ORIGINALES

Clinical-epidemiological profile of patients with covid-19 admitted to a university hospital reference

Perfil clínico-epidemiológico dos pacientes com covid-19 internados em um hospital universitário referência

Perfil clínico-epidemiológico de pacientes con covid-19 hospitalizados en un hospital universitario de referencia

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ABSTRACT:
Objective: To characterize the epidemiological profile of patients hospitalized with COVID-19 in a referral emergency unit in northern Paraná; analyze the profile of patients affected by COVID-19 regarding gender, color/race, age, marital status, origin and type of referral; measure the average length of hospital stay, from the date of admission of the patient until discharge, determine the percentage of the main hospital outcomes.
Method: It was field research with a quantitative, observational, unicentric, descriptive, exploratory and retrospective approach, carried out at the University Hospital of the State University of Londrina, located in the north of the Paraná. The study population consisted of data from 2,800 patients admitted and hospitalized with a confirmed diagnosis of COVID-19 in the Emergency Room of the hospital in question, according to records of the epidemiology center and Medical and Statistical Archive Service, from January 2021 to July 2021.
Results: It was observed that most of those affected were male, had a white color, were single and were between 58 and 67 years old. The mean length of hospitalization was 16 days. The Mobile Emergency Care Service obtained the highest referral records and the discharge and death outcomes had very close values.
Conclusion: It is concluded that the second wave of COVID-19 was devastating in all segments, reflecting the change in the age profile of those affected, the increase in hospitalization rates, high mortality rates and the close relationship between the hospitalization period and the evolution to death.

RESUMO:
Objetivo: Caracterizar o perfil epidemiológico dos pacientes internados com COVID-19 em uma unidade de pronto socorro referência do norte do Paraná; analisar o perfil dos pacientes acometidos por COVID-19 quanto ao: gênero, cor/raça, idade, estado civil, procedência e tipo de encaminhamento; mensurar o tempo médio de internação hospitalar, desde a data da admissão do paciente até sua alta, determinar o percentual dos principais desfechos hospitalares.
Método: Tratou-se de uma pesquisa de campo com abordagem quantitativa, do tipo observacional, unicêntrica, descritiva, exploratória e retrospectiva, realizada no Hospital Universitário da Universidade Estadual de Londrina, localizado no norte do Paraná. A população do estudo consistiu dos dados de 2.800 pacientes admitidos e internados com diagnóstico confirmado de COVID-19 no Pronto Socorro do hospital em questão, conforme registros do núcleo de epidemiologia e Serviço de Arquivo Médico e Estatística, no período de janeiro de 2021 a julho de 2021.
Resultados: Observou-se que maioria dos acometidos eram do sexo masculino, possuíam cor branca, eram solteiros e tinham entre 58 e 67 anos. O tempo médio de internação foi de 16 dias. O Serviço de Atendimento Móvel de Urgência obteve os maiores registros de encaminhamentos e os desfechos de alta e óbito possuíram valores muito próximos.
Conclusão: Conclui-se que a segunda onda da COVID-19 se mostrou devastadora em todos os seguimentos, refletindo na mudança do perfil etário dos acometidos, no aumento das taxas de internação, nos altos índices de mortalidade e na a estreita relação entre o período de internação e a evolução ao óbito.

Palavras-chave: COVID-19; Pandemia por COVID-19; Perfil epidemiológico; Gerenciamento Clínico; Serviços Médicos de Emergência.

RESUMEN:
Objetivo: Caracterizar el perfil epidemiológico de los pacientes hospitalizados con COVID-19 en una unidad de emergencia de referencia en el norte de Paraná; analizar el perfil de los pacientes afectados por COVID-19 en términos de: sexo, color/raza, edad, estado civil, procedencia y tipo de derivación; medir el promedio de estancia hospitalaria, desde la fecha de ingreso hasta el alta del paciente, determinar el porcentaje de los principales resultados hospitalarios.
Método: Se trata de una investigación de campo con abordaje cuantitativo, observacional, unicéntrica, descriptiva, exploratoria y retrospectiva, realizada en el Hospital Universitario de la Universidad Estadual de Londrina, ubicado en el norte de Paraná. La población de estudio estuvo constituida por los datos de 2.800 pacientes ingresados y hospitalizados con diagnóstico confirmado de COVID-19 en el Servicio de Urgencias del hospital en cuestión, según registros del núcleo de epidemiología y el Servicio de Estadísticas y Archivo Médico, desde enero de 2021 hasta julio de 2021. de 2021.
Resultados: Se observó que la mayoría de los afectados eran del sexo masculino, de raza blanca, solteros y tenían entre 58 y 67 años. La estancia hospitalaria media fue de 16 días. El Servicio Móvil de Atención de Urgencias presentó los mayores registros de derivaciones y los desenlaces de alta y muerte tuvieron valores muy similares.
Conclusión: Se concluye que la segunda ola de COVID-19 fue devastadora en todos los seguimientos, reflejando el cambio en el perfil etario de los afectados, el aumento de las tasas de hospitalización, las altas tasas de mortalidad y la estrecha relación entre el período de hospitalización y progresión a la muerte.

Palabras clave: COVID-19; Pandemia por COVID-19; perfil epidemiológico; Gestión clínica; Servicios médicos de emergencia.

INTRODUCTION

The first reports of the new severe acute respiratory syndrome coronavirus (SARS-COV-2), designated as COVID-19 by the World Health Organization (WHO), were identified in Wuhan, a city in China's Hubei province, in December 2019. After the first confirmed cases, SARS-CoV-2 spread rapidly and led China to an outbreak, primarily of pneumonia. On January 30, 2020, WHO declared the outbreak as a Public Health

Emergency of international concern and on March 11, 2021, a pandemic [1].

SARS-CoV-2 is classified as a beta coronavirus of the same subgenus as Middle Eastern Respiratory Syndrome (MERS), but of another subtype. There are several similarities and differences between SARS, MERS and SARS-CoV-2 viruses. The three types of coronaviruses can cause severe symptoms of respiratory distress and death, although mortality rates vary considerably, with MERS being the most lethal. SARS-CoV-2 appears to be more transmissible than SARS, but less fatal [2,3].

The clinical spectrum of SARS-CoV-2 infection is broad, with variations ranging from the asymptomatic pattern to mild symptoms of a cold of the respiratory tract with flu-like symptoms, including fever and myalgia in some cases, the moderate form, evolving dyspnea to moderate and intense efforts associated with flu-like symptoms, to the severe form, in which patients commonly need ventilatory support because they evolve with Acute Respiratory Distress Syndrome (ARDS) characterized by acute impairment of secondary respiratory function of a diffuse interstitial-alveolar inflammatory process of the pulmonary parenchyma with formation of edema and diffuse fibrosis. This variation between clinical manifestations is mainly due to the heterogeneity of age compositions, social conditions, presence of morbidities, cultural divergences, social structure and health care between countries and regions [4].

Taking into account the context of the pandemic of the new coronavirus, it is essential to identify and understand the epidemiological and clinical characteristics of patients affected by SARS-CoV-2, prioritizing the recognition of the most vulnerable profiles of the disease, the clinical management of these groups and the outcomes arising from the infection, in order to help in the prevention, detection contribute to a more effective care of the population. Therefore, the following question emerged: what is the epidemiological profile of patients hospitalized with COVID-19 in a reference university hospital in northern Paraná?

This study aims to characterize the epidemiological profile of patients hospitalized with COVID-19 in a referral emergency unit in northern Paraná; analyze the profile of patients affected by COVID-19 regarding gender, color/race, age, marital status, origin and type of referral; measure the average length of hospital stay, from the date of admission of the patient until discharge, determine the percentage of the main hospital outcomes.

The choice of the study is justified by the relevant experience in the front line of the COVID-19 pandemic in an emergency unit, in which it provided the care and management of a large number of patients affected by the virus, different profiles and hospital outcomes related to the disease. It is also justified, for the reason to seek the best scientific evidence for the management of these patients, so that better care can be provided to them, because possibly, by appropriating this knowledge, it will be possible to adopt care and management actions, as well as assisting in the prevention and detection of possible vulnerable victims, since new waves of COVID-19 may still be faced in the country.

METHOD

This is a field research with a quantitative approach, observational, unicentric,

descriptive, exploratory and retrospective, classified as analytical, carried out at the University Hospital of the State University of Londrina (HU-UEL), in the Emergency Unit, located in the north of Paraná.

The HU-UEL, operates uninterruptedly 24 hours a day, and every day of the year, the daily population circulating exceeds 5,000 people and is a reference in patient care of medium and high complexity, for the 17th Regional Health, Macroregional North, in addition to several municipalities of the Northwest Macroregional, covering an approximate population of 1,625,012 people, benefited from the excellent services provided. However, in the registers of its Medical and Statistical Archive Service (SAME) [Serviço de Arquivo Médico e Estatística], Human Resource Services (SRH) [Serviços de Recursos Humanos] and attendance to the academy contain patients, students, collaborators and professors from all the Health Regions of Paraná and all regions of the country, a circumstance that increases the initial scope of its reach and performance.

The study population consisted of data from 2,800 patients admitted and hospitalized with a confirmed diagnosis of COVID-19 in the Emergency Room (ER) of the HU-UEL in the care units: emergency, adult hospitalization, observation ward, Intensive Care Unit (ICU) 1 of the ER and ICU 2 of the ER, according to records of the epidemiology nucleus and MSAS of the HU-UEL.

It is noteworthy that the Data Use Committed Term (DUCT) was used to preserve the privacy and maintain the confidentiality of the data collected in the SAME of the HU-UEL, as well as the privacy of its contents.

All patients aged ≥18 years old, admitted with a test of *Reverse Transcription Polymerase Chain Reaction* (RT-PCR) for SARS-CoV-2 positive, from January 2021 to July 2021, with passage through the emergency sectors, adult hospitalization, ER observation ward, ICU of the ER 1 or ICU of ER 2, were included by recording diagnostic confirmation by the epidemiology nucleus of HU-UEL.

All patients aged 0 to 17 years old, all patients who were admitted to the ER for outpatient consultations or other needs who did not have a positive diagnosis of COVID-19, patients who were admitted only as suspected COVID-19 and who did not have diagnostic confirmation, as well as those who were not hospitalized in the care units were excluded: emergencies from 1 to 7, adult inpatient ward, observation ward, ICU 1 and 2 of the ER.

The analysis units were composed of the reports issued by the information system and will occur following the steps below:

    o **Step 1** – Request to the Statistics Sector of the Medical Archive and Statistics Division of the Clinical Board of HU-UEL. At this stage, the responsible sector was requested to send and/or access the data issued by the information system's service report.

    o **Step 2** - Analysis of information system service reports. During this stage, the variables that make up the care reports, listed below, were analyzed for subsequent statistical correlations:

        ▪ Age (in years, months and days);

- Address (city);
- Marital Status;
- Color;
- Gender;
- Type of referral (or direct search);
- Date of admission;
- Date of discharge/death;
- Type of discharge (clinical improvement/death);
- Hospitalization sector;
- Hospitalization clinic;
- Discharge sector;
- Discharge clinic.
-
  - **Step 3** - Analysis and statistical correlations of the data.

Data collection was carried out from November 2021 to February 2022. Initially, the descriptive analysis of the data was performed, the continuous variables were expressed as mean and standard deviation and the variables were expressed as percentages and absolute numbers.

Data normality was tested by Kolmogorov-Smirnov test. The comparison of the study will be verified by means of Student's t-tests for independent samples according to their distribution and for categorical data Pearson's chi-square test, considering the significance level of 5% ($p < 0,05$).

Considering this is a research with a quantitative and descriptive approach, with a scientific attitude that seeks to explain the behavior of things, by establishing mathematical relationship of cause and effect, biostatistical analyzes were used, such as descriptive analysis using the software *Statistical Package for Social Sciences* (SPSS) to organize the findings.

This study complied with all ethical precepts inserted in Resolution No 466 of December 12, 2012 and Resolution No 580 of March 22, 2018, and only started after the approval of the Research Ethics Committee (CEP) [Comitê de Ética e Pesquisa] of the Health Science Center (HSC) of UEL under the approval No: 5.273.300 and CAAE: 54894321.0.0000.5231 and with the authorization of the superintendence of HU-UEL.

RESULTS

The majority of those affected belonged to the male sex (57.3%), were married (44.1%) and the predominant color among those affected was white (80.8%). The mean length of hospitalization was 16 days (Table 1).

Table 1 - Characterization of the profile of patients affected by COVID-19 regarding: marital status, color/race, gender, age, length of stay, origin and type of referral. Londrina, 2022. (n = 2800).

Variable	Absolute Frequency (n)	Absolute Frequency (%)
Marital Status		
Single	482	17,2
Married	1235	44,1
Widow/ Widower	184	6,6
Divorced	136	4,9
Others	763	27,3
Total	**2800**	**100,0**
Color		
White	2261	80,8
Black	137	4,9
mixed race	193	6,9
Others	163	5,8
Yellow	44	1,6
Indigenous	2	,1
Total	**2800**	**100,0**
Gender		
Female	1195	42,7
Male	1605	57,3
Total	**2800**	**100,0**
Age (years)		
Average = 58,66 Standard deviation = 11.77		
Length of stay (days)		
Average = 16.09 Standard deviation = 13.71		

Source: authors themselves, 2022, Londrina - Pr.

It was observed that, alarmingly, The Mobile Emergency Care Service (SAMU), obtained the largest referral records comprising a total of 2,360 referrals, followed by the Bed Regulation Center (CRL) [Central de Regulação de Leitos] 347 referrals and by patients who sought the service directly, adding up to 57 patients (Graph 1).

Graph 1 - Characterization of the profile of patients affected by COVID-19 regarding the service they referred. Londrina, 2022. (n = 2800)
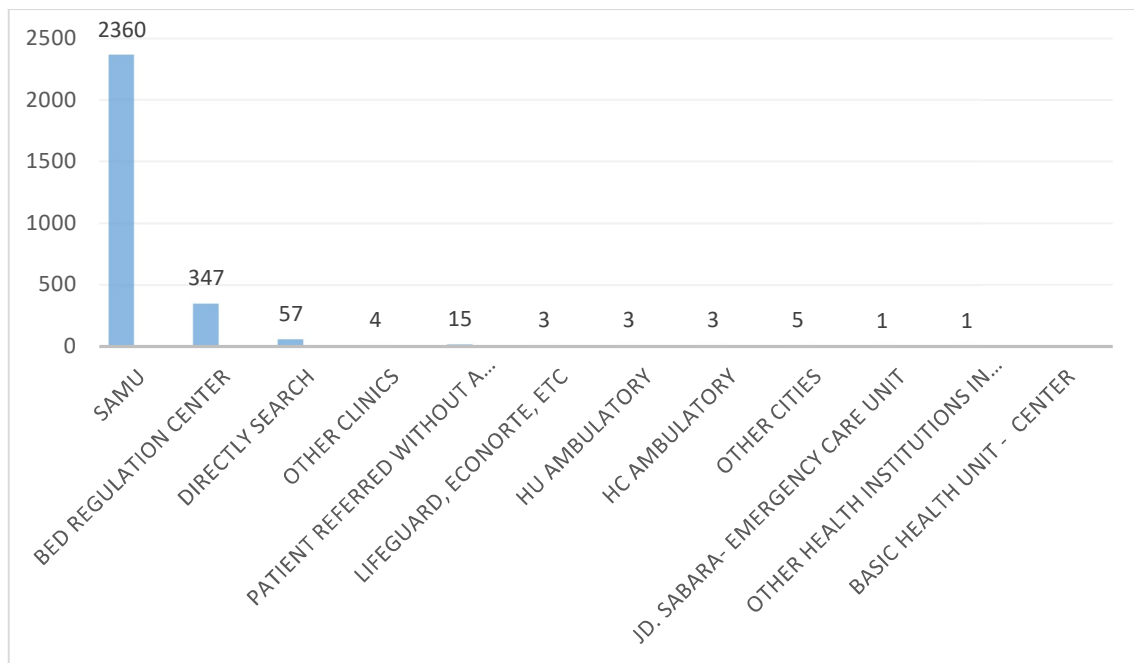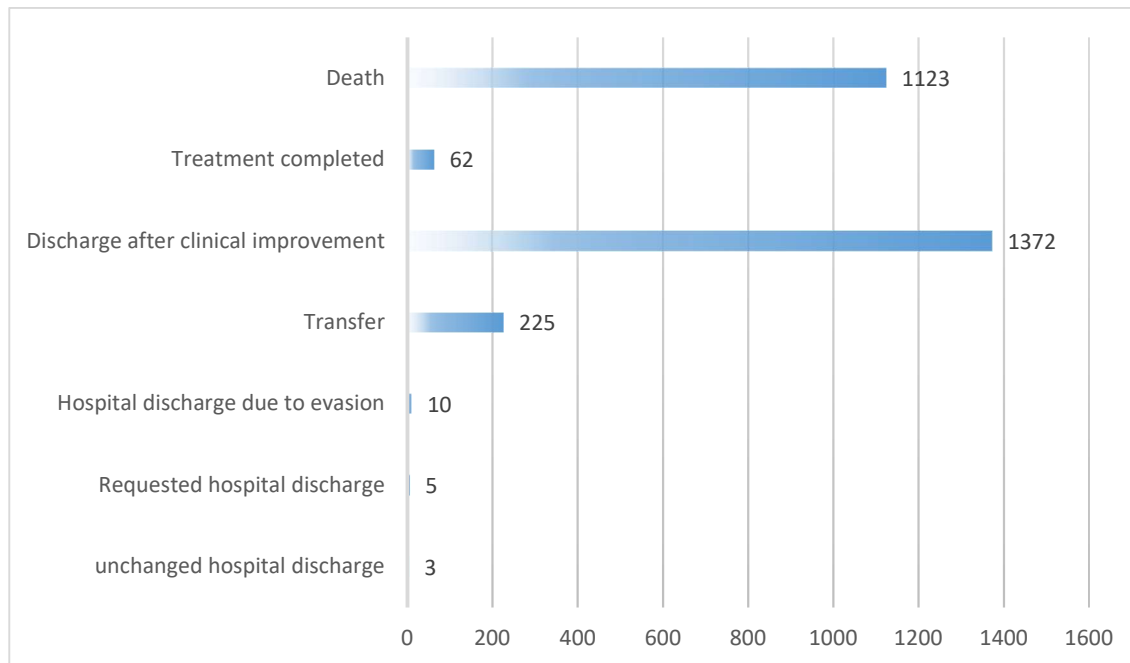

Source: Authors themselves, 2022, Londrina - Pr.

Among those affected, the highest outcomes were improved discharge, computing 1,372 records, followed closely by 1,123 records of deaths (Graph 2). It was observed that in general way (Graph 3), all sectors were overloaded, with the occupancy rate approaching 100% throughout the period and sectors. The sectors that obtained the highest mean occupancy were the ICUs: 3(98,4%), 1 (97,4%), 2 (96,2%), 4 (97%), 7(95,7%), 5 (88,5%) e 6 (84,9%), followed by the emergency room. Attention is drawn to the emergency room, as it was the sector responsible for the immediate care of all patients who entered the referral and the person responsible him/her transfers, considering the other sectors mentioned and despite being a sector of high turnover, presented with extremely high rates of occupation throughout the period, reaching almost 80% and the Temporary Hospitalization Units (UPS) [Unidade de Internação Provisória] until the critically ill patients received ICU vacancies for later transfers, also presented high rates of occupation, being: ICU ER1 (83,2%) and ICU ER 2 (69,4%). Followed by these data, we have the data of the ICUs of the Hospital de Retaguarda (HR), in which they recorded the following occupancy rates: ICU HR2 (93.2%), ICU HR3 (80.7%) and ICU HR1 (47.5%).

The mortality rate was more significant in the following sectors: ICU HR 3 (58.6%), ICU 3 (54,4%), ICU HR 2 (45,70%) ICU HR 1 (41,1%) ICU 5 (39,2%) ICU 6 (38,1%) ICU 4 (32,10%) ICU 7 (31.9%) ICU 2 (29%) ICU 1 (26,5%).

Intriguingly, the sectors with the highest occupancy rates did not necessarily have the highest mortality rates. This leads us to reflect on what happened in this scenario and understand the outcomes presented.

The lowest mortality records were in the ER (3,1%) and their respective ICUs: ICU ER 1 (6,2%) e ICU ER2 (7,8%) This is largely explained by the high turnover of patients in these sectors, with much shorter periods of stay when compared to ICUs.

GRAPH 2 - Characterization of the discharge outcome of patients affected by COVID-19. Londrina, 2022. (n = 2800).

Source: Authors themselves, 2022, Londrina - Pr.

Graph 3 – Demonstration between the average occupancy rate and the average mortality rate by sector of patients affected by COVID-19. Londrina, 2022. (n = 2700).
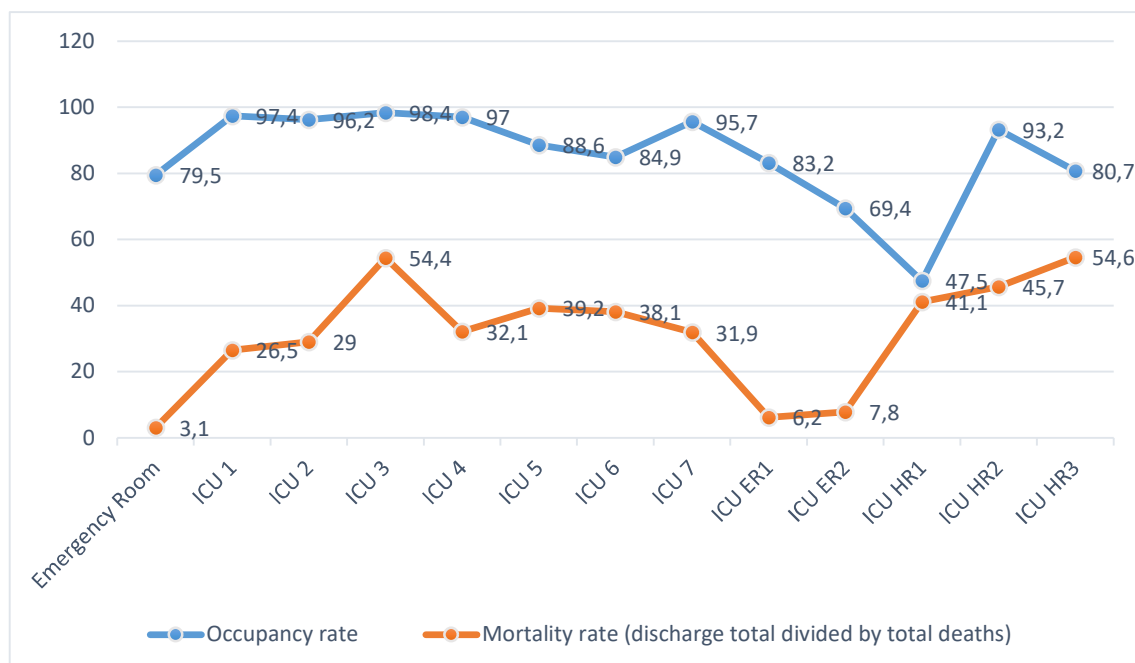
Source: Authors themselves, 2022, Londrina - Pr.

Clearly (Graph 4), the sector with the most accumulated numbers of outflows was the ER with a quantity of 1,233 in the period under analysis, but these numbers are explained by the high turnover of patients for long-term hospitalization sectors and

intensive care sectors.

When analyzing the percentages of deaths in isolation, it is observed that the same sector also led with the highest rates (37%). This fact is explained by the sector is a critical emergency unit in which it received critical patients who sometimes evolved to unfavorable outcomes even before receiving vacancies in the intensive care sector, which is also justified by the high occupation in all sectors of ICUs and the long stay of patients who waited for the availability of vacancies while they were hospitalized in the ER.

It is emphasized that this discussion assumes the same arguments for the sectors identified as ICU EM1 e ICU EM2 because they comprise the EM sector.   When analyzing the ICU data, ICU 7 stood out with high records of outflows (45,7%) and a not-so-discrepant percentage of deaths (12%), followed by ICU 2 comprising (43%) outflows and (12.3%) deaths, ICU 4 (40,3%) outflows and (12,7%) deaths and ICU 1 (38,6%) and 10% deaths.   On the other hand, the data referring to the ICUs of the HR obtained unfavorable outcomes in relation to the number of exits and the number of deaths. The HR ICU 1 recorded (9,3%) outflows and (5,7%), it is observed that deaths were almost proportional to the number of outflows. The HR 2 ICU with (33,3%) outflows and (15,5%) deaths and the HR3 ICU with (28,4%) outflows and (15%) outflows per death also obtained similar results.

Graph 4 - Demonstration between the average number of departures from the sector (discharges, deaths and internal transfers) and the average number of discharges from the sector per death of patients affected by COVID-19. Londrina, 2022. (n = 2800).
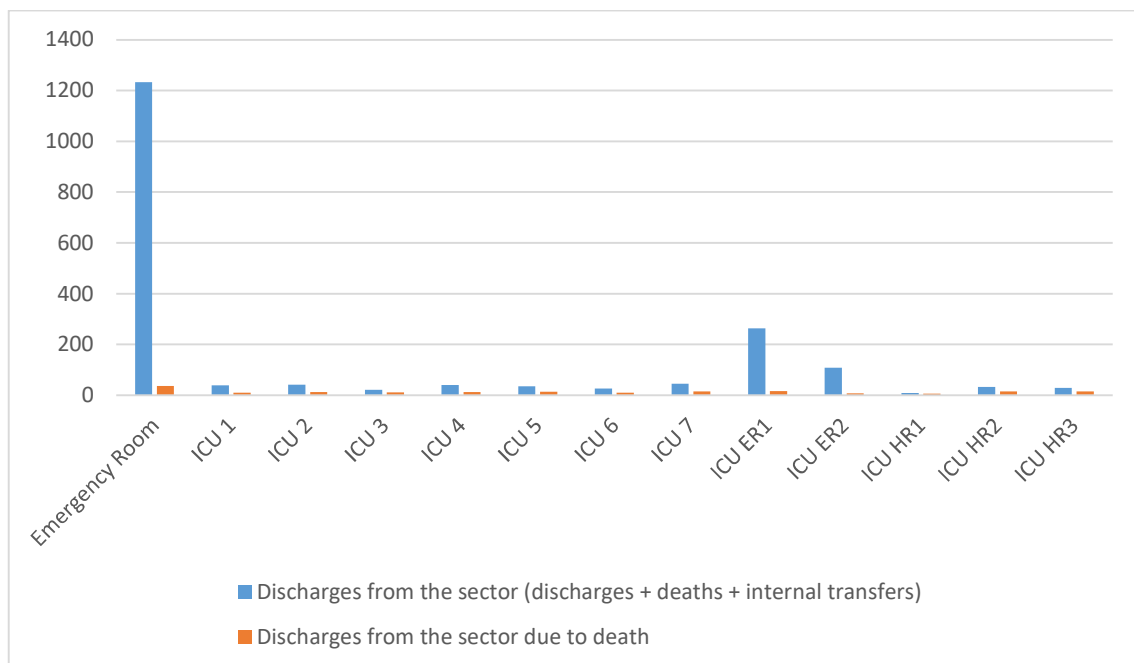
Source: authors themselves, 2022, Londrina - Pr.

DISCUSSION

In line with the results of the characterization of patients affected by the disease, studies that analyzed the epidemiological profile of patients affected by COVID-19 in Brazil and worldwide, corroborate the findings that the male sex was the main affected by the disease. Among the group stand out those aged over 50 years, white race and married [4-7].

Advanced age is a risk factor for SARS-CoV-2 infection, as it increases the chances of progression to SARS, which is the most severe outcome of the disease, requiring care in the ICU, and mechanical ventilation and has a greater chance of progressing to death [8.9].

When analyzing the type of service that referred patients to the EM of the HU-UEL, a regional reference service, it was observed that the Mobile Emergency Care Service (SAMU) accumulated higher numbers of occurrences, corresponding to the quantity of 2,360 referrals in the period under study, followed by the 347 referrals from the Bed Regulation Center (BRC).

Studies carried out in different SAMUs in the southern region of Brazil inferred that these workers perceived a great increase in the demand for respiratory diseases and felt the losses in the relationships established with other services of the network. In addition, the participants also reported a negative impact on the response time of the service to the detriment of the time spent on safety measures, such as disinfection of ambulances, the process of dressing, de-dressing of personal protective equipment of the teams. The professionals pointed out that in addition to the increased workload, these experiences also negatively impacted mental health and that they were exposed to the limitations imposed by the pandemic, restricting opportunities to relieve emotional, cognitive and physical tensions at work [10,11].

The result of the correlations of the outcomes of the patients in the study in question pointed out that most patients progressed to the outcomes of improved discharge with a quantity of 1372 patients, but the number of deaths was 1123 and was expressive in relation to the discharges. Data that allow us to reflect on how large and devastating the COVID-19 pandemic was, specifically in the period under study, carried out at the peak of the second wave of the disease in the country.

A study carried out in all states of Brazil analyzed the excess of death from all causes and the ones from COVID-19 in Brazil in 2021, showing that the country considerably extrapolated the number of expected deaths (1,364,603) to the detriment of the number of deaths observed (1,551,673), totaling an excess of death of 187,07070 (13.7%), of which COVID-19 deaths comprised 208,518, until the study period, which proved alarming and astonishing since COVID-19 deaths were greater than the excess of deaths.

A comparative analysis of the clinical profile of patients hospitalized with COVID-19 in the first and second waves of the pandemic carried out in India found an associated increase in cases and a change in the profile of those affected, such as a reduction in the average age of two years, noting an increase in infection in groups under 20 years old, age groups between 20-39 and 40-60 years old compared to the predominant

profile in the first wave that was those older than 60 years old (KUMAR *et al., 2021*). Countries such as Germany, Japan, South Korea and Iran also reported a shift towards younger demographics [13-15], these data are related to the results presented in the research, in which it was carried out in a time frame of the second wave of COVID-19 and it was evidenced that there was a great concentration of people in the age groups between 20 and 60 years old.

The factors associated with a change in the age profile of the affected population can be explained by the prioritization of the vaccine for high-risk groups, frontline workers and the geriatric population, while the non-prioritized groups remained unvaccinated. In addition, the relaxation of restrictive measures may explain the increase in infection in the age groups mentioned [16].

In addition to the high mortality records due to the disease, the present study showed that the hospital in which the study was carried out evidenced that capacity remained between 79,5% and 98,4% of occupancy rates, showing itself to be more pronounced in ICUs. At the same time, the mortality rate corresponded to the occupation curve in the vast majority of intensive care sectors.

Corroborating the findings, a cohort study of the epicenter of the pandemic revealed that hospital mortality from COVID-19 is associated with bed occupancy and length of stay, critical factors in planning for future pandemics [19]. Data evidenced in by Dale et al. (2021), in the USA, showed that high rates of confirmed cases of the disease and saturation of hospital capacity are inversely proportional to survival at hospital discharge [17].

CONCLUSION

Based on the discussion above, it is concluded that the second wave of COVID-19 was devastating in all segments, reflecting the change in the age profile of those affected, the increase in hospitalization rates, high mortality rates and the close relationship between the hospitalization period and the evolution to death. In addition, it culminated in the overload of the entire system, especially with regard to pre-hospital care, represented by SAMU, a service responsible for more than 90% of patient referrals to the referral hospital.

The study was also able to demonstrate the evolution of patients in the service under analysis, showing significant differences in discharge rates due to improvement and deaths among ICUs, which leads us to reflect on what was different in the care provided and which factors culminated in these discrepancies.

Furthermore, the second wave of the disease has generally generated many lessons for planners and policy makers, researchers, mental health specialists, social scientists and health professionals. In addition, health authorities and the population could see that victory should not be declared early, as was done in January 2021, and the impact that restriction measures and other health measures had on disease control.

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