VAP PREVENTION KNOWLEDGE IN THE EMERGENCY DEPARTMENT

by

Nicole Maria Jones

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As members of the DNP Project Committee, we certify that we have read the DNP Project prepared by Nicole Maria Jones entitled VAP Prevention Knowledge in the Emergency Department and recommend that it be accepted as fulfilling the DNP Project requirement for the Degree of Doctor of Nursing Practice.

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STATEMENT BY AUTHOR

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ABSTRACT

Introduction: Ventilator associated pneumonia (VAP) is a prevalent hospital acquired infection that patients have a risk of developing after being intubated. The mortality rate of intubated patients is estimated between 30-50 percent. Furthermore, it is estimated that VAP occurs in 10-30 percent of all intubated patients. Numerous studies have linked VAP protocols and evidence based guidelines initiated in the intensive care unit (ICU) to a decrease in the prevalence of VAP. However, limited research exists on VAP prevention protocols implemented in the emergency department (ED). Early implementation of VAP bundles and protocols are linked to a decrease in the prevalence of VAP.

Purpose: Evaluate the knowledge of interdisciplinary staff members on VAP, and the VAP prevention protocol in the emergency department.

Setting: The setting of the DNP project is a 61-bed level one trauma emergency department at a Banner University Medical Center, serving approximately 77,000 patients a year.

Results The average score VAP survey was a 71.6%, with majority of the respondents unable to identify the correct patient diagnosed with VAP. The major barriers identified by the survey included lack of education, availability of the necessary supplies, proper orders to be imputed by providers, patient availability, lack of time and/or supplies, and RN ratios.

Discussion: The results of the survey show majority of the registered nurses are not familiar with the protocol, but suggest they do implement the protocol on those patients who are intubated in the ED. Thus, there are still gaps in the full implementation of the VAP protocol and there is a need further improvement in the care of patients who are intubated in the ED.

INTRODUCTION

Background

Ventilator associated pneumonia (VAP) is a prevalent hospital acquired infection that patients have a risk of developing after being intubated (CDC, 2015; Denno, 2014; O'Grady, Murray, and Ames, 2012). Intubated patients are at a higher risk of developing pneumonia due to the alteration in the normal physiological and pathophysiological responses aimed at protecting the lungs and airways. The mortality rate of intubated patients is estimated between 30-50 percent and the development of VAP has a domino effect on poor patient outcomes, increasing healthcare costs, and increasing hospital length of stays (Grap, Munro, Unoki, Hamilton, & Ward, 2010). It is estimated that VAP occurs in 10-30 percent of all intubated patients (Rosenberger, Hranjec, McLeod, Politano, Guidry, Davies, et al., 2013). Numerous studies have linked VAP prevention protocols and evidence based guidelines initiated in the intensive care unit (ICU) to a decrease in the prevalence of VAP (CDC, 2015). However, limited research exists on VAP prevention protocols implemented in the emergency department (ED) (McCoy, Fields, Kent, 2012; DeLuca, Walsch, Davidson, Stoneking, Yang., et al, 2017).

The healthcare industry continues to grow and evolve and emergency departments are seeing more patients and are managing patients longer than before (CDC, 2015). The Institute of Medicine reports an increase in ED visits by 26 percent between 1993 and 2003. In addition, patient stays in the ED are prolonged due to a decrease in the number of available inpatient hospital beds; leaving the emergency departments crowded with admitted patients staying in the ED for 48 hours or longer (Denno, 2014). Evidence suggests that early implementation of VAP prevention protocols in the ED decreases a patient's risk of developing VAP (McCoy, Fields, &

Kent, 2012;, Walsch, Davidson, Stoneking, Yang., et al., 2017). Thus, implementing VAP Prevention protocol(s) in the ED is important for improving patient outcomes, decreasing healthcare costs, and decreasing hospital length of stays (Grap, Munro, Unoki, Hamilton, & Ward, 2012; and Koenig & Truwit, 2006; O'Grady, Murray, Ames, 2012). Many prevention guidelines are now available for VAP prevention and have shown to reduce VAP rates by 50 percent or more (Decelle, Thys, Zech, and Verchuren, 2013). VAP prevention protocols have been associated with a decrease in patient mortality when the entire protocol is implemented. There are several steps in VAP prevention that involves a multidisciplinary team approach from providers, nurses, and other healthcare professionals (Grap, Munro, Unoki, Hamilton, & Ward, 2012).

In 2012, a feasibility study, at Banner University Medical Center Emergency Department, showed a positive correlation with VAP knowledge transfer in the Emergency Department (DeLuca, Walsch, Davidson, Stoneking, Yang., et al, 2017). After completion of the study, knowledge improvement was demonstrated on VAP knowledge. However, implementation of the new VAP prevention protocol in the emergency department was only supported through a PowerPoint presentation and real time feedback given to all interdisciplinary staff members in the ED by Clinical Nurse Specialists (CNS). ED staff members were evaluated using pre and posttest surveys on VAP knowledge for the emergency department. Two common themes were drawn from the survey including the lack of time necessary to fully implement the protocol as well as the setting not being an intensive care unit (DeLuca, Walsch, Davidson, Stoneking, Yang., et al, 2017). Furthermore, emergency medical staff have indicated they are not

comfortable implementing the VAP prevention protocol in the ED. Therefore, ED staff RN's are now shadowing ICU RN's to become "more comfortable" caring for ventilated patients.

The study conducted by DeLuca, Walsch, Davidson, Stoneking, Yang., et al. (2017) demonstrated a reduction in VAP rates by almost 50 percent. A further reduction in VAP rates is essential to help improve patient outcomes, decrease health care costs, and improve patient care. Implementation of VAP prevention protocols involves the process of change, which is currently in the process for interdisciplinary staff members in the ED who are caring for intubated patients. The process of change is difficult, especially when common routines are changed (Grol, Bosch, Hulscher, Eccles, and Wensing, 2007). The ED at Banner University Medical Center is currently in the process of change in the management for ventilated patients.

Although implementation of a VAP prevention protocol in the ED showed a significant reduction in VAP rates, gaps still exist between the integration of the VAP prevention protocol, acceptance by interdisciplinary staff members, and diffusion of the new practice into the ED. A needs assessment helps to identify other possible barriers to implementation of the VAP prevention protocol; and hopefully further reduce VAP rates. The needs assessment will focus on VAP knowledge and the perceived barriers of the VAP prevention protocol implementation. An education plan will be developed to support the greatest needs identified by the survey respondents.

Purpose

The purpose of this project was to evaluate the knowledge of interdisciplinary staff members on VAP, and the VAP prevention protocol in the emergency department. Interdisciplinary staff members were defined as patient care technicians (PCT's), medics,

respiratory therapists (RT's), registered nurses (RN's), and providers in the emergency department. In addition, this project will focus on staff member's beliefs and perceptions of compliance with the VAP prevention protocol that was recently implemented in the ED at Banner University Medical Center.

DNP Project Question

What is the knowledge level and perceptions of interdisciplinary staff members in the ED on VAP and the VAP prevention protocol in the emergency department?

Aims

- Aim 1 Assess ED staff members on their knowledge of VAP.
- Aim 2 Assess ED staff members on their knowledge of VAP prevention protocol.
- Aim 3 Evaluate ED staff members on their beliefs and perceptions of implementing VAP prevention protocol in the ED.
- Aim 4 Evaluate perceived barriers to full implementation of VAP prevention protocol in the ED.
- Aim 5 Develop an educational plan to help improve VAP knowledge and compliance to the VAP prevention protocol.

Theoretical Framework

The Diffusion of Innovation (DOI) Theory by Everett Rogers was the framework for this DNP project. Everett Rodgers developed a social science theory known as the Diffusion of Innovation theory in 1962. This theory emphasizes how over a time, an idea or product gains momentum and diffuses, or spreads, through a specific population or social system. The end result of the diffusion is that people, as part of the social system, adopt a new idea, behavior, or

product. Before successful implementation of any new practice, the DOI theory emphasizes that the person(s) must perceive the idea as new or innovative, and the process of diffusion will help support the new practice.

Diffusion involves a three-stage process including: the presentation of the new culture element to the society, acceptance by the society, and the integration of the accepted elements into the pre-existing culture (Dearing, 2009). A further reduction in VAP rates at Banner University Medical Center ED may be seen if these gaps are addressed using the DOI theory. In this project, evaluating what barriers exist for the full VAP prevention protocol implementation is the first step in helping support the staff members during their process of change. Principles of the DOI theory, along with literature reviews, were utilized as a framework to improve compliance and overcome identified barriers of the VAP prevention protocol in the emergency department.

According to Everett Rogers, adopting a new practice, or change, is difficult. Rogers mapped out the process of change, which involves five categories of *adopters*. These adoption categories defined in the DOI theory are essential to supporting the change process. The categories of adopters, identified by Everett Rogers, are referenced in appendix C. Rogers defines the five categories of adopters as: the innovators, early adopters, early majority, late majority, and laggards. Innovators make up 2.5 percent of the adopters and require the shortest adoption period of all the categories. The innovators, also known to be risk takers, are motivated by the changing element, and are usually the peer educators. The early adopters make up 13.5 percent of the population and serve as the opinion leaders and role models in the process of change. The early majority consists of 34 percent of the population and are the ones who interact

frequently with peers and serve as opinion leaders. As time passes, the early majority become more comfortable in the process of change. The late majority also makes up approximately 34 percent of the population and usually responds to peer pressure. They are motivated to keep up with competitors and are easily influenced by the laggards. Lastly, the laggards consist of 16 percent of the adopters and are the most reluctant to change. Capturing all five categories in the process of change is paramount in helping achieve the change in management for ventilated patients in the ED.

Within the DOI theory, the goal is not to move people within the five categories, but rather streamline all categories to support the new innovation (Kaminski, 2011). Thus, an education plan was developed to meet the needs of all five categories defined in this theory to help further reduce VAP rates for those patients who are intubated in the ED. The Diffusion of Innovation Theory is a valuable framework for guiding the process of change. This theory helped provide a backbone in planning and evaluating change among interdisciplinary staff members in the emergency department at Banner University Medical Center- Emergency Department.

Synthesis of Evidence

Specific articles relevant to VAP prevention were retrieved from PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. Search strategy terms included: “ventilator associated pneumonia AND emergency department (ED); ventilator associated pneumonia AND function; ventilator associated pneumonia AND intensive care unit”; VAP AND emergency department”; “ventilator associated pneumonia AND bundle (“protocol”) and “ventilator associated pneumonia.” Results were further refined to include publication dates within the past 10 years and to include adults aged 18 years or older. A total of 18 articles were

selected for synthesis and deemed relevant to this study. Inclusion criteria for the selected articles included: VAP bundle/protocol implementation in either the ICU or ED, knowledge and prevalence of VAP in the emergency departments, and associated articles closely related to the purpose of this study.

When patients are intubated, an endotracheal tube, or naso-tracheal tube, is inserted into the lungs, displacing the epiglottis (McCoy, Fields, & Kent, 2012). This creates a path to allow micro-aspiration of bacteria into the lungs, which increases a patient's risk for developing pneumonia, known as ventilator-associated pneumonia (CDC, 2015). Coughing is an important reflex to help clear the airways of inhaled material, excessive secretions, or abnormal substances, such as secretions or pus, which can lead to the development of pneumonia (McCance, Huether, Brashes, & Rote, 2010). In addition to coughing, a physiological component aimed at protecting the airway is the epiglottis. The epiglottis is a flexible flap at the superior end of the larynx, which allows air to pass into the lungs and food to pass into the esophagus.

VAP is a common and prevalent hospital acquired infection that increases patient morbidity, mortality, increases patient care costs, and prolongs hospital length of stay (Rosenberger, Hranjec, McLeod, Politano, Guidry, Davies, et al., 2013). In 2004, the Institute for Healthcare Improvement introduced bundled care as a structured protocol for preventing the development of pneumonia in mechanically ventilated patients (Hsin-Lan, Chih-Cheng, & Li-Yu, 2014). Currently, the National Clearinghouse VAP bundle recommendations (2011) include:

- Elevating the head of the bed 30-45 degrees if medically able to
- Maintaining a cuff pressure in the endotracheal tube between 20-25mmHg

- Circuit changes between patients and when visibly soiled
- Use of heated humidifiers and heat and moisture exchangers
    - Change heat and moisture exchangers every 48 hours or when they become visibly soiled or mechanically malfunction.
- Provide oral care with chlorhexidine and water-soluble mouth moisturizer at least 4 times per day.
- Continuous or intermittent aspiration of subglottic secretions
- Closed in line suctioning
- Evaluation for kinetic bed therapy
- Sedation reduction
    - Including regular testing of patient's ability to sustain adequate ventilation, oxygenation, and breathing comfort (spontaneous breathing trials).
- Daily, or more frequent, assessments of weaning readiness with brief weaning trails.
- Stress ulcer disease prophylaxis
- Deep vein thrombosis prophylaxis

Overall, the early implementation of VAP prevention bundles helps decrease a patient's risk of developing ventilator-associated pneumonia after being intubated. The guidelines put forth by the Centers for Disease and Control (CDC) for the prevention of ventilator-associated pneumonia are not uniformly or consistently implemented in hospitals (Cason, Tyner, Broome, 2007). Often times, implementation of VAP prevention bundles are delayed until patients are

admitted to the intensive care unit where research suggests the need for further education, knowledge, and adherence to improve overall VAP rates (Blot, Labeau, Vandijck, Van Aken, and Claes, 2007; and McCoy, Fields, & Kent, 2012). VAP bundle implementation in the ICU is well studied and is linked to a decrease in the prevalence of VAP. However, research suggests that critical care RNs often lack the necessary knowledge of VAP prevention and there is a need for further education (Akın Korhan, Hakverdioğlu Yönt, Parlar Kılıç, & Uzelli, 2014; Blot, Labeau, Vandijck, Van Aken, and Claes, 2007; Hsin-Lan, Chih-Cheng, & Li-Yu, 2014; Jansson, Ala-Kokko, Ohtonen, MerilÃ¤inen, SyrjÃ¤lÃ¤, & KyngÃ¤s, 2014; and McCoy, Fields, & Kent, 2012).

Surveys evaluating compliance with VAP prevention bundles among intensive care nurses have been published; yet limited surveys on VAP prevention, compliance, or knowledge have been performed in the ED (Bhat, Goyal, Graf, Bhooshan, Teferra, et al., 2014; and Blot, Labeau, Vandijck, Van Aken, and Claes, 2007). Similar studies conducted by Blot, Labeau, Vandijck, Van Aken, and Claes (2007) and Labeau, Vandijck, Rellow, Adams, Weinshce, et al. (2008) evaluated ICU nurse competence on VAP bundles; and both showed a similar lack of knowledge and the need for further education to help prevent VAP. Although knowledge does not ensure adherence to VAP bundles, lack of knowledge may be a barrier to adherence to the full implementation of VAP bundles.

Lin, Lai, and Yang (2014) conducted a VAP prevention knowledge assessment questionnaire in southern Taiwan in five intensive care units, using a 12-point multiple-choice questionnaire, with only one correct answer. The questionnaire was distributed to 150 critical care nurses to assess their knowledge of VAP prevention based on local guidelines. A total of

133 questionnaires were collected in the study with a mean score of 65.6 percent. The study suggests that critical care nurses is southern Taiwan lack the necessary knowledge of VAP in the ICU and there is a need for additional training. Another study by Korhan, Yont, kilic, and Uzelli (2013) also evaluated critical nurses knowledge on VAP using a nine-point evidence based guideline questionnaire for VAP and found a similar lack of knowledge.

Limited studies were found on implementing VAP prevention bundles in the ED; however, those studies suggest that the implementation of VAP prevention bundles in the emergency department are linked to an improvement in preventing patient's development of VAP (Graf, Bhooshan, Teferra, & Frohna, 2014; Bhat, Goyal, Grap, Munro, Unoki, Hamilton, & Ward, 2012; and McCoy, Fields, & Kent, 2012). Early implementation of healthcare delivery to patients is paramount in many diseases, including ventilated patients, in order to improve health outcomes for these patients (Grap, Murno, Unoki, Hamilton, & Ward, 2010).

A study conducted at a large urban tertiary-care, teaching hospital between 2009 and 2011 evaluated the implementation of post intubation care for patients in the ED. These interventions performed in the ED included: a chest x-ray, placement of an oral gastric tube, implementation of adequate sedation within 30 minutes of patients being intubated, obtaining an arterial blood gas, having appropriate tidal volume (6-10cc/kg) for the patients, and implementation of EtCO2 monitoring. In this retrospective cohort study, 169 patients were included in the study and statistical evidence showed that those patients who received fewer than the 3 defined intervention had a significantly higher mortality rate when compared to the those patients who received five of the defined interventions (Bhat, Goyal, Graf, Bhooshan, Teferra, Dubin, and Frohna, 2014). This stresses the importance of VAP bundle implementation in the

emergency department. The impact of instituting early post-intubation interventions on patients in the emergency department is not well studied (McCoy, Fields, Kent, 2012).

A study conducted by Grap, Munro, Unoki, Hamilton, and Ward (2012) found that "providing the right care [to high risk patient, including those intubated] at the right time can significantly reduce mortality." In addition, due to increasing length of stays in the emergency departments, the implementation of interventions to reduce VAP should begin in the ED when patients are intubated. Grap, Munro, Unoki, Hamilton, and Ward (2012) noted that increased prevalence of VAP related to intubation in the ED may be linked to the les than ideal environment in which intubation takes place and the fact that fewer VAP related precautions are taken in the ED versus the ICU setting.

Bhat, Goyal, Graf, Bhooshan, Teferra, et al. (2014) conducted a study evaluating the impact of post-intubation interventions on mortality in patients in the ED. This study evaluated the outcomes of mortality, VAP, ventilator days, and ICU length of stays. Their post intubation bundle included arterial blood gas sampling, obtaining chest x ray, gastric decompression, early sedation, appropriate initial tidal volume, and quantitative capnography. The study found that the performance of a chest x-ray and early sedation as well as performing five or more of the interventions listed above was linked to a decrease in patient mortality for those who were intubated in the ED (Bhat, Goyal, Bhooshan, Teferra, et al., 2014).

Munro and Ruggiero (2014) reviewed the current evidence on VAP. This study found that the evidence available for VAP bundle implementation is weak. According to Munro and Ruggiero (2014), there is varying levels of evidence, and the numerous definitions for VAP including VAP definition for those who are monitored and the definition of VAP used for

clinical diagnosis. As stated before, VAP increases a patient's risk of mortality and morbidity (Munro and Ruggiero, 2014; Klompas and Kalil, 2014; O'Grady, Murray, and Ames, 2012). Thus, clearly defining and diagnosing of VAP is essential to help improve patient outcomes and overall decreasing healthcare costs. According to Klompas and Kalil (2014) intensivists are less than 50 percent confident about more than 30 percent of the patients they diagnose with VAP. The definition of VAP is not clearly defined and the diagnosis of VAP is often associated with indirect evidence, such as radiographic evidence, with may be further compounded by subjective information (Klompas, and Kalil, 2014). Thus, a standardization definition and diagnosis criteria is paramount for VAP and VAP prevention.

Decelle, Thys, Zech, and Verchuren (2013) evaluated the prevalence and the risk factors of VAP for patient who are intubated either in the ED or out-of-hospital setting. This retrospective descriptive study evaluated all intubated patients who were admitted to the ICU over a one-year period. A total of 75 intubated patients were evaluated in the study, and of the 75 evaluated for the study, 15 of those patients developed VAP. Furthermore, of the 15 patients who developed VAP, there was a 17 percent mortality rate among those patients who were intubated. Thus, based on the mortality rate and prevalence of VAP found in this study, Decelle, Thys, Zech, and Verchuren (2013) recommend implementation of preventive strategies in the ED, which have been proven to be effective in the ICU settings. This study emphasized the importance on ED staff member's role in VAP prevention and the need for further research to evaluate effective preventive strategies on VAP (Decelle, Thys, Zech, and Verchuren, 2013).

The limitations among research obtained in the literature review include a lack of generalizability, lack of specificity in relation to guidelines and protocols among evaluation of hospitals on VAP prevention bundles, and small sample sizes.

The literature overall supports a need for education on VAP prevention among nurses in both the critical care setting and the emergency department setting (Subramanian, Choy, Gobal, Mansor, & Hong, 2013; and Tolentino-DelosReyes, Ruppert, and Shiao, 2007). Numerous studies in the ICU have been linked to a decrease in the prevalence of VAP. However, these articles also suggest that ICU nurses often lack the necessary knowledge in VAP prevention. In the emergency department, there is limited research on implementing VAP prevention protocols; however, these studies also have a positive correlation with a decrease in VAP prevalence. Thus, based on my clinical experience, assessment, and literature review my project will focus on VAP knowledge and the VAP prevention protocol in the ED for those interdisciplinary staff members associated with direct patient care.

METHODS

Design

This doctor of nursing practice (DNP) project consisted of a needs assessment to evaluate the knowledge and perceptions of interdisciplinary staff members on ventilator associated pneumonia, the VAP prevention protocol and its use in the emergency department. This DNP project included a survey consisting of demographic questions, quantitative questions relevant to VAP and the VAP prevention protocol, and questions evaluating barriers to implementation of the VAP prevention protocol at Banner University Medical Center. The survey was designed to assess knowledge of VAP through twelve multiple-choice questions, with only one correct

answer, on VAP and the VAP prevention protocol at the institution. Demographic questions in the survey were utilized to identify the respondent's role in patient care, years of experience, type of experience (critical care versus emergency medicine), as well as first time exposure to the survey or not. Qualitative questions in the survey were used to help identify barriers to implementation of the VAP prevention bundle. Common themes were drawn from qualitative questions and an education plan was developed to help support the identified barriers and ultimately help further reduce VAP rates in the ED. Based on the protocol, referenced in Appendix B, the emergency department is currently equipped with the necessary supplies to implement the VAP prevention protocol.

Setting and Participants

The setting of the DNP project was a 61-bed level one trauma emergency department at Banner University Medical Center, serving approximately 77,000 patients a year. The 61 beds in the emergency department consists are 7 trauma beds, 17 pediatric beds, 5 fast track rooms with 8 chairs associated with fast track in the emergency department, and 24 general adult ED beds. Fast track rooms and chairs are often associated with lower acuity patients and are not often associated with intubated patients. Of the 24 general adult ED beds, 3 rooms are specifically designed hardened psychiatric beds. The ED is currently staffed with approximately 70 physicians, 68 residents, 140 RN's, 2 LPN's, 17 paramedics, 54 EMTs/PCTs, and approximately 51 RT's.

This emergency department is Southern Arizona's only Level 1 trauma center and is recognized with Magnet designation from the American Nurses Credentialing Center (Banner University Medical Center, 2014). The needs assessment focused on the 24 adult general ED

beds and interdisciplinary staff members associated with direct patient care including medics, patient care technicians (PCTs), RNs, respiratory therapist (RTs), and physicians (residents, fellows, and attending's).

Methods of Evaluation and Tools

This DNP project consisted of a brief introduction about VAP and VAP prevention in the ED, and recommendations to voluntary complete the survey during huddles prior to staff designation of assignments for RN's, PCTs, and medics. The same information was presented in conferences for residents, fellows, and other practitioners in the emergency department and they were given them the same opportunity as other interdisciplinary staff members to voluntary complete the survey. The survey was composed of 27 questions- 6 demographic questions, and 21 questions relevant to VAP and the VAP prevention protocol in the ED. The expected time to complete the survey was 15 minutes. Completed written surveys were kept in a secured locked box, with a combination lock that was only known to the author of this project. The survey selected for the knowledge base assessment questions on the VAP bundle in the ED was used in the prior VAP study by DeLuca, Walsch, Davidson, Stoneking, Yang., et al. (2017). This survey was utilized at Banner University Medical Center ED to assess knowledge transfer of VAP prevention in the ED. This survey showed an improvement in knowledge transfer on VAP bundles through a pre and post survey on interdisciplinary staff members in the ED. Permission was granted from Dr. DeLuca to utilize and adapt the survey used in the study by DeLuca, Walsch, Davidson, Stoneking, Yang., et al. (2017) to meet the purpose of this project. Adjustments were made to the survey to include demographic data, qualitative questions, and

quantitative questions that were specific to the VAP prevention protocol at Banner University Medical Center.

Interdisciplinary staff members were informed of their opportunity to voluntarily complete the survey independently, after a brief description of the study. Emails with the survey, available through SurveyMonkey®, were be sent out to interdisciplinary team members. The survey was available to all interdisciplinary staff members associated with direct patient care in the emergency department for a total of 25 days.

Analysis

Demographic questions in the survey were utilized to correlate knowledge with staff roles, years of experience, and type of experience. Responses to demographic questions were correlated with VAP knowledge and the VAP prevention protocol knowledge. Dichotomous data was collected through the 12 multiple-choice questions that have only one correct answer. Respondents were graded out of 12 possible points, and a percentage was given on the number of correct answers on the survey. Qualitative questions were assessed and themes were drawn to help identify barriers by interdisciplinary staff members to improve knowledge and compliance on the VAP prevention bundle in the ED. Findings from the survey were used to disseminate knowledge on VAP prevention and improve VAP prevention knowledge on the specific protocol at Banner University Medical Center. Data collected through the survey was translated into recommendations to improve VAP knowledge among emergency medicine staff and overall help to further decrease ventilator associated pneumonia in patients who are intubated in the emergency department.

Ethical Considerations

The participant's decision to participate in the survey was voluntary and their decision did not affect their future relationship with The University of Arizona or Banner University Medical Center. Candidates for survey were able to refuse to participate in the study or withdraw from the study at any time without any repercussions. Surveys included limited demographic data including role in patient care, years of experience in the field, and type of experience related to VAP. Participants had the opportunity to email the author with any questions or concerns that arose during the timeframe of the study. There were no foreseeable risks or discomforts to the subjects as a result of participation in the survey provided for this project. Data obtained through this study was used to guide future education on VAP knowledge to help reduce ventilator-associated pneumonia on patients who are intubated in the emergency department.

There were not any benefits to those who participated in the survey during the study. Participation in the survey was voluntary and every candidate had an equal opportunity to participate in study. There were no incentives to participate in the survey, and every candidate received the same survey. This study did not involve any participation of vulnerable populations.

Prior to the distribution of the survey, approval was obtained from the University of Arizona Institutional Review Board. Surveys completed on SurveyMonkey® were secured with a password that was only known by the author of this project. The data collected were stored on an external hard drive and was locked in a secure location to ensure that the data collected through the surveys were secured and protected.

RESULTS

The VAP survey (Appendix A) was open from December 19, 2016 until January 12, 2017. Weekly reminders, via work email, were sent out to all interdisciplinary staff members in the ED, approximately 600 staff members, to complete the VAP survey either via SurveyMonkey® or printed handouts, available in the "doc box", to all interdisciplinary staff members in the emergency department. The survey availability was extended beyond the original four-week time line in order to collect more survey responses. A total of twenty-six responses were collected through SurveyMonkey® and zero printed handouts were submitted. Completed surveys included twenty-five RN responses and one PCT response. One of the twenty-six surveys completed indicated that the survey had been taken prior; however, no survey responses appeared duplicated; thus, this one survey was included in the analysis of the data collected for ventilator associated pneumonia in the emergency department.

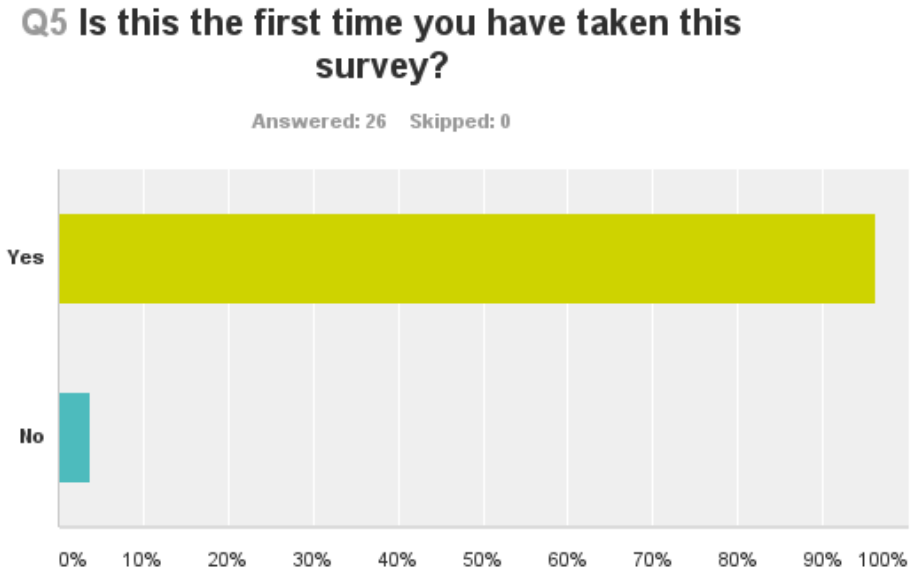


Figure 1: SurveyMonkey Demographic Question 5

A total of 96.15%, or 25 responses, of the survey's completed were completed by RN's and 3.85%, or 1 response, was completed by a patient care technician in the emergency department. Staff that had less than 1 year of experience in the emergency department completed 12% of the survey responses. A total of 32% of the survey's completed were from those who had 1-3 years of emergency department experience. Of the twenty-six surveys returned, seven of the surveys, or 28%, indicated they had 3-6 years experience. Lastly, another 7, or 26.9%, of the surveys indicated that they had more than 6 years experience in the emergency department. In regards to critical care experience, 23.07% of the survey respondents had no critical care experience, while 3.85% had less than 1 year of critical care experience, 30.77% had 1-3 years of critical care experience, and 42.31% had greater than 3 years of critical care experience. The range of the number of ventilated patients that respondent's cared for in a full work week ranged from 0-6, leaving an average of 3 ventilated patients cared for per week.

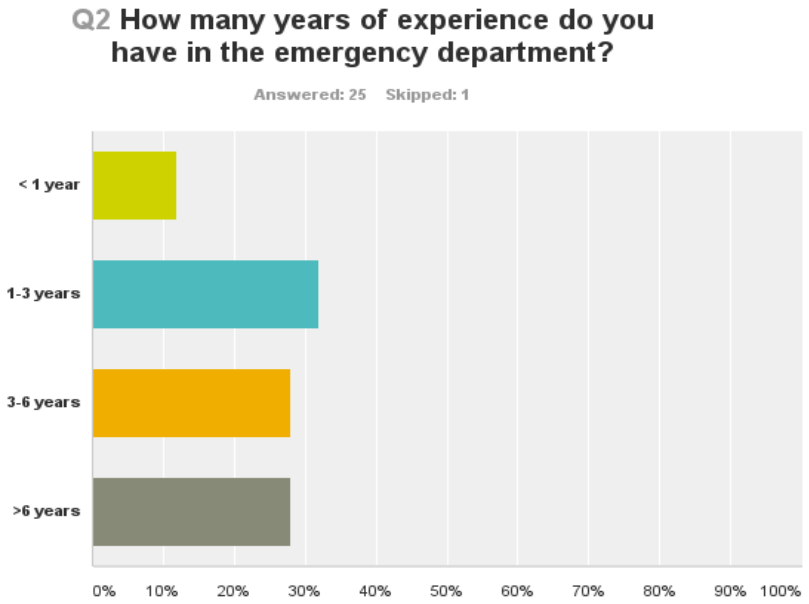


Figure 2: SurveyMonkey Demographic Question 2

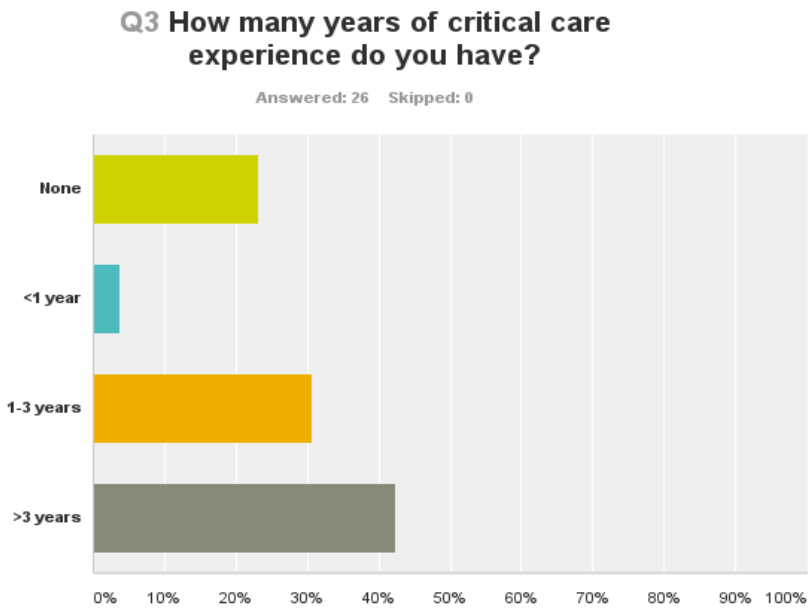


Figure 3: SurveyMoney Demographic Question 3

Majority, or 69%, of the respondents indicated they implemented the prevention protocol on majority of the ventilated patients in the ED, while five, or 19%, of the survey respondents indicated they rarely or never implement the protocol on patients who are intubated in the ED. One, or 0.03%, of the survey respondents did not answer the question. Nineteen of the twenty-six respondents, or 73%, indicated they were comfortable implementing the protocol in the emergency department for two reasons: it is easily implemented and other staff members are available to help implement the protocol. Four of the survey respondents, or 15.3%, indicated they were not comfortable implementing the protocol because they have not had much experience caring for ventilated patients, while one survey respondent indicated that it was the RN's job. Two of the survey respondents, or 7.7%, skipped the question, leaving the answer field blank. Similar responses were obtained regarding confidence in implementing the survey with fourteen, or 53.8%, of the responses indicating they were confident in implementing the protocol because of previous educational training, reminder cards on name badges, and/or the simplicity

of implementing the protocol. Four of the survey respondents, or 15.4%, indicated they are not confident in implementing the protocol due to the fact they have not had much experience caring for ventilated patients or because they were unfamiliar with the protocol. Eight of the twenty-six responses, 30.7%, indicated it was the same question as feeling comfortable with implementing the protocol in the ED. Two respondents, or 7.7%, skipped the question and thus no data could be analyzed.

The major barriers identified by the survey included lack of education, availability of the necessary supplies, proper orders to be input by providers, patient availability with multiple interventions necessary in their care that often times take priority over implementing the protocol, lack of time and/or supplies, and RN ratios with critically ill patients in the emergency department. Two respondents, or 7.7%, skipped the question. Survey respondents indicated that daily huddles, education, reminder cards for badges, additional training, checklists, readily availability of supplies, and team work will help further support the protocol in the ED. A total of three respondents, or 11.5%, skipped this question regarding what they think would help to further support the full implementation of the protocol.

Staff indicated that VAP bundle care was introduced via orientation to the ED, previous CNS' in the ED, and other staff members in the ED who were more familiar with the protocol. The training received by the survey respondents for VAP ranged from no training, to orientation upon hire and/or with preceptor, huddles prior to designation of staff assignments, and modules needed to be completed by staff yearly for competencies. Respondents also indicated that majority, if not all, of the supplies are readily available to ED staff members to implement the VAP prevention protocol. One survey respondent, or 3.8%, indicated that other staff members

are readily available to help implement the protocol. A total of three survey respondents, or 11.5%, skipped the question and one provided no constructive feedback. The common themes drawn from the survey for the biggest barriers of fully implementing the protocol-included lack of time, knowledge, experienced staff or staffing in general. Other barriers included the lack of, or availability of the necessary supplies to fully implement the VAP prevention protocol. One respondent, or 3.8%, indicated that there were no barriers to fully implement the protocol, while another respondent, or 3.8%, indicated they were not sure what the biggest barrier was to VAP bundle implementation was. A total of three survey respondents, or 11.5%, skipped this particular question.

Of the resources available to staff, the survey indicated that other staff members including RTs, medics, PCTs, and float RN's are available to help implement the protocol. One survey respondent, or 3.8%, indicated this was "n/a" to them, another survey respondent, or 3.8%, indicated that there was no resources available for VAP bundle implementation, and five, or 19.2%, survey respondents skipped this question.

On the quantitative survey, question number 18 on original survey or question number 24 on SurveyMonkey®, was eliminated because none of the multiple choice answers provided in the survey were correct. Therefore, the quantitative survey was graded out of 11 questions instead of the original 12 questions that were sent out to all interdisciplinary staff members in the ED. If any quantitative question was not answered, the response was deemed wrong. A total of three survey respondents skipped some quantitative questions on the survey, while the other twenty-three surveys returned had all quantitative questions answered. The average score on the quantitate questions was a 71.6% with the most common questions missed was identifying the

correct patient who could be diagnosed with VAP, the frequency of oral care, the proper stress ulcer/ulcer prophylaxis indicated for intubated patients, and when respiratory care should be called to change the ventilator circuits on intubated patients. There was no correlation between VAP score and years of clinical experience indicated by the survey respondents due to a relatively small sample size.

DISCUSSION

VAP is a common hospital acquired infection that could be reduced with early implementation of a VAP prevention protocol (CDC, 2015; Denno, 2014; O'Grady, Murray, and Ames, 2012). Based on the overall VAP survey results given at Banner UMC Emergency Department main campus, there are still gaps in the full implementation of the VAP prevention protocol including lack of knowledge on VAP and VAP prevention. The Emergency Department is currently in the process of change in the care for patients who are intubated in the ED. According to Everett Rogers, "innovations are not adopted by all individuals in a social system at the same time" (Dearing, 2009). The results of the survey show majority of the registered nurses are not familiar with the protocol, but suggest they do implement the protocol on those patients who are intubated in the ED. Thus, there are still gaps in the full implementation of the protocol and there is a need further improvement in the care of patients who are intubated in the ED. The DOI theory emphasizes, that in the end, that people as part of the social system, adopt a new idea, behavior, or product. Many of the RN's identified the correct pathological factors that contribute to the development of VAP. However, several had trouble identifying the correct patient who could be diagnosed with VAP, and thus further education is needed for RN staff members to fully understand VAP. The ED is still in the process of change since the

implementation of the VAP prevention protocol in 2012, and further education and support is paramount to help support the process of diffusion on VAP and the VAP prevention protocol in the Emergency Department.

The major barriers to the VAP prevention protocol in the ED, identified by the survey respondents, included lack of education, lack of readily available necessary supplies, the lack of the proper orders to be imputed by providers for VAP prevention, patient availability with multiple interventions necessary in their care that often times take priority over implementing the protocol, lack of time, and RN ratios with critically ill patients in the emergency department. Based on the common themes drawn from the barriers to the full implementation of the VAP prevention protocol at Banner UMC, further education is needed to all interdisciplinary staff members to help in VAP prevention and the full implementation of the protocol in the ED. Teamwork is necessary to help to fully implement the protocol among all interdisciplinary staff members, along with a standardized education plan on VAP and VAP prevention protocol in the emergency department. In addition, having the necessary supplies readily available to all staff members in one defined location will help with time management and efficiency of the VAP prevention protocol implementation.

Based on the categories within the DOI theory the innovators who are the first to except the process of change and the early adopters who are the role models for the process of change have begun to emerge in the ED for VAP prevention. The survey results show that majority of the RN's are among the early adopters and have began to accept the process of change and will evolve as the role models for VAP prevention in the ED. Now it is time to focus on the early majority, late majority, and the laggards. According to the DOI theory, the early majority will

start to be become more comfortable with the prevention protocol implementation as time passes. The late majority are said to respond to peer pressure and will change as the diffusion process continues to disperse in the ED. The laggards will be the last to accept the process of change for intubated patients in the ED. As the ED embraces the process of change, changing common practices among patients intubated in the ED, the laggards will be eventually follow and help to fully support the protocol implementation. To help support the process of change at Banner UMC ED it is time to help capture the early majority, late majority, and laggards to help further reduce VAP rates. Thus, a standardized education plan for all new oncoming emergency medicine staff and also experienced staff members is necessary in helping support the process of change in culture in the care for intubated patients in the emergency department.

The education plan was composed of a PowerPoint presentation on VAP and the VAP prevention protocol in the Emergency Department at Banner University Medical Center-main campus. A VAP PowerPoint presentation was created based on the survey results (Appendix F) to help support, a standardized education plan on VAP and VAP prevention for all interdisciplinary staff members defined in this study. The PowerPoint presentation should be used to help guide future education in the ED. Adjustments should be made to the PowerPoint, based on future identified needs in VAP prevention. Along with the PowerPoint presentation, a mock-up with all the necessary supplies, including a standard ED bed with the head of bed (HOB) elevated between 30 and 45 degrees will be set up to be visualized by all interdisciplinary team members in the VAP prevention protocol at Banner UMC-Tucson. In addition to required yearly competencies of all interdisciplinary staff members in the ED on VAP, the same

educational plan should be provided to all new hires in the emergency department who will be associated with direct patient care.

The recently implemented VAP survey at Banner UMC was completed by 96.15% of registered nurses, who are at the frontline of healthcare delivery to patients. According to Subramanian, Choy, Gobal, Mansor, and Hoong (2013) a nurse led education plan will help improve the knowledge and compliance for VAP. Thus, RN's in the ED at Banner University Medical Center should help drive the yearly VAP education and implementation plan to overall help improve VAP rates at Banner University Medical Center ED. Yearly competencies, evaluations, and a standardized orientation on VAP and the VAP prevention protocol in the ED will help ensure all interdisciplinary staff members are equipped with the necessary knowledge and skills in order to fully implement the VAP prevention protocol. The original VAP survey should be re-evaluated every year to re-assess interdisciplinary staff member's knowledge and perception on ventilator-associated pneumonia in the ED. Future education plans should be modified and made based on the survey results and the greatest needs identified by all interdisciplinary staff members. In addition, the definition of critical care experience should be clearly defined as only intensive care experience versus emergency medicine experience. The recent survey did not clearly define ICU experience versus emergency department experience.

VAP rates in the ED should be assessed monthly to evaluate the need for future education and/or training on all interdisciplinary staff members in the ED associated with direct patient care. As stated previously, the definition of ventilator-associated pneumonia varies greatly and the use of radiographic evidence for the diagnosis VAP via chest X-ray is unreliable due to various interpretations and varying radiographic techniques. Furthermore, reliance on specific

clinical symptoms for the diagnosis of VAP in unpredictable as reported data is subjective and may be poorly or inconsistently documented (CDC, 2017). The CDC (2017) recommends a standardized definition based on objective streamlined data to be utilized in the assessment of the effectiveness of prevention strategies.

According the CDC (2017) the three standardized definitions of VAP include: 1) Ventilator-Associated Condition; 2) Infection-related Ventilator-Associated Complication; 3) and Possible VAP. Utilizing these three standard definitions in patients who are intubated in the ED can be streamlined to help detect ventilator-associated complications, including ventilator associated pneumonia, via the existing electronic health record (EHR) system at Banner University Medical Center Emergency Department. The existing EHR system can be utilized to detect, and identify events that are clinically important and associated with outcomes such hospital length of stays and mortality rate among patients diagnosed with VAP. In the algorithm defined by the CDC (2017) the Numerator Data is used to collect and report each ventilator-associated event (VAE) that is identified during the month selected for surveillance. The VAE numerator data should include patient demographic information and the start date and location of the initiation of mechanical ventilation. The denominator data should include the number of mechanical ventilation days and number of hospital days. The number of ventilator days, or days intubated, should be collected daily at the same time, according to the chosen location, in this case the ED. These daily counts should be summed and reported in monthly totals to report VAP rates for those patients who are intubated in the ED.

The CDC (2017) recommends utilizing a valid and reliable surveillance to assess the effectiveness of prevention strategies. Thus, a utilizing a VAE algorithm can help streamline

detection on VAP among patients who intubated patients in the ED. This VAE algorithm is recommended purely for surveillance, it is not a clinical definition algorithm and is not intended for use in the clinical management of patients (CDC, 2017). This tool will be necessary in evaluating VAP rates among patients who are intubated in the ED, and help guide future education plans to further reduce VAP rates among patients who are intubated in the ED.

Implementation of a ventilator protocol and staff education has decreased both VAP incidence and length of stay in the unit (Parisi, Gerovasili, Dimopoulos, Kampisiouli, Goga, et al., 2016). Thus, VAP rate should be collected monthly utilizing the VAE algorithm, and VAP knowledge should be evaluated every 12 months via a VAP knowledge survey. Based on algorithm rates and the survey results, yearly competencies should reflect deficits in VAP knowledge and the VAP protocol to help to further reduce VAP rates in patients who are intubated in the ED.

Limitations of this study include limited demographic data with majority of the respondents only being RN's. A larger scale study is necessary for statistical significance in evaluation of VAP knowledge in the Emergency Department at Banner University Medical Center- main campus. A larger scale study should include all interdisciplinary team members involved in direct patient care to further assess knowledge barriers of VAP and the VAP prevention protocol at Banner University Medical Center.

CONCLUSION

The major barriers identified for the full implementation of the VAP protocol, via the VAP survey, included: lack of education, lack of readily available supplies, lack of proper orders to be input by providers, patient availability, lack of time, and RN ratios. Based on survey results, a

standardized education and training plan on VAP and the protocol for all interdisciplinary staff members is crucial in VAP prevention among all patients who are intubated in the Emergency Department. Teamwork among all interdisciplinary staff members is crucial in helping to fully implement the protocol; everyone including patient care technicians, registered nurses, respiratory therapists, and even providers are vital participants in helping prevent ventilator associated pneumonia in patients who are intubated the emergency department. Early implementation of VAP bundled care and protocols have been linked to a decrease in the prevalence of VAP and it is paramount that it be implemented as soon as a patient is intubated regardless of the location. All healthcare workers involved in direct patient care provide a necessary role in VAP knowledge and VAP prevention. Healthcare workers knowledge on VAP is necessary to improve compliance and help overcome identified barriers defined in the VAP survey at Banner University Medical Center.

APPENDIX A

VAP SURVEY

APPENDIX A

VAP SURVEY

Purpose: Evaluate the knowledge of interdisciplinary staff members on ventilator associated pneumonia (VAP) prevention bundles in an emergency department (ED).

Demographic Questions:

1. What is your current position at Banner University Medicine?
    a. Registered Nurse (RN)
    b. Resident
    c. Attending
    d. Medic
    e. Patient Care Technician (PCT)
    f. Respiratory Therapist (RT)

2. How many years of experience do you have in the emergency department?
    a. < 1 year
    b. 1-3 years
    c. 3-6 years
    d. >6 years

3. How many years of critical care experience do you have?
    a. None
    b. <1 year
    c. 1-3 years
    d. >3 years

4. Please enter the average number of ventilated patients you care for in a full weeks of work?
    a. _____

5. Is this the first time you have taken this survey?
    a. Yes
    b. No

6. How often do you implement the VAP prevention Protocol
    a. _____

APPENDIX A

VAP SURVEY

Qualitative Questions:

1. Do you feel *comfortable* with implementing the VAP prevention bundle in the ED? Why or why not?

2. Do you feel *confident* with implementing the VAP prevention bundle in the ED? Why or why not?

3. Please identify any barriers to the full implementation of VAP prevention protocols in the ED?

4. What do you feel would further support the implementation of VAP prevention bundles in the emergency department?

5. How did you learn about the VAP bundle in the emergency department at Banner University Medical Center?

6. What training did you receive in regards to the VAP bundle in the ED?

7. What supplies are readily available to you, to help you fully implement the VAP protocol in the ED?

8. What do you feel is the biggest barrier to fully implementing the VAP protocol in the ED?

9. What resources are available to assist you in the implementation of the VAP protcol for intubated patients?

Survey Questions:

10. Which of the following pathologic factors contribute to the development of VAP?
    a. Upper airway defenses bypassed by ET tube
    b. Mouth colonized with pathogenic bacteria
    c. Decreased level of consciousness and inability to protect airway
    d. All of the above
    e. None of the above

11. Which of the following patients could be diagnosed with VAP?
    a. Patient just intubated in ED for respiratory failure due to large bilateral pneumonia

APPENDIX A

VAP SURVEY

b. Patient intubated and developed new infiltrates on chest x-ray 48 hours after intubation
c. Patient who was intubated in ED, and one week after discharge from hospital returns with new pneumonia
d. All of the above

12. Recommendations for sedation include:
    a. Deeply sedated and paralyzed
    b. Deeply sedated (unaraousable) but not paralyzed
    c. Paralyzed but not sedated
    d. Minimize sedation while providing adequate analgesia

13. Daily spontaneous breathing trials
    a. Increase risk of aspiration from agitated patients
    b. Decrease number of ventilator days
    c. Have no significant effect on VAP
    d. All of the above

14. How often are sedation vacations recommended in ventilated patients
    a. Daily if medically stable
    b. 6 hours after intubation
    c. Every 48 hours
    d. Every 72 hours

15. How often is oral care recommended by the VAP prevention protocol at Banner University Medicine
    a. Periodic oral care
    b. Every 2 hours
    c. Every 4 hours
    d. Oral care is performed once the patient is transferred to the ICU

16. Stress ulcer / DVT prophylaxis
    a. Reduce incidence of VAP
    b. Increase incidence of VAP
    c. Likely have no direct effect on VAP
    d. None of the above

17. Antibiotics are recommended for all intubated patients to prevent VAP
    a. True

b. False

18. The most appropriate hand hygiene is:
    a. Using alcohol based hand scrub for 30 seconds
    b. Washing hands without soap in between patients
    c. Hand washing is not necessary between patients if you don't come in contact with secretions
    d. All of the above

19. Respiratory therapy should be called to change ventilator circuit
    a. Daily
    b. When fluid accumulated in circuit changes from clear to brown
    c. Between patients and as clinically indicated otherwise
    d. All the above

20. To decrease risk of VAP, Banner University Medicine protocols states:
    a. Raise the head of bed 15-25 degrees
    b. Raise the head of bed for 30-45 degrees
    c. Raise the head of the bed 30-45 degrees except trauma patients, who must all be kept flat
    d. None of the above

21. Who is responsible for VAP prevention at Banner University Medicine?
    a. RN's, RT's, and PCT's
    b. RN's, RT's, and Providers
    c. RN's, RT's, and medics
    d. All of the above
    e. None of the above

APPENDIX B

AIRWAY, ARTIFICIAL, MANAGEMENT PROTOCOL

APPENDIX B

AIRWAY, ARTIFICIAL, MANAGEMENT PROTOCOL
(Banner University Medical Center, 2014)

Purpose:

To outline the nursing management of patients with artificial airways.

Supportive data
Patients with artificial airways require specialized care in the maintenance of a patient artificial airway. Patients with artificial airways are at risk for aspiration and respiratory distress. Artificial airways must be managed by licensed personal.

Assessment

- Assess patient at least every shift for the following:
  - Correct airway placement/patency (via adequate air moving, unobstructed breathing).
  - Cuff status (down/partially or fully inflated) if applicable.
  - Respiratory status
  - Presence/amount/character of secretions
  - Wound status for excessive bleeding/healing if applicable.
  - Pain status
  - Color/skin condition
  - Psychological status
  - Difficulty breathing
  - Level of consciousness

- General Care
- Auscultate chest for breath sounds at least every 4 hours and PRN
- Suction as indicated
- Administer oxygen as ordered by physician/LIP
- Secure airway to prevent dislodgment as needed
- Monitor pulse, respirations and pulse oximetry as indicated by patient's condition
- Administer oral hygiene per Oral Care Protocol (PCS 1660.5) (q shift brush teeth, q2 hr swab).
- Apply water soluble jelly to lips to prevent mucosal drying and cracking if indication Safety
- For confusion, agitation, patient pulling at artificial airway NOT associated with hypoxia, measures to protect airway (i.e. reorientation, sedation, etc.) should be attempted first. Obtain physician/LIP order for restraints and follow restraint policy.
- Keep call light within patient's reach at all times
- Have functioning suction set up at bedside at all times.

APPENDIX B

AIRWAY, ARTIFICIAL, MANAGEMENT PROTOCOL

Suctioning

- Suction as frequently as patient's condition warrants; obtain physician/LIP order for in-line suction catheter if patient requires frequent suctioning.
- Hyperoxygenate with bag/high flow oxygen ventilator prior to suctioning and between attempts, as patient condition warrants.
- Suctioning pressure should not be greater than 120mmHg for adult patients.
- Limit suction passes to 10 seconds each.
- Avoid NS lavage, discuss with physician/LIP ways to mobilize secretions (hydration, P&PD).
- Auscultate lungs after each suction to evaluate effectiveness.
- Suction oral cavity (after suctioning artificial airway) prn to keep free of secretions
- Change suction canister and tubing every 72 hours if used (date, initial and label canister).

Psychosocial Support

- Provide explanations to patient/significant other prior to procedures
- Provide a communication board or flash cards as per patient preference.

Reportable Conditions

- Odorous drainage at trach site, and any elevation in temperature
- Changes in amount, color, or odor of secretions.
- Decreased breath sounds, increasing congestions
- Changes in mental status
- Airway dislodgement or plugging as evidenced by absent breath sounds, extreme agitation, and dramatic color changes

Special Considerations for Oral Airways

General Care

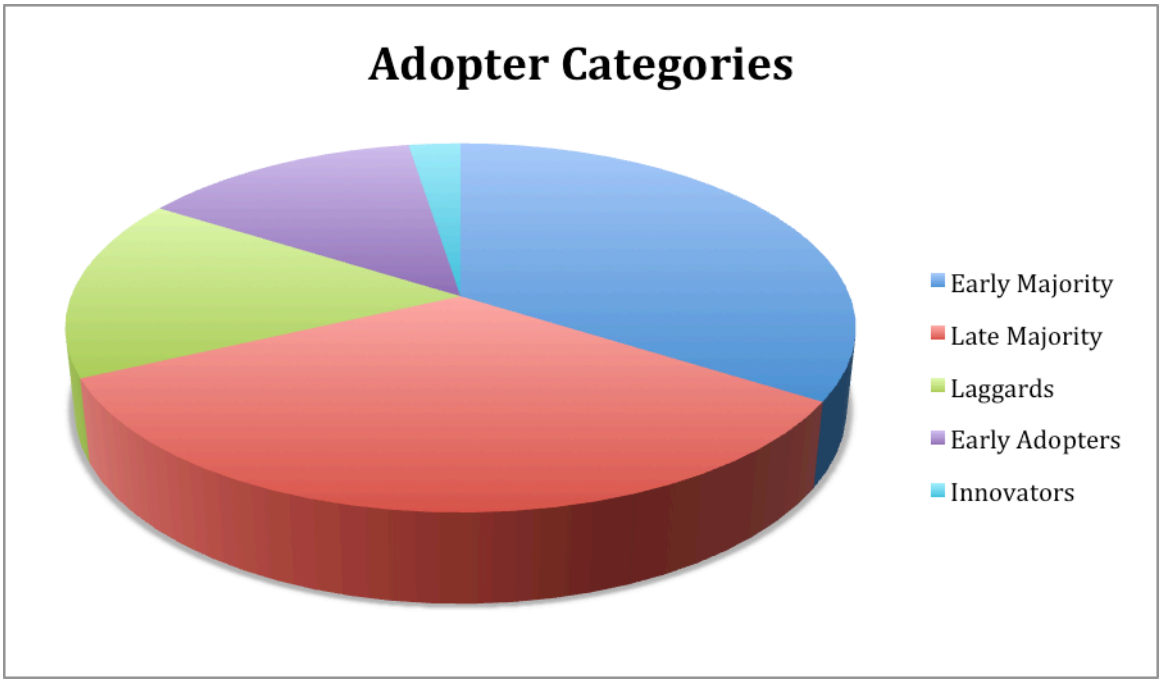
- Provide oral care q 2 H. and prn
- Ensure tongue is not between teeth and airway
- Position patient on their side to decrease possibility of aspiration, if condition allows, if patient is in supine and gagging or vomiting occurs, turn head to side and suction vomitus immediately
- Inspect skin at least q shift for breakdown. Reposition airway frequently if airway flange contacts lips.

APPENDIX C

EVERETT ROGERS DIFFUSION OF INNOVATION ADOPTER CATEGORIES

APPENDIX C

EVERETT ROGERS DIFFUSION OF INNOVATION ADOPTER CATEGORIES



APPENDIX D

INTRODUCTORY STATEMENT

APPENDIX D

INTRODUCTORY STATEMENT

My name is Nicole Jones and I am a Doctorate of Nursing Practice (DNP) student at the University of Arizona. This is my project as a DNP student aimed to help further reduce ventilator associated pneumonia (VAP) in the emergency department.

VAP is a prevalent hospital acquired infection that patients have a risk of developing after being intubated. Intubated patients are at a higher risk of developing pneumonia due to the alteration in the normal physiological and pathophysiological responses aimed at protecting the lungs and airways. The mortality rate of intubated patients is estimated between 30-50 percent. Furthermore, it is estimated that VAP occurs in 10-30 percent of all intubated patients. Numerous studies have linked VAP prevention protocols and evidence based guidelines initiated in the intensive care unit (ICU) to a decrease in the prevalence of VAP. However, limited research exists on VAP prevention protocols implemented in the emergency department (ED). Early implementation of VAP bundles and protocols are linked to a decrease in the prevalence of VAP. Therefore, implementing VAP bundles in the ED is becoming more important to improve patient outcomes, decrease healthcare costs, and decrease hospital length of stays. In 2012, a VAP prevention protocol was implemented in the ED after a feasibility study proved to reduce VAP rates in the ED by almost 50 percent. The purpose of this project is to evaluate the knowledge of interdisciplinary staff members on VAP, and the ventilator associated pneumonia prevention protocol in the emergency department to help further reduce VAP rates. VAP knowledge will be evaluated utilizing a survey to assess interdisciplinary members knowledge of VAP, and the VAP prevention protocol and its use in the ED.

APPENDIX E

DISCLOSURE FOR SURVEY

APPENDIX E

DISCLOSURE FOR SURVEY

The purpose of this study is to evaluate knowledge and perceptions of interdisciplinary staff members on ventilator associated pneumonia (VAP), the VAP protocol and its use in the emergency department (ED).

If you choose to take part in this Quality Improvement study, you will be asked to complete a survey composed of 27 questions: 6 limited demographic questions and 21 questions relevant to VAP and the VAP protocol in the ED. It will take approximately 15 minutes to complete this survey. There are no foreseeable risks associated with participating in this study and you will receive no immediate benefit from your participation. Survey responses will be utilized to guide future education on VAP and the VAP protocol in the ED at Banner University Medical Center-Tucson. Survey responses are anonymous.

If you choose to participate in the study, you may discontinue participation at any time without penalty. In addition, you may skip any question that you choose not to answer. By participating, you do not give up any personal legal rights you may have as a participant in this study. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the study team, you may contact the Human Subjects Protection Program at 520-626-6721 or online at http://rgw.arizona.edu/compliance/human-subjects-protection-program.

For questions, concerns, or complaints about the study, you may call Nicole Jones AGACNP-BC, RN, BSN via email at ngonzalez0589@email.arizona.edu or phone at 520-272-0817.

By taking this survey you agree to have your responses used for study purposes.

Survey is available through: https://www.surveymonkey.com/r/MFD9B5V.

APPENDIX F

VAP EDUCATION POWERPOINT

APPENDIX F

VAP EDUCATION POWERPOINT

Ventilator Associated Pneumonia (VAP)

Nicole Jones AG-ACNP, BSN, RN

ARIZONA COLLEGE OF NURSING

ENVISION. ENGAGE. INNOVATE

What is VAP?

- VAP is ventilator associated pneumonia, a type of pneumonia that occurs in patients who receive mechanical ventilation.
- VAP occurs in ventilated patients due to the fact that:
  - Upper airways defenses are bypassed by the ET tube
  - Mouth is colonized with pathogenic bacteria
  - There is a decreased level of consciousness and inability to protect airways

(CDC, 2015; Denno, 2014; O'Grady, Murray, and Ames, 2012)

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APPENDIX F

VAP EDUCATION POWERPOINT

VAP Diagnosis

- Ventilator associated pneumonia is diagnosed in patients who have developed new infiltrates on a chest x-ray 48 hours after being intubated
- NOT
  - in patients who are intubated for respiratory failure due to pneumonia
  - in patients who develop pneumonia after being discharged from the hospital, after being intubated.

(CDC, 2015; Denno, 2014; O'Grady, Murray, and Ames, 2012)

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Why is a VAP Bundle/Protocol?

- Numerous studies have linked VAP prevention protocols and evidence based guidelines initiated in the intensive care unit (ICU) to a decrease in the prevalence of VAP.
- Evidence suggests that early implementation of VAP prevention protocols in the ED decreases a patient's risk of developing VAP.
- Implementing the VAP Prevention protocol in the ED is important for improving patient outcomes, decreasing healthcare costs, and decreasing hospital length of stays.

(CDC, 2015; McCoy, Fields, & Kent, 2012; Grap, Munro, Unoki, Hamilton, & Ward, 2012; Koenig & Truwit, 2006; O'Grady, Murray, Ames, 2012)

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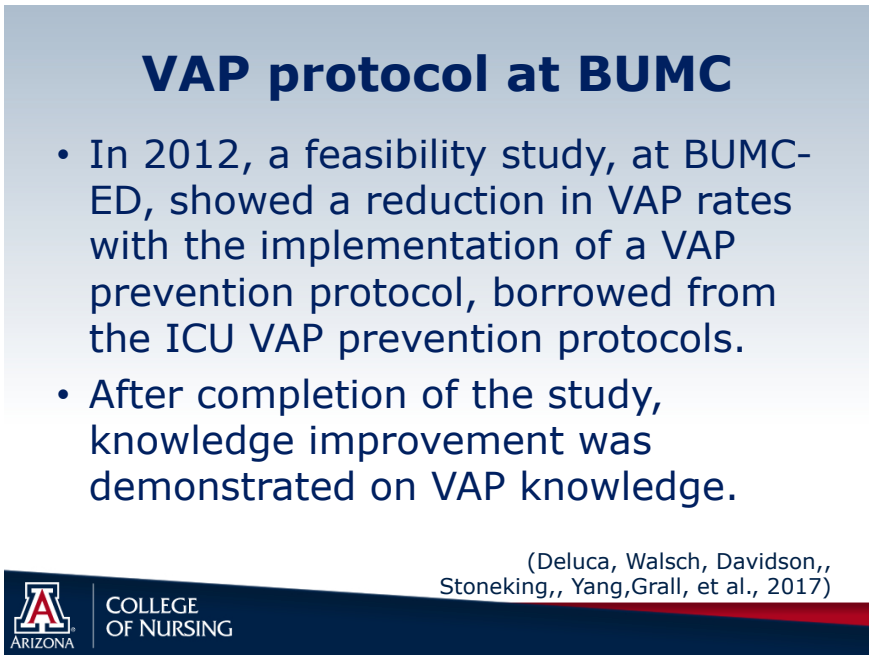
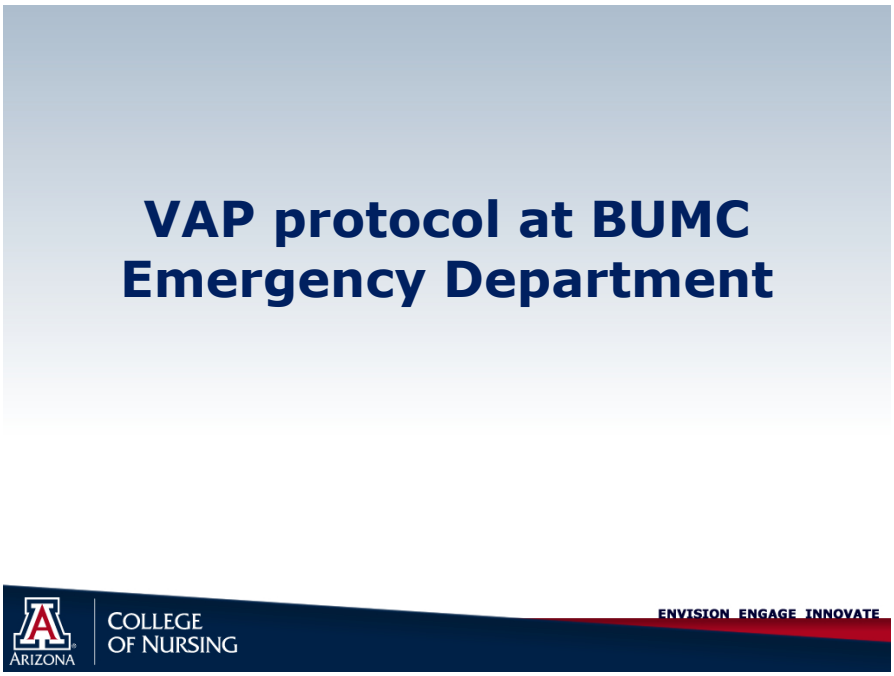
APPENDIX F

VAP EDUCATION POWERPOINT





APPENDIX F

VAP EDUCATION POWERPOINT

Sedation in ventilated patients

- Minimal sedation while providing adequate analgesia is necessary for patients who are intubated.
- It is NOT recommended:
  - Deeply sedate or paralyze intubated patient if not medically necessary
  - Paralyze any patient who is not sedated.

(Institute for Healthcare Improvement, 2015)

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Spontaneous Breathing Trials

- Daily spontaneous breathing trials (SBT) are recommended for all ventilated patients who are medically stable.
- Help decrease the number of ventilated days.

(CDC, 2015)

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APPENDIX F

VAP EDUCATION POWERPOINT

Antibiotics

- Antibiotics are not recommended for all intubated patients to help prevent VAP.
- Early implementations of VAP prevention bundles are superior in the prevention of VAP.

(Koenig & Truwit, 2006)

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Oral Care Frequency

- Oral care with cholorhexidine, is recommended 4 times per day with patients who are intubated.
- The VAP protocol at Banner UMC states oral care every 2 hours or PRN with oral care kits.

(CDC, 2015)

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APPENDIX F

VAP EDUCATION POWERPOINT

Stress Ulcer/DVT Prophylaxis

- Critically ill patients and who require mechanical ventilation are at a higher risk of developing a stress ulcer and gastrointestinal bleeding for different reasons.
- Stress ulcer/DVT prophylaxis is recommend in ALL intubated patient who can medically tolerate to help reduce the incidence of VAP.

(Khorvasch, Abbasi, Meidani, Dehdashti, & Atael, 2012)

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Ventilator Circuits

- Ventilator circuits should be changed between every patient and when clinically indicated otherwise.
- Frequent ventilator circuit changes are associated with a high risks of ventilator associated pneumonia.

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HOB elevation

- VAP protocol states to raise the head of the bed 30-45 degrees for all intubated patients who are medically stable.

VAP Prevention and Implementation

- VAP prevention and bundle implementation is a team effort.
- All those associated with direct patient care, within their job descriptions, can help to further reduce VAP rates and help to fully implement the VAP prevention protocol in the ED.

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