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RESEARCH

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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

Características clínicas de los pacientes hospitalizados en menos de ventilación mecánica unidad de cuidados intensivos

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ABSTRACT

Objective: The study's aim has been to describe the clinical characteristics of hospitalized patients undergoing mechanical ventilation in an Intensive Care Unit (ICU). **Methods:** It is a cohort study with a quantitative approach. Sampling of 90 patients admitted to a referral hospital for cardiopulmonary diseases, located in the city of Fortaleza (Ceará State, Brazil). Data collection conducted in October 2016 through a structured instrument. The study was approved by the Institutional Research Ethics Committee under the Protocol CAAE-53956816.2.0000.5052. **Results:** It was observed that 56.7% were female, in the age group from 50 to 59 years old (59%). The main reasons for hospitalization were cardiovascular diseases (53.3%); 88.9% were undergoing antibiotic therapy; 34.4% presented pneumonia associated with mechanical ventilation; 80% used vasoactive drugs and only 25.6% performed tracheostomy after hospitalization 36.7%. **Conclusion:** The critical health patient has peculiarities that require from the nursing professional planning for care actions aiming to reduce both severe and lethal complications.

Descriptors: Mechanical Ventilation; Intensive Care Units; Nursing.

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RESUMO

Objetivo: Descrever as características clínicas de pacientes sob ventilação mecânica internados em Unidade de Terapia Intensiva (UTI). **Métodos:** Estudo transversal e quantitativo, com amostra de 90 pacientes internados em um hospital referência em atendimento de doenças cardiopulmonares, situado na cidade de Fortaleza/Ceará. Coleta de dados realizada em outubro de 2016 através de um instrumento estruturado. O estudo foi aprovado pelo Comitê de Ética em Pesquisa da Intituição sob o protocolo CAAE-53956816.2.0000.5052. **Resultados:** Observou-se que 56,7% eram do sexo feminino, na faixa etária de 50 a 59 anos (59%). Os principais motivos de internação foram as doenças cardiovasculares (53,3%); 88,9% utilizaram antibioticoterapia; 34,4% apresentaram pneumonia associada à ventilação mecânica; 80% utilizaram drogas vasoativas e apenas 25,6% realizaram traqueostomia após a internação 36,7%. **Conclusão:** O paciente crítico possui peculiaridades que exige do enfermeiro um planejamento das ações de cuidados que vise à redução de possíveis complicações graves e letais.

Descritores: Ventilação Mecânica; Unidades de Terapia Intensiva; Enfermagem.

RESUMEN

Objetivo: Describir las características clínicas de pacientes sometidos a ventilación mecánica en unidad de cuidados intensivos (UCI). **Métodos:** Estudio transversal y cuantitativa, con 90 pacientes ingresados en un hospital de atención enfermedades cardiopulmonares, situado en la ciudad de Fortaleza/Ceará. Recopilación de datos realizada en octubre de 2016 a través de un instrumento estructurado. El estudio fue aprobado por el Comité de ética de investigación de la institución bajo el protocolo CAAE-53956816.2.0000.5052. **Resultados:** Se observó que el 56,7% eran mujeres entre las edades de 50 a 59 años (59%). Las principales razones de hospitalización fueron las enfermedades cardiovasculares (53,3%), 88,9% utiliza antibióticos; 34,4% presentadas ventilador había asociado neumonía; 80% usada drogas y sólo 25,6% traqueotomía realizada vasoactivos después de hospitalización 36,7%. **Conclusión:** El paciente crítico tiene particularidades que requiere que la enfermera una planificación de la atención dirigida a la reducción de posibles complicaciones graves y letales.

Descriptorios: Respiración Artificial; Unidades de Cuidados Intensivos; Enfermería.

INTRODUCTION

Mechanical Ventilation (MV) is one of the ventilatory support methods used in the Intensive Care Unit (ICU) to treat patients with acute or chronic acute respiratory failure and aims to maintain gas exchange and relief of respiratory muscle work.¹

Given the large number of patients admitted to intensive care units who are using MV, it is essential that nurses have specific technical-scientific knowledge for the development of care, in order to minimize their adverse effects.²

It is emphasized that in order to have adequate nursing care, the maintenance of the MV should be prioritized by the actions of the nurse. The Federal Nursing Council determines, through the Law No. 7.498/86, which is the responsibility of nurses to perform direct nursing care for critically ill patients at risk of death, as well as nursing care

of greater technical complexity, requiring scientifically based knowledge and the ability to make immediate decisions.³

Although in the last years it has reduced significantly, the complications of the secondary airways, those related to endotracheal intubation and its maintenance are still very frequent. Mild and short-term symptoms may occur, but most patients may experience severe and permanent lower airway lesions requiring surgical correction.⁴

Undoubtedly, the importance of the nurse's role in the reduction of these complications, including primary actions ranging from the planning of the Nursing Assistance Systematization to the training of the nursing team, is important to prevent and reduce the risks in the period in which the patient is under MV, whether in the process of intubation, aspiration, change of decubitus, hygiene, placement of the patient in the prone position, use of tracheostomy or even in ventilatory weaning.⁵

Considering the above, nurses' knowledge about the profile of patients assisted in ICU is important for the critical analysis and conduction of nursing actions to the critically ill patient.

The present study aims to describe the clinical characteristics of patients under mechanical ventilation admitted to a ICU.

METHODS

This is a descriptive, documental and retrospective study, with a quantitative approach. The study was carried out in a public hospital, in agreement with the Sistema Único de Saúde (SUS) [Unified Health System], a reference in the treatment of cardiopulmonary diseases, located in the city of Fortaleza (Ceará State, Brazil).

The population was selected for convenience being composed of 90 patients hospitalized in an Intensive Care Center. The following were included: patients 18 years old or older submitted to MV and using the endotracheal tube fixation device. Tracheostomized patients in MV were excluded.

The data collection was developed in October 2016, in the Medical and Statistical Archive Service, using a structured instrument prepared by the researchers with the support of the literature, composed of sociodemographic variables and clinical profile of the patients: gender; age; skin color/race; marital status; schooling; existence of remunerated activity; provenance; medical diagnostic; comorbidities; antibiotics used; pneumonia associated with ventilation; pressure injury; use of vasoactive drugs; tracheostomy after hospitalization; hemodialysis; cultures; staying period in the ICU and unplanned extubation.

Absolute and relative frequencies were calculated for the qualitative variables and the central tendency measures (average and standard deviation) were presented for the quantitative variables.

The study is in accordance with Resolution No. 466/12, which deals with research with humans. The project was sent to the Ethics and Research Committee of the institution in which it was developed and obtained a favorable opinion under the Protocol CAAE-53956816.2.0000.5052.

RESULTS

According to **Table 1**, sociodemographic aspects demonstrated that among the group of 90 patients, it was verified that the majority was female (56.7%), with the predominant age group from 50 to 59 years old (59%). Regarding skin color/race, 71 (78.9%) of the patients were brown. It was observed predominance of married patients, 51 (56.7%); 38 (42.2%) having unknown schooling status, where 26 (28.9%) of whom had studied from 1st to 4th grade. Regarding the occupation of the sample, there was a predominance of patients who exercised some paid activity, 54 (60%).

According to the origin, a significant number of patients, 50 (55.6%) were from *Fortaleza*; The other cases were from inner cities and municipalities that make up the metropolitan region.

Table 1 - Sociodemographic profile of the patients. *Fortaleza - Ceará - Brazil, 2016*

Sociodemographic data	f	%
Sex		
Male	39	43.4
Female	51	56.7
Age		
From 40 to 49 years old	08	8.9
From 50 to 59 years old	26	28.9
From 60 to 69 years old	19	21.1
From 70 to 79 years old	19	21.1
More than 80 years old	18	20
Skin color/race		
White	14	15.6
Black	05	5.6
Brown	71	78.9
Marital status		
Single	14	15.6
Married	51	56.7
Divorced	06	6.7
Widower	16	17.8
Not available	03	3.3
Origin (from)		
Capital	50	55.6
Metropolitan region	04	4.4
Interior	35	38.9
Other States	01	1.1

(To be continued)

(Continuation)

Schooling		
Literate	02	2.2
From 1 st to 4 th grade	26	28.9
From 5 th to 8 th grade	08	8.9
High school	04	4.4
College (finished)	01	1.1
Illiterate	11	12.2
Ignored	38	42.2
Exercise paid activity		
Yes	54	60
No	5	5.6
Not informed	31	34.4

Table 2 shows the clinical profile of the patients. The main reasons for hospitalization were cardiovascular diseases, 48 (53.3%) and pulmonary 33 (36.7%). A large number of patients, 66 (73.3%) had comorbidities associated with the primary diagnosis. In this period, antibiotic therapy was used in 80 (88.9%) patients.

Ventilator-associated pneumonia (VAP) was present in only 31 patients (34.4%); Pressure lesions in 64 patients (71.1%); The majority, 72 (80%) used vasoactive drugs; 23 patients (25.6%) performed tracheostomy after hospitalization; only 33 (36.7%) underwent hemodialysis. In 59 of them (65.6%) some type of germ culture was performed and unplanned extubation was present in only 10 (11.1%).

Table 2 - Clinical profile of the patients. *Fortaleza - Ceará - Brazil, 2016*

Clinical profile	f	%
Medical diagnostic		
Cardiovascular diseases	48	53.3
Pulmonary diseases	33	36.7
Cardiovascular + pulmonary diseases	06	6.7
Other diseases	03	3.3
Antibiotics use		
Yes	80	88.9
No	10	11.1
Comorbidities		
Yes	66	73.3
No	23	25.6
Not informed	01	1.1
Pneumonia associated with ventilation		
Yes	31	34.4
No	59	55.6
Pressure injury		
Yes	64	71.1
No	26	28.9

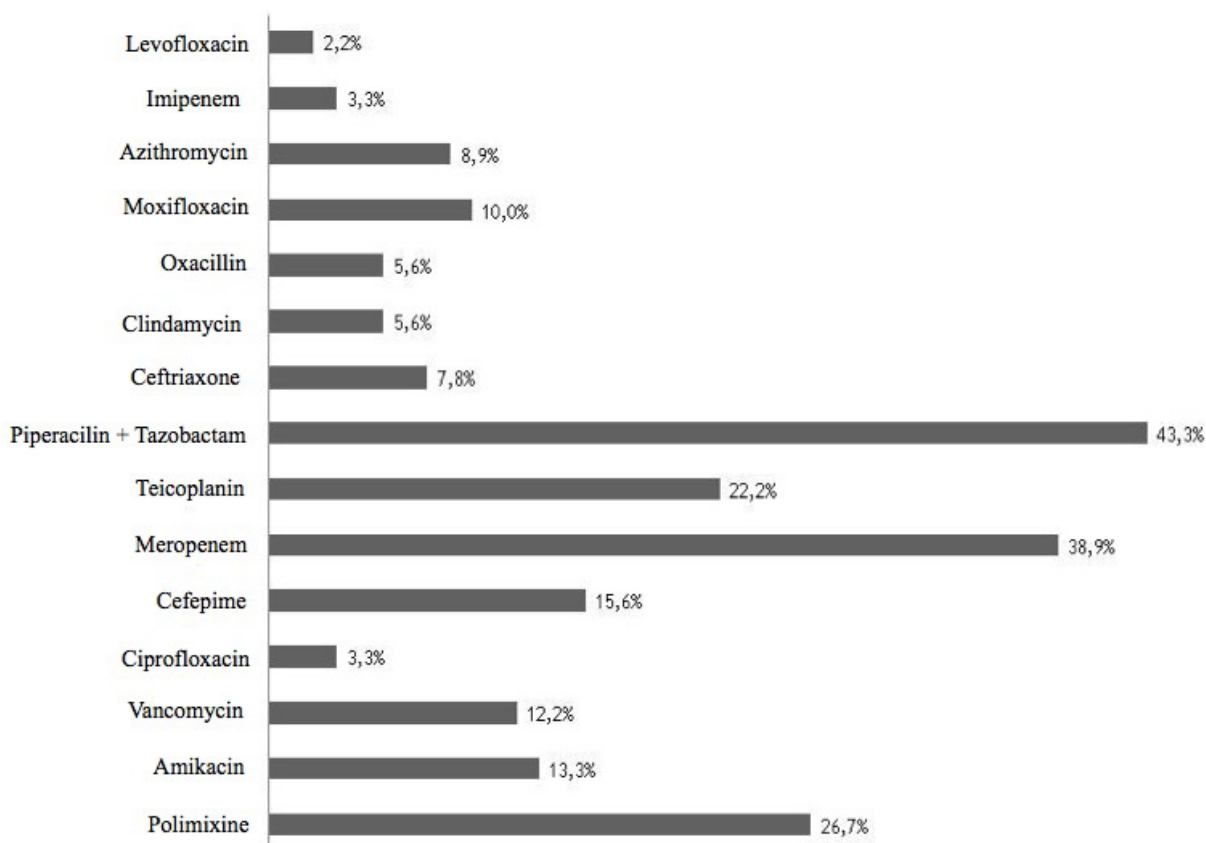
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Tracheostomy		
Yes	23	25.6
No	67	64.4
Use of vasoactive drugs		
Yes	72	80
No	18	20
Made Cultures		
Yes	59	65.6
No	31	34.4
Unplanned Extubation		
Yes	10	11.1
No	79	87.8
Not informed	01	1.1
Hemodialysis		
Yes	33	36.7
No	56	62.2
Not informed	01	1.1

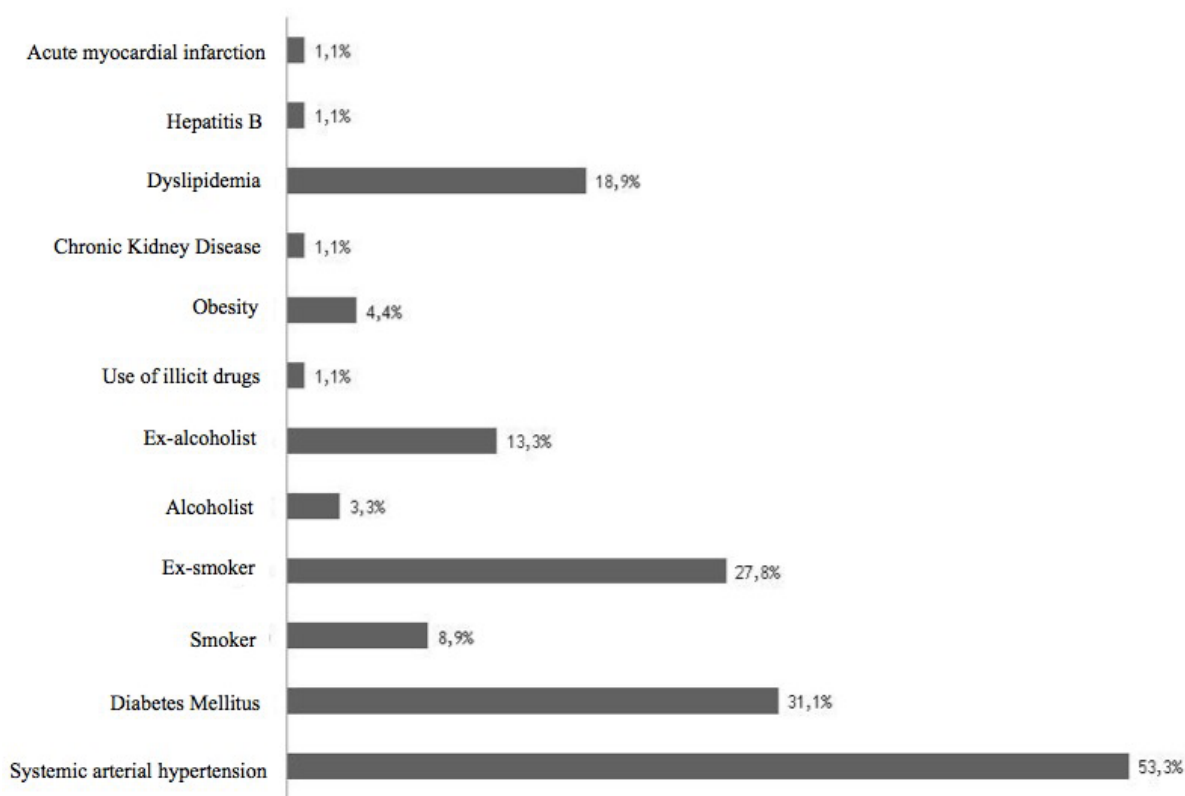
Regarding the use of antibiotics and the mean time of day of use, the most used therapy was Piperacillin + Tazobactam (43.3%) and the average of days between them ranged from 7 to 14 days.

Figure 1 - Distribution of antibiotics used by patients. Fortaleza - Ceará - Brazil, 2016



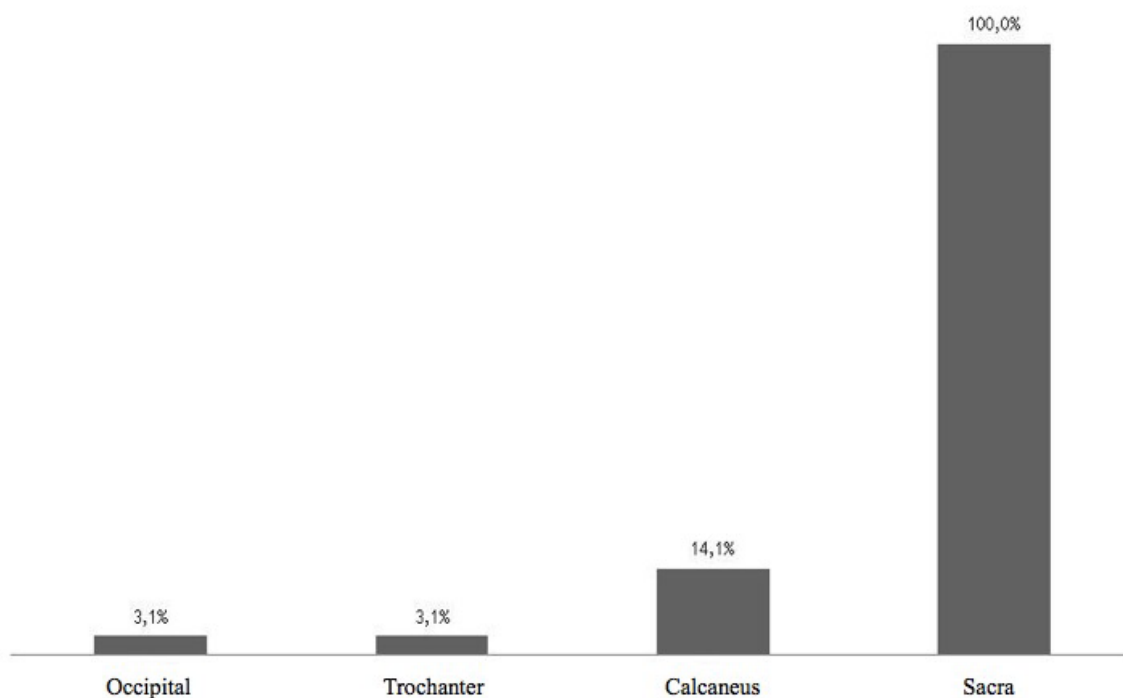
Regarding the distribution of comorbidities, it was noted that more than half (53.3%) had systemic arterial hypertension and (27.8%) reported Diabetes Mellitus.

Figure 2 - Distribution of patients' comorbidities. *Fortaleza - Ceará - Brazil, 2016*



Regarding the sites of pressure injury, it was observed that of the total number of patients who developed lesion, 64 (100%) of the patients presented in the sacral region; nine (14.1%) in the calcaneal region; two (3.1%) in the occipital region and two (3.1%) in the trochanter region (**Figure 3**).

Figure 3 - Distribution of the patients' injury sites done by pressure. *Fortaleza - Ceará - Brazil, 2016*



Pseudomonas aeruginosa (7.8%) and *Candida tropicalis* (7.8%) were the ones with the highest occurrence, being present in (7.8%) of the total samples of cultures.

In the analysis of the patients' stay in the ICU, a minimum time of 2 days and a maximum of 96 days was observed, with an average of 17.7 ± 17.6 days. Regarding the clinical outcome of the patients, it was verified that 46 (51.1%) evolved to death.

DISCUSSION

It was observed that the patients in the study are mostly adults between 50 and 59 years old and belonging to the female sex. This finding differs from other studies regarding the age and sex of patients admitted to the ICU, where the majority of the patients are elderly and male.⁶

Regarding the declared skin color/race, the majority of the patients were brown (78.9%), which is probably explained due to the miscegenation of the races in the Northeast of Brazil, with the immigration of blacks and whites people.

In terms of schooling, low schooling was present in (28.9%) of the patients, a fact that can negatively influence the quality of life of the population in general.⁷

In relation to the most frequent causes of hospitalization, cardiovascular diseases were more prominent, corresponding (53.3%) patients. In developed and developing countries cardiovascular diseases remain the main cause of death, although a decline in this mortality rate has been observed in recent decades.⁸

Comorbidities have been associated in most patients in other studies as well.⁹ The presence of comorbidities may be understood as reflecting the increased age or increased susceptibility of the population with such diseases to develop serious complications.

Pressure injury is a major challenge in the high-complexity care of patients hospitalized in the ICU and is one of the common complications in patients with a long hospital stay.¹⁰ In this investigation, the mean length of hospital stay in days ranged from 17.7 ± 17.6 days, and of the 90 patients admitted to the ICU, sixty-four developed pressure injury.

The occurrence of pressure injury is related to several risk factors such as advanced age, nutritional deficit, altered sensory perception, excessive moisture, friction and shear, immobility, hypoxia, use of vasoconstricting drugs and chronic diseases such as Diabetes Mellitus.¹¹

In the present study (80%) patients had vasoactive drugs, (53.3%) had systemic arterial hypertension and (31.15%) diabetes mellitus, which may have contributed to the development of these lesions.

The time of use of the endotracheal tube fixation device contributed positively to the prevention of oral cavity injuries, since there were no reports of this event, and in the prevention of unplanned extubation, since it was present in only 10 (11.1 %) of the patients.¹²

Although numerous studies have demonstrated several advantages of early tracheostomy, prevention of airway injuries, reduction of the risk of ventilator-associated pneumonia, reduced mechanical ventilation and hospitalization time, and so forth.¹³ Only 23 (25.6 %) were submitted to tracheostomy, and 31 (34.4%) cases of pneumonia associated with ventilation were reported.

The presence of conditions that cause renal hypoperfusion and renal ischemia is related to the risk of developing acute renal injury and patients who present with renal function reserve are more likely to develop such a complication, even with small renal lesions. Advanced age, presence of Diabetes Mellitus, Arterial Hypertension, and the chronic use of some medications are considered risk factors for the onset of this lesion.¹⁴

The cases of renal insufficiency, reported by necessity during the hospitalization period of hemodialysis, can be related to the fact that most of them have some comorbidities such as Systemic Arterial Hypertension and Diabetes Mellitus, corresponding to respectively (53.3%) and (31.1%) of the total number of patients studied.

In this study, in relation to the complications acquired during hospitalization, it was observed that a good part of the patients admitted to the adult ICU presented some type of infection. Among the microorganisms isolated, there was a predominance of *Candida tropicalis* and *Pseudomonas aeruginosa*, corresponding to 7.8% of all microorganisms found. The literature shows that gram-negative bacteria are frequently involved in cases of Health Care-Related Infections, which corroborates the results found in this study.¹⁵

Pseudomonas aeruginosa is responsible for infections in various body sites, especially in immunocompromised patients, with prolonged intubation or tracheostomized, being known for the intrinsic resistance to various antimicrobials.¹⁶

According to **Table 2**, 80 (88.8%) of the patients used antimicrobials, but only 59 (65.6%) obtained culture or direct exams. Moreover, in all these patients, antimicrobial therapy had already been installed (empirical treatment), a fact that compromised the rational use of these drugs.

In several previous studies it was concluded that, in order to have a better definition of the antibiotic scheme for empirical treatment of Health-Related Infections, it is necessary to identify the germ or an assumption of which germs are most prevalent for a given clinical condition of the patient.¹⁷

It is known that a longer stay in the hospital, especially in the ICU, increases the risk of death in the hospital. In a previous study, for each day of hospitalization in the hospital and in the ICU, hospital odds of 1.0 and (4.0%) were estimated, respectively. The most frequent clinical outcome was death, occurred in 46 (51.1%) of the patients.¹⁸

CONCLUSION

This study contributed to the knowledge of the profile of clients undergoing mechanical ventilation admitted to an ICU. The results showed that there were highlights for females with their ages ranging from 50 to 59 years old, married and from the capital. The clinical profile revealed that the most common comorbidity was systemic arterial hypertension in ex-smokers, with the prevalence of cardiovascular diseases, most used the antibiotic piperacillin + tazobactam, with the appearance of *Pseudomonas aeruginosa* in their cultures, being the mean time of antibiotic use between 7 and 14 days, developed a pressure lesion in the sacral region and died in their clinical outcome.

The critical health patient has peculiarities that require of the nurse professional competence, scientific technical knowledge comprehensive and always updated. Knowing the clinical characteristics of the patients under study may provide subsidies that will help intensivists nurses in the elaboration of more complex care plans, aiming to reduce severe and lethal complications.

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