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ORIGINAL ARTICLE

KNOWLEDGE OF NURSES ABOUT THE INTERVENTION FOR THE PREVENTION OF PNEUMONIA ASSOCIATED WITH MECHANICAL VENTILATION

O CONHECIMENTO DO ENFERMEIRO ACERCA DAS INTERVENÇÕES DESTINADAS À PREVENÇÃO DA PNEUMONIA ASSOCIADA À VENTILAÇÃO MECÂNICA

CONOCIMIENTO DE ENFERMERAS SOBRE LA INTERVENCIÓN PARA LA PREVENCIÓN DE LA NEUMONÍA ASOCIADA A VENTILACIÓN MECÁNICA

Bruna Vanessa Wagner¹, Evelyn Francini Alves², Christiane Brey³, Maria Caroline Waldrigues⁴, Cristiano Caveião⁵

ABSTRACT

Objective: identifying the nurses' knowledge level about nursing interventions designed to prevent ventilator-associated pneumonia. **Method:** a prospective study of a quantitative approach performed with nine nurses at a Private Hospital in Curitiba/PR. Data were collected from a questionnaire and analyzed and organized in electronic tables. It was approved the research project by the Research Ethics Committee, CAEE n° 10826412.7.0000.0095. **Results:** obtained general average of 81% of hits of the participants about the priority nursing interventions for prevention of pneumonia. **Conclusion:** the nurses demonstrated adequate knowledge of preventive interventions with VAP. We emphasize the importance of updates to health services in order to benefit the patient by means of prescribed care actions assertively by nurses. **Descriptors:** Intensive Care Unit; Ventilator-Associated Pneumonia; Prevention; Nursing.

RESUMO

Objetivo: identificar o nível de conhecimento do enfermeiro acerca intervenções de enfermagem destinadas à prevenção da pneumonia associada à ventilação mecânica. **Método:** estudo prospectivo de abordagem quantitativa realizada com nove enfermeiros de um Hospital Privado de Curitiba/PR. Os dados foram coletados a partir de um questionário e analisados e organizados em tabelas eletrônicas. Obteve aprovação do projeto de pesquisa no Comitê de Ética em Pesquisa, CAEE n° 10826412.7.0000.0095. **Resultados:** obteve-se média geral de 81% de acertos dos participantes acerca das intervenções de enfermagem prioritárias à profilaxia da pneumonia. **Conclusão:** os enfermeiros demonstraram nível adequado de conhecimento acerca das intervenções de caráter preventivo à PAVM. Ressalta-se a importância de atualizações nos serviços de saúde, a fim de beneficiar o paciente, por meio de ações de cuidados prescritas de modo assertivo pelo enfermeiro. **Descritores:** Unidade de Terapia Intensiva; Pneumonia Associada à Ventilação Mecânica; Prevenção; Enfermagem.

RESUMEN

Objetivo: identificar el nivel de conocimiento de las enfermeras acerca de las intervenciones de enfermería para prevenir la neumonía asociada a la ventilación mecánica. **Método:** estudio prospectivo de enfoque cuantitativo realizado con nueve enfermeras en un hospital privado en Curitiba/PR. Los datos fueron obtenidos a partir de un cuestionario y analizados y organizados en tablas electrónicas. El proyecto de investigación fue aprobado por el Comité de Ética en la Investigación, CAEE n° 10826412.7.0000.0095. **Resultados:** se obtuvo la media general de 81% de respuestas correctas en las intervenciones de prioridad en enfermería para la prevención de la neumonía. **Conclusión:** las enfermeras demostraron un conocimiento adecuado de las intervenciones preventivas con VAP. Hacemos hincapié en la importancia de cambios a los servicios de salud con el fin de beneficiar al paciente por medio de acciones de cuidado prescritas asertivamente por enfermeras. **Descriptors:** Unidad de Cuidados Intensivos; Ventilador Asociado a la Neumonía; Prevención; Enfermería.

¹Bruna Vanessa Wagner. Nurse, Postgraduate Student of Health Management, Pontifical Catholic University of Parana/PUCPR. Curitiba (PR), Brazil. Email: brunessa1@hotmail.com; ²Nurse, Postgraduate Student of Nursing in Urgency and Emergency, University Positivo/UP. Curitiba (PR), Brazil. Email: evelynfrancini1983@hotmail.com; ³Nurse, Specialist Professor of Public Health, Graduate Nursing, Integrated Colleges of Brazil/Unibrasil. Curitiba (PR), Brazil. Email: christianefrey@hotmail.com; ⁴Nurse, Professor Specialist in Educational Policies and Public Management, Graduate Nursing, Integrated Colleges of Brazil/Unibrasil, Master's Student of Education, Federal University of Parana/UFPR. Curitiba (PR), Brazil. Email: carolwaldrigues@hotmail.com; ⁵Nurse, Specialist in Health Management and Auditing, Master Teacher of Biotechnology, Graduate Nursing, Integrated Colleges of Brazil/Unibrasil. Curitiba (PR), Brazil. Email: cristiano_caveiao@hotmail.com

INTRODUCTION

The Intensive Care Unit (ICU) is a critical area for the hospitalization of severe patients who require specialized professional attention continuously, specific materials and technologies necessary for the diagnosis, monitoring and therapy.¹ Thus it can be considered therapy intensive the most complex and advanced level within the hierarchy of hospital services, given that it is possible to increase the chances of recompose the stable patient conditions and enable their recovery and survival.²

A key maintenance resource to life is used in ICU is mechanical ventilation (MV), which consists of an artificial form of treatment used to maintain oxygenation and/or ventilation of critically ill patients who develop respiratory failure, since they increment the survival of these in the most different situations.³ In contrast, increase the risk factors predisposing to acquire hospital infections (HI).

According to the National Health Surveillance Agency (ANVISA), among the main causes of infection acquired in the hospital environment are those of respiratory tract, especially pneumonia as more significant morbidity of patients admitted to ICU.⁴

Among these, Ventilator-Associated Pneumonia (VAP) is a lung infection that manifests itself between 48h from intubation and 72h after endotracheal intubation; it is studied as a distinct clinical entity, due to its clinical relevance and epidemiological profile, since its occurrence implies a longer stay under invasive ventilation and prolongs the stay in the ICU significantly,⁵ on average of 14 days.

The global mortality in episodes of VAP ranges from 20 to 60%, reflecting largely the severity of the underlying disease of these patients, organ failure and characteristics of the population studied and the etiologic agent involved. Estimates of mortality attributed to this infection vary in different studies, but approximately 33% of patients with VAP die as a direct result of this infection.⁶

It is observed that there are several factors that can influence the onset of VAP, namely: age above seventy years old; coma; level of consciousness; tracheal intubation and reintubation; immune conditions; use of immunosuppressive drugs; shock; severity of the disease; previous Chronic Obstructive Pulmonary Disease (COPD); prolonged mechanical ventilation more than seven days; sucked contaminated condensate circuit of the ventilator circuits; malnutrition;

exogenous contamination; antibiotic prophylaxis; microbial colonization; prolonged surgeries; aspiration of contaminated secretions; gastric colonization and this suction, the gastric pH (greater than 4).³

The knowledge of the above risk factors is of fundamental importance for the nurse interfere in decision making control and prevention of disease through the Nursing Process (NP) regulated by COFEN Resolution nº 358/2009, consisting of a methodological instrument that guides professional care of nursing and the documentation of professional practice, which is organized into five steps related, interdependent and recurrent, they are: history of nursing, nursing diagnosis, nursing planning, implementation and evaluation of nursing.⁷

The adoption of nursing interventions, ie, the fourth EP step ensures minimizing the occurrence of this disease amounting often in ICUs. The set of professional nursing responsibility actions is the foundation for prevention of this pneumonia; therefore elevation of the head, oral hygiene, endotracheal suctioning, and tracheostomy care are critical nursing interventions to prevent VAP.

Such interventions, in association with collaborative action of care, are foundation to reduce VAP rates and aid in customer homeostasis. It is extremely important that nurses act jointly with their team and other professionals, because the assistance provided should be intermittent and continuous, and cover the whole complex risk that customer may have.

Thus, Decree nº 94.406/87 that regulates the Law nº 7.498/86 on the exercise of Nursing, in its 8th Article specifies that it is for the nurse as a member of the health team the prevention and systematic control of nosocomial infection and communicable diseases in general.⁸

Given the relevance of the condition, to act precisely it is necessary a constant search for scientific knowledge, making it a challenge to the professionals in intensive care for the prevention and control of this. With this in mind, care should be guided by scientific principles, which requires nurses' changes in ways of thinking, being and acting before the demands and requirements of care practice.

Reflecting on the work process to take care of these professionals working in ICUs, made up the following question: what is the nurse's level of knowledge about the nursing interventions for the prevention of Ventilator-Associated Pneumonia?

OBJECTIVE

• Identifying the nurses' level of knowledge about the nursing interventions for the prevention of Ventilator-Associated Pneumonia.

METHOD

Article compiled from the Work Course Conclusion << Ventilator Associated Pneumonia: the nurses' knowledge about preventive measures >>, to the Graduate Nursing Course of the Integrated Colleges of Brazil/Unibrasil. Curitiba-PR, Brazil, 2013. Prospective research of a quantitative approach, which translated into numbers the information collected through the survey of statistical data; descriptive, when all the facts observed and analyzed were interpreted without interference from researchers, through specific instruments for data collection and, being cross-sectional, as described the population surveyed regarding its personal characteristics.⁹

It was held in a general ICU of a large private hospital situated in Curitiba, State of Parana, between March and April 2013.

There were invited to participate in the research nursing professionals according to the following inclusion criteria: being with active and regular registration in the Regional Nursing Council; working in direct patient care in the ICU; have employment with the institution where the research was applied

and performing their activities in the morning, afternoon or evening (night 1 and 2).

It had as exclusion criteria: professionals who belonged to another professional category; did not have higher education in nursing, not worked in direct patient care in the ICU, had no employment relationship with the institution where the research was applied; worked in another sector than the Intensive Care Unit and; refused to participate.

It is noteworthy that all participants who agreed to participate signed the Consent and Informed (IC).

The population consisted of ten (10) nurses, but the survey had a sample of nine (9) nurses who met the inclusion criteria.

To make the proposed objective, data collection took place through a questionnaire containing information about the socio-demographic profile, consisting of seven (7) closed questions, followed by eight (8) closed questions with direct interpretation, each one with true option or false, about the prevention of VAP, and we can have more than one correct answer.

After the selection of valid data, the same were organized in electronic tables and presented through a database Excel-2010 program. Data analysis was performed according to the proportion of correct answers of the respondents. Thereafter, numerically converted as percentage conversion scale in Figure 1:

Questions			Hits			
5 Alternatives	0 = 0%	1 = 20%	2 = 40%	3 = 60%	4 = 80%	5 = 100%
4 Alternatives	0 = 0%	1 = 25%	2 = 50%	3 = 75%	4 = 100%	

Figure 1. Conversion of the percentages of hits.

The overall average of correct answers of all questions was calculated. It is noteworthy that the patient care involves two dimensions when thinking about interventions, namely: direct interventions and indirect interventions. Direct interventions are understood as care actions related directly to the patient. Have indirect interventions reflect the care follow-up actions, ie, collaborative actions, but concomitantly become indispensable.

After analysis, the results were presented in four (4) tables with simple frequency description and percentage according to the direct and priority nursing interventions to prevent VAP, they are: elevation of the head, oral hygiene, endotracheal aspiration and tracheostomy care.

With regard to legal and ethical aspects of research with human subjects, we obtained

previous permission to the research at the Institution and followed the regulations of the National Health Council, according to provisions of Resolution nº 466/12 of the Ministry of Health.¹⁰ It was effectively developed from the analysis, assessment and subsequent approval by the Ethics Committee for Research in Health Area of the Integrated Colleges of Brazil (Unibrasil), according to CAEE nº 10826412.7.0000.0095 and Opinion nº 212.888/2013.

RESULTS

The sample was composed of nine (9) nurses working in ICU, seven (7) female and two (2) males. Regarding age, six (6) were between 20 to 30 years old and three (3) 31-40 years old. It was obtained as graduating time an average period of four years and six months, taking as time of work in ICU, and the

average of two years and six months. Of the participants five (5) have Postgraduation *Latu sensu*. As for the weekly working hours, nine (9) meet 36 hours and of these, eight (8) participated in scientific events on VAP.

To better understand the results, it formulated four tables in which the

percentage of correct responses about nursing interventions to prevent VAP are presented. Table 1 expresses the care of action results as the elevation of the head, the table 2 the care with oral hygiene, table 3 for the endotracheal suction system, and finally, table 4 that refers to care to tracheostomy.

Table 1. Knowledge of the nurse about the elevation of the headboard as intervention aimed at preventing the PAVM.

The elevation of the headboard	Hits	
	#	%
** Elevate the head the angle of 15° to avoid pulmonary aspiration	9	100
* Elevate the head at an angle of 30° to 45° to prevent pulmonary aspiration	9	100
**Let the patient in the supine position in the presence of enteral probe and mechanical ventilation to avoid pulmonary aspiration	7	78
* Keep the patient in semi-fowler position	9	100
* In situations of trauma (severe) of cervical, it must keep the head elevated at an angle of at least 30°	2	22
Weighted average	80%	

Note: *True alternative **False alternative

Table 2. Knowledge of the nurse about the oral hygiene as intervention aimed at preventing the PAVM.

Oral hygiene	Hits	
	#	%
** Oral hygiene is recommended in the patient only when observed signs of dirt in the oral cavity.	9	100
** We recommend the routine use of chlorhexidine, considering that this does not lead to germ resistance.	4	44
* We recommend the use of chlorhexidine oral only in high-risk situations, considering that its routine use can lead to germs resistance.	3	33
** It is not recommended the use of chlorhexidine oral	8	89
* It is recommended to perform the oral hygiene at least 3 x a day	9	100
Weighted average	73%	

Note: *True alternative **False alternative

Table 3. Knowledge of the nurse about the endotracheal suction as intervention aimed at preventing the PAVM.

Endotracheal suction	Hits	
	#	%
** Endotracheal suctioning should be performed under open system when PEEP is high	9	100
* The endotracheal aspiration must be carried out under closed system when PEEP is high	9	100
* The open endotracheal suction system is of single use, ie it must be used only once in the same patient and thrown	8	89
** The open endotracheal suction system is multipurpose, there is no need to Exchange every aspiration	8	89
* It is necessary to change the suction bottle between patients, since the PAVM spreads through contaminated materials	6	67
Weighted average	89%	

Note: *True alternative **False alternative

Table 4. Knowledge of the nurse about the tracheostomy care as intervention for the prevention of PAVM.

Tracheostomy care	Hits	
	#	%
* Change the tracheostomy tube with aseptic technique	9	100
* The tracheostomy facilitates the removal of tracheobronchial secretions	8	89
** It is a technique always used as urgency procedure	8	89
** Tracheostomy increases the risk of PAVM	5	56
Weighted average	84%	

Note: *True alternative **False alternative

The above findings highlight the related nursing interventions directly to the care of shares to be given to the patient. However, to prevent VAP is necessary to multidisciplinary approach, which involves collaborative approach and necessary measures, as well as the interface between the teams, including hand hygiene, the pressure of the cuff, intubation and reintubation, as well as

cleaning and disinfection of hospital medical equipment.

In this sense, to reflect on the interface between the multidisciplinary team, it has listed two issues: care with intubation and reintubation and maintenance of correct pressure of the cuff of an endotracheal tube, which was obtained as a weighted average 93% accuracy with Intubation and

reintubation. However, this percentage is reduced to 53% of correct answers when asked about the proper pressure cuff of an endotracheal tube.

In the case of collaborative measures that are indirectly linked to the prevention of VAP, we obtained 96% correct with respect to hand hygiene versus 60% with respect to cleaning and disinfection of hospital medical equipment.

DISCUSSION

Nursing interventions for the prevention of VAP are mostly carried out by the multidisciplinary team, especially in Nursing, which is responsible for several mechanisms of prevention, whether in administrative, supervisory or personnel training.

An intervention impact on the prevention of VAP, recommended to achieve optimal results, is related to the elevation of the head, which was observed facility to check the level of inclination between 30° and 45° or semi Fowler, because the client in supine facilitates aspiration, mainly when enteral nutrition which leads to increased incidence of VAP.¹¹

However, when dealing with the head high in customer severe neck trauma situation, yielded unsatisfactory results, with only 22% accuracy, because the initial moments after the impact, both on the local and trauma in the hospital represents a critical phase in the pathophysiology of brain injury, when appropriate fencing measures in a timely fashion can improve the neurological prognosis significantly, among them the elevation of the head at an angle of at least 30°. ¹²

Corroborating with the previous study, in addition to elevating the head demonstrate positive aspects, in combination with other prophylactic measures in reducing the incidence of VAP, this angle contributes to the maintenance of intracranial pressure (ICP).

A study also discloses that in clinical conditions that prevent elevation of the head in the indicated angle is recommended to adopt the total bed inclined position (reverse Trendelenburg position).¹³

Another nursing intervention essential to the patient subjected to MV is the proper cleaning of the oral cavity, because in these cases there is reduced salivary production and inability to chew, which encourages the development of dental biofilm, which can be a major reservoir for pathogens and if bronchoaspirated, can cause VAP.¹⁴

In this perspective, as those from results of this study it can be inferred that nurses recognize the effectiveness of pharmacological cleaning with use of chlorhexidine 0,12%, given that significantly reduces the incidence of VAP⁶; however, demonstrate a lack of knowledge about the routine use of chlorhexidine 0,12%, as this can lead to resistance by the germs, so it is recommended to use three times daily.^{3,14} Therefore, the care of the oral health goes beyond comfort, which requires the nurse theoretical and practical knowledge.

With respect to tracheal aspiration, it is an essential part of care for patients with artificial airway in order to keep the airways and ensure good ventilation and oxygenation.¹⁵

Regarding the type of system being used, there is the existence of two systems: open and closed. In the literature studied no scientific evidence of the superiority of the two systems.¹⁵ However, the closed system determines a lower risk of hypoxia, arrhythmias and contamination and should be preferred, particularly in situations which are used high PEEP levels.¹⁶

Regarding the open suction system, it was observed in a study (11%) one participant is unaware of the need to change it every aspiration, in order to reduce contamination.¹⁷ In the same sense, we obtained partial result, 66% of hits on the exchange of the suction bottle, because it must be changed between patients, given that VAP is transmitted through contaminated materials.¹¹ Therefore, it is considered a key issue to be investigated, since the deposited secretions the suction bottle can contaminate the hands of staff in service and consequently promote cross-infection.

Patient safety, as it is for the completion of the endotracheal aspiration procedure is directly related to the knowledge and the nurse's judgment, to assess the clinical and ventilatory conditions of their patients and plan more adequate methods and techniques aimed at prevent or minimize complications.

In respect to tracheostomy (TQT), some studies suggest that this reduces the incidence of VAP, facilitates weaning from mechanical ventilation and reduces the need for sedative.¹⁸ The TQT is a procedure routinely used in patients with prolonged OTI or those expected to MV prolonged, whose appointment is to decrease the discomfort with the artificial airway and facilitate the removal of pulmonary secretions.¹⁸ In addition to these indications, the TQT promotes patient comfort, prevents airway lesions and

facilitates the work of nursing because it facilitates access to oral cavity for proper hygiene, allows the transfer of the patient to the ICU and promotes psychological benefits to the patient.

With regard to indirect interventions it is emphasized that they must be in association with direct interventions to the patient, as they represent situation, people and external factors that influence the prevention of VAP. It is evident in this case, the surprising result about hand hygiene, as is a constant subject matter in the institutions that provide health care, it should give a result of 100% accuracy, which refers to analyze that, nurses being instrumental in the care, must be in constant interaction with the education process in service, aiming guide their actions to better serve patients and promoting transformation strategies in the care setting.

Another indirect intervention related to the environment is expressed by the equipment cleaning and disinfection in that the expansion of knowledge and the use of best practices for the implementation of the cleaning process, and eliminates visible dirt and reduce the pollution load surfaces, prevents the spread of microorganisms by adopting preventive measures and control, which makes an integral part of the nursing process.

When indirect interventions involve people, you can list a question yet to be discussed: the interface between the multidisciplinary team. Maintaining the correct pressure cuff in patients undergoing MV is essential and it must be maintained not less than 20 cm H₂O to prevent excessive suction¹⁹, and not more than 30 cm H₂O to prevent ischemia of the tracheal mucosa.¹¹

Obtained only 53% of correct responses about this prophylactic measure, it is believed that because in most cases, the professional physiotherapist is responsible for the verification of this pressure.

International studies carried out in 2011, observed changes in cuff pressure after some situations, such as changing positions, tracheal aspiration and agitation.²⁰⁻¹ Thus, we can infer that there is a need to invest in professional nursing knowledge about the foregoing, since this provides the patient continuing care.

Regarding intubation and reintubation, highlights the need for interface between nursing staff and medical staff, as despite getting 93% correct about that collaborative action, there were participants who were unaware that reintubation should be avoided, since it reduces the efficacy of the natural

defense mechanisms of the system and facilitates the development of VAP, due to the aspiration of oropharyngeal pathogens to lower airways.¹⁵ Therefore, we emphasize care in avoiding unplanned extubation.

CONCLUSION

Hospital infections while bound occurrence both to intrinsic conditions of the patient as to the actions/procedures performed by the multidisciplinary team, have been the subject of discussions and reflections by workers in the health area.

Among these infections, VAP is a serious infection that affects the customers of lung mechanical ventilation and its occurrence is linked to the inappropriate use of measures that prevent the emergence of this infection in the ICU.

Arguably this study meant that the actions relating to the care practice of nursing professionals should be informed by scientific knowledge, because when applied to prevention, causes changes in the work process. Allied to scientific knowledge, the nurse has an important tool capable of direct patient care, the Nursing Process (NP). In this sense, it is emphasized that, although this study has focused on only one of the five steps of the Nursing Process, it must be sequential, as well as to reduce the incidence of VAP, nurses must constantly evaluate preventive strategies and cover greater investments in educational programs, and greater involvement of the health team in the constant search for a more humane and better the critical patient care, reducing the extrinsic factors of exposure to infection.

It is believed that this study may contribute to further discussions, despite the care practice, since the knowledge associated with the accession of preventive interventions are the basis for quality of care.

Although nurses have demonstrated in this study an adequate level of knowledge about preventive interventions with VAP, it emphasizes the importance of updates to health services in order to benefit the patient by means of prescribed care actions assertively by nurses.

It is inferred also the need for greater emphasis on curriculum model of Nursing Graduate courses within the Intensive Care, because knowledge generates interest and preparation for acting in the due sector. It is therefore basic that the training of health care academic contemplates the actions of prevention and control of hospital infections.

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Corresponding Address

Bruna Vanessa Wagner
Rua José Fabiano Barcik, 94, bloco 22, Ap. 01
Bairro Cajuru
CEP 82940-050 – Curitiba (PR), Brazil