Agustin, Price, Andoh-Duku, & LaCamera, 2016). Utilization of VAP prevention bundles decreases the incidence of VAP by over 50% (Wolfensberger et al., 2018). Compliance with this bundle protocol is then of great importance as it has an impact on the outcome of the patient and the cost to the facility.

Mobility

Early mobility is another factor that can significantly impact a patient's length of stay (LOS) and should be included on a care bundle (Schaller et al., 2016). Physical therapy and nursing interventions that focus on mobility have showed effectiveness in decreasing LOS and

improving mobility after leaving the hospital with several different measuring tools (Oosterhuis et al., 2014). The surgical optimal mobility score (SOMS) has also been shown to predict LOS both in and out of the ICU, which makes it a useful tool when assessing a patient's progress towards a functional mobility level at time of discharge (Shaller et al., 2016). Higher levels of mobility (daily ambulation, work with physical therapy) also contribute to decreased risk of complications due to nosocomial infections such as pneumonia and catheter acquired urinary tract infections (CAUTI) (Piva et al., 2015). While ICUs remain bottlenecks for patients due to complex medical conditions, identifying those factors that increase or decrease LOS can improve resource planning and improve patient outcomes (Almashrafi, Emonstri, & Aylin, 2016).

Sedation

Sedation vacation, referring to the stoppage or reduction in sedation, has shown to decrease the risk of VAP development and decrease mortality, LOS in both hospital and ICU, mechanical ventilation days, and incidence of delirium in ICU patients, as well as other ICU-related complications (Ackrivo et al., 2015). Research has shown that when there is an absence of guiding protocols, the tendency is often shifted toward over sedation. Sedation interruption is of particular importance as it can be difficult to gauge sedation level without allowing the sedation to wear off (Ackrivo et al., 2015). Sedation vacation protocol varies among institutions but the general guideline is to perform SV daily for ventilated patients, but these are not standardized on a large-scale (Ackrivo et al., 2015). Utilization of standardized methods of delirium prevention have proven to increase compliance and decrease prevalence of delirium in ICU patients (Bounds et al., 2016).

Sleep Promotion

Sleep promotion in the ICU has become more emphasized in recent years as quiet environment is a part of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) guidelines but also because sleep deprivation is suspected to contribute to hospital delirium (Bounds et al., 2016). Sleep disturbances interrupt normal circadian rhythm which can have a myriad of effects on the body and negative post-discharge outcomes (Ding, Redeker, Pisani, Yaggi, & Knauert, 2017). Respiratory dysfunction, posthospital syndrome, and delirium are among some of the more common complications that can arise from sleep disruption (Ding et al., 2017).

Pain Control

Pain control is the final metric that will be focused on in this project as it is related to the other metrics in several ways. Pain control is pivotal in the patient's ability to mobilize after surgery and will therefore contribute to a prolonged LOS (Gruskay, Fu, Bohl, Webb, and Grauer, 2015). Pain control is complicated by the fact that it can also contribute to over-sedation in many patients due to the frequent, and sometimes excessive, use of analgesics like fentanyl (Rozycki, Jarrell, Kruer, Young, and Mendez-Tellez, 2017). Inadequate pain control or over-sedation can also negatively impact a patient's sleep in the ICU (Rozycki et al., 2017). Poor pain control contributes to decreased patient satisfaction and an increased length of stay, further increasing cost (Kanaan et al., 2015).

Needs Assessment

In order to determine the needs of the ICU at the target hospital, an interview was conducted with the nursing educator and one of the ICU providers, as well as a multi-facility educator within the Fairview Health System. Oral care for ventilated patients (part of VAP prevention), mobility, and delirium prevention were brought up as some of the factors that are

both most important and most frequently found to be below the compliance threshold. These same educators assisted in developing strengths, weaknesses, opportunities, and threats (SWOT) analysis as a part of the needs assessment specific to the ICU at the target hospital.

Although the importance of VAP prevention is widely known in ICUs and most have some type of protocol in place, adherence to protocol can be improved with ongoing education and strategies implemented with theory-based procedures (Wolfensberger et al., 2018). There are four main aspects of the VAP prevention protocol: bed elevation, oral care, sedation interruption, and subglottic suctioning (Wolfensberger et al., 2018). At a study done in six ICUs in Zurich, Switzerland, bed elevation protocol adherence was at 27%, oral care at 41%, sedation interruption at 81%, and subglottic suctioning at 88% (Wolfensberger et al., 2018). While these numbers will vary from one institution to another, the important thing to note is that these numbers were improved with focused, research-driven interventions (Wolfensberger et al., 2018).

Early mobilization in the surgical ICU (SICU) patient decreases length of stay but is often neglected or underutilized (Schaller et al., 2016). In an international study done on the efficacy of early SICU mobilization, only 28% of patients in the control group reached functional independence versus 58% that underwent the early mobilization program (Schaller et al., 2016). Staff education and training on early mobilization increases adherence to this program and the impact of early mobilization is well-researched (Bilodeau, Gallagher, & Tanguay, 2018).

The prevalence of sedation vacation (SV) adherence in a study done at Boston Medical Center was only 14% prior to intervention (Ackrivo, 2015). This number will vary at different institutions but certainly raises concern for under-fulfillment of protocol guidelines when it comes to the advised interruption of sedatives.

The ICU environment alone has an impact on the sleep of patients regardless of their condition but anxiety and emotion further disrupt the normal sleep pattern in addition to their condition or symptomology (Ding et al., 2017). Improvements in sleep promotion are needed to ensure patients maintain a normal circadian rhythm to promote healing both in, and out of the hospital.

Pain control is guided by pain scales and the CAM-ICU (confusion assessment method for the ICU) scoring scale but remains somewhat subjectively up to the discretion of the nurse. While the pain scale is widely used, the CAM-ICU is mainly used in the ICU to assess for delirium and to track existing delirium for resolution or deterioration. The development and use of a pain intervention algorithm reduced over sedation due to inappropriate administration of Fentanyl, Ativan, or propofol (Rozycki, 2017). Increased adherence to outlined protocol decreased the amount of fentanyl administered versus those that had less adherence but pain control was considered adequate in both cases (Rozycki, 2017).

Problem Statement

While ICUs strive to provide the best care for their patients, there is a lack of standardized assessment of the various protocols that guide ICU care. The Awakening and Breathing Coordination, Delirium Monitoring and Management, and Early Mobility (ABCDE) bundle includes many of the protocols described in this paper but is not the standard at all ICUs and also requires adherence among those ICUs that utilize this bundle (Bounds et al., 2016). Despite the multitude of guidelines and protocols available to the ICU to improve patient outcomes, adherence is required to make these guidelines functional.

Project Aim

The goal for this project is to develop a concise charting format that provides education on, and tracks the adherence to, the evidence-based protocols that guide the ICU practices of VAP prevention, early mobility, SV, and pain control. After implementation of the developed plan, HCP will achieve at least 5% improvement to adherence rate in each aspect of the protocol after three months of initiating the process change.

Clinical Question

Can a post-shift questionnaire of protocol charting increase protocol adherence in ventilated ICU patients?

Congruence with Organizational Strategic Plan

Developing new strategies and innovations is in direct alignment with Fairview's goal to "…continually improve our programs and skills through learning and innovation." (Fairview, 2019). Meeting and exceeding expectations through the adherence of evidence-based protocol is a great service to the ICU patient population as it gives them the best inpatient and outpatient chances at the best outcomes (Ackrivo et al., 2015; Bounds et al., 2016; Schaller et al., 2016). By improving ICU care in the present, it will pave the way for an even healthier future for this population and become a driving force for ICU care everywhere (Fairview, 2019).

Synthesis of Evidence

A database search of the Cumulative Index to Nursing and Allied Health (CINAHL), Google Scholar, and the Cochrane Library was utilized to obtain 40 articles for review. Of these articles, 18 were not applicable to the project or excluded as being of poor quality. Search criteria included the terms: ICU length of stay, VAP protocol adherence, increasing adherence, sleep disturbance and ICU, sedation vacation adherence, ICU pain control, and various factors that affect length of stay. A total of 22 articles from 2014 to present were selected as relevant or

contributory to either guide project development or to dispel potential conflicting information. Different factors affecting length of stay were examined as these can benefit the patient in almost any stage of their hospitalization.

Length of Stay

Length of stay as a metric for intervention effectiveness was chosen for its catch-all nature in determining results. Length of stay was researched because LOS can contribute to increased risk of nosocomial infections and other complications (Toptas et al., 2017). Gonçalves-Bradley, Lannin, Clemson, Cameron and Shepperd (2016), on the other hand, examined the effectiveness of individualized, multidisciplinary discharge planning on the length of stay. This is a systematic review which compared those patients who had no changes to their discharge planning with those who had this new, individualized method utilized (Gonçalves-Bradley et al., 2016). This review examined the data of nearly 12,000 participants; making a very large sample and granting credence to its findings (Gonçalves-Bradley et al., 2016). While this review of studies was not specific to ICU patients, it was helpful in developing a portfolio of strategies to reduce LOS for all inpatients.

Perioperative and Postoperative Factors

When comparing perioperative and postoperative factors that affect LOS, those that existed prior to surgery were less impactful (Kanaan et al., 2014). The study by Kanaan et al. (2014) included the measuring of several factors that influenced LOS. The methods for this study included measuring postsurgical walking distance, balance scores, and bed mobility. This study contributed to an expanding knowledge-base of factors that do or do not affect LOS which will be useful knowledge when formulating a strategic plan for ICU care. Mobility was also shown to be a key factor in predicting an increased LOS by Oosterhuis et al. (2014). They conducted a

systematic review of randomized controlled trials (RCTs) that sought to answer how effective rehab post-lumbar surgery was when it came to improving post-surgical mobility. While effective physical therapy was important to the post-surgical recovery process, it was not useful for this project as it was specifically for spinal surgery patients, and only started the program 4-6 weeks after surgery (Oosterhuis et al., 2014). Because of this delay, the information is not applicable to the patient population of the ICU. Schaller and associated authors (2016) provide a randomized controlled trial that examined the effect of early mobilization of critically ill patients on SICU LOS and functional independence at time of discharge. This was an international study done at five SICUs around the world and measured the SICU optimal mobilization score, mini-modified functional independence measure score, and SICU LOS (Schaller et al., 2016). The researchers found that early mobilization improved patient mobility throughout their stay, decreased SICU LOS, and improved the functional mobility of those patients at discharge (Schaller et al., 2016). This was a well-designed study and showed strong evidence of the benefits of early mobilization of SICU patients (Schaller et al., 2016).

Much of the data was not isolated to the ICU, and some involved factors related to laboratory results, rather than mobility-related factors, as researched by Kanaan et al. (2014). Surgical predictors of LOS are examined in a retrospective cohort study of 593 spinal surgery patients that identified several factors that can prolong a LOS (Kanaan et al., 2014). This is applicable to the ICU as patients may have decreased mobility, but the laboratory results are always being evaluated very closely in this population. Toptas et al. (2017) looked more in-depth at these lab results and how they can affect LOS, which is a similar goal of research, but with a very different method than the work done by Kanaan et al (2014). This was a retrospective observational study of 3925 patients which found that there was a positive correlation between

urea, creatinine, sodium, and an increased LOS whereas a negative correlation was found between LOS, hematocrit, and uric acid (Toptas et al., 2017). While this is compelling evidence, it may prove less useful for the purposes of this project beyond providing more information on those factors that increase length of stay. While this information is quite useful, for this process change it will likely not be needed beyond expounding on those factors that increase LOS.

Utilizing the method of separating data based on BMI may help in data interpretation or explain some outlying data points when the time comes (Gruskay et al., 2015). Gruskay and associates (2015) provided valuable information from their retrospective cohort study of 104 spine surgery patients that showed a correlation between body-mass-index (BMI), estimated blood loss (EBL), and increased LOS. This is important to note so that factors affecting length of stay can be taken into account separately from the data evaluating the new project. A relatively small population was used in this study, but the results showed a strong correlation with a 95% confidence interval (Gruskay et al., 2015).

Methods to Decrease Length of Stay

Proper planning and care consultation can be effective in lowering the LOS in the ICU. Kyeremanteng, Gangnon, Thavorn, Heyland, and D'Egidio (2018) researched the impact that palliative care consultation could have on the ICU LOS, which could have significant impact on a patient. This systematic review ultimately utilized a very small sample size of only eight reviewable trials and then had to use narrative means of analysis due to heterogenicity (Kyeremanteng et al., 2018). Care planning was also important in the study done by Almasharfi et al. (2016) wherein stepdown unit availability and utilization reduced ICU LOS as well. They used multivariate logistic regression, proportional hazard, survival analysis, case-control, and regression tree methods to analyze 23 studies of ICU patients and found that access to stepdown

units decreases a patient's LOS in the ICU (Almashrafi et al., 2016). The pilot hospital for the prospective project has access to stepdown units and can therefore benefit from the knowledge that it is most beneficial to transfer the patient to these units as soon as appropriate as it will benefit the patient to do so. The results supported the consultation of palliative care, but with such a small sample size, it can really only be used as a minimally supported guideline. Showing strong statistical evidence that proper discharge planning can reduce length of stay and that this process should start from the time of admission (Gonçalves-Bradley et al., 2016).

Though step-down care in the hospital decreased LOS, the time in the ED prior to transfer did not (Agustin et al., 2017). A retrospective observational study from Agustin et al. investigated the link between LOS in the ED prior to admission to the ICU and mortality (Agustin et al., 2017). The study reviewed 287 septic patients in the ED and their varied length of time to transfer to the ICU and subsequent complications or mortality (Agustin et al., 2017). There was no statistical significance between patients transferred in the goal time of less than six hours, versus outside the goal range (Agustin et al., 2017). This particular study was useful in preventing redirecting of blame from the ICU in the event that the ED may be used as a scapegoat during project implementation. This study provides evidence that the burden of responsibility for ICU patients lies within the confines of the ICU itself (2017).

Methods not directly related to patient care aspects can still predict or affect LOS. One of the methods uses statistical prediction of LOS, as studied by Jeffery et al. (2018). The research examined the prediction capabilities of several statistical modeling strategies in the healthcare setting (Jeffery et al., 2018). This retrospective cohort study compared the prediction capabilities of logistic regression, Cox proportional hazards regression (statistical modeling strategies) and two machine learning strategies (random forest and random survival forest) when it comes to

cardiac arrest (Jeffery et al., 2018). The area under the receiver operating characteristic curve (AUROC) was found to show more consistency and accuracy in predicting cardiac events and therefore points to it being the more reliable method when it comes to certain healthcare application (Jeffery et al., 2018). This information was useful for this project if the need for a statistical model should arise.

Fast-Track Programs

The second method identified was an individualized and goal-specific fast-track programs for total hip replacements examined in a case-control cohort study done by Pamilo et al. (2018). Results revealed a decreased LOS was made possible by using this type of program. Fast-tracked patients could be discharged quickly if they are able to participate in a fast-track program and may be applicable to some of the surgical cases that are seen in the ICU (Pamilo et al., 2018). While this evidence is compelling and strong in nature, it would require the development or research on a fast-track program specific to the ICU. It was useful to know that a fast-track program could be used to decrease hospital stay, but may not be applicable to this project.

Intensive Care Unit Protocol

Preventions and intervention protocols are an everyday reality in ICU practice. Bundles, such as the ABCDE bundle, are guidelines of care for multiple aspects that this project aims to control. The research of Bounds et al. (2016) utilized the ABCDE bundle in a retrospective observational study that examined the prevalence of delirium that occurred before and after implementation of the ABCDE bundle by examining 159 records (Bounds et al., 2016). Several different scoring systems are used to gauge delirium such as the Intensive Care Delirium Screening Checklist, Richmond Agitation Sedation Scale, completion of breathing trials, SV

completed, early mobility, and the analgesics used (Bounds et al., 2016). This research is useful as it shows the value of adherence to a bundle that encompasses all of the aspects of the future practice change. Delirium-prevention is essential in the ICU and the retrospective cohort study done by Rozycki et al. (2017) investigates the adherence to delirium prevention protocol through pain and sedation techniques. This study revealed that nurse-managed interventions done with algorithm specified interventions are effective in protocol adherence (Rozycki et al., 2017). Therefore, self-managing these interventions increases adherence as it involves less individuals (Rozycki et al., 2017).

Pressure Ulcer Prevention

Another aspect of the ICU protocol bundle is the prevention of pressure ulcers. In a retrospective cohort study by Ahtiala, Kivimaki, and Soppi (2018) examined patients with preexisting pressure ulcers, pressure ulcers that arise in the ICU, and patients without pressure ulcers. They found that patients who develop pressure ulcers while in the ICU are statistically more critically ill than those with pre-existing ulcers or those who do not develop ulcers (Ahtiala. Kivimaki, & Soppi, 2018). This information is useful as it highlights those cases of patients who develop pressure ulcers in the ICU and reveals them to be severely ill regardless of other information. It is also an indication that they may need more interventions (Ahtiala, et al., 2018).

Brain Trauma Foundation Guidelines

Another case-control cohort study involved the relationship between adherence to Brain Trauma Foundation guidelines for patients with acute traumatic brain injury and education on the topic through the Adam Williams Initiative (Saherwala et al., 2018). The research showed that staff education specific to the measured guidelines improved adherence to the practice guidelines (Saherwala et al., 2018). The purpose of this research for the future practice change is to provide

evidence that education on protocol guidelines can improve adherence, which will be very important to any future practice changes.

Several of the articles focused on VAP prevention research, the first of which was a case-control cohort study that attempted to identify optimal behavioral leverage to improve VAP prevention protocol adherence (Wolfensberger et al., 2018). Upon examining the adherence to VAP prevention protocol during a 6-month (1730 patient-days) period, the results revealed a very low compliance with elevating head of bed and oral care (Wolfensberger et al., 2018). This is important information to the practice change as it gives a focus for educational efforts. This was similar work Ackrivo et al. (2015) which examines ways to improve SV protocol adherence. This study was also over 1730 patient-days. Researchers found that a change in the SV strategies based on other research, improved SV compliance from 14% prior to implementation, to 60% after implementation. These results demonstrate the correlation of evidence-guided practice changes with improved protocol adherence, which is what this project aims to do.

Environmental Factors Affecting Sleep

Environmental factors surrounding sleep in the ICU were examined in the case-control cohort study by Ding and associates (2017). They focused on interviews with staff and patients to examine the myriad of factors that influence sleep and strategies that are effective in sleep-promotion in the ICU (Ding et al., 2017). This study was limited by its qualitative nature and relatively small sample size of 38 interviewees (Ding et al., 2017). The information was useful in identifying factors that influence sleep while in the ICU and indicated that strategies to promote sleep must involve more HCPs than just nursing staff (Ding et al., 2017). This limitation made

the study slightly weaker than the work of Wolfensberger et al. (2018) and Ackrivo et al. (2015) but the research is still useful to gain an understanding of staff perception of sleep disturbances.

Mabasa, Suchorowski, Thomas, and Su (2018) also studied sleep but focused on the protocol to promote sleep and what sort of standardized protocol to accomplish this goal as opposed to focusing on the factors surrounding sleep interruption, as in the Ding et al. (2017) research. This was a retrospective cohort study of several studies but the criteria created were untested and only theorized to work (Mabasa et al., 2018). While the guidelines presented may be effective, they are untested policy changes and should be utilized with scrutiny.

Theoretical Framework

The theoretical framework for this project will be based on the Donabedian model to easily identify the setting, process and outcome of the project (Moran, 2017). This model facilitates improved organization of the project structure. With this framework it is easy to identify the setting in which the project will be implemented and those individuals who are involved with the project. How the project was carried out and how it was completed within the context of the target facility was clear within this framework. Finally, identifying those factors that are being measured and reviewed are clearly identified when using this framework (Moran, 2017). With this framework in mind, the ICU was the setting and the staff and patients are a part of that setting in which the process change took place. The specific setting involved ventilated ICU patients and their rooms. The nurses directly impacted this setting and were the primary individuals responsible for the process change.

The process change involves altering how VAP prevention protocol, delirium prevention protocol, sleep promotion, and pain control are charted so any lack of adherence is more easily noted and can be acted upon with minimal delay to improve patient outcome and decrease LOS.

Having a specific and focused charting system that is well-understood by staff was necessary to facilitate proper data collection.

The goal of this project was to influence protocol adherence via charting changes through a simple end-of-shift questionnaire. This was measured with the help of unit educators and management who had access to this data.

Project Design

This project took place within the inpatient ICU setting and involve those patients who meet the criteria of requiring critical care. Nursing documentation was a central theme of this project but also involved the input of respiratory therapy (RT), and the providing physician. This was done by utilizing a single-page questionnaire method for charting on the ABCDE bundle protocol. By creating a single page of charting questionnaire, the tracking of protocol adherence was simplified with the additional goal of increasing adherence through simplified charting.

Nurses caring for patients who were overflow status or who were no longer critically ill but remained in the ICU due to lack of bed availability on the appropriate unit, patients placed on comfort care, and patients who were in the ICU but had not been admitted to the care of the intensivist were excluded from project inclusion.

Tools

Informational and database technology were used with the on-site available components at Fairview Southdale Hospital (FSH). The current method for charting is done through Epic, an electronic health record (EHR). This was the program that was utilized to review patient charts of participants to calculate bundle compliance as a part of the normal workflow of managerial staff performing routine chart audits. Printed material necessary for teaching and disseminating information to nursing staff was used from available supply within FSH. Email was needed for

communication between team members, which is also provided through FSH and has no cost associated with the project.

Project Plan

Pre-implementation involved educating managerial staff on the project and describing the levels of participation needed from various members of staff. This took place two weeks prior to implementation to allowed time to address any concerns or make corrections. Charting questionnaires used for surveying nurse adherence to protocol were distributed to every nurse who is caring for intubated patients. These were distributed during the pre-shift huddle and were explained during this five-minute period. During the project implementation phase, nurses in the ICU caring for ventilated patients were provided with a post-shift questionnaire pertaining to elements of the ABCDE bundle charting. All nurses caring for patients who meet the criteria of being critically ill had the questionnaire sheet available at the nursing station which will record the date and elements of charting that pertained to elements of the ABCDE bundle. Data was recorded by hand on the questionnaire, was kept to a single page, and involved a yes/no selection to improve simplicity and nursing compliance. These questionnaires acted as a gauge for nurse-compliance with ICU protocols. The questionnaires were collected daily and stored at the charge nurse and unit coordinators desks in secure folders. From there, the project team collected the folders and secured any information on a secure Q-drive which was provided by the project facility. Patient charts audits were completed by Epic, which is utilized at Fairview Southdale Hospital. Data was collected over a three-month period and then evaluated using EHR audits to evaluate protocol adherence and if questionnaire completion had an impact on adherence. The project charting that was utilized can be viewed in the Appendix A. As stated previously, this was primarily charted by nursing but was directly influenced by RT and the primary physician as

these members of the care team can have a significant impact on the items within the ABCDE bundle.

Outcomes

The outcomes were measured retrospectively through chart reviews to understand if adding a post-shift questionnaire on ABCDE bundle data would change compliance with these protocols. This was done a week after project completion via EHR auditing. These audits were compared to auditing done on the same factors from September, 2019 to get comparison data. Because the chart reviews to identify bundle compliance are already done, this project will only add the relationship of the study to the bundle compliance, which should aid in simplifying the process. The goal of the project was to increase compliance with ABCDE bundle by 10% by the end of the three-month testing period. This was a measurable goal which was realistic, achievable, and within a specific timeline, fulfilling the constraints of a SMART objective.

Team Roles and Responsibilities

Project success was closely tied to the team's ability to communicate and work with multiple disciplines as well as with managerial staff. Because of this, members have been chosen who belong to several key roles within the ICU. I, Timothy Darby, served as project lead while my team consisted of several ICU registered nurses (RNs), a unit educator, unit coordinator, and a nurse practitioner (NP) who was a provider in the ICU before accepting a new position in March of 2020.

The nursing educator agreed to serve as a facilitator of unit-wide education on the project as she has experience in this role. The unit educator achieved unit-wide education through email education, which was low-effort and able to be completed very quickly. Staff was made aware that any and all communication needed for this project would be done through staff email to

minimize confusion and increase efficiency. This went well and provided staff with all the information that they needed as well as opened channels for staff to ask questions or gain clarification if needed. Information was also be given during the shift change huddle, where new information is disseminated in short briefings prior to each shift.

The benefit that the RNs provide is having direct access to educating their peers on the process. Because they will be working with fellow RNs after helping to develop this project, they will have the knowledge to inform others about the process without costing the hospital time to educate their employees.

Having a provider on the team as a liaison between the project team and the intensivist doctors has the benefit of facilitating communication and cooperation between disciplines. Improving lines of communication was beneficial to the project outcome as the team could better complete their goals of educating staff and following-up with project progression.

The unit coordinator was helpful in ensuring copies of the charting material was printed and available to those nurses who are caring for critically ill patients. Completed data sheets were collected at each nursing station in folders. These folders were periodically collected by the team leader.

Data Analysis

Data analysis consisted of evaluating EHR audits that are done through third party analysis agencies and reported to managerial and educational staff. Although data was collected on surveys during the project, the data that was actually entered into the EMR was necessary to assess if the presence of the surveys increased compliance with ICU protocols.

Ethical Considerations

This is a low-risk project that evaluated retrospective effectiveness of the addition of a questionnaire on the charting of elements of the ABCDE bundle. There is no direct patient contact involved and no specific alteration to the care that patients receive, only the recording of that care which is already the standard of highest quality. No patient data was recorded or reviewed for this project by the team itself, but rather data on protocol adherence is disseminated by managerial staff to further ensure patient privacy. Consent for participation was informed via the statement that can be seen in Appendix B wherein the information regarding the quality improvement project and the role of the participant are detailed. Evaluation of success was through a comparison of chart audit results from September, 2019 and March, 2020 which were obtained by the unit educator without sharing specific patient data.

Organizational Assessment

Discussing the need for increased protocol adherence with FSH ICU manager reveals a strong desire for continued improvement in practice as meeting the high standard of protocol adherence is a constant struggle. Finding new methods to increase protocol adherence and the continued pursuit of improved quality of care are high priorities of the ICU according to the managerial staff. A large outpouring of support for process improvement has aided in the development of this project by management, educational, and patient-care staff members. Despite this support, there were barriers to the project that had to be addressed throughout the implementation process.

Barriers and Facilitators to Success

Many of the barriers to the success of this project have to do with staff buy-in and a lack of understanding of the potential impact of the project. As with any project, there is a high dependence on education for participating staff or there is a risk of improper execution or data

collection. As project leader, it is my responsibility to ensure proper lines of communication are kept open between participating staff and the project team in order to answer questions or clarify procedures.

Site Strengths

One of the main strengths of the team is the inclusion of RNs who work within the ICU who were examples of proper technique as well as resources for their coworkers when questions arose. Another strength of the team is the unit educator who was able to facilitate unit-wide education through the unit huddles that took place before each shift. Because of the short time needed to complete the education on this project (approximately five minutes), the unit huddle was the perfect opportunity to inform staff regarding the project's implementation.

A key facilitator of this project was the provision of technologies and supplies from FSH. The availability of Epic to review charts was a key aspect in evaluating the success of the project. This will allow the data analysis phase of the project to continue.

Risks

The risks involved with this project were largely surrounding the leaking of patient information or improper handling of private information through the review of the EHR. Security measures in place involved the constant monitoring and recording of anyone accessing patient information. Because there was no patient data recorded on the project charting, risk of any information leakage was low. Leakage of patient information did not occur and remained not human subject testing as deemed by the CUHSR.

Project Budget

Budgetary needs were very minimal as many of the necessary tools, technologies, and supplies were provided by FSH at no cost. The time required for education on the questionnaire

took less than five minutes and was done during pre-shift huddles and through email. The savings on paid staff time are significant and that is the ultimate goal in keeping the education time so brief as to allow the education to be done in the pre-shift huddles. Two folders were purchased bringing the total cost of the project to $6.00 which was a fifth of the projected budget of $30.00.

	Cost to FSH	Cost to Project Team Leader	Total
Materials	**$0**	**$6.00**	**$6.00**

Results

The project evolved through several early questionnaire iterations but ultimately settled on the Appendix A format. Some of the changes that were made throughout this design process involved which items to include in the questionnaire. Making this decision required conferences with the project team and unit leadership as it was important for the information assessed to be useful not only to the project but to the future of the intensive care unit.

Outcomes

When it came time to collect data and compare EMR data from before and after project implementation, it was difficult to decide which metrics would be efficient and accurate representations determining project success. The decision of which items to pull from the audits was left to the unit educator, as she would be in charge of collecting the data from the third-party auditors. The items chosen reflected some of the items in the ABCDEF bundle, but all items on the ABCDEF bundle could not be audited as they may not be able to be quantified in yes/no questionnaire format of the project. The five items chosen to audit from the EMR included oral care, pain assessments, sedation vacation, early mobility, and weaning trials. These items were chosen as they have a simple way to track them on the EMR, making auditing simple and rapid

as well as being important components to patient outcome. These items were also chosen as they represent different portions of nursing responsibility. Some of these items are expected to be charted periodically on every shift, such as oral care and pain assessments, whereas others are only charted at the time of occurrence, such as sedation vacation, mobility, and weaning trials. The idea behind auditing these items was to see if the project was more/less effective overall but also if the different type of items were affected differently.

Analysis of outcome data

Analysis of the audit material revealed the project did have an impact on some of the items, while not having an effect on others. Both the oral care and ventilation weaning trial metrics remained about the same as their pre-project compliance. Oral care remained over 95% compliant, and ventilation weaning trials remained close to 40% compliant. Because this questionnaire did not assess whether the patient was appropriate for weaning trials or not, and because this score did not change more than 5% from previous scores, we estimate that this is because appropriate patients are being weaned at adequate compliance levels, similar to the oral care. The remaining metrics all saw an increase in charting compliance in the post-project audit. This included pain assessment, mobility, and sedation vacation. Pain assessment charting increased from 78- 89%, sedation vacation increased from 68-80%, and early mobility increased from 42-60% after project completion. These figures can be seen in Appendix D. Nurses were then sent a follow-up survey; 45 nurses participated in this survey, 37% of whom stated that they opened the EMR when completing the project questionnaire. The follow-up survey revealed that 17% of nurses made alterations to the EMR while filling out the questionnaire, which correlates closely to the increase in charting compliance overall from auditing. Another question that was asked on the post-project survey was if the questionnaire took too long to complete, to which

100% of nurses said that the questionnaire did not take too much time to complete. This can be seen in Appendix E. This survey was not approved by CUHSR and is discussed in greater detail in the Deviations from Project Plan section below.

Discussion

Elements of the ABCDE bundle compliance did improve by greater than 10% by the end of the project implementation and nursing behavior was found to be malleable when it came to charting. This was done using a brief, end-of-shift questionnaire tool that assessed ABCDE charting elements. The greatest success of this process was feedback from nursing staff who stated that the questionnaire tool was very helpful in ensuring they had adequately completed their charting. This, along with improving compliance scores, really conveyed a sense of success in regards to this project. Having limited access to audit data as well as having to obtain this data through a third-party created some difficulty and strain on the project, but ultimately the issues were resolved.

Deviations from Project Plan

Near the end of the project the nurse educator informed the project team that she would be taking a leave of absence to care for a sick relative so at that time it was unknown if we would be able to get the audit data. The project team met and decided to send a follow-up survey that investigated nursing behavior while completing the survey and whether the survey itself prompted any changes made to the EMR, as well as assessing response to the survey itself. The team designed this survey to further assess if the end-of-shift questionnaire was sufficient to change nursing behavior and alter charting patterns. The addition of the post-project survey was added without CUHSR approval and it should be noted that this was an error on the part of the student investigator. No explanation for this error will be included in the paper as explanation is

irrelevant and approval should have been secured. The results of the survey will remain within this paper in Appendix E but it should be noted that their existence was not approved prior to obtaining them. Despite this oversight the goal of the project was realized by improving adherence of elements of the ABCDE bundle by greater than 10% with the use of a simple questionnaire.

Limitations

The only real limitation occurred in the second month of implementation. This was an abnormally low number of ventilated patients. As these were the only patients on which the questionnaire could be completed, it skewed the second month's results. Had these numbers continued to be low, the project may have needed to continue for a longer period, but numbers increased and the project was able to be completed on time. The first month of the project also had above-average numbers of ventilated patients, so the overall numbers were likely a reasonable representation over the three-month project period.

Implications for Practice

As this project consists of a simple end-of-shift questionnaire, it is entirely reasonable and possible to sustain this project as long as it is useful. The questionnaire could be adapted further to pinpoint problem areas or areas of low compliance across any metric. End-of-shift review questionnaires showed usefulness in increasing charting compliance, so it stands to reason that this could be accomplished with any charted item.

Future Research

For items involving multiple disciplines, this strategy has shown to be effective when it is driven by a single discipline and then disseminated between disciplines. It would be interesting to see how far this type of project could advance compliance with any issue or if this could be

integrated into the EMR to program and automatic end-of-shift reminder on different topics. The results of this project will be shared with the unit and with the health systems educators.

Nursing

This was a nurse-mediated initiative that improved bundle compliance directly related to improved patient outcomes. This could likely be applied to advanced practice nurses for any item with which they have decreased compliance. Nursing educators should be aware that nursing initiatives are powerful tools in improving patient care.

Conclusion

Within this project overview there has been evidence provided on the importance of protocol adherence in the ICU as well as charting methods that can potentially increase this compliance. Altering the charting of protocols within the ABCDE bundle was examined in this project. Evaluation of this data has revealed that simplified charting methods can contribute to an increase in protocol adherence.

DNP Essentials

This project met DNP *Essentials* I through the acquisition of and development of evidence to support the project design and implementation. DNP *Essential* II, III, and IV were met through the utilization of information systems to evaluate current practices, disseminate information, and evaluate the needs of the project site. *Essentials* VI, VII, and VIII were met through collaborative work with management, education, and nursing staff to identify gaps in care that, if better managed, would benefit patient outcomes through a project developed through collaboration with multiple disciplines (American Association of College of Nursing, 2006). This process has been a great learning experience and has certainly been the foundation of a practical research application. Using a purposeful and evidence-based approach to protocol

adherence improvement by developing a simple charting method and end-of-shift reminders, an effective method for quality improvement was found for an intensive care unit environment. Increasing protocol adherence has a direct benefit to patients and is a chief concern for intensive care units across the country. Continuous improvement of health care strategies through research and innovation is a part of the core principals of the DNP *Essentials* and the doctoral-prepared nurse practitioner (American Association of College of Nursing, 2006).

Plan for Dissemination

A comprehensive presentation of this project has been given to Bradley University staff as well as all interested parties of the project site and members of the public. A copy of the project paper has been submitted to the Bradley University's Doctors of Nursing Practice Doctoral Project Repository. A debriefing has also been arranged with managerial staff of the project site to be completed after student's official graduation.

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Appendix A

Date:_____

Was pain assessment charted every 2 hours? **Day shift:** Yes [ ] No [ ] **Night shift:** Yes [ ] No [ ] **Was oral care charted every 2 hours?** **Day shift:** Yes [ ] No [ ] **Night shift:** Yes [ ] No [ ] **Is head of bed at 30 degrees?** Yes [ ] No [**Is this patient appropriate for pressure support trials?** Yes [ ] No [ ] **Was a pressure support trial done in the last 24 hours?** Yes [ ] No [ ] **Method of sedation** Propofol [ ] Versed [ ] Fentanyl [ ] Precedex [ ] Other:_____ **Is the sedation within the ordered RASS parameters?** Yes [ ] No [ ] **Was daily sedation interruption performed?** Yes [ ] No [ ]	**Was the CAM-ICU charted?** Yes [ ] No [ ] **Is the patient restrained?** Yes [ ] No [ ] **Is patient appropriate for therapies?** Yes [ ] No [ ] **Is PT/OT ordered?** Yes [ ] No [ ] **Was patient up to chair/chair position in the last 24 hours?** Yes [ ] No [ ] **Active range of motion done in the last 24 hours?** Yes [ ] No [ ] **Plan of care reviewed with family?** Yes [ ] No [ ]

Appendix B

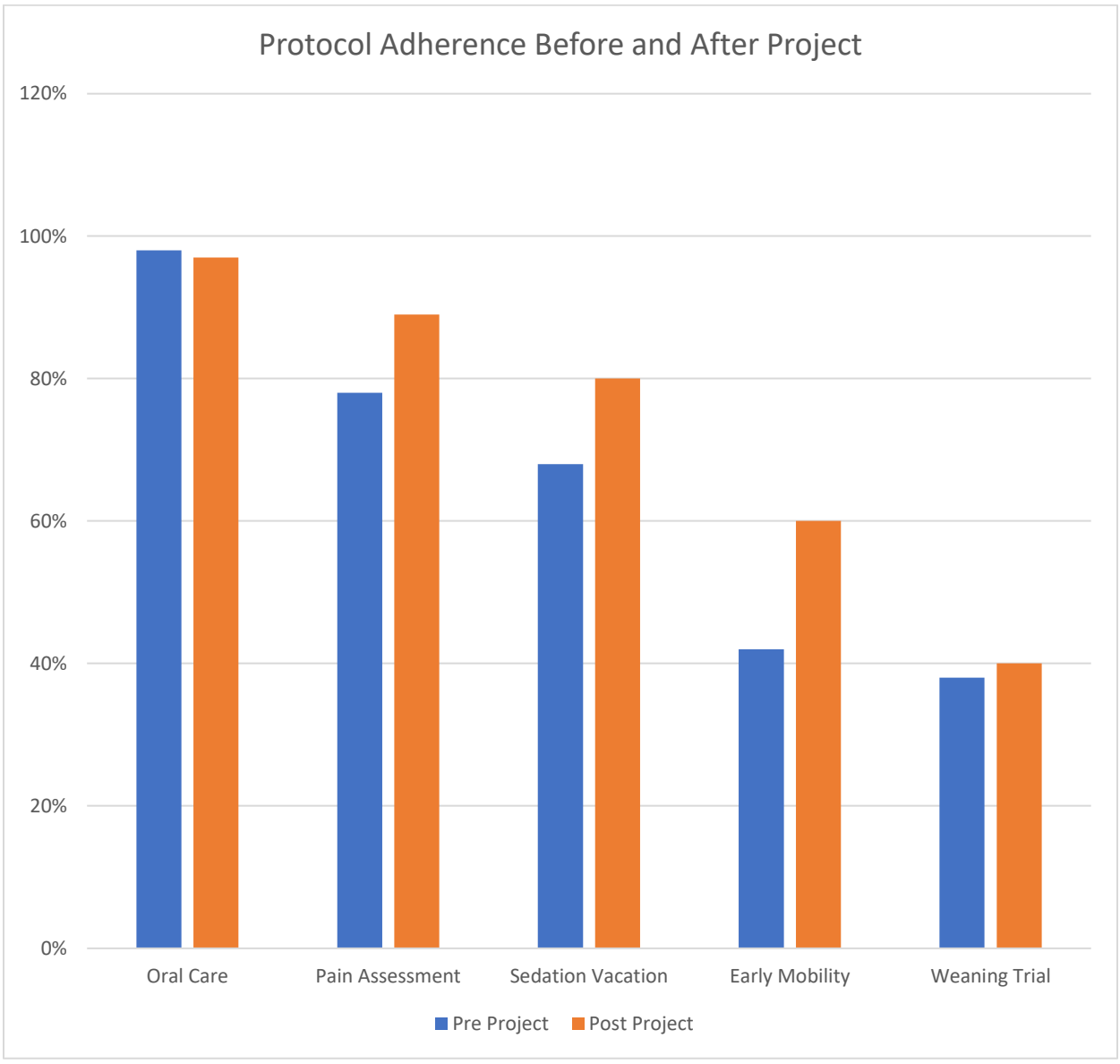
You are invited to participate in a quality improvement project. The purpose of this project is to determine the effect an end-of-shift checklist may have on the adherence to ICU protocols. This quality improvement project has the support of ICU management and several members of the nursing team. Your participation in the project consists of filling out a brief survey. Your participation in this project will take approximately two minutes at the end of your shift. Your participation in the project and the data collected will remain confidential and there will be no link between you and the recorded data. Though taking part of the project has been authorized by managerial staff, the outcome of the analysis will have no bearing on your employment. Questions about this project may be directed to the student principal investigator (SPI): Timothy Darby at (515)290-1767, or to the co-principal investigator (Co-PI): [Dr. Peggy Flannigan] at (309) 677 –2540. Your submission of the means that you have read and understood the information presented and have decided to participate. Your submission also means that all of your questions have been answered to your satisfaction. If you think of any additional questions, you should contact the project leaders(s).

Signature:_____ Date:_____

Appendix C

Survey item	Total "yes"	Total "no"	Total unanswered
Was pain assessment charted every 2 hours?	42	48	0
Was oral care charted every 2 hours?	100	0	0
Is head of bed at 30 degrees?	94	6	0
Is this patient appropriate for pressure support trials?	70	30	0
Was a pressure support trial done in the last 24 hours?	36	64	0
Is the sedation within the ordered RASS parameters?	66	12	12
Was daily sedation interruption performed?	37	52	11
Was the CAM-ICU charted?	60	40	0
Is the patient restrained?	64	36	0
Is the patient appropriate for therapies?	79	21	0
Is PT/OT ordered?	54	40	6
Was the patient up to chair/chair position in the last 24 hours?	18	76	6
Active range of motion done in the last 24 hours?	84	16	0
Plan of care reviewed with family?	96	4	

Appendix D


Protocol Adherence Before and After Project
120%
100%
80%
60%
40%
20%
0%
Oral Care
Pain Assessment
Sedation Vacation
Early Mobility
Weaning Trial
Pre Project
Post Project

Appendix E

Legend: 45 nurses who participated in the project were surveyed with three questions upon completion of the project.

A. Did you open the EMR while completing the questionnaire?

B. Did you enter new information or alter information while completing the questionnaire?

C. Did the questionnaire take too long to complete?