https://dx.doi.org/10.22161/ijaers.75.13 ISSN: 2349-6495(P) | 2456-1908(O)

Clinical-Epidemiological profile of Patients who acquired Pneumonia Associated with Mechanical Ventilation in an ICU inside the State of Rondônia

Iuri Santana de Jesus[1*], Gleison Faria[2*], Letícia Rodrigues de Souza Leal[3], Marcos Vinicius Amabile[4], Welida Jeysiane Mateus Carvalho[5], Welida Cristina Pereira Ramos[6], Jhennyffer Oliveira Eller[7], Emily Kelly Ferreira Gomes Santos[8], Leonice Vieira dos Santos Pedro[9], Vinícius Gabriel Dumer Bressa[10], Juliana P. Vendrusculo[11]

[1*]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020) -Member of the academic league of urgency and emergency in nursing – LAUENF
[2*]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020) -Member of the academic league of urgency and emergency in nursing – LAUENF
[3] Nurse at the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[4] Nurse at the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[5]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[6]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[7]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[8]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[9]Graduating in Nursing from the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[10]Nurse at the Faculty of Biomedical Sciences of Cacoal - FACIMED (2020)
[11] Advisor, professor of the Undergraduate Nursing Course at the Faculty of Biomedical Sciences of Cacoal - FACIMED. Graduation in nursing from the Regional University of the Northwest of the State of Rio Grande do Sul (2002). Latosensu Post-Graduation in Occupational Health by the same university (2003), Didactics of Higher Education by Facimed (2007) and Hospital Infection Control by Unileya (2019).
*Correspondent author

Abstract**—** *Infections in the hospital environment are a serious problem in the intensive care unit environments. Mechanical ventilation-associated pneumonia (VAP) is the second most frequent infection in American and European Intensive Care Units (ICUs). This project aimed to outline the clinical-epidemiological profile of patients admitted to an Intensive Care Unit. It is descriptive, documentary, with a quantitative approach. Data were collected using a specific form, directly from the patients' medical records and, afterwards, underwent a quantitative analysis process. Information was collected from 17 patients, through their medical records, who developed VAP in an Intensive Care Unit from January to December 2018, with two patients developing the infection twice. Thus, 100% of patients who developed VAP in the period were surveyed. The incidence density of VAP during the period in the studied unit was 5.6 cases for every 1000 mechanical ventilators / day. At the outcome of the clinical course of patients hospitalized with VAP, the mortality rate was 41% due to VAP, however, 24% of the patients died of other complications, 35% were successful in the treatment and management of VAP. Knowledge about these data is of great importance in the creation of assessment instruments in nursing care, gaining gains in the evolution of the clinical condition of patients, providing nurses with better planning of their health care actions.*

Keywords**— Pneumonia associated with mechanical ventilation, ICU, Epidemiologicalclinical profile.**

https://dx.doi.org/10.22161/ijaers.75.13 *ISSN: 2349-6495(P) | 2456-1908(O)*

PERFIL CLÍNICO-EPIDEMIOLÓGICO DOS PACIENTES QUE ADQUIRIRAM PNEUMONIA ASSOCIADA À VENTILAÇÃO MECÂNICA EM UMA UTI NO INTERIOR DO ESTADO DE RONDÔNIA

Resumo— *As infecções no ambiente hospitalar constituem um grave problema nos ambientes de unidade de terapia intensiva. A pneumonia associada à ventilação mecânica (PAV) é a segunda infecção mais frequente em Unidades de Terapia Intensiva (UTIs) americanas e europeias. Este projeto teve como objetivo traçar o perfil clínico-epidemiológico dos pacientes internados em uma unidade de Terapia Intensiva. É de caráter descritivo, documental, com abordagem quantitativa. Os dados foram coletados por meio de formulário próprio, diretamente do prontuário dos pacientes e, após, sofreram um processo de análise quantitativa. Foram coletadas informações de 17 pacientes, através de seus prontuários, os quais desenvolveram PAV em uma Unidade Terapêutica Intensiva no período de janeiro a dezembro de 2018, sendo que dois pacientes desenvolveram a infecção por duas vezes. Assim, foram pesquisados 100% dos pacientes que desenvolveram PAV no período. A densidade de incidência de PAV no período na unidade estudada foi de 5,6 casos para cada 1000 ventiladores mecânicos/dia. Ao desfecho do curso clínico dos pacientes internados com PAV, a taxa de mortalidade foi de 41% por PAV, entretanto, 24% dos pacientes evoluíram a óbito por outras complicações, 35% tiveram êxito no tratamento e conduta da PAV. O conhecimento sobre esses dados é de grande importância na criação de instrumentos de avaliação na assistência em enfermagem, adquirindo ganhos na evolução do quadro clínico dos pacientes, proporcionando, ao enfermeiro, planejando melhor suas ações ao cuidado em saúde.*

Palavras-chave— Pneumonia associada a ventilação mecânica, UTI, Perfil clínico epidemiológico.

PERFIL CLÍNICO-EPIDEMIOLÓGICO DE PACIENTES QUE ADQUIRIERON NEUMONÍA ASOCIADA A VENTILACIÓN MECÁNICA EN UNA UCI DENTRO DEL ESTADO DE RONDÔNIA

Resumen— *Las infecciones enel entorno hospitalariosonun problema grave enlos entornos de unidades de cuidados intensivos. La neumoníaasociada a la ventilaciónmecánica (VAP) es la segunda infección más frecuenteen las Unidades de Cuidados Intensivos (UCI) estadounidenses y europeos. Este proyectotuvo como objetivo esbozarel perfil clínico-epidemiológico de los pacientes ingresados en una Unidad de Cuidados Intensivos. Es descriptivo, documental, conun enfoque cuantitativo. Los datos se recopilaron utilizando unformulario específico, directamente de los registros médicos de los pacientes y, posteriormente, se sometieron a unproceso de análisiscuantitativo. Se recopilóinformación de 17 pacientes, a través de sus registros médicos, que desarrollaron VAP en una Unidad de Cuidados Intensivos de enero a diciembre de 2018, y dos pacientes desarrollaron la infección dos veces. Por lo tanto, se encuestó al 100% de los pacientes que desarrollaron VAP enel período. La densidad de incidencia de VAP enel período estudiadoen la unidadfue de 5,6 casos por cada 1000 ventiladores mecánicos / día. Enel resultado del curso clínico de los pacientes hospitalizados con VAP, la tasa de mortalidadfuedel 41% debido a VAP, sin embargo, el 24% de los pacientes fallecieron por otrascomplicaciones, el 35% tuvieronéxitoeneltratamiento y manejo de la VAP. El conocimiento sobre estosdatos es de granimportanciaen la creación de instrumentos de evaluaciónenel cuidado de enfermería, ganando ganancias en la evoluciónde la condición clínica de los pacientes, brindando a las enfermeras una mejorplanificación de sus acciones de atención médica.*

Palabras clave— Pneumoníaasociada a ventilaciónmecánica, UCI, perfil clínico epidemiológico.

I. INTRODUCTION

Hospital infection, also defined as health care-related infection (HAI) is that acquired during the patient's stay in the unit, which can be attributed to some type of procedure performed and present his symptoms even after the patient's discharge.

Mechanical ventilation-associated pneumonia (VAP) is the second most frequent infection in American and European Intensive Care Units (ICUs). In Brazil, even with the absence of national and multicenter data, individual tests also show VAPs as the most constant infections within ICUs (MORAES et al., 2013).

Hospital pneumonia is defined as pneumonia that occurs within 48 hours of the patient's admission. It is often associated with the use of mechanical ventilation (MV) and is called Pneumonia Associated with Mechanical Ventilation (VAP). Pneumonia associated with mechanical

https://dx.doi.org/10.22161/ijaers.75.13 ISSN: 2349-6495(P) | 2456-1908(O)

ventilation is associated with an increase in the hospitalization period, increased mortality and increased hospital costs (MILLER, 2018).

In the Intensive Care Unit, prolonged hospitalization and the complications of this hospitalization may be related to the clinical epidemiological profile of patients who use the service. Basic diseases, length of stay, as well as the use of invasive devices can contribute to increasing the susceptibility of patients to Health Care Related Infections (COSTA et al., 2016; COSTA; MOTTA; AFRADIQUE, 2018; BAHLIS , 2018).

Patients submitted to the care of an intensive care unit are continuously susceptible to pneumonia associated with mechanical ventilation during their hospital stay. The factors that can lead to the development of VAP can be classified as modifiable and non-modifiable. Unmodifiable factors are: age, severity score when the patient enters the ICU and presence of comorbidities, heart failure, chronic obstructive pulmonary disease, diabetes, neurological diseases, neoplasms, trauma and postoperative surgeries. The modifiable factors are related to the environment (microbiota) of the ICU itself. It is estimated that VAP has an incidence of 9 to 27% with a mortality rate of 25 to 50% (PERUGINI et al., 2015; MACHADO, 2018).

This study is justified by the need to know the epidemiological clinical profile of patients who acquired nosocomial infection in intensive care, as well as on the risk factors for VAP, to interfere in the decision-making for the control and prevention of the disease. Knowledge about the profile of patients who acquire VAP helps to improve the care provided, with intensive care professionals who seek knowledge for quality care, including the education of health professionals in the care provided to the patient. This information will enable better targeted and effective actions to prevent this event, based on the principle that knowledge is the first step towards improving health care. (RUAS et al., 2018). The perspective is that these data will collaborate with health services, thus having a better assistance to critically ill patients, reducing, among others, mortality and hospital infection rates.

The study aimed to identify the clinical-epidemiological profile of patients diagnosed with Pneumonia Associated with Mechanical Ventilators in an ICU in the interior of the State of Rondônia, from January to December 2018.

The results of this study contribute to support the results of research on VAP, and can serve as a comparison with rates of other health facilities. This research tends to obtain relevant and specific data on patients who developed VAP, such as invasive procedures, and to analyze whether patients who acquired such infection have a longer period of use of mechanical ventilator and stay in the ICU, emphasizing the importance of developing techniques for Infection control.

II. MATERIALS AND METHODS

The project was submitted for evaluation by the Ethics and Research Committee of the Faculty of Biomedical Sciences of Cacoal - FACIMED, being approved under CAAE 12638919.9.0000.5298, under the opinion 3.349.685. Then, the data collection was authorized by the Direction of the Regional Hospital of Cacoal and Management of Teaching and Research of the institution. Data collection took place from August 1 to September 5, 2019. The research to be developed is descriptive, transversal, documentary, with a quantitative approach.

This study was developed according to the steps determined in the schedule. We searched for scientific articles for theoretical reference, where we selected the articles that contained epidemiological analyzes similar to the one studied at work, data regarding the relation of VAP, sex, age, clinical history, discharge / death.

The data were collected from the Hospital Infection Control Commission (CCIH) and the Medical and Statistics Archive Service (SAME) of the institution, in order to identify the clinical-epidemiological profile of patients diagnosed with Pneumonia Associated with Mechanical Ventilators during hospitalization. in the ICU. For data collection, a questionnaire prepared by the authors themselves was used, containing 12 open questions and 8 closed questions, based on the objectives of the study.

The sample consisted of the total population of medical records of patients who acquired Pneumonia Associated with Mechanical ventilation during admission to the adult ICU, which is composed of ICU I and ICU II, from January to December 2018, making a total of 17 medical records.

VAP incidence density was calculated, patients were grouped by age group, gender, clinical history, in-hospital mortality rate, mean age, mean length of stay in the ICU, mean intubation time, outcome in the clinical case, length of stay of the Orotracheal Intubation device, Tracheostomy and Mechanical Ventilation.

For the calculation of the incidence of VAP, we use the recommendation of Brasil (2017), which states that the incidence density is the number of new cases of a

https://dx.doi.org/10.22161/ijaers.75.13 *ISSN: 2349-6495(P) | 2456-1908(O)*

disease, divided by the number of people at risk, and the calculation must be performed using if the formula:

$$\text{DI in PAV} = \frac{\text{N° of new cases of PAV in the surveillance period}}{\text{N° of MV patients} - \text{day in the surveillance period}} \text{X } 1000$$

DI - Incidence Density.

PAV - Pneumonia Associated with Mechanical Ventilation.

VM - Mechanical ventilation.

III. RESULTS AND DISCUSSION

Information was collected from 17 patients, through their medical records, who developed VAP in an Intensive Care Unit from January to December 2018, with two patients developing the infection twice. Thus, 100% of patients who developed VAP in the period were surveyed.

The incidence density of VAP during the period in the studied unit was 5.6 cases for every 1000 mechanical ventilators / day. According to Dalmora (2013) apud Costa (2018), VAP rates in different units are extremely discrepant, ranging from 6% to 50% of incidence, representing, according to studies, 27% and 47% of all hospital infections and 9% to 40% of infections acquired in the ICU environment. Data on the epidemiology of the incidence of VAP vary widely and depend on the type of patient admitted to the Intensive Care Unit, the demographic characteristics of the location, the infrastructure offered by the hospital, the infection control systems of the hospital and the donation of protocols to prevent this condition. Hospitals with effective surveillance and a hospital infection control program have a frequency of pneumonia 20% lower than those that do not.

The 17 studied patients who had received VAP notification were separated according to sex, which demonstrated that there was a predominance of male patients, 58% men and 42% women, as shown in Figure 1. In this study, patients were also separated according to the age group, determining that the patients affected in the studied hospital unit have an average age of 47 years, with a range between 18 and 78 years of age. Despite having a higher incidence among men, there is no statistical data to prove the data presented in this study, evaluating gender as an indifferent factor regarding the risk of contracting the disease (COSTA; MOTTA; AFRADIQUE, 2018).

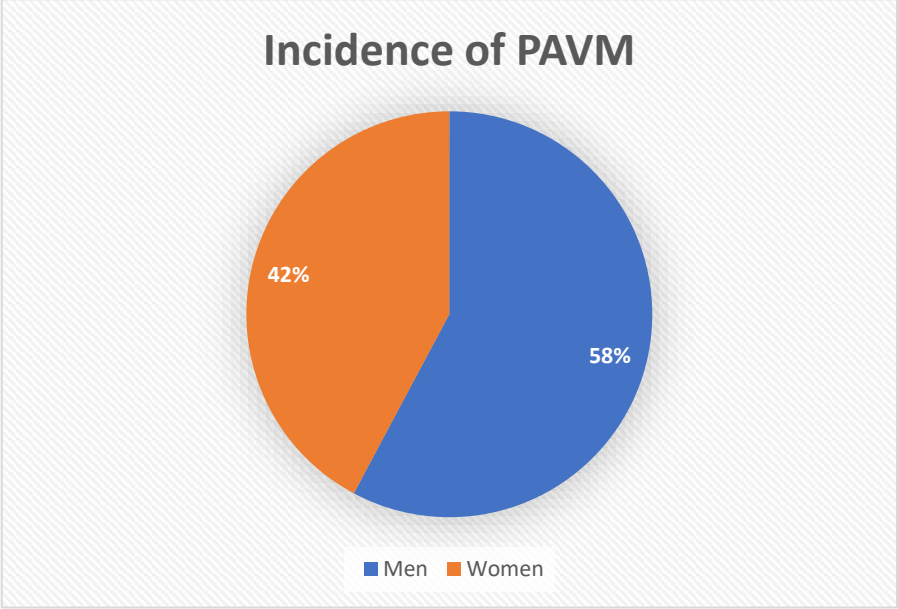

Fig.1 - Distribution of patients with VAP according to sex. Cacoal, 2018.

Source: Graph extracted from the questionnaire developed by the authors, 2019.

Women with VAP have an average age of 53.5 years, while men have an average age of 45.9 years. Thus, the survey obtained a percentage of 59% of patients who acquired VAP who are between 46 and 78 years of age, characterizing, therefore, a condition that affects individuals of adult life and advanced age. Researchers indicate that there is a higher incidence of VAP in elderly patients than in young patients. Justifying the higher incidence in elderly patients due to their greater susceptibility to infection due to a weakened immune system, with a body with less capacity and cardiorespiratory reserves, less kidney function, sometimes accompanied by a series of chronic diseases that aggravate their condition. health and by the physiological aging process itself, which decreases the capacity for faster

https://dx.doi.org/10.22161/ijaers.75.13 ISSN: 2349-6495(P) | 2456-1908(O)

recovery, so young people have the fastest recovery performance (COSTA; MOTA; AFRALDIQUE, 2018).

The average age of the patients who constituted this mortality rate is 56.2 years, while the average age of those who had therapeutic results was 36 years. This study demonstrated that there is a higher mortality among patients who are older. However, MOTA et al. (2017) say that the age factor, by itself, has restricted representativeness when seen in isolation, placing older patients in a broader context, one can assess age as a predisposing factor, but not in isolation.

The reason that led the patients to be hospitalized were post-surgical cases, trauma, CRF + hypoglycemia, ischemic stroke, with that, the patients had complications, requiring intubation due to their general condition. Coincidentally, a longer period of exposure to mechanical ventilation and a longer prolongation in the ICU environment influence an increase in the risk of contracting VAP. In general, they are patients coming from surgical clinics, post-surgical, who had more cases, where more cases of VAP were observed.

The reason that led patients to admission to the Intensive Care Unit in the period was 18% of cases in the post-surgical period, 18% due to a lower level of consciousness, 11.7% due to a traffic accident causing trauma, 11.7% due to dyspnea associated with ARDS. All other causes had 5.8% each, with CRF + Surgical Hypoglycemia, chronic alcoholism, aggression, pesticide poisoning, Ischemic Stroke and Seizure Crisis (Table 1).

Table 1 - Relative and absolute distribution of patients with VAP according to the reason for hospitalization. Cacoal, 2018

Reason for hospitalization	Amount	%
Post-surgical	3	18%
Lowering the level of consciousness	3	18%
Trauma	2	11,7%
SARA-associateddyspnea	2	11,7%
IRC + Hypoglycemia	1	5,8%
Surgical	1	5,8%
Chronicalcoholic	1	5,8%
Aggression	1	5,8%
PesticideIntoxication	1	5,8%
Ischemicstroke	1	5,8%
ConvulsiveCrisis	1	5,8%
Grand total	17	100%

Source: Graph extracted from the questionnaire developed by the authors, 2019.

In basic diseases, we obtained a result of 59% of patients who had SAH, 29.4% did not have any type of basic diseases, with 5.8% AIDS, 5.8% Epilepsy. Within these cases, 23.5% of the patients had more than one underlying disease, they are, one case of Slender Carcinomatosis and SAH, one case of COPD and one case of Diabetes Mellitus and SAH, one case of Sigmoid Adenocarcinoma. Recent studies show that the final sample patients with 49% have COPD, SAH, DM, that is, most of the time the patients are already diagnosed with some type of underlying disease (BAHLIS, 2018).

After the date of intubation, we obtained an average of 17 days until the date of diagnosis of the infection, with the shortest time of infection in 2 days, and the longest time of 68 days. Therefore, the data related to the permanence time of the Orotracheal Intubation, Tracheostomy and Mechanical Ventilation device were analyzed. Figure 2 shows the distribution of patients with VAP according to the length of stay, with the average permanence of the devices in patients with VAP being 35 days. Patients lack a certain length of hospital stay and, on average, remained hospitalized for 60.7 days. In the research, the longest stay recorded was 195 days, and the shortest stay was 10 days. Some authors point out that there is a statistical basis in relation to the increased permanence in mechanical ventilation and the increased incidence of VAP. The disease has a favorable relationship to a longer duration of ventilatory support, in addition, they declare that a longer period of need for MV entails a greater risk of contracting VAP (SÃO PAULO, 2019).

https://dx.doi.org/10.22161/ijaers.75.13 ISSN: 2349-6495(P) | 2456-1908(O)

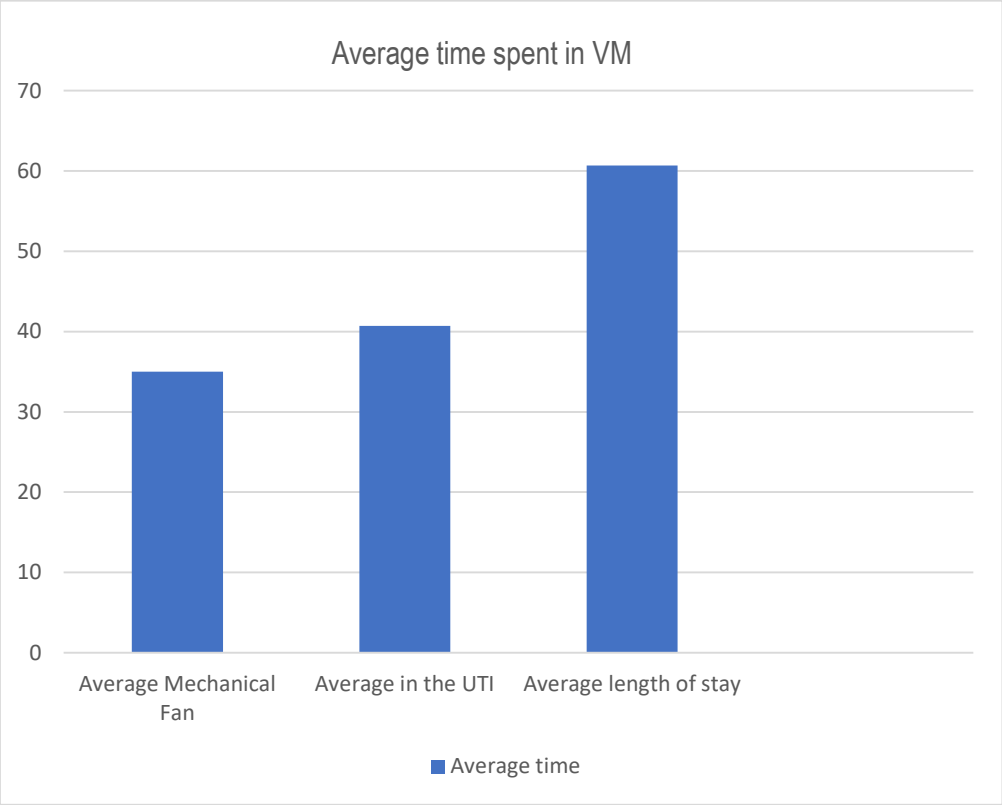

Fig.2 - Distribution of patients with VAP according to length of stay. Cacoal, 2018

Source: Graph extracted from the questionnaire developed by the authors, 2019.

Regarding the outcome of the clinical course of patients hospitalized with PAV, the mortality rate was 41% due to PAV, however, 24% of the patients died of other complications, 35% were successful in the treatment and management of PAV and underlying pathology that led patients to need hospitalization in an intensive care setting, which can be seen in figure 3. It is important to note that, even having acquired PAV, this was not the cause of death in all cases, some cases were for other complications such as, multiple organ failure, septic shock, stroke.

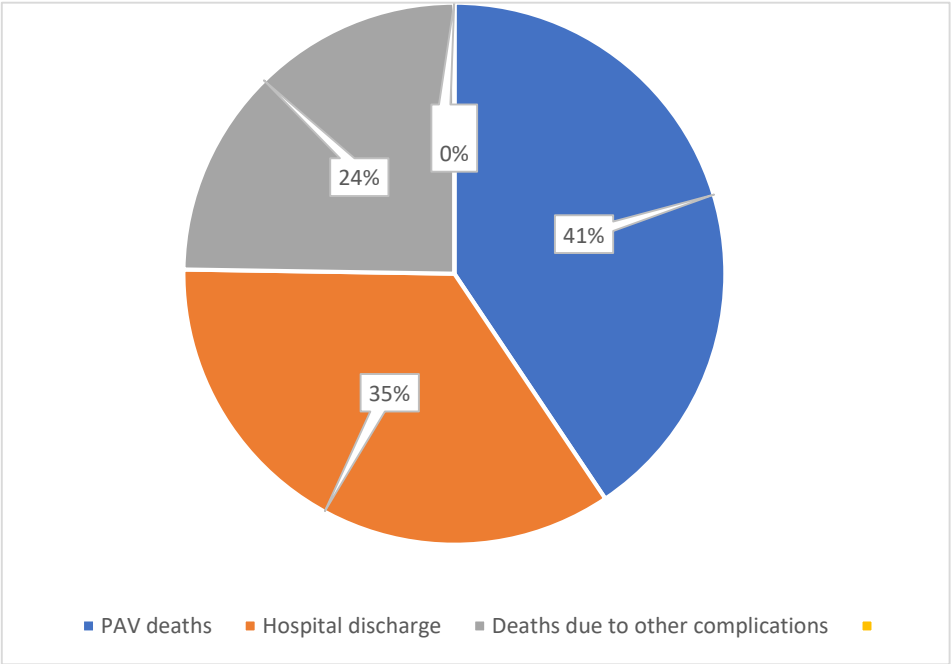

Fig.3 - Distribution of the studied patients according to the clinical outcome in general. Cacoal, 2018.

https://dx.doi.org/10.22161/ijaers.75.13 *ISSN: 2349-6495(P) | 2456-1908(O)*

IV. FINAL CONSIDERATIONS

Through this study it was possible to conclude that the ICU is an important unit for the local health system, where critically ill patients are admitted who, mainly, are hospitalized due to accidents or surgical specialties. The incidence of VAP analyzed in the Intensive Care Unit was 5.6 cases per 1000VM-day, which can be considered within the normal range, using several studies as reference. The mortality rate of VAP comprises 41%, being linked to patients with a more advanced age group and a longer time in the ICU and with MV.

Among other conclusions that can be drawn from this research is that there is a need to include technologies to provide diagnostic tools that are further improved and provided for in the main diagnostic protocols, which would include data on the epidemiological profile and a strengthening of patient care. In addition, it is understandable that there is a need in accordance with the rules for providing VAP for the adoption of prevention bundles, which are practices that have been proven to prevent VAP. Based on this epidemiological profile, it is believed that these indexes can be used in the preparation of health and class indicators in patient care in the ICU, in addition, outlining tactics for the prevention and treatment of this very serious condition affecting a large number of people.

We concluded that the objectives of this project were achieved, leading researchers and readers to understand the importance of the epidemiological clinical profile of patients who acquired VAP in a hospital unit, improving the quality of patient care, helping with strategies for treatment and prevention.

Therefore, this study can contribute to the creation of assessment instruments in nursing care, gaining gains in the evolution of patients' clinical condition, reducing mortality and hospital infection rates. However, we suggest the development of new similar studies, with new data, thus expanding on the impact on the care process in Intensive Care Units.

REFERENCES

[1] ANVISA. **Prevenção de pneumonia**: veja medidas específicas recomendadas pela ANVISA, 2017. Disponível em: https://www.segurancadopaciente.com.br/protocolo-diretrizes/prevencao-depneumonia-veja-medidas-especificas-recomendadas-pela-anvisa/. Acessado em: fevereiro de 2019.

[2] ANVISA. **Critérios Diagnósticos de Infecções Relacionadas à Assistência à Saúde**, 2017. Disponível em: http://portal.anvisa.gov.br/documents/33852/3507912/Cadern o+2++Crit%C3%A9rios+Diagn%C3%B3sticos+de+Infec%C3%A7%C3%A3o+Relacionada+%C3%A0+Assist%C3%AAncia+%C3%A0+Sa%C3%BAde/7485b45a-074f-4b34-8868-61f1e572450. Acessado em: fevereiro de 2019

[3] AHLIS, L. F.; DIOGO, L. P.; KUCHENBECKER, R. S.; FUCHS, S. C. Perfil l clínico, epidemiológico e etiológico de pacientes internados com pneumonia adquirida na comunidade em um hospital público do interior do Brasil. **J BrasPneumol.** V.44(4), p. 261-266, 2018. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806037132018000400261&lng=pt&nrm=iso&tlng=pt. Acessado em: fevereiro de 2019

[4] COSTAS, J. B.; COSTA, A. L.; TORRES, F.; SILVA, A. F. G. S.; TERRA, J. A. T. Os Principais Fatores de Risco da Pneumonia Associada à Ventilação Mecânica em UTI Adulta. **Revista Científica da Faculdade de Educação e Meio Ambiente.** V.7(1): p. 80-92, jan-jun2016. Disponível em: http://www.faema.edu.br/revistas/index.php/Revista-FAEMA/article/view/361. Acessado em março de 2019

[5] COSTA, R. S.; MOTTA, L. C. S.; ALFRADIQUE, M. D. O Perfil Epidemiológico do Paciente com Pneumonia Associada à Ventilação Mecânica. **Revista da Faculdade de Medicina de Teresópolis**. Vol. 2 | N. 02, 2018. Disponível em: http://rcs.fmit.edu.br/index.php/rcsfmit_zero/article/view/766. Acessado em março de 2019

[6] LOSS, S. H.; OLIVEIRA, R. P.; MACCARI, J. G.; SAVI, A.; BONIATTI, M. M.; HETZEL, M. P.; DALLEGRAVE, D. M.; BALZANO, P. C.; OLIVEIRA, E. S.; HOHER, J. A.; TORELLY, A. P.; TEIXEIRA, C. **A realidade dos pacientes que necessitam de ventilação mecânica prolongada: um estudo multicêntrico**, 2015. Disponível em:

[7] MACHADO, L. G. **Etiologia, fatores de risco e terapia inapropriada em pneumonias associadas à ventilação em pacientes adultos internados em uma unidade de terapia intensiva de um hospital de ensino no Brasil**. Sistema de Bibliotecas da UFU, MG, fev. 2018. Disponível em:https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=8&ved=2ahUKEwj44ruthLXhAhVZILkGHfgCBPcQFjAHegQIBxAC&url=https%3A%2F%2Frepositorio.ufu.br%2Fbitstream%2F123456789%2F20795%2F3%2FEtiologiaFatoresRisco.pdf&usg=AOvVaw1e3TPsXHE-t-phv1nkd4F8. Acessado em: março de 2019

[8] MILLER, F. **Pneumonia Associadas à Ventilação Mecânica**. Junho, 2018. Disponível em: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjj44Wop7DhAhVJJrkGHR6tDpYQFjAAegQIABAC&url=https%3A%2F%2Fwww.sbahq.org%2Fwpcontent%2Fuploads%2F2018%2F07%2F382_portugues.pdf&usg=AOvVaw2gZvvw3v1kOp6G4zFgH_ei. Acessado em março de 2019

[9] MOTA, E. C.; OLIVEIRA, S. P.; SILVEIRA, B. R. M; SILVA, P. L. N; OLIVEIRA, A. C. **Incidência da pneumonia associada à ventilação mecânica em unidade de terapia intensiva Medicina** (Ribeirão Preto, Online.) 50(1):39-46, 2017. Disponível em:

http://revista.fmrp.usp.br/2017/vol50n1/AO5-Incidencia-dapneumoniaassociada-a-ventilacao-mecanica-em-UTI.pdf. Acessado em: Março de 2019

[10] NEVES, M. J. **Pneumonia Associado a Ventilação Mecânica em UTI**. Sociedade Paulista de Infectologia. cap.3/18, 2013. Disponível em: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=15&ved=2ahUKEwj__9auibDhAhXmIbkGHYcbA3E4ChAWMAR6BAgGEAI&url=http%3A%2F%2Ftcconline.utp.br%2Fmedia%2Ftcc%2F2015%2F01%2FPNEUMONIA-ASSOCIADAAVENTILACAOMECANICAEMUTI.pdf&usg=AOvVaw07860W7LjTSy6UTb5Q66Sc. Acessado em: março de 2019

[11] OLIVEIRA, H. M.; SILVA, C. P. R.; LACREDA, R. A. **Políticas de controle e prevenção de infecções relacionadas à assistência à saúde no Brasil**: RevEscEnferm USP. 50(3):505-511, 2016. Disponível em: http://www.scielo.br/pdf/reeusp/v50n3/pt_0080-6234-reeusp-50-03-0505.pdf. Acessado em abril de 2019

[12] PERUGINI, M. R. E.; PERUGINI, V. H.; FIGUEIRA, F. D.; FONTANA, L. M. S.; DINIZ, J. J.; SANTOS, D. L. D.; BELEI, R. A.; VESPERO, E. C.; PELISSON, M.; STIPP-ABE, A. T.; CAPOBIANGO, J. D. **Impacto de um *bundle*nas taxas de pneumonia associada à ventilação mecânica (PAV) em uma unidade de terapia intensiva pediátrica em Londrina-PR.** Semina: Ciências Biológicas e da Saúde, Londrina, v.36, p. 259-266, ago. 2015. Disponível em: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwj6m9OvirXhAhWiD7kGHXWHDY0QFjABegQIAxAC&url=http%3A%2F%2Fwww.uel.br%2Frevistas%2Fuel%2Findex.php%2Fseminabio%2Farticle%2FviewFile%2F19396%2F17008&usg=AOvVaw2FjghuUXxV9pBoIUUHc8mo. Acessado em maio de 2019

[13] POMBO, C. M. N.; ALMEIDA, P. C.; RODRIGUES, J. L. N. **Conhecimento dos profissionais de saúde na Unidade de Terapia Intensiva sobre prevenção de pneumonia associada à ventilação mecânica. Universidade Federal do Ceará**, 2010**.** Disponível em: 14 http://www.scielo.br/scielo.php?script=sci_abstract&pid=S141381232010000700013&lng=en&nrm=iso&tlng=pt. Acessado em: agosto de 2019

[14] RUAS, S. J. S.; SANTOS, R. S.; OLIVEIRA, H. M.; JUNIOR, R. F. S.; NASCIMENTO, A. P. O.; BARBOSA, R. R. S.; SANTOS, J. R. F.; ARCANJO, I. N.; PEREIRA, S. G. S.; LOPES, J. R.; SILVA, C. S. O.; FLECHA, D. A.; ROCHA, S. F.; EUGÊNIO, K. K.; GOMES, N. T. **Perfil dos pacientes internados em unidade de terapia intensiva que adquiriram infecção relacionada à assistência à saúde**. Revista Eletrônica Acervo Saúde. Vol. Sup. 11, 2018. Disponível em: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwivhuR_6XhAhV_HrkGHSD0AJQQFjAAegQIARAC&url=http%3A%2F%2Facervosaud.dominiotemporario.com%2Fdoc%2FREAS142.pdf&usg=AOvVaw3eUWPoX2k8yM1Th0oo7IG9. Acessado em setembro de 2019

[15] SANTOS, C. R.; COSTA, B. H. S.; DIAS, T. K. C.; GUEDES, H. C. S.; PAZ, M. S. S.; OLIVEIRA, T. C.; SILVA, J.; SILVA, J. N. B.; MARINHO, H. L. M. **Fatores de Risco que Favorecem a Pneumonia Associada à Ventilação Mecânica**. Revenferm UFPE. Recife, 12(12):3401-15, dez, 2018. Disponível em: file:///C:/Users/Usuario/Downloads/235025-129161-1-PB.pdf. Acessado em setembro de 2019

[16] SÃO PAULO. **Manual de orientações e critérios diagnósticos**, 2019. Disponível em: http://www.saude.sp.gov.br/resources/cve-centro-de-vigilancia-epidemiologica/areas-de-vigilancia/infeccao-hospitalar/2019/definicoeseconceitos.pdf. Acessado em setembro de 2019

[17] SOUZA, E. S.; BELEI, R. A.; CARRILHO, C. M. D. M.; MTSUO, T.; YAMADA-OGATTA, S. F.; ANDRADE, G.; PERUGINI; M. R. E.; PIERI, F. M.; DSSUNTI, E. M.; KERBAUY, G. **Mortalidade e Risco Associados a Infecção Relacionada à Assistência à Saúde**. Florianópolis, 2015 Jan-Mar; 24(1): 220-8. Disponível em: http://www.scielo.br/pdf/tce/v24n1/pt_0104-0707-tce-24-01-00220.pdf. Acessado em setembro de 2019