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PREVENTION IS BETTER THAN CURE

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CHAPTER-I

INTRODUCTION

"Prevention is better than Cure"

BACKGROUND OF THE STUDY

Ventilator-associated pneumonia (VAP), the second most common hospital acquired infection in pediatric intensive care units, is linked to increased morbidity, mortality, and lengths of stay in the hospital land intensive care unit, adding tremendously to health care costs. VAP is defined as a hospital acquired pneumonia that develops in patients who have been treated with mechanical ventilation for 48 hours or longer who had no signs or symptoms of lower respiratory infection before they were intubated and treatment with mechanical ventilation began.[1]

Primarily, unlike adults, children have developmental and physiological differences for a wide range of ages. Age is also a factor in immunity, so younger or preterm infants are more likely than older children or adults to experience infection and to have more changes to enter complication. In a study to identify risk factors of VAP in pediatric intensive care unit (PICU),shows : genetic syndrome, steroids, re intubation or self-extubation, bloodstream infection, prior antibiotic therapy and bronchoscopy. Pneumonia is a leading cause of death of children worldwide (WHO, 2012). VAP is a marked health risk for hospitalized infants and children and the mortality rate for patients of all ages with VAP is approximately 33% to 50%. More ever, in the PICU, 20% of nosocomial infections are VAP, with an incidence of 4 to 44 per 1000 intubated children. It is one of the top causes of hospital-acquired infection in the PICU, accounting for 18% to 26% of all HAIs in the unit and resulting in a mortality rate of about 10% to 20 %. VAP is associated with increased mortality and morbidity, increased length of hospital stay, and high health care cost.[2]

According to Gomes,(2010), availability of resources, training of staff members, staff motivation and compliance, team work, updated protocols and more nursing staff would contribute in the implementing the evidence based guidelines for prevention of VAP. As well as, unavailability of resources and cost represents a barrier to the implementation of evidence based guidelines on prevention of VAP. Understanding the importance of recommended practices increases the likelihood of adherence and may overcome barriers to implementation. If the nurse does not have enough knowledge on measures proven to decrease VAP rates she may not have the necessary confidence to take action and make decisions regarding such practices. Patient recovery may be delayed and other risks of complications from mechanical ventilation can be prevented. Prevention and control of ventilator associated pneumonia are dependent on education and awareness of ICU staff towards the problem and on the application of evidence based strategies.[2]

Adherence to the evidence based guidelines on prevention of ventilator associated pneumonia will occur once staff involved directly with the patient's care has knowledge of such guidelines and can put them into practice. Prevention of VAP in Infants; the challenge faced when dealing with the pediatric population is the lack of evidence to support best practice. Most of the practices are extrapolated from the adult literature. This requires assessing each of the adult recommendations based on risk and potential benefit (Canadian ICU Collaborative Faculty, 2012). VAP avoidance strategies which vary between adults and infants have been created to find a solution to the problem of VAP.[2]

Because of higher incidence and costs of VAP, there are several recommendations to decrease it. The health care infection control practices advisory committee suggests using oro tracheal tubes instead of naso-tracheal tubes when the patients require mechanical ventilation, changing breathing circuits of ventilator only if malfunction or visibly contaminated and using endotracheal tubes with dorsal lumen to allow respiratory secretions to drain. Lately, health care infection control practices advisory committee suggested also implementing ventilator bundle which resulted in dramatic reductions in the incidence of VAP.[3]

The ventilator bundle has four key components they are, Elevation of the head of the bed to between 30 and 45 degrees, daily "sedation vacation" and daily assessment of readiness for extubation,Peptic ulcer disease prophylaxis (unless contraindicated)and,Deep venous thrombosis (DVT) prophylaxis.[2]

Guidelines for VAP prevention have been published by the American Association of Critical-Care Nurses(AACN) and by many other organizations, including the CDC,the Institution for Healthcare Improvement(IHI),and the Association for Professionals in Infection Control and Epidemiology. However, because of the lack of research in infants and children, manyof the guidelines focus on VAP prevention. In 2008,the AACN published evidence that led to prevention interventions known as the VAP Practice Alerts. The alerts are intended to be succinct, dynamic directives supported by authoritative evidence to ensure excellence in practice and a safe and humane work environment. These interventions include elevating the head of the bed 30º to 45ºto prevent aspiration and minimal changes of the ventilator circuit. The AACN also recommends using an endotracheal tube with a dorsal lumen above the endo-tracheal cuff to allow continuous suctioning of tracheal secretions in the subglottic area.[3]

NEED OF THE STUDY

VAP is the second most common hospital-acquired infection among paediatric and neonatal intensive care units. Mechanical ventilation is one of the major supportive modalities in the intensive care unit but it carries a lot of risks and complications, the most common one being ventilator associated pneumonia. The lungs are the major organs involved in multiple organ failure and thus it is challenge of delivering appropriate ventilation with as little complications as possible is extremely important. To ensure the highest standards of nursing care, nursing practice must be based on a strong body of scientific knowledge.[3]

NICU VAP rates vary by birth weight category as well as by institution. The National Nosocomial Infection Surveillance (NNIS) data from 2002 to 2004 show NICU VAP rates ranging from 1.4 to 3.5 per 1,000 ventilator days. In 1998, a cross-sectional study of hospital-acquired infections in 50 children's hospitals was performed by the Paediatric Prevention Network of 43 children's hospitals that returned questionnaires reporting NICU and PICU surveillance data, the VAP rate by device days was reported by 19 hospitals, and 12 hospitals provided VAP rates stratified by birth weight. In this cross-sectional survey, VAP rates were highest for the 1,001- to 1,500-g and <1,000-g birth weight categories.[3]

Prevention of VAP can be achieved through adherence to the evidence based guidelines for prevention of ventilator associated pneumonia, ultimately improving patients' outcomes. Improved outcomes will shorten patient’s ICU length of stay, hospitalization as well as benefit the patient financially with decreased hospital costs. Hospitals also gain benefits as they are continually faced with the challenge of providing cost effective services to patients

and communities. Ventilator associated pneumonia (VAP) is associated with additional complications for patients in the intensive care units. Despite the volume of published information on VAP in adults, the amount of research on VAP in children is limited. Health care providers need to be aware of the risk for VAP in infants and children and should have preventive programs in place.[4]

Prevention is the most appropriate intervention, but little research has been done in children to identify necessary skills and strategies. Critical care nurses play an important role in identification of risk factors and prevention of ventilator-associated pneumonia. Knowledge on evidence based practices should bring confidence to intensive care nurses to make appropriate decisions and prevent poor outcomes in the recovery of mechanically ventilated patients. VAP continues to be a common and potentially fatal complication of ventilator care and it is an ongoing challenge for critical care nurses as they use current evidence-based strategies to decrease its incidence and prevalence of VAP is necessary in our country. So the researcher felt the need of conducting a study on the knowledge regarding prevention of ventilator associated pneumonia.[4]

Research problem statement

"A study to assess the knowledge regarding prevention of ventilator associated pneumonia among staff nurses working in selected NICU and PICU units of Sangli- Miraj -Kupawad corporation area."

Objectives of study

1. To assess the knowledge of staff nurses regarding prevention of ventilator associated pneumonia.
2. To find out the association between the knowledge score and selected demographic variables.

Assumptions

Staff nurses are having some knowledge regarding prevention of ventilator associated pneumonia.

Operational definitions

1. **Assess:** In this study Assess means, gathering information through self-structured questionnaire.

2. **Knowledge:** In this study, knowledge means the correct response given to structured questionnaires regarding prevention of ventilator associated pneumonia.
3. **Staff nurses:** In this study staff nurses means, the nurses who are working in PICU and NICU.
4. **Prevention:** In this study, Prevention means the measures to be taken in prevention of ventilator associated pneumonia.

CONCEPTUAL FRAMEWORK

A conceptual frame work provides a background or foundation for a study. It helps to explain the relationship between concepts. A framework for a research study helps to organize the study findings.

A conceptual framework is designed for the development of self learning material regarding prevention of ventilator associated pneumonia followed by staff nurses in PICU and NICU.

KOLCABA COMFORT THEORY

The comfort theory is a nursing theory that was first developed in 1990s by Katherine Kolcaba. Comfort theory is middle range 5theory for health practice, education, and research. Kolcaba's theory has the potential to place comfort once again in the forefront of healthcare.

- **Health Care Needs** are those identified by the health care provider in a particular setting of PICU and NICU and assess the knowledge regarding prevention of ventilator associated pneumonia among the staff nurses working in PICU and NICU.
- **To Find Knowledge on** Prevention of ventilator associated pneumonia among staff nurses form PICU and NICU.
- **Demographic Variables** are those factors that are not likely to change and can have little control (age, sex, period of experience in ICU, qualification in nursing).
- **Comfort is** an immediate desirable outcome of nursing care,according to Comfort theory.
- **Health Seeking Behavior** is the change in knowledge to improve health.
- **Best Policies** are the protocols and procedures developed by an institution for overall use after collecting the evidence.

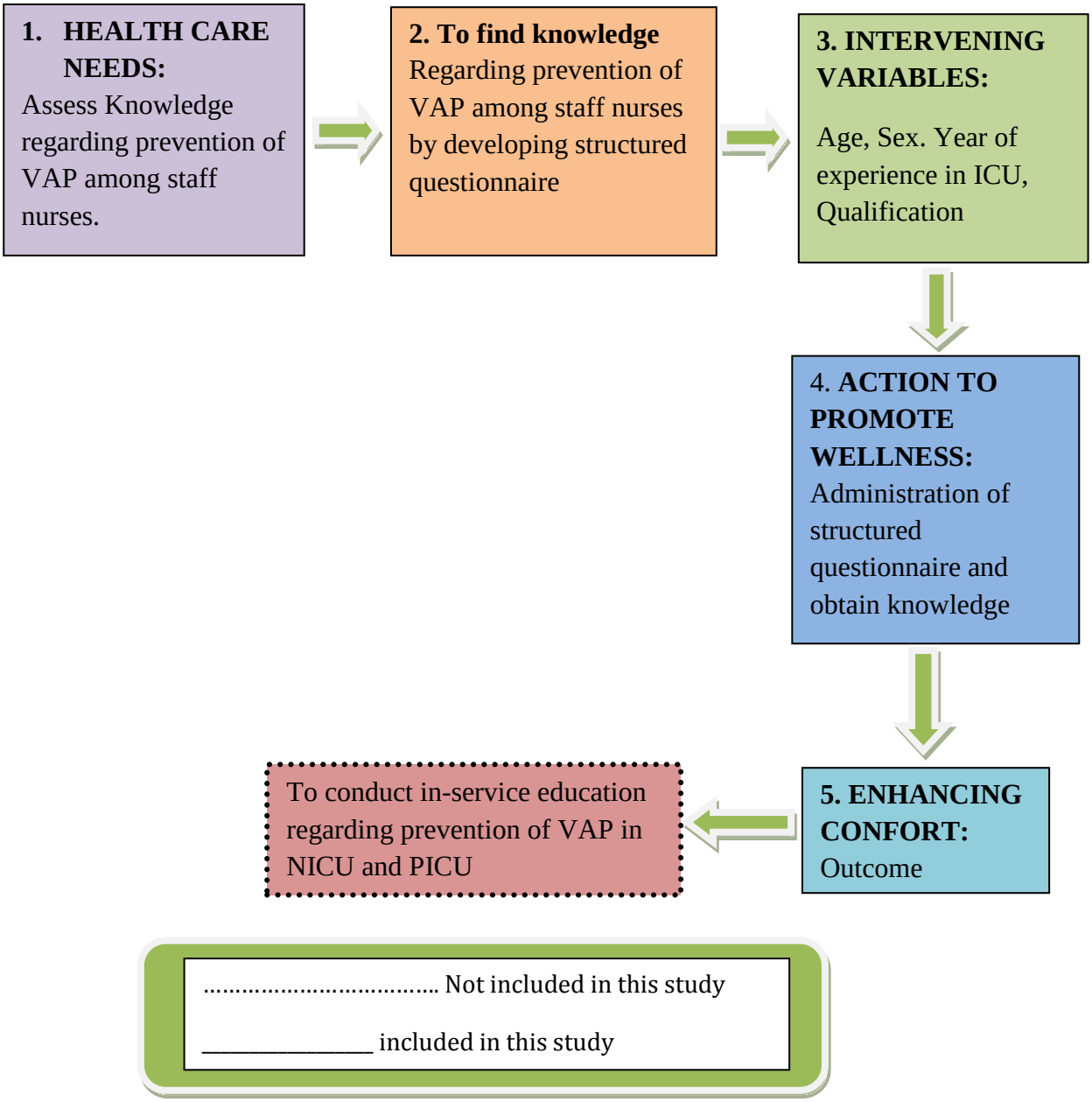

Figure No. 1: Conceptual Frame Work Based On Kolcaba's Comfort Theory.

DELIMITATION

The study is delimited to staff nurses who are working in selected Intensive care units i.e NICU's and PICU's.

CONCLUSION OF CHAPTER

Statistics showed that there is increased in census of getting VAP. Conceptual frame work used for the study is based on KOLCABA'S COMFORT THEORY which is developed in 1990 by Katherine Kolcaba. Comfort theory is middle range 5 theory for health practice, education, and the theory has the potential to place comfort once again in the forefront of

healthcare. The Theory of Comfort considers patients to be individuals, families, institutions, or communities in need of health care. The environment is any aspect of the patient, family, or institutional surroundings that can be manipulated by a nurse or loved one in order to enhance comfort. Health is considered to be optimal functioning in the patient, as defined by the patient, group, family, or community. In the model, nursing is described as the process of assessing the patient's comfort needs, developing and implementing appropriate nursing care plans, and evaluating the patient's comfort after the care plans have been carried out. Assessment can be objective, such as the observation of wound healing, or subjective, such as asking the patient if he or she is comfortable.

CHAPTER-2

REVIEW OF LITERATURE

A literature review is a compilation of resources that provides the ground work for further study.

The review of literature is an extensive systematic selection of potential sources of previous work, facts and finding of the chosen problem. A literature review helps to lay the foundation for a study and can also inspire new research ideas. It also plays a role at the end of the study when researchers are trying to make sense of their findings.

Review of published and unpublished research as well as non-research literature are an integral component of any scientific research. It involves a systematic identification, location, scrutiny and summary of written material that contain information regarding a research problem. It broadens ones understanding and gives an insight necessary for the development of a broad conceptual context into which the fits.

The review of literature is a broad, comprehensive, in-depth systematic and critical view of scholarly publication, unpublished scholarly print materials, audio-visual material and personal communications. The reviewed literature for the present study is organised under following headings.

[1] Literature related to incidence of VAP:

[2] Literature related to cause of VAP:

[3] Literature related to prevention of VAP:

[4] Literature related to knowledge of staff nurses regarding prevention of VAP.

[1] Literature related to incidence of VAP

Hina Gadani Arun, Vyas Akhya Kumar Kar author conducted a cohert study for critical review the incidence and outcome,identify various risk factors and conclude specific measures to prevent VAP.Studied on 100 patients randomly,patientskept on ventilatory support for more than 48 hours. After excluding those who develop pneumonia within 48 hours VAP was diagnosed when a score of>6 was obtained in clinical pulmonary infection scoring system was having 6 variables and maximum score of 12. After evaluating the data were subjected to univariant analysis using the Chi-Square test. The level of significance was set at P<0.05. Result found that 37 patients developed VAP. The risk factor significantly associated with VAP in this study was found to be duration of ventilator support,reintubation,supineposition,advance age altered consciousness. The Study Concluded that the most common organism isolated in our institution was Pseudomonas, the incidence of early-onset VAP (within 96 h) was found to be 27% while the late-onset type (>96 h) was 73%. Late-onset VAP had poor prognosis in terms of mortality (66%) as compared to the early-onset type (20%). The mortality of patients of the non-VAP group was found to be 41% while that of VAP patients was 54%. Targeted strategies aimed at preventing VAP.[5]

Neelima Ranjan, Uma Chadry, ct all conducted a prospective observational study and carried out over a period of 1 year study to determine the incidence, various risk factors and attributable mortality associated with VAP and to identify the bacterial pathogens causing VAP in the ICU. VAP was diagnosed in using the clinical pulmonary infection score. Endotracheal aspirate and bronchoalveolar lavage samples of suspected cases of VAP where collected from ICU patient's and processed as the standard protocols. Statistical analysis was done by using fisher's exact test to compare two or more set of variables were compared. Result showed the incidence of VAP in the study was 57.14% and the intensity of density of VAP was 31.7/1000 ventilator days. The incidence of VAP increased as the duration of mechanical ventilation increased and there was a total agreement in bacteriology between the semi quantitative ETAS and BALs in a study. Study concluded that incidence of VAP was 57.14% and the incidence of VAP is directly proportional to duration of mechanical ventilation and the most common causing VAP were Acinetobacter and Pseudomonas aeruginosa and were associated with a high fatality rate.[6]

Pooja Balasubramanian, Milind S.Tullu conducted a study to determine the incidence, etiology,risk factors and outcome of VAP among mechanically ventilated patients. Study included patient who were mechanically ventilated for me than 48 hours. The development of

VAP was defined by radiological and clinical criteria described by the center for disease control and prevention/national nosocomial infection surveillance (2003). The risk factor for VAP was determined by univariant and multivariant analysis using appropriate statistical methods. Results showed that the median age of the subjects (N=232) was nine with a male to female ratio of 1.3:1. Of 232 subjects enrolled there were 15 episodes of VAP in 14 patients. Eight of fifteen VAP episode showed positive endotracheal culture with gram negative organisms as the pre-dominant isolate with Acinetobacter being the commonest organism isolated 62.5%. Neuro muscular disease (P=0.05), histamine 2 receptor blockers (P=0.0001), tracheostomy (P=0.0001) and positive blood culture growth (P=0.0008) were found to be significantly associated with VAP (univariant analysis). On multivariant analysis,only positive blood culture growth was a risk factor for VAP the study concluded that the frequency of VAP was 6.03% with neuromuscular disease,histamine 2 receptor blockers, tracheostomy and positive blood culture being risk factor of VAP.[7]

The group Maha. Almuneef, Ziad, Hanan Balkhy conducted a prospective surveillance study to describe the rate and risk factors of VAP in pediatric patients. It included all patient's receiving mechanical ventilation for 48 hours or more admitted to a pediatric intensive care unit in Saudi Arabia from May 2002 to November 2002. National nosocomial infection surveillance system was used 361 eligible patients were enrolled. Result showed that 37 developed VAP. The mean VAP rate was 8.87 per 1000 ventilation days with a ventilation utilization rate of 47%. The mean duration of mechanical ventilation was 21 days for VAP patients and 10 days for non-VAP patients. The mean PICU stay was 34 days for VAP patient and 15 days for non-VAP patients. A study concluded that there was no significant different between VAP and non-VAP patients regarding mortality rate. The mean VAP rate was higher than reported by NNIS system surveillance of PICU.[8]

CONCLUSION

As per the above reviewed literature related to incidence of VAP it shows thatIncidence is directly proportional to duration of mechanical ventilation and re-intubation is a strong risk factor for development of VAP. Therefore, duration of ventilation has to be reduced to get rid of morbidity and mortality associated with mechanical ventilation, which can be achieved by administering a proper weaning protocol and titrating sedation regimens as per the need of the patients.Targeted strategies aimed at preventing VAP should be implemented to improve patient outcome and reduce length of intensive care unit stay and cost.

[2] Literature related to cause of VAP

Debaprase Mohanty,DebasisMishra, ct all conducted a prospective cohort study to determine the cause of VAP on 100 patients who were admitted to medical intensive care unit and on ventilator support for two or more days and were not suffering from pneumonia prior to putting them on ventilator were excluded. Endotracheal aspirates were obtained under strict aseptic precaution with a mucous extractor. The endotracheal aspirates were send for biochemical test and gram staining for identification of antimicrobial susceptibility test. The patients were classified into four groups named VAP, non-VAP, Survivors and Non-survivors. The data collected was tabulated result showed that the association between genders (p value=0.372),age (p value 0.929), and VAP infection was not found to be significant. There was no significant correlation between the primary disease and development of VAP (p value=0.24). Most common organism isolated was P.Aeruginosa, and most of them were resistant to commonly used antibiotics. Study concluded that VAP paients have higher mortality rate, longer duration of mechanical ventilation in duration of hospital stay than non-VAP patients. Early diagnosis of VAP an initiation of appropriate antibiotic treatment is vital to prevent the adverse outcome.[9]

Jordi rello, ct.all conducted a retrospective multicenter study compared microorganism documented by quantitative cultures from bronchoscopic samples in episodes of ventilator associated pneumonia from three different institutions. The observations were compared with the findings reported by trouillet and coworkers. The objective was to evaluate whether a classification of etiologies of VAP in four groups based on no of ventilation days and previous antimicrobial use. Significant variations in etiology ($p < 0.05$) where found in all microorganisms isolated from VAP episodes. In group 1 (<7d and absence of antibiotic), whereas the incidence of Acinetobacter baumannii was significantly higher, owing to findings. In group 2 (<7d and antibiotics), group 3(>7d and absence of antibiotic), and group 4 (antibiotics and > 7 days). Study concluded that causes of VAP varied markedly across four treatment sites resulting in the large-scale variation in antimicrobial prescribing practices VAP should be based on upto date information of the pattern of multiresistant isolates from each institute.[10]

A prospective study was conducted at Spain to ascertain the frequency, risk factors and causes of early and late onset VAP in ICU. Study consisted of all patients on mechanical ventilator for more than 48 hours. Results of the study revealed that, incidence of VAP was

20.31 per 1000 patient days. Pathogens most commonly isolated was, Staphylococcus Aureus and Pseudomonas Aeruginosa in early onset and Pseudomonas species in late onset VAP. Study concluded that, risk of developing late onset versus early onset VAP was twice as great in post operative patients.[11]

A survey design was used by NISHAMOL. Y. N Chitra Tirunal Institute For Medical Sciences And Technology,Trivandrum,India in Nov 2011 to assess the knowledge and practice of endotracheal suctioning among Neuro Nurses, SCTIMST.The sample were 30 Neuro Nurses include permanent and temporary were selected from neuro medical ICU in Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum. Convenient sampling technique was used for selecting sample. Total period of study was from August2011 to November 2011.An observational checklist was maintained in order to record the steps of the procedure and the knowledge assessed by using questionnaire. The result shows that the knowledge score of staff nurse with less ICU experience ranged from 10 to 14 with a mean of 12.06 (1.48).The knowledge of staff nurse with more ICU experience ranged from 11 to 14 with a mean of 12.08 (1.19). There was no statistically significant difference in the mean knowledge score of both group. Thirty Endotracheal suctioning episodes of 19 staff nurses both permanent and temporary were observed during all three shifts. However there was no statistically difference in the mean practice score of both groups. It was Concluded that the study was designed to identify the intensive care nurses' knowledge and practice of endotracheal suctioning. Based on the findings of the study Neuro Nurses have average knowledge about ET suctioning but in practice they are not practicing some critical care elements.[27]

A structured, non-participatory, observational study was conducted by Miia Jansson in Oulu University Hospital, Oulu, Finland in Aug 2012sample size of (n=40) using a 25-item best-practice information sheet to assess critical-care nurses' ETS practices in a mixed medical-surgical intensive-care unit. One sample-and independent-samples *t*-tests were used to compare critical-care nurses' ETS performance against current recommendations with in different ICU experience groups. The result shows that the quality of observed ETS practices was significantly lower than the required quality of care ($p<0.001$). The most significant discrepancies were observed in ETS practices related to infection-control practices. Hence it is concluded that, Critical-care nurses are currently not following current ETS recommendations. Significant discrepancies, which may constitute a risk factor for VAP by

increasing microbial colonization of the lower airway, were identified. Unsafe ETS practices may jeopardize patient safety, and thus the quality of nursing care. Educational interventions, clinical guidelines and adequate support need to be provided to critical-care nurses to assess and improve their professional capabilities and current practice. Regular auditing and prompt feedback would be beneficial.[28]

CONCLUSION

As per the above reviewed literature related to causes of VAP it shows that Inappropriate antibiotic use prior to ventilator support increase the early-onset variety, should be practiced anti-microbial practices, Pseudomonas, Acinetobacter is the most common organism causing VAP.

[3] Literature related to prevention of VAP

Suresh.K.Sharma, Jasbir Kaur conducted a randomized control trail on 260 patients to determine the efficacy of 0.12% chlorhexidine gluconate mouth care to prevent the VAP among the mechanically ventilated patients admitted in ICU'S.130 patients in the randomizedexperimental group and 130 in the control group. Result showed that mouth care with 0.12% chlorhexidine twice daily was significantly effective in prevention VAP among mechanically ventilated patients as compared to conventional method of mouth care. VAP is (5.7%) without any significant adverse event (p value is <0.05). However, chlorhexidine mouth care was consistently effective with even longer duration of mechanical ventilation.Study concluded that it is recommended to provide mouth care twice daily with 0.12 chlorhexidine to mechanically ventilated patients to prevent VAP.[12]

An experimental study was conducted at KLE institute,Belgaum to study the effect of multi modality chest physiotherapy in mechanically ventilated patients for the prevention of VAP study consisted of 101 patients with 51 in controlled group and 50 in study group. Manual hyper inflation and suctioning were administered to patients uncontrolled group while the study group received positioning and chest wall vibration in addition to hyperventilation and suctioning. Results of the study showed that there was significant decrease in mortality rate among study group 24% as compared to controlled group 49%.[13]

A depth literature review was done by CODY WINSTON AMATO college of nursing Burnett honors college at the university of central Florida Orladno. This team determine the effectiveness of subglottic secretion aspiration by means of specialized ETT tubes in

decreasing the incidence rate of VAP the VAP guidelines recommended secretions aspiration as a means to prevent its occurrence. Important variable such as suction pressure,frequency, secretions, viscosity and ETT cuff pressure and volume need to be considered. The interaction among determines the effectiveness of subglottic secretions removal.The result showed that Teleflex ISIS removed secretions more efficiently than the Hi-Lo Evac and the Sacett ($p<0.0001$). It can be concluded that Teleflex ISIS is the best choice in clearing secretions from the subglottic region compared to Hi-Lo Evac and portex blue line SACETT.[14]

A qualitative convergent care research study carried out by Sabrina,Gutteres,Silva.Ctall. Study aimed at construction of a bundle to prevent ventilator associated pneumonia by nursing and physiotherapy professionals. A data collection occurred including individual interviews and discussion groups with participation of 25 and 14 professionals respectively. The data analysis was done after interview and discussion group regarding construction of bundle by the evidenced based practice criteria. In the 1st research phase 25 professional individual interviews where taken. The interview result was present in discussion group after which the professional's collective choice four care actions for inclusion in the bundle thus the study concluded that the bundle comprised evidence level I and II care actions,which where oral hygiene using 0.12% chlorhexidine,elevation of head of the bed between 30 and 45 degree,cuff pressure between 20 to 30 centimeters H2O and care with the aspiration of secretion.[15]

CONCLUSION

Above research studies show that the strategies for prevention of VAP are positioning of the patient or child who is mechanically ventilated, suction system used, and oral care by chlorhexidine mouth wash and the type of suction catheter used while suctioning.

[4] Literature related to knowledge of staff nurses regarding prevention of VAP

Study done by Zachary.W. Fitch, Glenn.J.R on 4th December 2013 conducted a cross sectional study to evaluate the knowledge of nurses working in general intensive care units concerning evidence based measures for the prevention of VAP. Collection of research data was performed by means of nurse identification form and a form of evidence based knowledge concerning the prevention of VAP characterization statistics where showed by percentage median and chi-square and Wilcoxon test and Kruskal-wall is test were used. Result shows that median value of total points scored by the nurses on the questionnaire was

4.00_+2.00. The difference between the nurse's education level,duration of work experience and participation in In-service education programmer on prevention of VAP. The median value of their total score on the questioner was found to be statically significant ($p<0.05$). The study concluded that the critical care nurse's knowledge about ventilator associated pneumonia prevention is poor.[16]

Ally Tatu Said of Tanzaniaon conducted a cross-sectional observational study to evaluate the knowledge and practices of ICU nurses on prevention of ventilator associated pneumonia. Knowledge of 118 nurses working in ICUS the knowledge was tested by using a close ended questionnaire and practice by observational check list by using disruptive and inferential statistics result showed that no association between knowledge and year of work experience (p 0.34), ICU training (p=0.64) and level of education (p value 0.55). ICU nurses practice on prevention of VAP was statistically associated with educational level but not associated with ICU training and year of experience. ICU nurse's knowledge on VAP prevention was adequate but their practices was found to be poor. Study concluded that there was no significant association between ICU training,level of education,year of working experience and knowledge.[17]

Ms. Shilpa. N. Rao 1st year M.SC Nursing government college Bengaluru conducted a descriptive study to assess the effectiveness of structured teaching programme on knowledge regarding prevention of ventilator associated pneumonia among pediatric intensive care unit, staff nurses using structured questionnaire sample where 30 and purposive sampling technique was use. At the end of the study they concluded that nurses lack knowledge regarding recommendations for VAP prevention. Continuing education would help to improve evidence based practices.[17]

Gehan EL Nabawy Ahemed in Faculty of Nursing,Mansoura University, Egypt conducted a descriptive study to evaluate the knowledge of pediatric critical care nurses regarding evidence based guidelines for prevention of VAP in both pediatric and neonatal intensive care units. The study was conducted at pediatric intensive care unit (PICU) and (NICU) the study involved 28 nurses from PICU and 21 nurses from NICU.The result clarifies that there is strong correlation between years of experiences,previous training on guidelines of prevention of VAP.But there is no correlation between age and nurses level of Knowledge regarding evidence based guidelines for prevention of VAP. Study concluded that there is strong correlation between year of experience and previous knowledge on evidence based

practice and there is no correlation between age and knowledge of nurses on evidence based guidelines for prevention of VAP. [18]

CONCLUSION

As the above reviewed literature, have shows inadequate knowledge of pediatric critical care nurses regarding evidence based guidelines for prevention of ventilator associated. It strong correlation between years of experiences, previous training correlation between age and knowledge of nurses on evidence based guidelines for prevention of VAP. And shows that there is poor knowledge of staff nurses regarding prevention of VAP.

CONCLUSION

For the current study the reviewed literature above shows the incidence of VAP maximum number of children in PICU and NICU are cases of VAP and the length of stay in ICU is for long duration, Even the literature shows the causes VAP due to organisms like Acinetobacter, pseudomonas etc and aseptic technique to be used for VAP prevention and The Literatures shows the preventive measures for VAP are the bundle practice which include the head of the bed elevation 40-30 degree, the effect of chloroxidine mouth wash, the appropriate suction system and the aseptic techniques to be used during suctioning and intubation extubation. The studies show Knowledge level of staff nurse working in ICU regarding prevention of VAP the staff nurses have poor knowledge about the prevention of ventilator associated pneumonia and some nurses have average knowledge but are not practicing in Picu and Nicu. Therefore, Education plays a key role in the management of patients with VAP. Use of self-study education modules on nursing care and patients at risk of VAP can reduce the rate of VAP significantly.

CHAPTER-3

RESEARCH METHODOLOGY

Research methodology is the systemic way to solve the research problem. It includes the step that researchers adopt to study his problem with the logic behind. It indicates the general pattern of organizing the procedure of gathering valid and reliable data for an investigation. This chapter provides a brief description of the method adopted by the investigator to conduct the study.

It’s a Scientific method approach to comprising all procedures that scientists have used, currently using, or may use in the future to propose knowledge.

This chapter includes the research approach, research design, setting of the study and sampling technique. It further deals with the development of the tool, procedure for the data collection and plan for data analysis.

RESEARCH APPROACH

For the present study, quantitative research approach is selected for the study as it aims to find out the knowledge level of staff nurses regarding prevention of ventilator associated pneumonia, which will be in numerical form.

RESEARCH DESIGN

Non- experimental descriptive research design is used for this study as the researcher wants to find out knowledge level regarding ventilator associated pneumonia without doing any manipulation.

VARIABLES

The variables used in this study are demographic variables consist of Age, Sex, Experience in critical care unit. Professional Qualification in nursing attended any in-service regarding prevention of VAP. Knowledge is a research variable under study.

SETTING OF THE STUDY

The study setting is the location in which the research is conducted. The present study was conducted in Bharati hospital Sangli which has 750 bed capacity with samples were 35 staff nurses, Wanless hospital Miraj which is 500 bedded and samples were 30, Amnapure pediatric hospital miraj which is 50 bedded 13 samples, Sudhakar Jadhav hospital Sangli 50 bedded and 15 samples.

POPULATION

In present study the population consists of Staff Nurses working in PICU and NICU.

SAMPLE

In this study samples were Staff nurses working in selected Bharati hospital sangli, Wanless hospital miraj, Amnapure hospital miraj, Sudhakar Jadhav hospital sangli.

SAMPLING CRITERIA FOR THE STUDY

Inclusion criteria

1. Staff nurses working in selected NICU and PICU units.

2. Staff nurses available at the time of data collection.
3. Staff nurses who are able to understand English or Marathi.

Exclusion criteria

Staff nurses who have experience less than 1 month.

SAMPLE SIZE

The present study consisted of 93 staff nurses working in PICU and NICU units.

SAMPLING TECHNIQUE

As the researcher got a specific purpose the researcher used non-probability purposive sampling technique for selecting samples.

DATA COLLECTION TOOL

Data collection tool was prepared by doing extensive review of literature regarding ventilator associated pneumonia researcher prepared the questionnaire by the experts in the field of interest. The tool was divided into two sections. The first section contained demographic variable. The second section contained 22 multiple choice questions with four options for assessing knowledge. Questions were related to definition, causes, clinical manifestations, method, steps of suctioning, andcare of child on ventilator. The correct answer scored with one mark, wrong answer with 0 and maximum score was 22.

Since it is a structured questionnaire the grading of the score was formulated by investigator with the help of educationist. The total was divided into 4 categories' less than 0-7 marks as poor, 8– 12 marks as average, 13 – 16 marks as good and 16 – 22 marks as excellent.

VALIDITY

21 experts of various fields were selected to do the content validity of the tool, and among them 4 were Paediatricians, 10 from paediatric nursing, 2 from medical surgical nursing, 2 from obstetrics & gynaecology nursing, 2 from community health nursing and 1 statistician.

There were some corrections which were made and the final tool was prepared. As per the suggestion from expert correction made in inclusion and exclusion criteria. Some questions were not related to topic were omitted and some minor grammatical mistakes. Thus, the questionnaire had 32 items initially, after the validity final tool was prepared with 22 basic

questions and the final tool was prepared under guidance of research guide and completed as section-I demographic variables, section -II was the questionnaire.

ETHICAL CONSIDERATIONS

The Research proposal with data collection tool was presented in front of ethical committee before getting ethical approval. Permission to conduct the study taken from the concerned authorities of the hospital.

Approached the samples, explained about the purpose of the study and assured them that the confidentiality will be maintained before getting the written consent.

RELIABILITY

Reliability of the tool was done by using test re-test method. Data collection tool were given to the 10 samples and same tool was given to the samples after 5 days and collected the data. And Knowledge questioner score was calculated by using Karl Pearson correlation coefficient and test retest method r= 0.8285.As the calculated 'r'value is greater than required value (0.75) the tool was found to be reliable.

PROCEDURE FOR DATA COLLECTION

After the validity and reliability of the tool final tool was prepared for final data collection The permission from concerned authority was taken prior to study. Then for final data were collected from 16 aug to 31st aug 2016. As my samples were the staff nurses working in Picu and Nicu Consent from samples before administration of knowledge questionnaire approximately 30 min were taken by the samples for filling the data and after data collection data kept confidential. The samples were selected as per the Inclusion and exclusion criteria of this study.

PLAN FOR DATA ANALYSIS

Based on the objectives of the study, Frequency percentage, Mean, median, SD were calculated. Chi square test and fisher exact test will be applied to check the association between different demographic variables and knowledge.

PILOT STUDY

Pilot study was conducted in Dr Jeevan Mali pediatric hospital, Sangli from 9-8-16 to 15-8-16 to assess the feasibility of the study. A prior permission was taken from the hospital authority. The Pilot study was excluded from the final study.

10% sample of final study i.e 10 sample were taken. The researcher explained the purpose of the study and got written consent from them participation of the study. The knowledge score was assessed of the 10 samples. Result showed that 60% of staff nurses were having average knowledge score.

The pilot study helped to Visualize some practical problems that could be faced while conducting the study and gave better insight about research methodology.

PLAN FOR DISSEMINATION

The study findings will be Published in reputed Medical conferences, Nursing journals and the dissemination will be planned in order to address the issue related to feasibility and will communicate research findings effectively.

CONCLUSION

The chapter tells us the research methodology, which showed that the study is quantitative study and Non-experimental descriptive research design was used. The study was carried out in the selected hospitals of sangli,miraj,kupwad corporation area among the staff nurses working in PICU and NICU with the sample size of 93.The tool was corrected by 21 experts and then final tool was prepared. The tool was found reliable by using Karl Pearson's correlation coefficient formula. After approval of the ethical committee pilot study were conducted. The pilot study was carried out using 10 samples and final study with 93.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

To complete this study properly, it is necessary to analyse the data collected in order find the assumption and answer the research questions. Data collection is followed by the analysis and interpretation of data, where collected data are analyzed and interpreted in accordance with study objectives.

This chapter comprises the analysis, presentation and interpretation of the findings resulting from this study. The analysis and interpretation of data is carried out using descriptive and inferential statistics.

The data was analyzed as per the objectives of the study i.e.

1. To assess the knowledge of staff nurses regarding prevention of ventilator associated pneumonia.

2. To find out the association between the knowledge score and selected demographic variables.

ORGANIZATION OF THE FINDINGS

The analysis and interpretation of the findings are given in the following selection,

SECTION -I:-Frequency and percentage distribution of demographic variables.

SECTION-II:-Frequency and percentage distribution of Knowledge regarding VAP.

SECTION-III:-Association of knowledge score with selected demographic variables.

SECTION-I:-FREQUENCY AND PERCENTAGE DISTRIBUTION OF DEMOGRAPHIC VARIABLES

TABLE NO.1

n=93

Demographic Variables	Frequency	Percentage(%)
Age:		
20 - 30 years	76	81.7
30 - 40 years	16	17.2
40 - 50 years	1	1.1
Total:	93	100
Sex:		
Male	77	82.8
Female	16	17.2
Year of experience in ICU:		
0-5 Yr	81	87.1
6-15 Yr	9	9.7
16-25 Yr	3	3.2

Table no.1 shows, maximum samples i.e 81.7% belonged to the age group of 20-30 years. Females were more with 82.8% than male (17.2%).87.1% of staff nurses are having 0-5 yrs of ICU Experience.Most of the samples with 87.1% had experience of 0-5 years, 9 samples with 9.7% had experience of 6-15 years and remaining only 3.2% belongs to 16-25 years of experience.

TABLE NO.2.

n=93

Demographic Variables:	Frequency	Percentage (%)
Qualification:		
ANM	32	34.4
GNM	48	51.6
BSC	13	14
MSC	0	0
Total:	93	100
In-service education attended:		
YES	16	17.8
NO	77	82.2

Table no.2 shows, In Qualification 51.6% of staff nurses were GNMs, and 34.4% were ANMs and no MSC nurses as staff nurses. Staff nurses about82.2% did not attended in-service education, and 17.8% staff nurses attended the in-service education.

SECTION-II: FREQUENCY AND PERCENTAGE DISTRIBUTION OF EXISTING KNOWLEDGE.

TABLE NO – 3: Knowledge Score.

n= 93

GRADING'S	FREQUENCY	PERCENTAGE (%)
Poor (0-7 marks)	27	29
Average (8 – 12 marks)	53	57
Good (13 – 16 marks)	11	11.8
Excellent (17 – 22 marks)	2	2.2

Table no.3 shows, 29% staff nurses were having poor knowledge score (0-7), 57% have Average knowledge score(8-12), 11.8% have good knowledge score (13-16) and 2.2%staff nurses have excellent knowledge score(17-22).

Knowledge Score

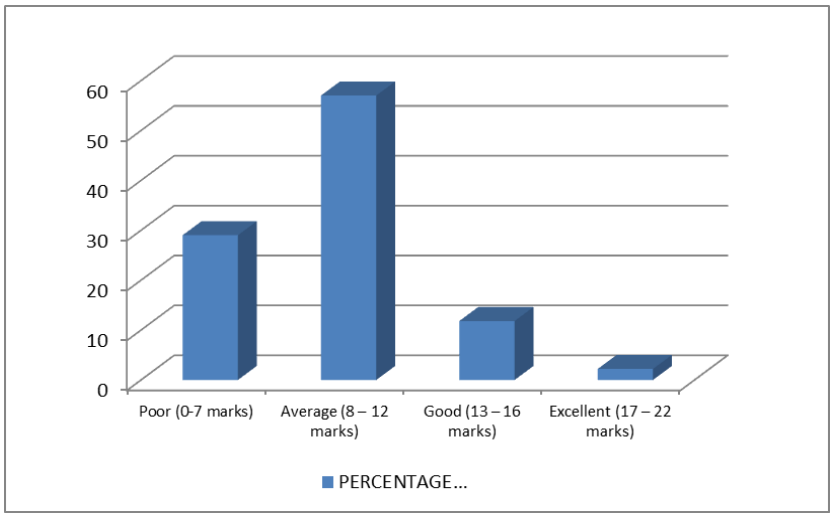

Figure no.2 Knowledge Score.

SECTION III: ASSOCIATION BETWEEN SELECTED DEMOGRAPHIC VARIABLE AND KNOWLEDGE SCORE.

TABLE NO-4:

n=93

Sr. No.	Demographic variable:	Fisher's exact test:	Table value:	Remark:
01	Age	7.517	0.366	No significant association
02	Sex	2.267	0.55	No significant association
03	Year of experience in ICU	11.977	0.037	Significant
04	Qualification	34.519	0.000	Significant
05	In-service education attended	7.054	0.056	No significant association

Table no.4, Indicates that, there is no significant association between age, sex, In-service education and knowledge score as calculated 'p' value is more than tabulated 'p' (0.005). But, there is significant association of the knowledge score with year of experience in ICU and Qualification as the calculated 'p'-value is less than (0.005).

CONCLUSION

This chapter deals with analysis and interpretation of data collected from 93 samples regarding knowledge on prevention of ventilator associated pneumonia. Analyses were done as per the objectives. Frequency and percentage were used for finding out the knowledge and

association of knowledge with demographic variable was done by using chi-square and fisher's exact test.

Study concluded that 57% belongs to average knowledge and 29% were with poor knowledge only year of experience and qualification was associated with knowledge regarding VAP.

CHAPTER-V

DISCUSSION, CONCLUSION AND RECOMMANDATION

This chapter deals with the discussion of the major findings of the study, summary and its application to nursing practice and recommendation for further study.

FINDINGS OF THE STUDY AND DISCUSSION

Findings of the study were based on the objectives of the study.

1. To assess the knowledge of staff nurses regarding prevention of ventilator associated pneumonia.
2. To find out the association between the knowledge score and selected demographic variables.

   The study was conducted on 93 samples.

DISCUSSION

Present study was aimed to assess the knowledge regarding prevention of ventilator associated pneumonia among staff nurses working in selected NICU and PICU units of Sangli- Miraj -Kupawadcorporation area.It was found that29% staff nurses have poor knowledge score (0-7), 57% have Average knowledge score(8-12), 11.8% have good knowledge score (13-16) and 2.2%staff nurses have excellent knowledge score(17-22).

Javed& et al. (2011), stated that nurse working at critical unit are having knowledge gap to be able to prevent incidence of VAP among ventilated patients. Studies have shown that nurses lack knowledge of evidence based guidelines for the prevention of VAP, a lack of knowledge may be a barrier to adherence. The safety of children within our hospitals is increasingly an area of focus for all involved in child health. Ventilator associated pneumonia (VAP) is the second most common health-care-associated infection (HCAI) in pediatric intensive care (PICU) accounting for 20% of nosocomial infections.

Prevention of VAP in infants; the challenge faced when dealing with the pediatric population is the lack of evidence to support the best practice. Most of the practices are extrapolated from the adult literature.

Ventilator-associated pneumonia (VAP) is a common nosocomial infection in critically ill patients that is associated with poor clinical and economic outcomes, including longer duration of mechanical ventilation, longer ICU and hospital stay, increased mortality, and increased hospital charges. VAP is preventable, and many practices have been demonstrated to reduce the incidence of VAP audits associated burden of illness. Despite efforts to prevent ventilator-associated pneumonia (VAP), this disease continues to occur frequently in critically ill patients and is associated with significant morbidity and mortality. Although prevention is paramount, when VAP does occur, optimal management is important to reduce further morbidity, mortality, and health care costs.

CONCLUSION

The purpose of the study was to assess the knowledge of staff nurses regarding prevention of ventilator associated pneumonia and to find out the association between the knowledge score and selected demographic variables.Non-experimental descriptive research design and non-probability purposive sampling technique used for the present study. Sample size selected for the study was 93 staff nurses working in PICU and NICU units of Sangli, Miraj, Kupwad corporation area. Staff nurses working in selected NICU and PICU units. Who available at the time of data collection i. e. from 2nd August 2016 to 3 September 2016 and who are able to understand English or Marathi are included in the study. Development of tool involved the steps and reviewing of literature related Literature related to Various experts validated the tool pilot study was done and the same tool was used for the final study. The present study tries to improve knowledge and give idea about to educate nurses and create awareness among the staff nurses regarding prevention of VAP. The reliability coefficient was done using Karl Pearson correlation coefficient formula was used for estimation of reliability.

The research design used was the Non-experimental descriptive research design Non probability purposive Sampling method was used and 93 samples were selected according to criteria.

The data collection tool used was\

Section A: Demographic variables.

Section B: Self structured questioner to assess the knowledge of staff nurses regarding prevention of VAP.

The present study showed that, 29% staff nurses were having poor knowledge score (0-7), 57% have Average knowledge score (8-12), 11.8% have good knowledge score (13-16) and 2.2%staff nurses have excellent knowledge score (17-22).

The association between the knowledge score with demographic variables shows that, there is no significant association between age, sex, In-service education and knowledge score as calculated 'p' value is more than tabulated 'p' (0.005). But, there is significant association of the knowledge score with year of experience in ICU and Qualification as the calculated 'p'-value is less than (0.005). The aim of this study was to assess knowledge of pediatric critical care nurses regarding evidence based guidelines for prevention of ventilator associated pneumonia in both pediatric and neonatal intensive care units. The results of this study showed that, the highest percent (87.1%) of studied nurses had less than 5 years of experience in the intensive care unit and the majority (82.2%) of them didn't take any previous training about guidelines of prevention of VAP.

In relation to nurses' knowledge regarding evidence based guidelines for preventing ventilator associated pneumonia, the result of the present study revealed that the highest percentage of studied sample reported the correct answer regarding oral intubation, position after intubation, necessity of suctioning appropriate routine oral care. Moreover, most of the studied sample reported incorrect answer regarding frequency of ventilator circuit changes, type of air way humidifier, type of suction system, frequency of change in suction systems, head of the bed and hand hygiene and gloving. The participants were most frequently correct about using anroute of endotracheal tube intubation and about using open versus closed suction systems and respondents had the least knowledge about the frequency of humidifier changes and best hand hygiene policy and suction pressure applied during suction in children.

Unfortunately, little is known about the degree of nursing knowledge on evidence based guidelines for the prevention of ventilator associated pneumonia and about factors that can contribute or represent barriers to their implementation. In relation to nurses' level of

knowledge regarding evidence based guidelines for preventing ventilator associated pneumonia, the result of this study revealed that, more sample had unsatisfactory level of knowledge regarding evidence based guidelines for preventing ventilator associated pneumonia. This may be due to no written protocol regarding evidence based guidelines for prevention of VAP in both units and the nurse patient ration in ICU not maintained, work load etc. This lack of knowledge is considered a huge barrier to implementation of evidence based guidelines for VAP prevention as resources are available at times but nurses are not aware of the importance of such interventions and its implementation.

IMPLICATION

The findings of the study will be help nurses in the following aspects.

Nursing Education

Nursing education developing rapidly in India and The education curriculum must include imparting knowledge about the use of various teaching strategies for the health education. Nursing education must emphasize on preventive aspects of health. The nurse should know the changing trends and the changing environment of nursing now days. The nurses should have knowledge regarding prevention of VAP in pediatric patients and the new protocols and polices set in ICU. Nursing education is important to gain the knowledge regarding prevention of VAP in children but it should also be practices in our clinical settings to improve the overall health of children and prevent them from the occurrence of VAP.

While providing care to the clinical area this study is shows that there is an average knowledge of the staff nurses regarding prevention of VAP but its should be practices in clinical area and reduce the risk of VAP in children from PICU and NICU.

Nursing Administration

As a part of administration the nurse administrator plays an important role in the education of all the nurses. The findings of the study should be used as a basis of in-service education program for nurses to make them aware of the problems in children and communicate the findings.

Nursing Research

Nursing research is an essential aspect of nursing education as it uplifts the profession, develops new nursing norms and enhances the body of nursing knowledge. It also improves

the image and perception of nursing in society, which is urgently required for the future of nursing.

The present study helps to researcher to review the findings and also apply this knowledge in practice.

RECOMANDATIONS OF THE STUDY

Recommendations

- Written unit protocols should be present and reviewed regularly as updates and new evidence for best practice are constantly emerging and staff should be educated on the updated protocols.
- Orientation of new staff members in ICU's should include education on strategies for prevention of VAP.
- ICU training programs should include evidence based guidelines for prevention of VAP. Learning resources such as articles, journals and electronic resources such as computers and internet should be made accessible in the units for staff members.
- ICU's environment should enable a nurse to translate knowledge into practice by ensuring availability of facilities.
- Similar study is recommended to include large sample size in other hospitals which provide care for critically ill pediatric patients, further researchon factors affecting implementation of VAP prevention strategies is recommended.

CONCLUSION

The current chapter concludes that the study was planned on objectives and assumptions. The study showed that the knowledge of the staff nurses working in Picu and Nicu were average and only year of experience and knowledge regarding Ventilator associated pneumonia were shown the associated.

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