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Walden University
2020

Abstract

Improving Sedation Management in Mechanically Ventilated Patients

by

Jannette Lord

MS, Walden University, 2018

BS, Chamberlain University, 2015

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

February 2020

Abstract

In the intensive care unit (ICU), sedation management of the critically ill, mechanically ventilated patient is a source of concern. Optimal sedation management is integral to critical care practice, yet optimal levels of sedation are not consistently applied. Suboptimal sedation carries significant risks for patients, as inadequate sedation or oversedation may lead to prolonged ventilator days, ventilator-associated pneumonia (VAP), extended length of ICU stay, and costs. The purpose of this quality improvement (QI) project was to improve sedation management of mechanically ventilated patients by improving staff nurses' knowledge of and attitudes toward sedation management, ultimately achieving a zero-ventilated associated pneumonia rate. The Institute for Healthcare Improvement QI model provided the framework for the study. The practice-focused question guiding the project concerned whether nurses' knowledge and attitudes would improve after participation in an educational module, and whether implemented strategies would improve outcomes in the cardiovascular ICU. An online education module with face-to-face debriefing aimed at addressing sedation management was used. Pre- and posttest results demonstrated a change in knowledge acquisition ($t = 9.251$, $df = 29$, $p=.000$). A positive change in attitudes was indicated in the qualitative debriefing as nurses appreciated the value of preventing VAP without oversedation and brainstormed ways to overcome barriers. Most importantly, there were zero incidents of VAP in the 8 weeks following the educational process and debriefing discussions. Clinical implications of this QI project are that an educational process can help nurses find the means to provide optimal sedation management and to prevent negative consequences of oversedation, which would constitute positive social change.

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Dedication

This work is in dedication to God, who granted me the strength and perseverance in pursuit of this DNP journey. In addition, I dedicate this work to my mother, sister, and fiancé who have always been there to support me. You are greatly appreciated, thank you.

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Section 1: Nature of the Project

Introduction

In the intensive care unit (ICU), sedation management is a fundamental component of care for the mechanically ventilated critically ill patient and is an area of unrelenting interest in clinical practice. However, optimal sedation management has not been reliably applied in practice, leading to inadequate sedation or oversedation of mechanically ventilated patients and thus increasing ventilator duration, length of stay (LOS) in the ICU, morbidity, and mortality. Objective assessment of sedation has been validated in the ICU for the assessment and titration of sedatives in maintaining a Richmond Agitation Sedation Scale (RASS) score between -2 and 0. Nurses play an integral role and can be effective in the optimal management of sedation in the mechanically ventilated patient; however, there are barriers to this effort. Nurses' experiences, openness to change, and levels of motivation all influence nurse behaviors (Hermes et al., 2018). An evidence-based strategy for achieving an optimal level of sedation can lead to improved short- and long-term patient outcomes. This quality improvement (QI) educational project was conducted to examine sedation management in mechanically ventilated critically ill patients and to evaluate critical care nurses' knowledge of and attitudes toward adherence to best practices. The goal was to guide nurses in the decision-making process by educating them on the appropriate use of a validated sedation assessment tool in the management of mechanically sedated patients in the ICU. This Doctor of Nursing Practice (DNP) project may lead to positive social change by proposing that optimal use of the RASS assessment tool for proper

management of sedation in mechanically ventilated patients can facilitate positive outcomes for patients, crucial care nurses, and hospital systems by reducing the incidence of ventilator-associated pneumonia (VAP), a common complication of poor sedation management.

Problem Statement

Local Nursing Practice Problem

In the CVICU, many of the patients are critically ill and undergoing mechanical ventilation, a process that can increase anxiety, myocardial oxygenation, and sleep disturbances. To alleviate these adverse effects, most mechanically ventilated patients receive sedation, which allows depression of awareness and diminution of their response to external stimulation. Providing mechanically ventilated patients with an optimal level of sedation is challenging because, as Riker and Fraser (2009) noted, sedation regimes differ extensively and, if administered inappropriately, can have a worsening effect on the patient.

Local Relevance

Oversedated critically ill patients are more challenging to liberate from mechanical ventilation and are more at risk for developing complications such as VAP. Patients who receive mechanical ventilation require a continuous infusion of sedation and face the risk of being excessively sedated and consequently are susceptible to prolonged ventilation and being afflicted with VAP (Shahabi et al., 2007). The number of mechanically ventilated patients per month in the CVICU is approximately 150; the unit averages about two incidents of VAP every month (i.e., 1 in every 75 patients).

According to the Centers for Disease Control and Prevention (CDC, 2019), in 2011, an estimated 157,000 healthcare-associated cases of pneumonia ensued in acute care hospitals in the United States, of which 39% were VAP. Sedation management can have an overwhelming influence on the duration of mechanical ventilation and other patient outcomes (Sedwick et al., 2012). In mechanically ventilated patients, oversedation may lead to alterations in respiratory drive and prolonged duration of mechanical ventilation, VAP, and delusional memories of a stay in the ICU. Conversely, undersedation may result in agitation, thus placing patients at risk for self-extubation and physical harm or injury. The ventilator bundle is a package of evidence-based interventions that contains the components of head-of-bed elevation, daily sedation vacation, assessment of readiness to extubate, stress ulcer prophylaxis, and daily use of chlorhexidine gluconate (Newsome et al., 2018) aimed to improve outcomes in mechanically ventilated patients. Day-to-day spontaneous awakening and breathing trials are concomitant with VAP reduction and liberation from mechanical ventilation. Average LOS in the CVICU for mechanically ventilated patients is 2.55 days, showing similarity to the national ICU LOS, which is just a bit lower at 2.46 days. However, VAP occurs in 9-27% of all intubated patients (American Thoracic Society, 2004), resulting in an increase in LOS in the ICU of 5 to 7 days and a two-to threefold increase in hospital LOS (Augustyn, 2007). VAP remains a commonly encountered challenge amid mechanically ventilated critically ill patients and conveys noteworthy burdens of morbidity and healthcare costs. According to the CDC (2019), national surveillance for VAP has been challenging due to the absence of objective, reliable definitions; thus, in 2013, the National Healthcare Safety

Network (NHSN) supplanted surveillance for VAP in adult inpatient locations with surveillance for ventilator-associated events. Although VAP has multiple risk factors, optimal sedation management can reduce the incidence of this disease. With two incidents of VAP in 150 mechanically ventilated patients in the CVICU indicating a seemingly low rate of 1%, zero incidence can be an optimal goal for the CIVCU.

An optimal level of sedation for patients on mechanical ventilation is imperative; thus, the role of critical care nurses involves vigilance in patient assessment and intravenous medication titration. In the CVICU, the current practice of sedation management is based on physicians' sedation titration orders to the nursing staff with the validated RASS assessment tool to guide optimal sedation in mechanically ventilated patients. The *American Journal of Critical Care* supports the validity and reliability of the RASS assessment tool for measuring the quality and depth of sedation in adult ICU patients (Barr et al., 2013). For mechanically ventilated patients, the Society of Critical Care Medicine (SCCM) recommends light sedation levels (RASS score -2 to 0) to improve clinical outcomes as indicated by shorter duration on the ventilator and decreased ICU LOS (Bar et al., 2013). Despite the benefits of light sedation, countless patients endure being profoundly sedated, indicating possible knowledge deficits as well as attitudes based on the perception that it is easier to care for sedated patients on mechanical ventilation than for patients who are awake while receiving mechanical ventilation. During a recent accreditation visit at the project site, surveyors cited evidence of nurses' nonconformity to sedation management in mechanically ventilated patients exceeding the parameters of the prescribed continuous sedatives, the RASS

reassessments exceeding the 2-hour reassessment timeframe per organizational policy, and lack of objective evidence that nursing staff notified providers that patients were not responding to titration orders. For these reasons, the suboptimal sedation management of critically ill, mechanically ventilated patients is a relevant practice problem that signals the need for improvement.

Significance to Nursing Practice

It has been identified that sedation management guidelines have not been adequately maintained in the care of mechanically ventilated critically ill patients in the CVICU. This DNP project has significance for the nursing practice arena in that it may motivate CVICU staff to continually promote QI initiatives and adherence to evidence-based protocols for the critical care nursing staff to effectively manage sedation. This project also addresses nurses' knowledge and attitudes regarding sedation management, which affects patient outcomes regarding increased LOS and morbidity. The global significance of this DNP project to nursing practice resides in its potential to increase awareness and understanding of the importance of optimal sedation management with the use of the validated RASS tool as a clinical guide for critical care nurses. Following recent recommendations, health care professionals should utilize valid and reliable tools such as the RASS to implement sedative drug delivery protocols for patients getting mechanical ventilation (Ely et al., 2003).

<div align="center">

Purpose

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The intended outcome of this DNP QI project was to improve sedation management of critically ill, mechanically ventilated patients with proper use of the

RASS sedation assessment tool, critical care nurses' compliance with the RASS assessment tool, the achievement of target sedation goals, and staff nurses' knowledge and attitudes concerning sedation management according to best practices. This project may contribute to improved outcomes for adult mechanically ventilated patients receiving continual sedation in the ICU.

Gap in Practice

The differences between optimal sedation in the CVICU in the management of mechanically ventilated critically ill patients and current practice are habitually underemphasized and must be a key part of critical care nurses' knowledge to optimize patient safety. The provision of sedation in mechanically ventilated patients is associated with unique challenges; thus, understanding the optimal level of sedation is imperative. EBP is the hallmark of clinical practice; hence, it is concerning that nurses may have difficulty in assessing and judiciously applying current best evidence. Validated sedation assessment tools such as the RASS are available for use in clinical practice in the management of mechanically ventilated patients. Given the current underutilization of the RASS tool with mechanically ventilated patients, it is evident that a practice gap exists. This DNP project may afford nurses the knowledge they need to provide optimal sedation management in the care of mechanically ventilated patients.

Practice-Focused Question

The practice-focused question was the following: In mechanically ventilated patients, will educational strategies improve outcomes in the CVICU and reduce the incidence of ventilator-associated pneumonia (VAP)? This QI project will allow the

organization to evaluate the current use of and compliance with the RASS assessment in achieving target sedation goals. The population included all critical care nurses caring for mechanically ventilated patients receiving sedation in the CVICU. The intended outcome of this QI project was to identify appropriate adoption of evidence-based practice leading to decreased incidence of VAP and improved patient ICU LOS in mechanically ventilated patients.

Addressing the Gap in Practice

Mechanical ventilation can be a lifesaving intervention, but it can also be an uncomfortable experience due to the invasiveness of the tubing and dyssynchrony with ventilation. Nurses' perceptions concerning sedation management and appropriate use of the RASS tool may challenge adherence to optimal sedation in mechanically ventilated patients. Presently, the nursing practice of managing sedation in the CVICU is guided by the RASS tool and reassessment timeframe per organizational policy. In the CVICU, nurses may adjust sedation using wide-ranging information involving subjective assessments of patients' amnesia and comfort needs, as well as the need to prevent self-injury. Sedation management by nurses may vary with the proficiency of care, and with nurses' beliefs, knowledge, and attitudes. The knowledge and skills required to manage sedation for critically ill patients safely are exceedingly multifaceted and constitute an integral part of critical care (Varndell et al., 2015). In support of the theory about why optimal sedation management is not maintained in the CVICU, the SCCM agitation clinical practice guidelines were reviewed along with audits regarding nurses' compliance with the organizations' sedation protocol and documentation standards. The

SCCM 2013 clinical practice guidelines for management of agitation in adult patients in the intensive care unit serve as a living example of nurses' involvement in the development and application of professional guidelines and encompass new recommendations for changes in the approach with which care is delivered, challenging old paradigms and revealing new unanswered questions that indicate the need for further research (Davidson et al., 2015).

Additionally, gaps in sedation management in clinical practice were addressed by providing pretest and posttest questionnaires to the nursing staff concerning their knowledge of sedation management. Addressing this gap may enhance nurses' behavior in improving patient outcomes. The implementation of evidence-based protocols is one method that theoretically allows for positive outcomes for patients and increases consistency in decision making by health professionals; thus, promotion of protocols in a culture of change management may increase compliance (Rose & Bucknail, 2004).

Nature of the Doctoral Project

Sources of Evidence

The nature of this DNP project involved examining evidence-based guidelines in the literature to support the need for adopting evidence-based practices for sedation management in the CVICU. Sources of data were gathered from Walden University databases, CINAHL, and Google Scholar. Sedation is an essential component of care for mechanically ventilated patients in the CVICU. Barr et al. (2013) provided an executive summary of clinical practice guidelines for sedation management in adult patients in intensive care. While Hermes et al. (2018) identified gaps in agitation management in

intensive care, Riker and Fraser (2009) distinguished alterations in sedation paradigms to improve patient outcomes. Yousefi et al. (2015) examined the efficacy of RASS and sedation of mechanically ventilated patients and concluded that its application leads to reduction in sedation assumption, connection to the ventilator, and LOS. The research studies by Yousefi et al. (2015) and Urner et al. (2018) support the notion that sedation should always be delivered in a patient-goal-directed manner by means of a validated sedation assessment tool such as the RASS. A review of the literature revealed improvement with positive patient outcomes involving a decrease in sedation used, decreased LOS, and improved nursing practice with the implementation and utilization of a validated sedation assessment tool. The results also support recommendations for evidence-based guidelines in the clinical nursing practice setting.

Approach

This DNP project was guided from a QI perspective with an educational intervention relevant to the practice focus question. Developed frameworks such as the SCCM agitation guidelines facilitate the aforementioned approaches to sedation management and use of a validated sedation assessment tool. These guidelines underscore the need to improve team communication in the ICU, standardize care practices, and prioritize approaches that lighten sedation and improve overall sedation management in mechanically ventilated critically ill patients. The aim of this DNP project with a QI approach involved an innovative planned in-service staff nursing education program with a pretest questionnaire to assess nurses' knowledge and attitudes regarding the proper use of RASS in offering light sedation as opposed to deep sedation,

followed by a posttest to determine positive effects of educational interventions. The

purpose and process of the project were explained to the unit manager and staff nurses.

Preparation for the educational program involved conducting a review of all policies,

practices, and procedures applicable to sedation management and assessment of external

context such as evidence-based practices and extant practice guidelines. The facility

administration plans to conduct chart reviews/audits as part of the QI peer review process

to determine if practice with the use of the RASS tool actually changed after CVICU

nurses completed the educational module. However, this chart audit will occur outside

the scope of the DNP project. This chart audit process may be helpful in the future to

evaluate any incidents of VAP in order to determine if patients' sedation was managed

properly. Finally, the impact of the educational program on VAP was evaluated using

deidentified data for an 8-week period following the educational program.

Significance

Stakeholders

Most mechanically ventilated patients require sedation, a challenge faced by

clinicians and critical care nurses alike. Clinical practice guidelines have been established

by the SCCM to increase awareness of these issues in the critically ill. The contemporary

practice of using guidelines for the management of sedation in critically ill patients aims

for more awake and interactive patients (Jablonski et al., 2017). The RASS, a validated

assessment tool, is used for assessing agitation and sedation in critically ill patients in the

ICU. Patients do not metabolize sedative medications at the same rate; therefore, a

standardized scale can ensure that continuous infusion of sedatives is titrated to a specific

goal. Sedation scales can help identify those ICU patients who are sedated suboptimally and standardize sedation management (Pandharipande et al., 2014). The outcome of this DNP project may affect multiple stakeholders by addressing the lack of appropriate use of the RASS tool in maintaining appropriate sedation levels in mechanically ventilated patients. Without well-organized optimal sedation management, the risk of oversedation is always present, and although sedation tools are well accepted, they are not used as commonly recommended (Woien et al., 2012). The identified stakeholders are the CVICU nursing staff, patients, physicians, nursing educator, and nursing management. This QI project provided new practice knowledge for the nursing staff in guiding patient care and the CVICU with the potential to improve patient outcomes and decrease critical care and hospital LOS.

Contribution of the Doctoral Project

This project's contribution to nursing practice resides in its potential to promote enhanced knowledge and effective sedation management among mechanically ventilated patients. Additionally, the sequel of this project may improve patient safety and outcomes, as it will moderate morbidity as well as ICU and hospital LOS. Nursing as a practice profession needs both practice experts and nurse scientists to expand the scientific basis for patient care (American Association of Critical-Care Nurses, 2006). This DNP project enhanced nurses' knowledge and attitudes while inspiring them with patient ownership to collaborate with physicians to reduce suboptimal sedation practices.

Transferability

Evidence-based practice (EBP) is the assimilation of clinical expertise, patient values, and the best research evidence into decision-making practice for patient care (American Speech-Language-Hearing Association, n.d.). EBP serves as the foundation for knowledge transfer and a methodology to use critically appraised and scientifically proven evidence for clinical decision making in the delivery of quality health care to patients. Optimal sedation management with the use of a validated assessment tool such as the RASS in mechanically ventilated patients may improve care in other ICUs with similar practice problems. The results of this QI project may be shared among the other ICUs in the healthcare organization, as well as with other ICUs within the state.

Social Change Implications

Constructive social change implies a cognizant method of making and applying thoughts, frameworks, and activities to propel the esteem, regard, and enhancement of individuals, culture, and common requests with useful changes achieving enhancement of human and social conditions (Walden University, 2017). This doctoral project created positive social change within the CVIVU by encouraging nurses to adopt EBP. The adoption of evidence-based protocols and validated sedation assessment tools will promote positive social change as early recognition and management of anxiety and agitation in mechanically ventilated patients can facilitate positive outcomes for patients, critical care nurses, and the hospital system. Enhanced clinical practice knowledge and improved patient safety may support positive social change for critical care nurses. The adoption of EBP may facilitate changes in decision making related to sedation

management, thereby improving patient outcomes in the CVICU, specifically reducing incidents of VAP in the mechanically ventilated patient.

Summary

Suboptimal sedation can lead to poor patient outcomes. According to Jew (2014), if not carefully managed, liberal use of sedation can extend the length of mechanical ventilation and increase the risk of complications such as VAP, as well as mortality. Hence, effective management of sedation is indispensable for improving practice in the CVICU. To alleviate poor patient outcomes from suboptimal sedation, adoption of EBP is essential in facilitating the best patient outcomes as well as providing validated assessment tools that can aid in clinical decision making in the care of mechanically ventilated patients receiving continuous intravenous sedation. The appeal for evidence-based QI and healthcare transformation underscores the need to redesign care to be more effective, safe, and efficient (Stevens, 2013).

Section 2: Background and Context

Introduction

Sedation management is a fundamental component of care for mechanically ventilated critically ill patients and is an area of unrelenting interest in clinical practice. The practice problem for this project is that sedation management in mechanically ventilated patients in the CVICU varies based on the individual nursing care provided secondary to critical care nurses' knowledge and attitudes regarding optimal sedation management. Riker and Fraser (2009) noted that sedation regimes differ extensively and, if administered inappropriately, can have a worsening effect on patients.

The practice-focused question for this doctoral project was the following: In mechanically ventilated patients, will educational strategies improve outcomes in the CVICU and reduce the incidence of ventilator-associated pneumonia (VAP)? This DNP QI project was conducted to examine current sedation management in mechanically ventilated patients in the CVICU in conjunction with the use of and compliance with the RASS sedation assessment tool in achieving target sedation goals. Through this project, I sought information on critical care staff nurses' knowledge and attitudes concerning sedation management, and I sought to educate them according to best practices.

This section contains an overview of the concepts, models, and theories that guided this QI project concerning optimal sedation management according to best practices in critically ill, mechanically ventilated patients. The significance of this problem to nursing practice, the local background and context prompting the exploration

of this problem at the selected project site, and my role as the DNP student and the role of the project team are also addressed and discussed in this section.

Concepts, Models, and Theories

Mechanical Ventilation

Mechanical ventilation can be well defined as an artificial way to ventilate patients who are unable to breathe spontaneously in order to decrease the work of breathing. It is presented as an essential tool for the recovery of critically ill patients admitted to the ICU (Melo et al., 2015). Critically ill patients requiring mechanical ventilation need a high level of care and are at risk of adverse events including VAP. Carvalho (2006) cited mechanical VAP as one of the most feared adverse effects in the intensive care setting. A qualitative descriptive study by Atashi et al. (2017) emphasized the position of contextually appropriate evidence-based guidelines for effective VAP prevention. The care of mechanically ventilated patients should focus on the assessment of patients' response to and titration of mechanical ventilation and other interventions such as sedation management. The weaning of patients from mechanical ventilation is frequently impeded by the sedation that they have received. Robinson et al. (2008) discovered that continuous sedative infusions increase the duration of mechanical ventilation and LOS in intensive care. In their study, Robinson et al. revealed that for a protocol group, median mechanical ventilation was 1.2 days, median number of ventilator-free days at Day 28 was 26.4, median ICU LOS was 4.1 days, and hospital LOS was 12 days, compared to a median duration of mechanical ventilation of 3.2 days,

median number of ventilator-free days at Day 28 of 22.8, ICU LOS of 5.9 days, and hospital LOS of 18 days in the control group.

Because sedative medications are not metabolized at the same rate in individual patients, a standardized assessment scale can ensure that continuous infusions of sedatives are titrated to a specific goal. Accumulation of sedative drug or its active metabolites is common and may lead to oversedation, prolonged duration of mechanical intubation, and greater length of ICU stay (Rowe & Fletcher, 2008). A RASS of -2 to 0 has been advocated in the setting of mechanically ventilated patients to minimize sedation (MDCalc, 2019). Thus, according to Urner et al. (2018), sedation should always be delivered in a patient goal-directed manner by using a valid sedation assessment tool such as the RASS.

Sedation Management

Providing optimal sedation management in mechanically ventilated patients is a challenge faced by critical care nurses in the CVICU. Consequently, sedatives are among the most commonly administered drugs used in a widespread spectrum of symptom control to achieve patient comfort in the ICU environment and to eliminate anxiety in mechanically intubated critically ill patients. In the CVICU, optimal sedation management has not been reliably applied in practice, leading to inadequate sedation or oversedation of mechanically ventilated patients.

The SCCM guideline was used for this DNP project because it provides a structured framework that guides sedative administration and monitoring in critically ill adult patients in the ICU setting. According to McEwin and Willis (2014), theory helps

guide practice and generate models that improve nursing practice. The SCCM outlined clinical practice guidelines to increase awareness of optimal sedation in critically ill patients, with the ultimate target level of sedation resulting in a calm patient who can be effortlessly aroused with the maintenance of the customary sleep-wake cycle.

Barr et al. (2013) recommended that sedative medications be titrated to support a light rather than a deep level of sedation in adult ICU patients. To appropriately titrate and balance sedation in mechanically ventilated patients, several assessment tools have been devised. Recent clinical practice guidelines recommend the use of a scoring-system method to measure the sedation level of patients in ICUs. The RASS, remarkable for its ease of use, admirable interrater reliability, and superior discriminatory capacity compared to other commonly used scales, is used in these guidelines. The RASS assessment tool has been deemed valid and reliable in providing a standardized way in which healthcare team members can speak the same language regarding the intensity of sedation in adult ICU patients to meet established clinical goals according to best practices.

Ely, Truman, and Shintani (2003) first established the reliability and validity of the RASS scale in adults. There were 290 paired observations that nurses documented with mechanically ventilated patients used to establish interrater reliability, construct validity, and criterion validity, firmly establishing these psychometric properties for the tool. Based on this study, the RASS has become the gold standard in sedation management in ICUs across the country.

A study done by Kerson et al. (2016) assessed the validity and reliability of the RASS tool in both mechanically and nonmechanically ventilated patients in the pediatric population by comparing it to the visual analog scale (VAS) and the University of Michigan Sedation Scale (UMSS). The results of the study indicated a high correlation when compared with a previously validated sedation assessment tool used in the pediatric population. Hence, the researchers in the study concluded that the RASS is an intuitive and valid responsiveness scale that is excellent for use in critically ill children in the pediatric ICU (Kerson et al., 2016).

RASS scores range from -5 to +4, with a score of -5 denoting deep sedation and a score of +4 indicating no sedation. For mechanically ventilated patients, the SCCM recommends light sedation levels (RASS score -2 to 0) to improve clinical outcomes as indicated by shorter duration on the ventilator and decreased ICU LOS (Barr et al., 2013). Additionally, the appropriate use of the RASS tool can lead nurses to make an informed decision that maximizes patient comfort and safety (Yousefi et al., 2015). The SCCM supports decision making to reduce variation in sedation management practice in mechanically ventilated critically ill adult patients in the ICU while supporting the use of evidence-based practice.

Ventilator-Associated Pneumonia

Among mechanically ventilated critically ill patients, VAP remains a commonly encountered challenge. National surveillance for VAP has been challenging (CDC, 2019); hence, the NHSN replaced surveillance for VAP with surveillance for ventilator-associated events (VAE) in adult inpatient locations. Atashi et al. (2017) reflected that

critical care nurses' perceptions of barriers to the prevention of VAP involved their

limited professional competence, noting characteristics of unfavorable professional

attitudes, inadequate professional knowledge, low job motivation, and limited

professional liability. The authors found that some nurses had not received theoretical or

practical VAP-related training and thus had limited knowledge about sedation reduction,

ventilator weaning, and mouth care protocols (Atashi et al., 2017). Despite having good

infection-related knowledge, critical care nurses in the study had poor infection

prevention practice, indicating that unfavorable professional attitudes can affect nurses'

clinical practice. The nurses' low job motivation was due to their unfavorable work

conditions, heavy workload, and lack of reinforcements. Accountability is the

cornerstone of nursing practice, yet nurses executed their professional roles based on

habitual routines and in order not to be officially reprimanded (Atashi et al., 2017).

The VAP bundle developed by the IHI is a collection of evidence-based practices

that, when executed communally and reliably, decrease VAP rates and improve quality of

care for patients receiving mechanical ventilation. Bird et al. (2010) compared VAP rates

before and after initiation of the VAP bundle, finding a VAP rate of 10.2 cases per 1,000

ventilator days that decreased to 3.4 cases per 1,000 ventilator days when compliance

with the bundle was maintained. The surgical intensive care unit (SICU) depicted in the

study adopted the VAP bundle practice when mediocre VAP rates were noted.

Awareness of the gap between guideline propagation and clinical practice has led to

efforts by health care systems to institute programs directed at complying with VAP

prevention guidelines to moderate the burden of VAP infection (Bird et al., 2010). The

ventilator bundle is a package of evidence-based interventions that contain the components of head-of-bed elevation, daily sedation vacation, and assessment of readiness to extubate, stress ulcer prophylaxis, and daily use of chlorhexidine gluconate (Newsome et al., 2018). Currently, in the CVICU, approximately 150 patients require mechanical ventilation per month, with VAP rates averaging about two incidences, that is, 1 in every 75 patients, reflective of a seemingly low rate of 0.44 for every 1,000 patient days, less than .5 for every 1,000 ventilator days. However, maintaining a rate of zero cases of VAP per 1,000 ventilator days can be an optimal goal for the CVICU. Introducing the concept of the VAP bundle may result in substantially more significant improvement in daily goal setting in reducing the incidence of VAP, the mean period of mechanical ventilation, and ICU and hospital LOS while providing evidence-based care (IHI, 2019b).

Barriers to Effective Sedation Management

Appropriate sedation assessment by critical care nurses and titration parameters of continuous intravenous sedatives are of pivotal importance for effective sedation management and avoidance of jeopardizing the comfort and safety of mechanically ventilated patients. However, suboptimal sedation management has gained particular attention in clinical practice in the CVICU. As noted by Riggi and Glass (2013), health care practitioners are urged to standardized sedation management practices by adhering to specific strategies that may improve patient comfort and safety. The RASS tool is favorably correlated in assessing arousal states among all ICU patients based on the descriptions allied with each level of sedation. Light sedation is the target sedation level

for most patients unless contraindicated, with a score between 0 and -2 (Barr et al., 2013).

Although guidelines and assessment tools may support sedation delivery, the efficiency

of sedation management is dependent mainly on critical care nurses' abilities. The

independent assessment of nurses is essential in observing changes in patients' sedation

level, as nurses are accountable for safeguarding that patients are safely and optimally

sedated. Thus, nurses' knowledge, skills, attitudes, experience, confidence, and clinical

judgment are significant for safe sedative administration (Walker & Gillen, 2006).

In the CVICU, many patients continue to be heavily sedated, indicating possible

contributory factors of knowledge deficits and attitudes concerning the inappropriate use

of the RASS scale and the ease of patient care for sedated patients versus more awake

mechanically ventilated patients. In hindsight, these factors have unfavorably affected

adherence to evidence-based sedation practices (Walker & Gillen, 2006). Initiatives to

expand critical care nurses' knowledge and skills in optimal sedation management are

imperative to improve evidence-based sedation therapy and adherence.

IHI Quality Improvement Model

The IHI seeks to improve health care by supporting change and offers a

calculated, controlled approach to QI that includes the steps of clearly outlining the

desired change, brainstorming on the drivers of change that may impact the aim, and

initiating Plan, Do, Study, Act (PDSA) iterative cycles based on small changes to avoid

any disruption in care, thus ensuring success before a change is implemented on a grand

scale. Additionally, measurements in the IHI model for improvement are designed to

bring new knowledge into daily practices via multiple tests that gather small batches of

data. According to IHI (2019a), measurement is a precarious aspect of testing and implementing changes, as measures identify whether changes that are made truly lead to improvement. The IHI model was used as a framework for ascertaining explicit competencies needed to educate staff nurses on EBP in clinical practice.

QI processes help to close the evidence–practice gap where clinical practitioners know what to do but fail to do it. The adoption of the IHI model was used to discover the need for an educational program and develop education content. In the planning phase of the PDSA cycle such that the practice problem of suboptimal sedation management was identified, critical care nurses' knowledge, skills, and barriers regarding sedation management were assessed. The VAP rate in the CVICU of 2 infections per 150,000 was not consistent with the zero-based goal or with the organizational desire to eliminate VAP. The "do" phase of the PDSA concerned the education of staff nurses regarding the issue of suboptimal sedation in the CVICU. An education forum was initiated for critical care nurses in the ICU on the importance of optimal sedation management with the use of the RASS tool and adherence to targeted sedation practices. In the "study" phase of the PDSA, the impact of the education on the VAP rate was assessed. The "act" phase will occur outside the scope of the DNP project, through the work of the organizational QI team. In summary, the PDSA provided an apt framework for the DNP project, which will continue into the future, exploring opportunities continuously to evaluate effectiveness and the need for further improvements through the organization's QI initiative in the CVICU. The goal in exploiting this model is to support decision making

that will decrease inappropriate variations in sedation management practice in the

CVICU to eliminate VAP while supporting the use of EBP.
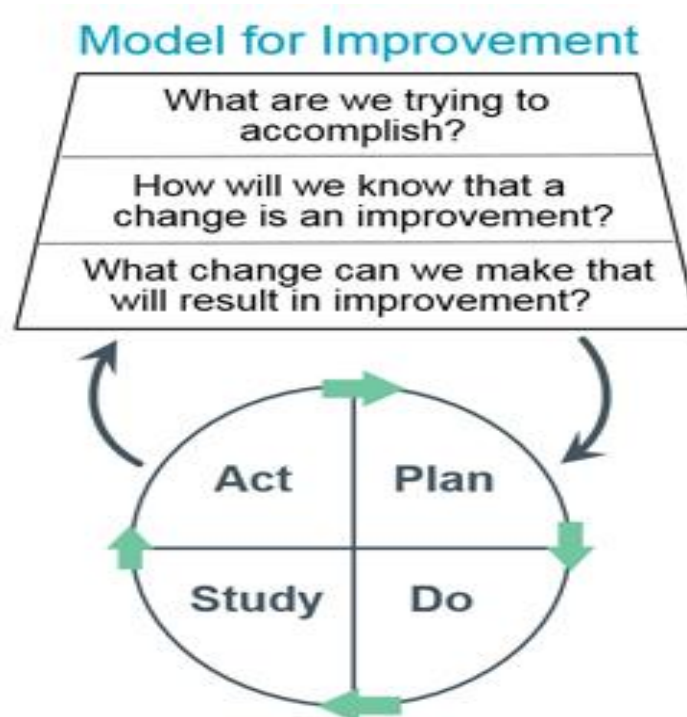
Figure 1. Plan, Do, Study, Act (PDSA) model. Adapted from "How to Improve," by Institute for Healthcare Improvement, 2019 (http://www.ihi.org/resources/Pages /HowtoImprove/default.aspx). Copyright 2020 by the Institute for Healthcare Improvement. Adapted with permission.

Relevance to Nursing Practice

EBP is central to decision making in nursing. In 2012, the SCCM published a

revised guideline to support the use of evidence-based and patient-centered practice for

the management of sedation in the adult critically ill patient (Barr et al., 2013). The

guidelines provide validated tools for the assessment and comprehensive management of

mechanically ventilated adult patients. In the CVICU, the current state of nursing practice

for sedation management is based on physicians' orders and organizational sedation

policy. The role of critical care nurses in optimal sedation management in mechanically ventilated patients with the aim of adhering to a RASS of 0 to -2 requires vigilance in patient assessment and titration of intravenous sedatives. Evidence of nurses' nonconformity to sedation management involving patients exceeding prescribed continuous sedative parameters and the reassessment of patients' RASS exceeding the 2-hour timeframe per organizational policy has been cited in a recent internal accreditation report, indicating the possibility of critical care nurses' knowledge deficits and attitudes regarding optimal sedation management. Thus, this report triggered recognition of the need to improve nursing practice concerning sedation management in the DNP project setting. McCrae (2011) recommended changing nursing practice through professional training and experience to acquire best practice on available practice. Quality and Safety Education for Nurses (QSEN, 2018) supports this statement by aiming to prepare nurses with the knowledge, skills, and attitudes needed to continuously ensure high-quality care. Strategies to facilitate evidence-based practice and decision making in sedation management involve adaptation of the SCCM practice guidelines for managing sedation in critically ill adult patients. The results of this study may heighten critical care nurses' awareness of the importance of optimal sedation management according to best practices.

The use of sedative drugs may be considered a universal intervention in mechanically ventilated patients in the ICU. Thus, ground-breaking sedation trials have made noteworthy contributions to healthcare professionals' understanding of the problems related with ICU sedation and have fostered changes to existing clinical practice. In the 1980s-1990s, sedation practice for adult ICU patients was mostly an

extension of the practice of general anesthesia and normally with a goal of deep sedation (Shehabi et al., 2013). The last two decades of critical care medicine has seen a beneficial shift from a propensity to heavily sedated patients to strategies of light sedation. Accordingly, sedation is recognized as an important aspect of critical care practice, and adult clinical practice guidelines this field remain the most popular amongst those produced by the SSCM.

<p style="text-align:center">Local Background and Context</p>

The CVICU was the intended setting for the commencement of this doctoral project consisting of 18 beds. The number of mechanically ventilated patients in the CVICU approximate 150 per month, of which 75% represents medical patients, and the remaining 25% represents surgical patients. The average LOS for mechanically ventilated patients is approximately 2.55 days with an average VAP rate of two incidences per month. VAP rate is expressed as the number of VAP per 1,000 ventilator days (IHI, 2019b); thus, the number of VAP rates in the CVICU approximate 0.44 VAP per 1,000 ventilator days. These patients typically require sedation to help facilitate the management of their underlying disease. The healthcare organization upholds the current stance of utilizing the latest available evidence in clinical practice. However, some areas in clinical practice remain problematic, thus, requiring improvement. One such problem area is suboptimal sedation in the mechanically ventilated patient population. Hence, there is an imperative need to adapt to the SCCM practice guidelines for sedation management to enhance nursing practice and support adherence to evidence-based practices.

Role of the DNP Student

As a DNP student, my goal in this QI project was to assist in reducing the VAP rate of 2 infections for every 150 patients in the CVICU by providing an educational process as a strategy in the QI initiative at the site. Based on the information attained from the published literature, I developed the educational content, conducted the discussion and debriefing with the CVICU staff nurses to made recommendations supported by research and guidelines that have helped enhance current nursing practice. The most updated available evidence integrated into clinical practice resonates with me in triggering the desire to solve a clinical practice problem and the available supporting evidence that exists in facilitating the adaptation of standardizing practice for the adult critical care population in the primary interest of reducing the incidence of VAP and improving patient care in the CVICU.

Role of the Project Team

Members of the project team included the DNP student, the unit manager, two-day shift and two-night shift staff nurses, and the infectious disease nurse. The team assisted in the propagation of the DNP project results and helped expedite the project recommendation at the local site. Using the IHI PDSA model, in the planning phase, the doctoral project was presented to the members of the team outlining the clinical practice problem which the DNP project addressed. Each team member's role was defined, and members were given the opportunity for feedback and to share their expertise related to the DNP project. In the "do" phase of the PDSA model, retrospective data collection was conducted on VAP incidents and rates, nurses' knowledge and attitudes concerning

optimal sedation management in a pretest, and the appropriate use of the RASS tool in maintaining light sedation was the main topic provided in the educational module. Data were also collected as a posttest to measure the educational outcomes. Finally, the VAP rates for an 8-week period of time following the education were captured. In the "act" phase of the PDSA framework, the team recommended ongoing use of the educational materials, and chart audits to be employed if VAP incidents occur in the future in the CVICU. Adoption of the PDSA model by the project team in this DNP project helped to increase awareness on the importance of adhering to evidence-based practices by clinicians in everyday patient care processes.

Summary

Nurses embrace the duty and trust to provide excellent nursing care. The integration of evidence-based practice and the PDSA model affords a well-developed set of tools and approaches for implementing, evaluating, and disseminating quality improvement in patient care outcomes. Significant emphasis should be placed on nurses understanding of clinical processes that facilitate as well as those barriers that may impact optimal sedation management. The structure and discipline of the PDSA approach may contribute to the possibility that change will be initiated into the CVICU practice setting that fosters an environment of adhering to evidence-based practices in sedation management of critically ill, mechanically ventilated patients.

Section 3: Collection and Analysis of Evidence

Introduction

In the ICU, patient agitation is arguably one of the most common clinical issues challenging healthcare providers in relation to mechanically ventilated, critically ill patients. Interventions focused on patient safety and the impact on long-term patient functionality and quality of life are essential to optimal sedation management. Patients receiving suboptimal or deep sedation are at risk for higher complication rates; hence, the level of sedation that is achieved can significantly impact patient outcomes. Evidence-based approaches for the management of sedation in the CVICU address the role of nurses in the care of this patient population. Nursing staff can become overwhelmed with the decision-making process in determining appropriate sedation. Based on an understanding that nursing care forms the foundation of the institution, this DNP project will assist nurses in the continual provision of safe patient care in alliance with EBP. In this section, I address sources of evidence for this project and provide an overview of the methodology that I used in evidence searches, including selection and inclusion criteria as well as the analysis and synthesis of the system used to consolidate the evidence obtained.

Practice-Focused Question

Sedation in the ICU is an important therapeutic modality that may be handled as an afterthought rather than being recognized as an integral component of the overall care of patients. Optimal sedation in the critically ill, mechanically ventilated patient is not merely compassionate, but is fundamental to patient care, in that agitation may contribute

to ventilator dyssynchrony and adverse events such as VAP and self-extubation. The practice-focused question for this DNP project was the following: In mechanically ventilated patients, will educational strategies improve outcomes in the CVICU and reduce the incidence of ventilator-associated pneumonia (VAP)? This QI project is significant to practice, in that a reduction in the variation in nursing practice for sedation management in mechanically ventilated patients is expected with recommendations provided according to best practice.

The purpose of this doctoral project was to improve the sedation management of critically ill, mechanically ventilated patients according to best practices with the appropriate use of the RASS tool in targeting sedation goals, as well as to evaluate the QI initiative that I led at the project site. This approach aligned with the practice-focused question, in that the evidence collected supported recommendations for EBP guidelines in clinical nursing practice for optimal sedation management in critically ill, mechanically ventilated patients in the CVICU. This QI project provides a standard, evidence-based guideline for the CVICU that may be implemented and used as the best approach in sedation care management.

Sources of Evidence

This project included a review of evidence-based guidelines in the literature relevant to sedation management in mechanically ventilated patients that could be endorsed to improve existing nursing practice in the CVICU. In addressing the practice-focused question, I used up-to-date sources of evidence drawn from current literature. A review of the literature indicated that sedation management in mechanically ventilated

patients is challenging. I located peer-reviewed journal articles and published guidelines using CINAHL, Google Scholar, and Walden University databases. In mechanically ventilated patients, sedation is an indispensable component of care. The 2013 clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the ICU are used to guide the recommendation of adopting optimal sedation management (Barr et al., 2013) in the CVICU.

Published Outcomes and Research

The exploration and analysis of evidence-based guidelines in the literature concerning appropriate sedation management in the adult critically ill patient will facilitate the approach to decision making in and adoption of evidence-based nursing. Sources of data were gathered using a strategic search of the literature that included keywords such as *adult sedation management*, *sedation in mechanically ventilated patients*, *sedation in the critically ill*, *sedation management*, and *evidence-based guidelines for sedation*. Focusing on efficient article retrieval, I explored Walden University databases, CINAHL, and Google Scholar, retrieving full-text, peer-reviewed sources with publication dates from 2004 onward. Additionally, I accessed websites of organizations such as the SCCM for additional resources.

Archival and Operational Data

All data used for this project were gathered by the QI team at the DNP project setting and provided to me in deidentified format, with no patient-identifying information included. The data were provided in aggregate to be consistent with the Walden QI manual for an existing QI initiative. Aggregate data on the incidence of VAP in the

CVICU were tracked for an 8-week period following in-service education. It was the expectation that a zero incidence of VAP would be an indication that the nurses were using the RASS assessment and managing sedation according to the content provided in the in-service education.

Evidence Generated for the Doctoral Project

 Participants. For this doctoral project, the intended setting was the CVICU, an 18-bed unit. A prospective data-collection effort using a pretest questionnaire was performed by the existing QI team on staff nurses to assess their knowledge and attitudes concerning optimal sedation management in mechanically ventilated patients in the unit with the use of the RASS measurement tool. The targeted population for the study was the critical care nurses working in the CVICU who had more than 1 year of work experience in critical care settings. There were over 50 nurses who worked in the unit, and about 40 met the inclusion criteria for the online education. The nurses' knowledge and attitudes concerning optimal sedation management will be a criterion, thus emphasizing the need for an educational process in ensuring safe and high-quality patient care.

 Procedures. An innovative in-service educational program was conducted for nursing staff. The educational in-service was aimed at developing critical care nurses' knowledge of optimal sedation management and favorable attitudes toward the complex care needs of the critically ill, mechanically ventilated patient population. The educational process included the delivery of content on assessing and managing sedation and hands-on sedation assessment practice by means of the RASS for both day- and

night-shift staff nurses, for a total of three sessions over a week (see Appendix B).

Information and knowledge are crucial to staff engagement and strong performance; it also important to address longstanding attitudes, barriers, and obstacles to proper sedation management. Thus, to engage staff participation in a discussion forum, case scenarios were presented that were similar to situations that the nurses were increasingly encountering in the CVICU. Nurses' active interaction and participation in a learning environment resulted in deeper learning and understanding of the RASS tool and its application in practice.

To evaluate nurses' baseline knowledge and attitudes concerning the use of the RASS tool in offering optimal sedation management, a pretest questionnaire was made available to staff nurses (see Appendix C). Following all education steps (i.e., both the online didactic module and the face-to-face debriefing), a sedation management posttest was conducted to determine if the educational interventions were effective in achieving knowledge acquisition and in changing attitudes. Participants received contact hours for their participation at the completion of the education project.

Protections. Staff nurses were given detailed explanations of the purpose and contents of the study. Informed consent or waiver of informed consent was obtained for human subjects' participation in this DNP project. Participants were informed that they could depart from the project at any time without any disadvantages. Participant identifiers were excluded from the collection of data to evaluate the results of the educational module. There were no patients directly involved in the project, and all operational data on the incidence of VAP were deidentified. Thus, no potential ethical

issues were foreseen that presented problems for the completion of this project. I received permission from the Institutional Review Board (IRB) of both the project site organization and Walden (IRB approval number 05-22-19-0641537).

Analysis and Synthesis

Microsoft Excel served as the system for recording, tracking, organizing, and analyzing the evidence for this doctoral project. The quantitative data gathered from the educational process (i.e., the pretest and posttest comparisons) were analyzed using SPSS v25 using parametric as the sample met the normal assumption to determine if knowledge acquisition and a change in attitudes occurred as a result of the in-service education. In addition, data on the incidence of VAP for the 4 weeks prior to the education and for 8 weeks after the education were tracked to determine the impact of the training on nurses' practice in the CVICU. Qualitative data gleaned from the post education debriefing sessions were summarized thematically; no participants were identified in the data summary. After the findings were summarized, they were presented to the unit manager with recommendations based on the guidelines set forth by the SCCM regarding sedation management in the adult patient in the ICU to improve best clinical practices as applicable.

Summary

The goal of this doctoral project was to provide recommendations that could help in addressing the gap in practice regarding optimal sedation in critically ill, mechanically ventilated patients. The outcomes of this DNP project helped to enhance nursing practice

as well as improve patient outcomes in the CVICU. This doctoral project improved

patient safety in the healthcare organization.

Section 4: Findings and Recommendations

Introduction

Critically ill patients may experience several interventions that can lead to distress, including mechanical ventilation. Use of sedative medications is an integral part of the complex management of many mechanically ventilated patients in the ICU to minimize patient discomfort while reducing the risk of agitation and accidental self-extubation. Nevertheless, providing critically ill, mechanically ventilated patients with an optimal level of sedation is a challenging task. Suboptimal sedation management can result in adverse consequences, including increased morbidity, VAP, prolonged mechanical ventilation and ICU duration of stay, and increased cost. The need for higher order, evidence-based best practice management of critically ill, mechanically ventilated patients has been highlighted in the ICU community. Significant advances in the management of ICU patients have culminated in the development of evidence-based guidelines that include sedation management in critically ill patients (Barr et al., 2013). Nurses play an integral role in the management of sedation for mechanically ventilated patients in the ICU. At the practicum site, nursing care is the foundation of the institution, as nurses are relied upon to provide care that is aligned with published evidence. A gap in nursing practice exists when there are differences between optimal sedation management of mechanically ventilated, critically ill patients and current practice, in that compromised patient outcomes, including VAP, may occur. The provision of sedation in mechanically ventilated patients is associated with unique challenges; thus, an understanding of the optimal level of sedation is imperative and must be a key part of critical care nurses'

knowledge to optimize patient safety. EBP is the hallmark of clinical practice; hence, it is concerning that nurses may have difficulty in assessing and judiciously applying current best evidence. Variations in sedation-related guideline use and clinical practice are prevalent, and variation in assessment-scale preference may affect harmonization of care. Validated sedation scales should be used to guide titration of sedative medications. The RASS is one of the most widely used sedation tools for evaluating level of consciousness because it captures arousal, cognition, and sustainability of response. Recent guideline updates have included the recommendation to avoid deep sedation during ICU clinical practice and maintenance of light sedation with a RASS score between -1 and -2 in adult ICU patients (Barr et al., 2013). Given the benefits of light sedation, nurses have an important function in caring for critically ill, mechanically ventilated patients. The purpose of this project was to improve the care of critically ill, mechanically ventilated patients with proper use of the RASS sedation tool in achieving target sedation goals and improving staff nurses' knowledge and attitudes concerning sedation management according to best practices.

The practice-focused question that guided this DNP QI project was the following: In mechanically ventilated patients, will educational strategies improve outcomes in the CVICU and reduce the incidence of VAP? Sources of evidence used to address the practice-focused question included current literature indicating that sedation management is challenging in mechanically ventilated patients and validating the need for light sedation while advising against oversedation in mechanically ventilated patients. Peer-reviewed studies and published guidelines were retrieved from CINAHL, Google

Scholar, and the Walden University databases. *Sedation management, sedation guidelines*, and *sedation management validated tools* were the search terms used with literature review publication year limited to 10 years.

Findings and Implications

A total of 30 nurses participated in the DNP project educational forum. The purpose of the pretest was to obtain nurses' baseline knowledge of sedation management. The online-didactic education module and face-to-face debriefing met the goal of supporting nurses' knowledge acquisition and changes in nurses' attitudes concerning sedation management. Results are summarized in Table 1, showing the main characteristics measured.

Parametric statistics were employed in analyzing the results of the pre- and posttest, demonstrating approximately normally distributed data with kurtosis of .156 and -.638 and skewness of -.193 and .833, respectively. The pretest mean score was 64.66 and the posttest mean was 83, indicating a mean gain of 18.34. The *t* test ($t = -9.251$, $29df$, $p = .000$) shows that this gain was not likely due to chance. The purpose of analyzing the data collected for this DNP project was to determine improvement in nurses' knowledge acquisition while caring for critically ill, mechanically ventilated patients. The mean scores of the posttest indicated that the CVICU staff nurses' knowledge of sedation management did improve.

Table 1

Descriptive Statistics

		Pretest	Posttest
N	Valid	30	30
	Missing	0	0
Mean		64.6667	83.0000
Std. error of mean		2.12988	1.73867
Median		65.0000	80.0000
Mode		60.00[a]	80.00
Std. deviation		11.66585	9.52311
Variance		136.092	90.690
Skewness		-.193	.364
Std. error of skewness		.427	.427
Kurtosis		.156	-.638
Std. error of kurtosis		.833	.833
Range		50.00	30.00
Minimum		40.00	70.00
Maximum		90.00	100.00

[a]Multiple modes exist. The smallest value is shown.

Provision of sedation is a core pharmacotherapy aspect of the care of critically ill patients. The role of the nursing staff is crucial to assess levels of sedation and the maintenance of optimal sedation management in mechanically ventilated patients. After the pretest, the online-didactic education was followed with a discussion about perceptions, including barriers and facilitators to optimal sedation management in mechanically ventilated patients on sedation management. Nurses cited the following barriers when caring for mechanically ventilated patients: (a) some physicians' preference for deep sedation, (b) lack of knowledge issues, (c) poor outcome expectancy in lightly sedated patients, and (d) negative perceptions of the usefulness and accuracy of

the RASS sedation scale. Most of the nurses expressed the mindset that "it is impossible for every patient to have light sedation" and that "caring for the lightly sedated mechanically intubated patient is challenging." Nurses explained that it is particularly difficult to fulfill patients' needs when staff levels decrease and workload increases. Feelings of helplessness and frustration were reported by the nursing staff when patients were lightly sedated and other adjunct treatments had been tried but nothing worked.

Continued discussion explored nurses' attitudes and concerns about optimal sedation management. How nurses practice in relation to sedation management directly affects the quality of care provided to mechanically ventilated patients (Walker & Gilien, 2006). The nurses' perceptions of nursing-related strategies for optimal sedation management with adherence of a RASS of 0 to -2 included the following: (a) avoiding excessive workload and/or staff shortages, (b) implementing multimodal interventions including staff education, and (c) developing a nurse "buddy system" to help monitor lightly sedated ventilated patients. The nurses felt that "it was important to provide good-quality care that included knowledge about the importance of finding a good balance to light sedation," which indicated an important shift in attitude. "Increased utilization of the RASS tool and sedation guidelines" were also cited by the staff nurses as strategies to improve the use of light sedation in mechanically ventilated patients, another positive attitude shift. Finally, nurses felt inspired to care for lightly sedated patients, even though it demanded more of their time and resources.

Oversedation has been associated with prolonged mechanical ventilation and higher rates of nosocomial infections, namely VAP (SRLF Trial Group, 2018). In the

CVICU, nurses provide care for approximately 150 mechanically ventilated patients per month. At the start of this DNP project, there were about two VAP infections per month, affecting approximately 1 in 75 patients. The DNP educational program was provided within the context of an existing QI campaign at the site. In addition to the education that I developed and provided in the DNP project, there were other discussions and reminders about sedation management. The infectious disease nurse at the project site cited no incidences of VAP in the past 2 months, thus indicating the CVICU currently exhibiting an optimal goal of zero incidences. The average LOS in the CVICU for mechanically ventilated patients was about the same but reduced very slightly at 2.5 from 2.55. Thus, an optimal level of sedation is imperative for the short-term outcome benefits of fewer days of mechanical ventilation and ICU LOS. Within the context of the greater QI initiative at the site, the results of the education training provided to the staff nurses and the resulting campaign has had an impact on VAP incidence in the CVICU, in that the unit currently has zero VAP/1,000 ventilator days.

Recommendations

After analysis and synthesis of the data collected for the DNP project, the findings suggest that continued support and education on sedation management are needed for all nurses, especially those who provide care for critically ill, mechanically ventilated patients. Without knowledge, nurses are disadvantaged and are ill equipped to provide care for sedated mechanically ventilated patients, which may result in adverse outcomes. Hence, it is suggested that the QI project would have a significant influence on nursing practice at the project site, and I recommend consideration of moving forward with a

chart audit (see Appendix A) as a peer review to evaluate nurses' appropriate use of the RASS tool. These data should prompt healthcare administrators to ensure that nurses are provided the resources needed to provide optimal patient care and optimize health outcomes.

Contribution of the Doctoral Project Team

The final interpretation of the findings of the doctoral project was presented to the team and evidence-based recommendations were provided, outlining the results of the evidence obtained from the pre- and posttest. Team roles were essential in the final recommendation, in that team members' feedback, shared insights, and expertise related to the doctoral project impact the project's implementation. The project site administrators' acceptance of the recommendations provided from the project will drive the implementation process of the project.

Strengths and Limitations of the Project

A noteworthy strength of this DNP project is the knowledge gained throughout the process. This project fostered the opportunity to share the knowledge obtained with nursing leadership, frontline nurses, and possibly at the national level. The findings and recommendations of this project may help facilitate nursing leadership decision making on initiatives to improve nursing practice. Utilization of chart audits was outside the scope of the DNP project and was an identified limitation of the project. Lack of chart audits in the data collection phase limited the findings of comparable outcomes concerning nurses' appropriate use of the RASS tool in mechanically ventilated patients. One recommendation is for the project site to follow up with the designed chart audit tool

(see Appendix A), especially in the case of any emerging incident of VAP (i.e., if VAP were to occur, the patient's chart would be reviewed to assure that the RASS score was appropriately monitored, and that sedation was managed at a light, not a deep level).

Section 5: Dissemination Plan

Introduction

The influence of EBP has echoed across nursing practice. The need for evidence-based QI and healthcare transformation underscores the need for redesigning care that is safe. By investigating the relevance and impact of EBP for nursing practice, strategies can be set in motion for how to disseminate the information gathered and lend to new knowledge, which must then be transformed into clinical practice for achievement of improved patient outcomes. Sedation management in mechanically ventilated patients in the ICU is challenging, and there is a growing body of knowledge about sedation management being inconsistently applied in clinical practice, leading to suboptimal sedation, increased ventilator days, increased ICU and hospital LOS, and increased medical costs. The purpose of this DNP QI project was to improve the care of critically ill, mechanically ventilated patients with the proper use of the RASS sedation tool in achieving target sedation goals and improving staff nurses' knowledge of and attitudes toward sedation management according to best practices. The findings of this DNP project were intended to inform nursing leaders and support the recommendation of continued education among nursing staff and the adoption of the SCCM's guidelines for optimal sedation management in the ICU. The synthesis of the project results can be disseminated to the practice site leadership through this QI project.

The nursing staff at the project site constitute the principal audience for this QI project's dissemination. In support of this project, the involved stakeholders include the director of critical care nursing, the CVICU unit manager, and the infectious disease

nurse. A final PowerPoint presentation was conducted at an innovative staff nurse meeting to disseminate the QI project's findings and recommendations. This project's findings may foster and promote other changes in nursing practice for the CVICU. The plan is to seek prospects in a poster presentation and submit an abstract to several nursing journals of interest.

Analysis of Self

In 2018, the opportunity to achieve self-improvement and to grow professionally at the post-master's level paved the path for me to start the DNP program journey, which offers the potential to improve nursing practice through shared knowledge of EBP. The cornerstone to problem solving is EBP, and as ideas regarding my DNP project unraveled, I examined current issues of concern in the CVICU. The identification of current clinical practice problems at the practice site revealed that EBP was not embedded in every nurse's practice. Embarking on this DNP journey allowed me to gain greater appreciation for and knowledge of the importance of EBP commencing with the didactic course and practicum experiences. The doctoral program journey has enhanced both my personal and my professional growth immensely.

As an advanced practice provider and a professional nurse leader, I had a goal in my DNP program journey to address and decrease variations in nursing practice through a QI project for optimal sedation management in the CVICU according to best practices. Resistance to change was a challenging barrier that was foreseen, in that adoption of EBP has many benefits and barriers. Successful evidence-based clinical practice change involves organizational and individual commitment. Both my leadership and my

practicum experiences led me to develop strategies for addressing barriers to change and providing opportunities for the successful implementation of EBP in clinical practice.

Summary

Sedation management is an integral component of critical care practice and is challenging in mechanically ventilated patients, in that it carries significant risks for patients. The outcomes of decreased ventilator days, morbidity, and hospital LOS are based on how well sedation is managed in mechanically ventilated patients. Thus, it is imperative to evaluate the impact of nurses' knowledge and attitudes concerning sedation management and provide them with the tools and education they need to facilitate adoption of best practices that may help them, in collaboration with the medical team, to efficiently manage sedation in the ICU. The project site was provided the recommendations of the QI project findings; thus, the potential implementation of the project rests with the project site.

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Appendix A: Chart Audit Tool

Reviewer (Day/Night Shift RN):   Date:

Age: Gender: M/F

Date of Admission:

MD order to keep patient outside of RASS goal: Yes/No

Date Mechanically Intubated:

Number of days mechanically ventilated:

Days on Ventilator

Vent Day	RASS Score	Follow-up interventions for RASS below or above goal
1 D		
1 N		
2 D		
2 N		
3 D		
3 N		
1D		
1N		
2D		
2N		
3D		
3N		
	RASS according to protocol?	Yes/No

VAP diagnosis: Yes/No

Appendix B: RASS Curriculum and Tool

Learning Outcome(s): Ultimately, reduce the number of ventilated patients who are not managed according to current CVICU protocol.

Nursing professional development goal: Apply RASS evaluation to ventilated patients according to CVICU protocol, an evidence-based practice.
Patient outcome goal: Reduce CVICU LOS
Organizational Outcome: Reduce the incidence of hospital acquired VAP.

Topical Content Outline	Time frame	References	Teaching method/learner engagement and Evaluation method
Pretest	10"		Online slides with 10 pretest questions.
Introduction to Sedation Management and the RASS Tool	5"	Rowe & Fletcher (2008). Sedation in the intensive care unit. Woien et al. (2012). Improving the systematic approach to pain and sedation in the ICU by using assessment tools	Online PowerPoint
How to use the RASS Tool	15"	MDCalc. (2019). Richmond Agitation-Sedation Scale (RASS)	Online powerpoint
Anticipated Barriers and Obstacles	10"	Rose & Bucknail (2004). Staff perception on the use of sedation in the intensive care setting	Online Powerpoint

Case studies	10"		Online Powerpoint Case Studies
Summary and Posttest	10"		Online slides with 10 posttest questions.

The RASS

Score	Term	Description
+4	Combative	Overtly combative, violent, immediate danger to self
+3	Very agitate	Pulls or remove tube(s) or catheter(s); aggressive
+2	Agitated	Frequent non-purposeful movement, fights ventilator
+1	Restless	Anxious but movements not aggressive vigorous
0	Alert and Calm	
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice ($\geq$ 10 seconds)
-2	Light sedation	Briefly awakens with eye contact to voice ($\leq$ 10 seconds)
=3	Moderate sedation	Movement or eye opening to voice (but no eye contact)
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Procedure for RASS

Observe patient

Patient is alert, restless, or agitated   (score 0 to +4)

If not alert, state patient's name and say to open eyes and look at speaker

Patient awakens with sustained eye opening and eye contact   (score -1)

Patient awakens with eye opening and eye contact, but not sustained   (score -2)

Patient has any movement in response to voice but no eye contact   (score -3)

When no response to verbal stimulation, physically stimulate patient by shaking

shoulder and or rubbing sternum

Patient has any movement to physical stimulation   (score -4)

Patient has no response to stimulation   (score -5)

RASS Score Interpretation

RASS scores above 0 indicates a patient is not sedated enough and should be monitored for display of pain, anxiety, and other symptoms

RASS scores between -2 to 0 indicates a properly sedated patient who can be cooperative

RASS scores below -2 indicates a patient who is sedated too much and for which sedation medication should be decreases

RASS Score

Score	Description	
+4	Combative	Violent, immediate danger to self
+3	Very Agitated	Pulls at or removes tubes, aggressive
+2	Agitated	Frequent non-purposeful movements, fights ventilator
+1	Restless	Anxious, apprehensive but movements not aggressive or vigorous
0	Alert & Calm	
-1	Drowsy	Not fully alert, sustained awakening to voice (eye opening & contact >10 sec)
-2	Light Sedation	Briefly awakens to voice (eye opening & contact <10 sec)
-3	Moderate Sedation	Movement or eye-opening to voice (no eye contact)
-4	Deep Sedation	No response to voice, but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Appendix C: Questionnaire on Knowledge & Attitudes

Directions: Circle the best answer

Is there a sedation protocol available in your unit?
  Yes
  No
  I don't know
Is the sedation protocol being constantly used?
  Never
  Rarely
  Mostly
What kind of sedation protocol is being used in your ICU?
  Patient-targeted sedation protocol
  Daily interruption of sedation infusions
  A combination of both
Which of the instrument listed below do you use to assess the adequacy of sedation?
  Critical Care Pain Observation Tool (CPOT)
  Riker Sedation Agitation Score (SAS)
  Richmond Agitation Sedation Scale (RASS)
How frequently do you assess the adequacy of sedation during a shift?
  Every 2 hours
  Every 4 hours
  Every 12 hours
How often is daily interruption of sedatives performed in your unit?
  Every 4 hours
  Every 12 hours
  Every 24 hours
What are the main reasons for performing daily interruption of sedatives in the ICU?
  Shortening the duration of mechanical ventilation
  Neurology evaluation
  Facilitation of muscle's spontaneous movement
What are the 3 most important barriers to you for performing daily interruption in sedation?
  Not comfortable for the patient
  Greater possibility of agitation
  Possibility of self extubation
  Too high workload
  Insufficient knowledge
  Difficult patient care
What is the optimal sedation level with the use of the RASS tool?
  -3 to -5
  -2 to 0
  +2 to +4

If sedation is being withdrawn, are there any additional analgesic agents administered?
        Never
        Rarely
        Mostly