

Relationship between ventilator-associated pneumonia and permanence in an intensive care unit

RESUMO | Objetivo: Analisar a relação de incidência de Pneumonia associada à ventilação mecânica (PAV) com o aumento da média de permanência em pacientes de terapia intensiva. Método: Pesquisa quantitativa, retrospectiva, descritiva e documental. Realizada em duas UTIs de um Hospital Universitário no Estado do Paraná. A amostra foi composta por 2503 pacientes, no período de janeiro de 2017 a junho de 2019. Resultados: A maioria dos pacientes era do sexo masculino 58,7% (n=1471). Verificou-se forte poder estatístico, p valor de 0,0001, evidenciando que a PAV aumentou o tempo de internação, ou seja, o desenvolvimento de PAV gera uma permanência maior na UTI. O desfecho, 74,19% receberam alta e 25,81% evoluíram para óbito. Conclusão: Os dados apontaram para uma relação estatisticamente comprovada entre a PAV e o acréscimo do tempo de internação nas UTIs, o que acarreta o aumento dos riscos de morbimortalidade e altos custos na hospitalização.

Descritores: Unidades de Terapia Intensiva; Pneumonia Associada à Ventilação Mecânica; Enfermagem; Tempo de internação.

ABSTRACT | Objective: To analyze the relationship between the incidence of Ventilator-associated pneumonia (VAP) and the increase in the average length of stay in intensive care patients. Method: Quantitative, retrospective, descriptive and documentary research. Carried out in two ICUs of a University Hospital in the State of Paraná. The sample consisted of 2503 patients, from January 2017 to June 2019. Results: Most patients were male 58.7% (n=1471). There was a strong statistical power, p value of 0.0001, showing that the VAP increased the length of stay, that is, the development of VAP generates a longer stay in the ICU. The outcome, 74.19% were discharged and 25.81% evolved to death. Conclusion: The data pointed to a statistically proven relationship between VAP and increased length of stay in the ICUs, which leads to increased risks of morbidity and mortality and high hospitalization costs.

Descriptors: Intensive Care Units; Ventilator-Associated Pneumonia; Nursing; Length of Stay.

RESUMEN | Objetivo: Analisar la relación entre la incidencia de neumonía asociada a ventilador (NAV) y el aumento de la estancia media en pacientes de cuidados intensivos. Método: Investigación cuantitativa, retrospectiva, descriptiva y documental. Realizado en dos UCI de un Hospital Universitario del Estado de Paraná. La muestra estuvo constituida por 2503 pacientes, de enero de 2017 a junio de 2019. Resultados: La mayoría de los pacientes fueron hombres 58,7% (n = 1471). Hubo un fuerte poder estadístico, valor de p de 0,0001, mostrando que la NAV aumentó la estancia, es decir, el desarrollo de NAV genera una estancia más prolongada en la UCI. El resultado, 74,19% fueron dados de alta y 25,81% evolucionaron a muerte. Conclusión: Los datos apuntan a una relación estadísticamente probada entre NAV y mayor tiempo de estancia en UCI, lo que conduce a mayores riesgos de morbilidad y mortalidad y altos costos de hospitalización.

Descriptores: Unidades de Cuidados Intensivos; Neumonía asociada a ventilación mecánica; Enfermería; Duración de la estancia hospitalaria.

Camila Moreira da Silva

Nurse. Department of Nursing and Public Health – State University of Ponta Grossa - PR. Orcid: 0000-0001-7037-8365

Simonei Bonatto

Nurse. Department of Nursing and Public Health – State University of Ponta Grossa - Pr. Orcid: 0000-0001-8103-8163

Carla Luiza da Silva

Nurse. Department of Nursing and Public Health – State University of Ponta Grossa - Pr. Orcid: 0000-0002-2600-8954

Maria Dagmar da Rocha Gaspar

Nurse. Department of Nursing and Public Health – State University of Ponta Grossa - Pr. Orcid: 0000-0002-9368-6544

Guilherme Arcaro

Nurse. Department of Nursing and Public Health – State University of Ponta Grossa - Pr. Orcid: 0000-0003-1855-9091

INTRODUCTION

The Intensive Care Unit (ICU) is a sector dedicated to the care of critically ill patients who present instability or risk of systemic instability, which may denote risk to life. For this reason, it is a place that requires uninterrupted multidisciplinary care, as well as advanced technology equipment and specialized human resources to guarantee the quality of care. 1,2

Among the technologies and devices most used in ICUs, we can mention the mechanical ventilator, as defined by the National Health Surveillance

Received: 09/06/2021

Approved: 13/08/2021

Agency (ANVISA), this equipment is responsible for continuously assisting or controlling the ventilatory activity. 3 Through Mechanical Ventilation (MV), it is possible to assist patients with acute or chronic acute respiratory failure, thus aiming to improve gas exchange, that is, to correct hypoxemia and respiratory acidosis associated with hypercapnia, in addition to reducing discomfort and the work of breathing in addition to allowing the applicability of specific care. 4

The Center for Disease and Control Prevention (CDC) defines the events associated with mechanical ventilation taking into account the worsening of the respiratory pattern after a period of time with invariability or recovery of this pattern, evidence of inflammation or infection with a pulmonary focus, presenting laboratory evidence of respiratory infection. 5

The number of patients allocated to an ICU using MV is high due to the complexity of this environment. Therefore, it is noteworthy that health professionals need to be trained to carry out specific care for monitoring, aspiration of secretions, mobilization, humidification, heating of the gases offered and the supervision of hemodynamic conditions, in order to reduce adverse effects. 6

Given the characterization of users and the context of care that make up an ICU, it is important to define one of the main risks related to these conditions, especially when proper surveillance is not performed. 2 Health Care Related Infections (HAI) are those acquired after a patient's hospitalization, which are evidenced in the period following or after discharge, as long as they can be correlated with the hospital environment. 7 Belonging to this group, Ventilation-Associated Pneumonia (VAP) is a relevant HAI as it generates an increase in the number of days spent in the ICU's, which increases the risk of in-hospital death. 8



The number of patients allocated to an ICU using MV is high due to the complexity of this environment. Therefore, it is noteworthy that health professionals need to be trained to carry out specific care for monitoring, aspiration of secretions, mobilization, humidification, heating of the gases offered and the supervision of hemodynamic conditions, in order to reduce adverse effects



Among patients who are subject to MV in ICUs, the most frequent HAI is VAP, defined in the ANVISA Care-Related Infection Diagnostic Criteria booklet, as pneumonia detected 48 hours after the start of MV until its cessation or up to one day after ventilator removal, confirmed by conciliation of clinical, radiological and laboratory parameters. 9,3 It is mainly of aspiration origin, followed by exogenous inoculation of contaminated material or reflux from the gastrointestinal tract. 10

VAP has variable incidence rates, ranging from 9% to 67%, which is important due to its direct relationship with the increase in ICU stay and time on MV, resulting in high costs during the hospital stay and higher mortality. 11 Concomitant to this, it is considered the alert for surveillance of this index, which is a determining indicator for the assessment of the quality of the health service, having the need to be continuous and specific to the location, due to the variability of the causes of VAP according to the hospital, type of ICU and population studied. 2,12 The epidemiological surveillance of HAIs gathers information allowing for the direction of strategies to improve the prevention and control of infections, such as providing feedback to the health team, correlating the calculated rates with preventive measures, as well as the creation of specific bundles that can group together these measures to facilitate their application. 13

Since the incidence of VAP is relevant for the surveillance of Ventilator-Associated Pneumonia, this study seeks to analyze the relationship between the incidence of Ventilator-Associated Pneumonia (VAP) and the increase in the mean length of stay in intensive care patients.

METHOD

Retrospective, descriptive and documentary research with a quantitative

typology. This study is one of the specific objectives of an umbrella project entitled "Evaluation of quality indicators as a strategy for improving nursing care practices in the Intensive Care Unit". This stage of the research was carried out in two General ICUs of a University Hospital located in the city of Ponta Grossa – PR, each consisting of 10 beds (separated as ICU 1 and ICU 2), with exclusive care provided by SUS.

The study sample consisted of 100% of the records in the ICU's Entry and Exit Registry Book from January 2017 to June 2019. All patients admitted to Intensive Care Units 1 and 2 of a University Hospital in Paraná were included. It was not necessary to exclude any patient from the sample, totaling a sample of 2503 patients.

For analysis, data were entered into Excel® and Windows® spreadsheets for the proper storage of information, taking into account the following variables: days of hospitalization; gender (female/male); age; outcome (discharge/death); inpatient clinic (Neurology, Cardiology, Pulmonology, Orthopedics, Surgery, Renal and others). The incidence of VAP during the study period was evaluated.

Data were tabulated and analyzed using the Stata® version 12. software (StataCorp LP, CollegeStation, TX, USA). Exploratory and descriptive data analysis was performed. Then, a confirmatory analysis of the data was carried out, verifying the association between the variables through analysis of variance – ANOVA, using the F tests of Fisher and Bonferroni. The Kruskal-Wallis test was used when it was found that the data did not meet the assumptions of homoscedasticity. The Chi-Square test was used to test differences between proportions, with Incidence Ratios (IR) and their 95% confidence intervals being calculated. The level of statistical significance for the tests was set at 5%.

This study follows the principles contained in Resolution 466/12 of the

National Health Council/Ministry of Health and approved by the Research Ethics Committee (CEP) of the State University of Ponta Grossa – PR, under CAAE nº 01599618.60000.0105.

RESULTS

Of a total of 2503 patients belonging to the Intensive Care Units (ICU's) studied, 1471 were male (58,77%) and 1032 were female (41,23%). The mean age was 58,9 years and the mean length of stay was 6,55 ± 7,66, as shown in table 1. And, with regard to the clinical outcome, 646 (25,8%) progressed to death.

The main causes of admission to the ICU's were neurological diseases (26,09%), surgical procedures (21,37%), other causes (19,7%) and pulmonary diseases (18,14%). Of the 2.503 ICU patients, 166 (6,63%) developed VAP and 52 (31,32%) of these had the associated death outcome.

After the description of the data, the association of dependent variables with independent variables was performed. There was no statistically significant difference between these characteristics of the studied population and their relationship with the development of VAP, with the exception of length of stay and the variable "gender" in the two ICUs, as shown in Table 2.

Table 2 shows the associations between length of stay, age, sex, clinic and outcome with the development of VAP. Patients who developed VAP had a longer hospital stay (p<0,0001) than those who did not. In the Intensive Care Units, patients who were diagnosed with VAP spent an average of 18,8 days in the hospital, while those who did not manifest it, 5,68 days.

The comparison of the incidence of VAP in females and males showed statistical significance, that is, the incidence of men with VAP is higher than that of women, with a statistical significance of p<0,05.

Table 1 – Variables studied in patients admitted to the ICUs. Ponta Grossa (PR), Brazil – January 2017 to June 2019

Gender	Total (%)	Average (SD)
Female	1032 (41,23)	
Male	1471 (58,77)	
Age		58,87(±19,39)
Hospitalization days		6,55 (±7,66)
Discharge	1857 (74,19)	
Death	646 (25,81)	

Source: The author, 2020

Table 2 - Association between length of stay in the ICUs, age, gender, outcome and the development of VAP. Ponta Grossa (PR), Brazil – January 2017 to June 2019

Variables	VAP		p value
Hospital days (average)	Yes	No	0,0001 ^a
Age (average)	18,8	5,68	0,065 ^b
Gender	56,19	59,06	
F			0,028 ^c
M	55	977	
Outcome	111	1360	
Discharge			0,0928 ^c
Death	114	1743	
	52	594	

^a Kruskal-Wallis' test; ^b Bonferroni's test; ^c Chi-square test. Source: The author, 2020

DISCUSSION

It can be observed that the patients in the two ICU's studied are mostly men (58,77%) with a mean age of 58,8 years and that the male sex was shown to be a risk factor for manifesting VAP (p<0,05). Analyzes carried out in an Indian ICU and in an ICU in the south of Santa Catarina revealed similar

mean ages and indicated that most of the individuals studied were men, also associating males with the risk of acquiring VAP. 13,14 The Brazilian Society of Pulmonology and Phthysiology presents, in its guideline, male gender as an independent risk factor for VAP, while the American Thoracic Society declares that males are at risk for developing HAI in general. 15,16

With regard to the causes of hospitalizations, when compared with previous studies, disparities are noted due to the existence of different diagnostic profiles and population characteristics. However, as in the present research, pulmonary and neurological involvement are among the main reasons for hospitalization, even with different frequencies, in two other studies produced in Brazil. 13,17

Ventilation-Associated Pneumonia (VAP) has an important morbidity and is directly related to an increase in the length of stay in the ICU, making it responsible for raising hospitalization costs. 11,18 The data obtained in the study showed 166 (6,63%) cases of VAP in a sample of 2503 patients.

National surveys have increasingly described significant data in different ICUs on this topic. A 2018 study from Bauru – SP had a sample of 322 patients, of which 73 (22,67%) had VAP. 19 Research carried out in a teaching hospital in Minas Gerais, with 190 users, provided an incidence equal to 23,2% of VAP. 20 Another Brazilian study that covered the period from May to August 2017 reported an incidence of 10,58% (n=945). 21

Likewise, there are international surveys showing this index. In an observational study in an adult ICU located in India, 38% of 250 patients developed VAP. 14 In Poland, in a two-year analysis in seven adult ICUs, there were 2547 hospitalized patients and 205 cases of VAP, with an incidence of 8,0%. 22

The incidence rates of VAP vary

“
The incidence rates of VAP vary as a result of the different populations and diagnostic methods present in each institution. In places where there is monitoring of indicators related to this important HAI, the incidence of VAP has become lower after the introduction of preventive actions, showing that VAP is preventable. Observing this index allows us to assess and improve the quality of care provided, as the VAP can add up to 13,3 days in the ICU stay
”

as a result of the different populations and diagnostic methods present in each institution. In places where there is monitoring of indicators related to this important HAI, the incidence of VAP has become lower after the introduction of preventive actions, showing that VAP is preventable. Observing this index allows us to assess and improve the quality of care provided, as the VAP can add up to 13,3 days in the ICU stay. 10, 23

In this study, patients who presented Pneumonia Associated with Mechanical Ventilation extended their stay in the unit, staying on average 13 or 12 days longer compared to patients who did not develop VAP in the ICUs. A 2019 study carried out in São Paulo showed that individuals diagnosed with VAP increased their average length of stay by 17,7 days when compared to those who did not have this clinical condition. 17

It is known that hospitalized patients, especially those on MV, are at increased risk for pneumonia due to the body's impaired defense at that time. Furthermore, this infection can trigger a prolonged hospital stay. 10,20 In the present study, the mean length of stay was $6,55 \pm 7,66$. When compared to the literature, it was found that the average stay in the ICU can vary from 6 to 25,3 days. 17,20,24 And, this variable showed statistical significance when related to the development of VAP ($p < 0,0001$), as well as in other studies, where this association is frequently pointed out. The research carried out in an adult ICU, located in northern India, described a significant difference between patients with and without VAP, with 13 and 6 days of stay, respectively ($p < 0,001$). 14 Association is also present in other Brazilian studies. 17,20,21 Thus, the development of VAP triggers a longer hospital stay. 20

With regard to mortality, 25,8% of the patients in the studied Intensive Care Units had death as the outcome.

This rate corroborates the data presented in the literature. In Florianópolis, a survey of 695 individuals in an ICU showed that 142 (20,4%) died. 24 On the other hand, in an ICU in Fortaleza, 51,1% of patients died.²⁵ As for the outcome associated with VAP, it can be observed that 31,32% of those who acquired this infection died, agreeing with ANVISA records that 33% of patients who manifest VAP progress to death. 10 A study carried out in the adult ICU of a State Hospital in São Paulo resulted in 50,68% of deaths in the group with a diagnosis of VAP. 19

In this research there was no statis-

tical association between the development of VAP and death, however the relevance of this infection in the ICU is known, extending the length of stay of the patient, which generates high costs in hospitalization and increases the risk of death. 14, 25

CONCLUSION

According to the research and its results, it can be understood that VAP leads to longer hospital stays, which is an aggravating factor in hospital admissions. Based on these results, it is understood the importance of preventi-

ve measures packages in order to minimize these events in benefit of patient safety.

The present study provided specific epidemiological data for the implementation of care protocols and checklist, contributing to the reduction of the incidence of VAP, professional qualification and improvement of patient care.

It is hoped that this study can contribute to other research and assist in future publications in this renowned journal for the benefit of the patient, academic and scientific community.

References

1. Ministério da Saúde (BR). Lei nº. 3.432, de 12 de agosto de 1998. Dispõe sobre critérios de classificação para as unidades de tratamento intensivo. Brasília: Ministério da Saúde; 1998.
2. Silva T, Souza G, de-Souza S, Bitencourt J, Madureira V, Luzardo A. Incidence of ventilator-associated pneumonia in an intensive care unit / Incidência de pneumonia associada à ventilação mecânica em uma Unidade de Terapia Intensiva. *Revista de Pesquisa: Cuidado é Fundamental Online* [Internet]. 2017 Out; [Citado em 2019 Nov 11];9(4):1121-1125. Disponível em: <http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/5899>
3. Agência Nacional de Vigilância Sanitária. Critérios diagnósticos de infecções relacionadas à assistência à saúde. Brasília (DF); 2017.
4. Carvalho CRR, Franca SA. Ventilação mecânica: princípios, análise gráfica e modalidades ventilatórias. *J. bras. pneumol.* [Internet]. 2007 Jul [citado em 2019 Nov 11];33(Suppl2):54-70. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-37132007000800002-&lng=en. <https://doi.org/10.1590/S1806-37132007000800002>.
5. Pneumonia (Ventilator-associated [VAP] and non-ventilator-associated Pneumonia [PNEU]) Event [Internet]. [citado em 2019 Nov 11]. Disponível em: <https://www.cdc.gov/nhsn/pdfs/pscmanual/6pscvapcurrent.pdf>
6. Rodrigues YCSJ, et al. Ventilação mecânica: evidências para o cuidado de enfermagem. *Esc. Anna Nery (Online)* [Internet]. 2012 Dec [citado em 2019 Nov 11];16(4):789-795. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-81452012000400021&lng=en. <http://dx.doi.org/10.1590/S1414-81452012000400021>.
7. Ministério da Saúde (BR). Portaria nº 2616, de 12 de maio de 1998. Brasília: Ministério da Saúde, 1998.
8. Ribeiro C, Barbosa I, Martins-da-Silva R, Feitosa-Cestari V, Penaforte K, Custódio I. Caracterização clínica dos pacientes sob ventilação mecânica internados em unidade de terapia intensiva / Clinical characterization of patients under mechanical ventilation in an intensive therapy unit. *Revista de Pesquisa: Cuidado é Fundamental Online* [Internet]. 2018 Abr [Citado em 2019 Nov 11]; 10(2):496-502. Disponível em: <http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/6109>
9. Chastre, J. Conference Summary: ventilator-associated pneumonia. *Respir. care.* [Internet]. 2005 [citado em 2020 Ago 24];50:975-983. Disponível em: <http://rc.rcjournal.com/content/50/7/975>
10. Agência Nacional de Vigilância Sanitária. Medidas de Prevenção de Infecção Relacionada à Assistência à Saúde. Brasília. 2017.
11. Díaz LA, Lauradó M, Rello J, Restrepo MI. Non-Pharmacological prevention of ventilator associated pneumonia. *Arch. broncopneumol.* [Internet]. 2010 [citado em 2020 Ago 24];46(4):188-95. Disponível em: [https://doi.org/10.1016/S1579-2129\(10\)70047-1](https://doi.org/10.1016/S1579-2129(10)70047-1)
12. Carrilho CMDM, Grion CMC, Carvalho LM, et al. Ventilator-Associated Pneumonia in Surgical Intensive Care Unit. *Rev. bras. ter. intensiva (Online)*. [Internet]. 2006 [citado em 2020 Ago 24];18(1):38-44. Disponível em: <http://dx.doi.org/10.1590/S0103-507X2006000100008>
13. Kock KS, Rosa BC, Martignago N, Maurici R. Ventilator-Associated Pneumonia (Vap): Clinical Outcome And Impact On An Intensive Care Unit In South Of Santa Catarina. *ACM arq. catarin. med.* [Internet]. 2017 jan-mar [citado em 2020 Ago 24];46(1):02-11. Disponível em: <http://www.acm.org.br/acm/seer/index.php/arquivos/article/view/248/135>
14. Mathai AS, Phillips A, Kaur P, Isaac R. Incidence And Attributable Costs Of Ventilator-Associated Pneumonia (Vap) In A Tertiary- Level Intensive Care Unit (Icu) In Northern India. *J. infect. public health.* [Internet]. 2015 Mar-Apr;8(2):127-35. doi: 10.1016/j.jiph.2014.07.005. Epub 2014 Oct 28. PMID: 25444392.
15. Diretrizes brasileiras para tratamento das pneumonias adquiridas no hospital e das associadas à ventilação mecânica - 2007. *J. bras. pneumol.* [Internet]. 2007 Abr [citado em 2020 Ago 24];33(Suppl1):s1-s30. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-37132007000700001&lng=en. <https://doi.org/10.1590/S1806-37132007000700001>.
16. Guidelines for the management of adults with hospital-acquired, ventilator-associated, and health care-associated pneumonia. *Am. j. respir. crit. care med.* 2005;171(4), pp. 388-416. <https://doi.org/10.1164/rccm.200405-6445T>
17. Frota ML, Campanharo CRV, Lopes MCBT, Piacuzzi LHV, Okuno MFP,

References

- Batista REA. Good practices for preventing ventilator-associated pneumonia in the emergency department. *Rev. Esc. Enferm. USP*. [Internet]. 2019 [citado em 2020 Ago 24];530:e0460. Disponível em: <https://www.revistas.usp.br/reeusp/article/view/159426>
18. Dalmora CH, Deuschendorf C, Nagel F, Santos RP, Lisboa T. Defining ventilator-associated pneumonia: a (de)construction concept. *Rev. bras. ter. intensiva*. 2013 Apr-Jun;25(2):81-6. doi: 10.5935/0103-507X.20130017.
19. Viana AA, Rosa DM, Cavalcanti, Ambrozini ARP, Andrade RCM, Jamami M, Martinelli B. Clinical outcomes related to the incidence of ventilator-associated pneumonia in adults - a cohort study. *Fisioter. Mov. (Online)* [Internet]. 2018 [citado em 2020 Ago 28]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S010351502018000100211Ing=en.
20. Mota EC, Oliveira SP, Silveir BRM, Silva PLN, Oliveira C. Incidence of ventilator-associated pneumonia in intensive care unit. *Medicina (Ribeirão Preto)* [Internet]. 2017 [citado em 2020 Ago 28]; 50(1):39-46. Disponível em: <https://www.revistas.usp.br/rmrp/article/view/135044>
21. Zigart JAA, Contrin LM, Beccaria LM, et al. Adesão Ao Protocolo De Pneumonia Associada À Ventilação Mecânica. *Rev. enferm. UFPE online* [Internet]. 2019 Fev [citado em 2020 Ago 28];13(1):655-63. Disponível em: <https://doi.org/10.5205/1981-8963-v13i03a234873p655-654-2019>
22. Walaszek M, Rózanska A, Walaszek MZ, Wójkowska-Mach J. Epidemiology of Ventilator-Associated Pneumonia, microbiological diagnostics and the length of antimicrobial treatment in the Polish Intensive Care Units in the years 2013-2015. *BMC infect. dis*. 2018. <https://doi.org/10.1186/s12879-018-3212-8>
23. Iordanou S, Middleton N, Papatthanassoglou E, Raftopoulos V. Surveillance of device associated infections and mortality in a major intensive care unit in the Republic of Cyprus. *BMC infect. dis*. 2017. <https://doi.org/10.1186/s12879-017-2704-2>
24. Rodriguez AH, Bub MBC, Perão OF, Zandonadi G, Rodriguez MJH. Epidemiological characteristics and causes of deaths in hospitalized patients under intensive care. *Rev. bras. enferm. (Online)* [Internet]. 2016 [Citado em 2020 Ago 28];69(2):210-4. doi: <http://dx.doi.org/10.1590/0034-7167.2016690204i>
25. Ribeiro C, Barbosa I, Martins-da-Silva R, Feitosa-Cestari V, Penaforte K, Custódio I. Caracterização clínica dos pacientes sob ventilação mecânica internados em unidade de terapia intensiva / Clinical characterization of patients under mechanical ventilation in an intensive therapy unit. *Revista de Pesquisa: Cuidado é Fundamental Online* [Internet]. 2018 Apr 2; [Citado em 2020 Ago 28];10(2):496-502. Disponível em: <http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/6109>