

# Epidemiological profile of ICU patients at Faculdade de Medicina de Marília

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## SUMMARY

**Objective:** To characterize the epidemiological profile of the hospitalized population in the ICU of Hospital das Clínicas de Marília (Famema).

**Method:** A retrospective, descriptive and quantitative study. Data regarding patients admitted to the ICU Famema was obtained from the Technical Information Center (Núcleo Técnico de Informações, NTI, Famema). For data analysis, we used the distribution of absolute and relative frequencies with simple statistical treatment.

**Results:** 2,022 ICU admissions were recorded from June 2010 to July 2012 with 1,936 being coded according to the ICD-10. The epidemiological profile comprised mostly males (57.91%), predominantly seniors  $\geq 60$  years (48.89%), at an average age of 56.64 years ( $\pm 19.18$ ), with limited formal education (63.3% complete primary school), mostly white (77.10%), Catholic (75.12%), from the city of Marília, state of São Paulo, Brazil (53.81%). The average occupancy rate was 94.42%. The predominant cause of morbidity was diseases of the circulatory system with 494 admissions (25.5%), followed by traumas and external causes with 446 admissions (23.03%) and neoplasms with 213 admissions (11.00%). The average stay was 8.09 days ( $\pm 10.73$ ). The longest average stay was due to skin and subcutaneous tissue diseases, with average stay of 12.77 days ( $\pm 17.07$ ). There were 471 deaths (24.32%), mainly caused by diseases of the circulatory system (30.99%). The age group with the highest mortality was the range from 70 to 79 years with 102 deaths (21.65%).

**Conclusion:** The ICU Famema presents an epidemiological profile similar to other intensive care units in Brazil and worldwide, despite the few studies available in the literature. Thus, we feel in tune with the treatment of critical care patients.

**Keywords:** intensive care units, health profile, epidemiology, mortality.

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## INTRODUCTION

The concept of intensive care appeared in the Crimean War (1854), when Florence Nightingale and 38 other volunteers in Scutari (Turkey) cared for seriously injured British soldiers, grouped and isolated in areas with preventive measures to prevent infections and epidemics, such as dysentery and tetanus. Mortality reduction was remarkable. Later in Baltimore, in 1923, a three-bed unit specialized in neurosurgical postoperative period was created. Since then, new technologies have been incorporated into intensive care.<sup>1</sup>

The structure of care, as it is known today, was developed in the 1950s in response to the polio epidemic, when the first mechanical fans, called “iron lungs” were developed.<sup>2</sup> The Intensive Care Unit (ICU) has become, since then, an important resource for the treatment, recovery or maintenance of physiological functions in critically ill patients or potentially severe cases that need continuous and specialized care, such as permanent monitoring of vital signs, drug support and specialized support, including mechanical ventilators and hemodialysis machines to recover some organic insufficiencies.<sup>3,4</sup>

In Brazil, the first ICUs were implemented in the 1970s, in order to gather severe recoverable patients in a hospital area with human resources and specific equipment and materials intended for the care of these patients.<sup>3</sup>

Currently, ICUs play a decisive role in the chance of survival of critically ill patients, victims of trauma or any other type of life threatening situation. Studies show an increasing relevance of intensive care due to more cases arising from civil violence and the increasing longevity of the population. Improvements in living conditions both in developed and developing countries have increased the population's life expectancy and, thus, the occurrence of comorbidities. This exposes people to greater risk of being victims of traumatic or nontraumatic emergencies.<sup>4</sup>

In order to prioritize the hospitalization of patients who will most benefit from intensive care, and to better allocate the available resources (daily stay in a type II ICU facility costs the Brazilian government BRL 478.72 through the Unified Health System, SUS),<sup>5</sup> the American Society of Critical Care Medicine (SCCM) has developed criteria for ICU admission.<sup>6</sup> Patients are divided into four priorities for admission as follows: Priority 1 – severe, unstable patients who require intensive care and monitoring with significant chances of recovery in the ICU; Priority 2 – patients without instability, but requiring intensive monitoring due to possible decompensation; Priority 3 – unstable patients with low probability of recovery due to the severity of acute illness or comorbidities; Priority 4 – patients with no indication for ICU admission either because they are very well or too ill to benefit from treatment in intensive care.<sup>7</sup> Scores such as the APACHE II<sup>8</sup> (Acute Physiology and Chronic Health Evaluation II) and MODS<sup>9</sup> (Multiple Organ Dysfunction Score) are also used, allowing us to evaluate the prognosis of these patients, based on physiological and laboratory variables, age, comorbidities, and more.

Currently the service is more complex, both in terms of equipment and human resources, associated with a greater number of cases arising from different specialties (surgical or not) that can be admitted to the Intensive Care Unit. That is why this branch of medicine had to develop a multidisciplinary approach, including physicians from various specialties, as well as non-medical professionals, such as nurses, physiotherapists, nutritionists, psychologists and occupational therapists.<sup>4</sup>

The context of the Hospital de Clínicas de Marília is that of three admission units (HC I, HC II, and HC III) that, although functioning in separate buildings, make up a total of 269 beds, 24 in the adult ICU (according to 2012 data from the Famema technical information core, Núcleo Téc-

nico de Informações, NTI). The percentage of ICU beds out of the total number of available beds is 8.9%, which is in line with the national average ranging from 7 to 15% of the available, depending on the characteristics of each hospital.<sup>4</sup> In addition, we have a high occupancy rate and we are a reference for the Regional Health Board - IX comprising 62 municipalities in the region of Marília, São Paulo.

After a brief literature review, we found no epidemiological studies on the Famema ICU, which revealed the need to characterize this epidemiological profile. So, considering that an ICU aims to promote optimal care to critically ill and unstable patients who require specialized personnel and equipment, we searched our records for prevalence data regarding gender, age, education, religion, color/race, origin, admission diagnosis (ICD-10), as well as mortality rates, deaths and causes of death, average occupancy rate and length of stay in days, in order to understand and qualify our patients to adapt and improve our service.

## METHOD

This is a retrospective descriptive study, with a quantitative approach.

### Setting

The Famema complex comprises the Medical and Surgical Hospital das Clínicas de Marília (HC-I), the Maternal and Child Health Unit (HC-II) and Hospital São Francisco (HC-III) consisting of less complex clinical and surgical wards and a psychiatric ward. The Famema is part of a health care network under the Regional Health Board IX of Marília (DRS IX), comprising 5 microregions (Marília, Assis, Ourinhos, Tupã and Adamantina) with 62 municipalities, totaling approximately 1,100,000 inhabitants. It is a hospital that treats cases of medium and high complexity, and a reference to that region, with 269 beds available for care under the SUS system.<sup>10</sup> The Intensive Care Unit (ICU) located in HC-I building has 24 beds equally divided between two wings (ICU A and ICU B), and receives adult patients undergoing medical and surgical treatment, except for cases of cardiac surgery and transplantation (ICU type II).<sup>10,11</sup> During the study period, there was no institutional policy to fill vacancies in any of the two ICUs (A or B). The assessment of merit for ICU admission was based on the availability of beds, subject to the consent of the critical care intensivist physician and the team responsible for the ICU.

### Study population

All patients admitted to the Famema HC-I ICU from July 2010 to June 2012. All patients with hospital admission

recorded in the Hospital Information System, based on data obtained from the NTI-Famema, were eligible for the study.<sup>1</sup> Patients with more than one ICU admission will be included in the survey considering each hospital as an independent entry.

#### Data collection

To obtain the records, data were collected from the Technical Information Center (NTI) of the Famema Hospital Information System. The following socio-demographic and epidemiological variables were selected: gender; age; education; religion; color/race; origin; admission diagnosis according to the International Classification of Diseases – 10 (ICD-10); average occupancy rate and length of ICU stay in days, mortality rate < 24 and > 24 hours; deaths and causes of death (ICD-10).

#### Data analysis

For data analysis, we used the distribution of absolute and relative frequencies based on the simple tabulation of variables, then presented as tables for simple statistical analysis.

#### Ethical procedures

This study was approved by the Research Ethics Committee on 12/26/12. Opinion no.: 154.144. CAAE no.: 09631312.5.0000.5413.

## RESULTS

The data recorded in the NTI system from June 2010 to July 2012 show 2,022 admissions to the ICU of the Hospital de Clínicas de Marília-Famema. The profile of the population served is mostly that of males (57.91%); predominantly seniors aged  $\geq 60$  years (48.89%) with a mean age of 56.64 years and standard deviation  $\pm 19.18$ ; with low levels of formal education with complete primary school (63.30%). Most identified themselves as Catholic Christians (75.12%), followed by Protestants (18%). The ethnic profile reveals a population that declares itself primarily as white (77.10%) or mixed (15.3%). The patients admitted during the study period were from Marília (53.81%), followed by the nearest neighboring towns, Garça (4.25%) and Vera Cruz (2.37%). The average occupancy rate for the period was 94.42% and the mortality rates were 2.47% for stays <24 hours and 19.83% for >24 hours.

Of the 2,022 ICU admissions, 1,936 were coded using ICD-10; the remaining 86 (0.04%) did not provide diagnostic encoding. Therefore, our number of cases (N) is limited to 1,936 admissions.

The morbidity found revealed a predominance of Diseases of the Circulatory System with 494 admissions (25.5%). Following, cases of Trauma and External Causes with 446 admissions (23.03%), Cancer with 213 admissions (11.00%), Diseases of Gastrointestinal Apparatus with 189 admissions (9.76%), Infectious and Parasitic Diseases with 187 admissions (9.65%), and Diseases of the Respiratory System with 183 admissions (9.45%) (Table 1).

**TABLE 1** Distribution of the number and percentage of ICU admissions vs. ICD-10.

ICD-10	n (%)
I00-I99 Diseases of the circulatory system	494 (25.5)
S00-T98 Injury, poisoning, and other external causes	446 (23)
C00-D48 Neoplasms	213 (11)
K00-K93 Diseases of the digestive system	189 (10)
A00-B99 Infectious and parasitic diseases	187 (10)
J00-J99 Diseases of the respiratory system	183 (9)
N00-N99 Diseases of the genitourinary system	51 (3)
E00-E90 Endocrine, nutritional and metabolic diseases	49 (3)
Other (F00-F99; H00-H59; L00-L08; Q00-Q45; R00-R94; Z30-Z54)	42 (2)
G00-G99 Diseases of the nervous system	41 (2)
M00-M99 Diseases of the musculoskeletal system and connective tissue	20 (1)
O00-O99 Pregnancy, childbirth and the puerperium	16 (1)
D50-D89 Diseases of the blood and blood-forming organs	5 (0.25)
Total encoded (ICD-10)	1,936 (100)

n (absolute number of admissions); % (percentage)

Table 2 shows the prevalence of the most frequent subgroups admitted to the ICU during the study period based on the ICD-10 system. In the ICD-10 I00-I99 group of Diseases of the Circulatory System, Cerebrovascular Diseases (including the various types of stroke) and Ischemic Heart Diseases (including the various types of infarction) were more prevalent. The second group in number of admissions was that of ICD-10 S00-T98 Traumas and External Causes, with a higher internal prevalence for Injuries to the Head and Injuries to the Hip and Thigh. In third place, the group under ICD-10 C00-D48 code for Cancer, with a higher prevalence of Malignant Neoplasms of Digestive Organs and Neoplasm of Uncertain Behavior. Then, with percentages very close to the above, Diseases of Gastrointestinal Apparatus, CID-10 K00-K93, with a predominance of Disorders of Gallbladder, Biliary Tract and Pancreas, and Infectious and Parasitic Diseases.

es, CID-10 A00-B99, with a predominance of Bacterial Infection, including Sepsis and Septic Shock. Last, and still relevant, the Diseases of the Respiratory System, CID-10 J00-J99, with a predominance of Influenza Infection and Pneumonia.

**TABLE 2** Prevalence of the most frequent categories and subcategories admitted to the ICU vs. ICD-10.

ICD-10	N	n (relative %)
<b>I00-I99 Diseases of the circulatory system</b>	494	
Cerebrovascular diseases		156 (31.5)
Ischemic heart diseases		138 (27.93)
<b>S00-T98 Traumas and external causes</b>	446	
Injuries to the head		202 (45.29)
Injuries to the hip and thigh		78 (17.48)
<b>C00-D48 Neoplasms</b>	213	
Malignant neoplasms of digestive organs		85 (39.9)
Neoplasms of uncertain behavior		28 (13.1)
<b>K00-K93 Diseases of gastrointestinal apparatus</b>	189	
Disorders of gallbladder, biliary tract and pancreas		58 (30.6)
<b>A00-B99 Infectious and parasitic diseases</b>	187	
Bacterial infection, sepsis and septic shock		169 (90.37)
<b>J00-J99 Diseases of the respiratory system</b>	183	
Influenza infection and pneumonia		66 (36.06)

N (number of admissions in the category); n (absolute number of admissions in the subgroup); relative % (percentage in relation to its subgroup).

As for the length of stay, we observed that the average length of stay in days was 8.09 plus standard deviation (SD) ±10.73 (min=0.01 and max=119.61 days). The diseases that presented longer average ICU stay were those encoded as CID-10 L00-L99, Disorders of the skin and subcutaneous tissue, with average stay of 12.77 days plus standard deviation (SD) ±17.07 (min=0.69 and max =24.82 days), followed by Infectious and Parasitic Diseases, CID A00-B99, with average stay of 10.39 days (SD±12.47) and Diseases of the Respiratory System, CID J00-J99, with average stay of 10.34 days (SD±12.06).

Finally, the results show 471 deaths (24.32%) compared to the total 1,936 admissions during the study period. The age group with the highest mortality was the range from 70 to 79 years with 102 deaths (21.65%). The most prevalent causes of death according to ICD-10 were: Diseases of the Circulatory System (30.99%), followed by Infectious and Parasitic Diseases (22.71%) and Injury, Poisoning, and Certain Other Consequences of External Causes (14.43%). In cases of Diseases of the Circulatory System, deaths in the age range from 60 to 69 years (n=37), were more prevalent. In Infectious and Parasitic Diseases, death

was more prevalent in the range from 30 to 49 years (n=27), while in the cases of Injury, Poisoning, and Certain Other Consequences of External Causes, death was more prevalent from 30 to 49 years of age (n=21) (Table 3).

## DISCUSSION

Few studies refer to epidemiological surveys in intensive care units in Brazil and abroad. The exposed data show that patients received in our ICU are predominantly male, which is consistent with other studies.<sup>12-16</sup> According to Ciampone,<sup>17</sup> men have a higher ICU admission frequency because they use primary and secondary health care services less. In the population studied by Gomes,<sup>18</sup> the absence of men seeking health services can be explained by fear of discovering a severe illness, shame to expose their body to a health professional, the absence of exclusive units for the treatment of men's health and a limited availability of public services. As for the age range evaluated in our study, seniors predominated, which is in line with results found by other authors.<sup>15,19</sup> Based on the last Population Censuses (2000<sup>20</sup> and 2010<sup>21</sup>) carried out by the Brazilian Census Bureau, IBGE, an increase in the elderly population is observed. In a projection made for 2060, life expectancy for women will be 84.4 years and for men, 78.03 years apparently due to improved medical treatments and quality of life.<sup>22</sup> We believe that increasing age leads to a higher incidence of disease and therefore a greater number of elderly patients in ICUs.

Batista<sup>23</sup> described the meaning given to the sacred by patients in a context of hospitalization in Intensive Care Unit. His study showed that the imminence of death afflicts people; they seek in religion strength to face their fears through prayers, rituals and promises. Most patients in our study had a religious belief and we believe that this is a feature of the Brazilian culture. In the literature, studies investigating this variable in ICU patients are scarce.

Schein,<sup>24</sup> in a study on the profile of seniors admitted to an intensive care unit in the city of Rio Grande (RS), showed a majority of white individuals, which is similar to our study. However, according to Lins,<sup>25</sup> defining ethnicity basic on skin color and other physical characteristics is debatable in a society such as the Brazilian, with a genetic composition that mixes various ethnic backgrounds.

General hospital morbidity under the SUS system, according to data from the Datasus<sup>26</sup> in 2012, Nogueira,<sup>13</sup> Otto<sup>27</sup> and our data, point out as most frequent the Diseases of the Circulatory System. In our study, the Ischemic Heart Diseases and Cerebrovascular Diseases subcategories are part of this group. They certainly have great global relevance, with investments in prevention and treatment.

**TABLE 3** Distribution of the number of deaths in ICU vs. ICD-10 vs. age range.

ICD-10 group	N° of deaths per age range (years)							Total	
	<15	15 a 29	30 a 49	50 a 59	60 a 69	70 a 79	≥ 80	n	%
I00-I99 Diseases of the circulatory system	–	3	22	27	37	35	22	146	30.99
A00-B99 Infectious and parasitic diseases	–	8	27	26	13	25	8	107	22.71
S00-T98 Injury, poisoning, and other external causes	2	10	21	11	9	8	7	68	14.43
K00-K93 Diseases of gastrointestinal apparatus	–	–	3	11	16	12	11	53	11.25
J00-J99 Diseases of the respiratory system	–	2	6	4	15	12	8	47	9.97
C00-D48 Neoplasms	–	1	6	2	5	5	4	23	4.88
N00-N99 Diseases of the genitourinary system	–	–	1	2	1	–	1	5	1.06
E00-E90 Endocrine, nutritional and metabolic diseases	–	–	1	1	1	1	–	4	0.84
G00-G99 Diseases of the nervous system	–	–	1	1	–	–	–	2	0.42
Other	–	–	3	5	2	4	2	16	3.39
<b>Total</b>	<b>2</b>	<b>24</b>	<b>91</b>	<b>90</b>	<b>99</b>	<b>102</b>	<b>63</b>	<b>471</b>	<b>100</b>
<b>(%)</b>	<b>0.42</b>	<b>5.09</b>	<b>19.32</b>	<b>19.10</b>	<b>21.01</b>	<b>21.65</b>	<b>13.37</b>		

n (absolute number of admissions); % (percentage)

We know that the adult intensive care units occupy an important place in hospitals, with an increase in demand and occupancy in recent decades. Secondary and tertiary care hospitals typically have a high occupancy rate; in our study, the average occupancy rate was 94%. Likewise, Kimura,<sup>28</sup> showed a monthly occupancy rate in ICUs in the municipality of São Paulo between 80 and 100% in 58% of the units assessed.

Fluctuations in the average number of days of ICU hospitalization may have several explanations and generally reflect peculiarities of the population profile in each hospital and in each intensive care unit. Several studies show a variable average stay from 4.09 to 28.8 days,<sup>13,15,19,24,28-30</sup> which places us in a comfortable position with the average of 8.09 days. We can assume that the possible causes of these large variations in mean hospital stay are related to the age and preexisting comorbidities in individuals of the studies in question, including ours. Also quoted the respiratory diseases that, in most cases, when they need intensive care, take a longer length of stay for the probable reason for the use of mechanical ventilation as one of the main challenges in treatment and ICUs. The same with Infectious and Parasitic Diseases, predominantly represented in our hospital by Sepsis, responsible for large investments and longer intensive care.

One less desirable aspect found in our study is the overall mortality rate. Nevertheless, to compare mortality among the ICUs, we must consider the number of available beds, which differs in all of the studies thus limiting the relevance of this comparison. During the study period, we had 24.32% mortality; unfortunately,

this is a higher rate compared to results found in major Brazilian cities – Unicamp<sup>31</sup> (13.46%) or in more developed countries, such as Scandinavia<sup>32</sup> (9.1%), Australia and New Zealand<sup>33</sup> (16.1%). But we do have a lower mortality rate compared to Uganda Africans<sup>34</sup> (40.1%). One possible explanation for our mortality rate seems to be that we receive patients with low levels of education and economic power, which reflects in more severe cases. We also serve a large region (DRS IX), including 62 municipalities, and just over half of the patients (53.81%) are from the city of Marília. This leads us to assume that we may be receiving in our ICU cases referred from other cities at later, more complex stages, with worse and undesirable outcomes. Moreover, the hospital's economic situation, which depends solely on government funding, is unfavorable. More resources could yield better success rates regarding the treatment of critically ill patients and improvement in mortality rates.

## CONCLUSION

Since the end of last century, the intensive care units have become crucial in hospitals to treat increasingly severe and senile populations. Our ICU, at Hospital das Clínicas de Marília (Famema), has presented an epidemiological profile similar to other units in Brazil and worldwide, despite the few studies found in the literature. Our study showed that study population has the following predominant profile: Male, elderly, low education, Catholics and white. Diseases of the Circulatory System were the leading cause of ICU admissions and death, and the age range from 70 to 79 years had the highest mortality.

Thus, we feel proportionally in accordance with the increased demand of our time regarding the care of critically ill patients. It is noteworthy that, to better serve our population and to produce more favorable final results, we need better technical working conditions, more human resources and more government investments. We serve 62 municipalities in the region of Marília, which is a prosperous area, but still lacks proper health care.

## RESUMO

Perfil epidemiológico dos pacientes da UTI da Faculdade de Medicina de Marília

**Objetivo:** caracterizar o perfil epidemiológico da população internada na UTI do Hospital das Clínicas da Faculdade de Medicina de Marília (Famema).

**Método:** estudo retrospectivo, descritivo, quantitativo. Os dados foram obtidos do Núcleo Técnico de Informações (NTI) da Famema dos pacientes internados na UTI Famema. Para a análise dos dados, utilizou-se distribuição de frequências absoluta e relativa com tratamento de estatística simples.

**Resultados:** foram registradas 2.022 internações no período de junho de 2010 a julho de 2012 na UTI Famema, sendo 1.936 codificadas de acordo com a CID-10. O perfil epidemiológico mostrou predominância do sexo masculino (57,91%), população idosa  $\geq 60$  anos (48,89%), média de idade de 56,64 anos ( $\pm 19,18$ ) e baixa escolaridade com até 1º grau completo (63,30%), cristão católico (75,12%), brancos (77,10%), procedentes de Marília, SP (53,81%). A taxa média de ocupação foi de 94,42%. A morbidade predominante foram as doenças do aparelho circulatório com 494 internações (25,5%), seguida dos traumas e causas externas com 446 admissões (23,03%) e neoplasias com 213 admissões (11,00%). A média de permanência foi 8,09 dias ( $\pm 10,73$ ), sendo as doenças de pele e tecido subcutâneo as com maior tempo (12,77 dias;  $\pm 17,07$ ). Ocorreram 471 óbitos (24,32%), cuja causa mais prevalente foram as doenças do aparelho circulatório (30,99%). A faixa etária de maior mortalidade foi 70 a 79 anos com 102 óbitos (21,65%).

**Conclusão:** a UTI Famema apresentou um perfil epidemiológico semelhante ao de outras unidades no Brasil e no mundo, apesar dos poucos estudos na literatura. Com isso, nos sentimos em sintonia no atendimento ao paciente crítico.

**Palavras-chave:** unidades de terapia intensiva, perfil de saúde, epidemiologia, mortalidade.

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