Virtual Project: Ventilator Associated Pneumonia

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Introduction

In different wards and units of the hospital, nurses are important to support the health care providers in offering health care services. Nurses are crucial, along with the health care professionals, in order to provide medical care related to the serious diseases. It is the responsibility of the nurses not only to follow the protective procedures in emergency department. But also promote others to follow those guide lines, particularly with respect to sever ill patients. The work of nurses is challenging as they have to face many sever cases of sickness in intensive care unit and emergency department of hospitals. Nurses must be proficient about the treatment procedures and therapies, in addition to the probable post complications. Not

only this, they must adopt the methods to minimize the development of certain post complication or illness in the patients.

One of such conditions often occurred in hospital is the development of pneumonia in the patients on ventilators. It is a common complication found in the patients admitted to intensive care unit of hospital (Rubin et al, 2011). Nurses must know about the indications and symptoms exhibiting the pneumonia in such patients. As well, they must have information and capabilities of preventive and controlling pneumonia occurred due to use of ventilator.

In six to fifty-two percent of the cases, the incidence of ventilator allied pneumonia develops. It occurs either after the prolong intubation or 48 hours. 86 % of the nosocomial diseases in hospitals comprises of the ventilator associated pneumonia, a problem of mechanical ventilation. The microorganism forming colonies in the respiratory tract causing pneumonia are Stenotrophomonas maltophilia, Acinetobacter spp., and Pseudomonas aeruginosa. It is a complex medical problem, which generate the multifactorial prevention method, as it possesses a wide range of causes (Ramirez et al, 2012). These consequences encompass increased health care costs, as well as elevated residential period at hospital (Wagh & Acharya, 2009). VAP is one of the hospital acquired condition, which is also a leading cause of death. It occurs when the colonization of the pathogens formed in the lower air ways in the body of patient that is already in state of compromised immunity.

The vital element to understand the local factors is aggressive surveillance causing the microbiologic milieu of a given unit and VAP. There are following factors allied to the elevated susceptibility of VAP in the patients of Intensive care unit.

1. Immune suppression due to medication or disease causing the reduction in the release of immunoglobulin and interferon (impaired innate immunity)

2. Malnutrition
3. Advanced age
4. Sluggish gastric emptying or gastric stasis causing aspiration or esophageal reflux (Mauri et al, 2010)
5. Use of naso-gastric tubes that damage closure of sphincter
6. Increase in the gastric pH that enhances colonization of pathogens in GI due to the use of histamine 2 receptor antagonist
7. Altered neurologic status
8. Duration of intubation
9. Aspiration of infected gastric and oral secretions

Along with this, the diagnosis of VAP is also important. The diagnosis of VAP requires the competent clinicians, along with the skills such as microbiologic analysis, radiographic examination, and further thorough examination of respiratory secretions. The diagnosis of ventilator associated pneumonia includes the different parameters to consider, which are divided into microbiological diagnosis, radiologic diagnosis and clinical diagnosis. There are different methods in each provided division. With respect to clinical diagnosis, purulent tracheo- bronchial secretions, leukocytosis, and progressive or new infiltrate on chest radiograph, indicates the development of VAP. On the other hand, for diagnosing VAP, nurses must consider the poor accurateness of clinical criteria, as it is not surprising to observe secretions of purulent tracheobronchial that often present invariably in patients getting protracted mechanical ventilation, who are not often originated via pneumonia (Shan et al, 2011).

The microbiological diagnosis encompasses the several tests of body samples. The important diagnostic tests are

1. Quantitative cultures of airway specimens
2. Semiquantitative or Nonquantitative airway sampling
3. Cultures of Blood and pleural fluid

The radiologic diagnosis indicates the association between VAP and asymmetric pulmonary infiltrates. The reasons for this are asymmetric ARDS, drug reaction, pulmonary hemorrhage, pulmonary contusion, cryptogenic organizing pneumonia, pulmonary embolism, asymmetric cardiac pulmonary edema, chemical pneumonitis, atelectasis. All these diseases are caused by several noninfectious disorders. In this regard, nurses must concentrate on the patient medical history along with the in progress condition of illness.

After the execution of all the diagnostic tests, there are some more considerations before declaring the presence of VAP. These strategies are Comparisons between the diverse quantitative techniques of culturing, such as nonbronchoscopic versus bronchoscopic techniques, blind BBS, BAL and PSB, quantitative endotracheal aspirate (Deem et al, 2010), bronchoscopic protected specimen brush and BAL, as well as diagnostic accuracy.

All the tests, patient history and the information from research studies are highly important for decision making and initiation of treatment. Antibiotics are widely used for the treatment, but the administration of accurate dose, and frequency at right time must be conducted by the nurses. In addition, the treatment must also give allied to the underlying disease or cause of VAP. In presence of any of the discussed factor, it is the responsibility of nurses to provide extra monitoring and care for reducing the risks of complications including VAP. According to

Swann (2008), Muco-ciliary escalator, sedation and intubation suppress coughing potentially limit the clearance of infective secretions from the lower airways. The excess utilization of antibiotics and in critically ill condition, the colonization of pathogens starts in the oro-pharyngeal tract leading to the development of VAP in patients on ventilators (Joseph et al, 2010).

The colonization also occurs in the lower airways due to aspiration of secretions in oro-pharyngeal tract passing the cuff of tracheal tube. The reason is that the defenses of upper respiratory tract are bypassed by the endotracheal tubes, which allow the pooling of secretions from oro-pharyngeal tract by interfering with normal coughing and swallowing (Nseir et al, 2011; Diaz et al, 2010). The research studies and experiences of the health care professionals have isolated several controlling and preventing strategies for ventilator associated pneumonia. These strategies are useful to develop the standard guidelines or policies to reduce the risk of VAP in the patients of ICU. These important strategies are:

1. Kinetic therapy
2. Positioning of patients at an angle of 30 to 40 degree, known as semi recumbent positioning (Wolken et al, 2010)
3. Humidification; heated wire circuits versus exchange of heat and moisture (Han et al, 2010)
4. Pressure maintenance of ETT cuff
5. Frequency of tube management or ventilator circuit change
6. Continuous aspiration of subglottal secretions (Lacherade et al, 2010)

7. Prevention of unplanned extubation
8. Use of weaning protocols or early extubation
9. Spontaneous breathing trials or Use of daily sedation holds
10. Avoid frequent use of nasal ETT and use oral ETT
11. Use of BIPAP and CPAP to avoid invasive ventilation
12. Formal infection control program
13. Avoid transfusion of red blood cells
14. Avoidance of gastric over distension
15. Continuous versus intermittent tube feeding
16. Adequate support of nutrition
17. Stress ulcer prophylaxis (Quenot et al, 2009)
18. Deep vein thrombosis prophylaxis
19. Selective decontamination of the gastrointestinal tract
20. Hygiene of nasal and oral cavity
21. Use of gloves for decontamination of hand

The new technology for the prevention of VAP includes LoTrach, constant pressure inflation devices, polyurethane material using cuff technology, silver coated ETT, low pressure and high volume cuff (Coppadoro et al, 2012).

The nurses working in the intensive care unit particularly for the patient on ventilator can contribute a lot in order to reduce the incidence of VAP. Moreover, the risks of VAP minimize by using the recommendations of care modified to the challenges or requirements of the individual patient. It is very important for nurses to realize the importance of prevention which is much better than providing treatment services after development of any severe disease due to the negligence or ineffective capabilities of the health care practitioners. In this regard, there are many researchers who have conducted pertinent research. These studies provide the facts about the causes of ventilator associated pneumonia, as well as about the controlling and preventing strategies. Although some of the strategies require more research work to ensure the strength of each method as a useful intervention, but these are effective strategies (Ruffell and Adamcova, 2008). Therefore, along with this, the continue education is the most important element in the success of the utilized strategy. The evaluation and audit of outcomes and practice of these strategies is also essential. To offer best care for patients, the assurance of continuous process is also important.

Learning Objectives

The learning objectives of this educational curriculum for the nurses functioning in the intensive care units or the emergency units are as followed:

1. To create awareness concerning the conditions of VAP in order to execute the preventive measures on time without delay

2. To make the nurses aware about the causes, signs, symptoms, prevention and controlling strategies for ventilator associated pneumonia

3. To offer the effectual education curriculum to facilitate the improvement in skill sand learning of nurses working in intensive care unit
4. To introduce the novel technologies to prevent and control VAP
5. To increase the evidence based nursing practice for critically ill patients
6. To deliver the actual role of nurses to reduce incidence of VAP
7. To provide information about the recommended strategies for minimizing contamination of used equipment of mechanical ventilation.

Content Outline

The proposed teaching style based on the situation based or problem based learning. Via this strategy; the novice, as well as the senior nurses get the chance to solve the problems via using their knowledge and relevant professional experience. The teaching style selected, is didactic design of teaching strategy. In this regard, the power point presentation is made for the session on the considered topic "Ventilator Associated Pneumonia (VAP)." The power point presentation contains the following contents:

1. Ventilator associated pneumonia, definition and causes
2. Introduction of new technology to prevent ventilator associated pneumonia
3. Introduction to the preventive and controlling strategies for VAP
4. Evidenced based learning and practice for declining the rate of VAP

5. Role of nurses in reducing the development rate of VAP
6. Discussion on the problems with nurses in diagnosing VAP, and delivering care to the patients of VAP
7. Case studies
8. Feedback session including suggestions; and discussion with participants on the importance of education curriculum to enhance their professionals skills

Teaching Strategy

The selected teaching strategy for this educational curriculum is didactic style. This style provides the opportunity to the audience to learn something new in the better way, as well as to retain the learning for long duration in clinical practice. The environment of didactic learning involves the delivery of right information to the right audience at right time. It helps to builds on the existing understanding and information of the students. The use of power point slides makes it easy for the audience to absorb efficiently.

All the individuals possess dissimilar preferences to accept and understand the provided information. Therefore, efficient style of teaching must utilize various modalities. However, with respect to the goals, teachers can adopt different single or combined teaching styles. For this reason, the inclusion of problems and case studies allied to VAP is considered along with the provision of information to the audience. In addition, the interactive sessions is planned in order to evaluate the interest in topic, intensity of learning capabilities and to solve the problems, the audience is facing at their perspective work stations. There are following qualities of good didactic teaching style:

1. Incomparable presentation
2. Interesting material
3. Start and end at time
4. Good explanation of the complex material
5. To the point knowledge
6. Good organization
7. Good visuals and auditory

In the provided presentation on Ventilator Associated Pneumonia, the prime focus is on the basic concepts which assist the nurses to understand the importance of monitoring and offering of pertinent health care facilities. The repetition of complex facts and stories in the form of case studies enhance the attention of audience. According to Maskey (2008), the purpose of combined strategy including problem based learning and didactic style is to enhance the abilities of the nurses to encounter the complex situations in ICU and emergency wards via collaborating in the team of health care practitioners. They must have enough confidence to indicate any error in the medical care procedure, as well as to inform them about more effective method respecting the condition of patients. Such learning helps them to work in discipline and to integrate the accessed knowledge into practice. In addition, the practice of solving case studies enhance the development of expertise for self directed learning, self assessment, and solving the clinical problems. The nurses and other healthcare providers will get the enough information and understanding to make correct decisions for the patients.

During and at the end of lecture, the audience will get the chance to raise their questions or concerns about VAP. Moreover, the speaker will also share his own experiences contributing to promote the safe and quality care, as well as professional knowledge to employ at the time of need. The problem based learning is effective for professional based and academic based learning. At the end of session, audience will have the direction to start their learning and practice on the basic of evidence from the existing and new research studies. Moreover, they will learn the significance of the standard policies and procedures in order to deliver the safe, quality and appropriate health care services devoid of any risk allied to the development of sever diseases or adverse events. It is essential that this type of sessions must be conducted at regular intervals for the nurses, minimally once a week.

To make the session more interesting and to create awareness of the target population, the advertisement of the product, even in the form of lecture or educational session, is important. In this regard, flyers, brochures, handouts, and posters are the effective way to increase the rate of participation of nurses in the session on Ventilator Associated Pneumonia. For this session, the good option is the distribution of the handouts among the nurses of different health care settings and university hospitals, as the problem of VAP is not related to any single hospital. Handout will contain the highlights of the material to be discussed in session. Along with this, it will offer the information regarding the format of educational program for motivating the nurses to attend this curriculum.

Ventilator

Ventilator Associated Pneumonia in ICU and Emergency Department

Nurses are facing very difficult moments and challenges at their working stations, particularly at emergency department and intensive care units. One of the difficult conditions is the increase rate of ventilator associated pneumonia (VAP) incidence. There are several reasons of developing VAP including

Content Outline

- Definition and causes of Ventilator associated pneumonia
- Problem solving case study
- Introduction of new technology to prevent VAP

Participation and feedback will be

Conclusion

Nurses are vital part, along with the health care professionals, in order to provide medical care related to the serious diseases, such as VAP. Once the intubation of patient is decided, the strict monitoring of severe consequences, their control, and prevention must start. In this concern, there are many strategies are available in research providing the evidence to practice those procedures. The selected teaching strategy for this educational prospectus is didactic style. This style offers the opportunity to the audience to learn new medical techniques in the better way, in addition to preserve the learning for long duration in clinical practice.

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