



Burns and COVID-19, what is the impact of the pandemic? Epidemiological profile of a burn center between 2018-2022

Queimaduras e COVID-19, qual o impacto da pandemia? Perfil epidemiológico de um centro de queimados entre 2018-2022

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■ ABSTRACT

Introduction: Although prevalent, the epidemiology of burns has gaps. At the same time, Covid-19 established a new scenario with new human behaviors, which could equally impact the characteristics and incidence of burns. The overall objective of the project was to describe the epidemiological profile of patients in a Burn Treatment Unit. **Methods:** The study was a chart review from January 2018 to May 2022, including a sample of 1164 admissions from Hospital Padre Albino (Catanduva, São Paulo, Brazil). Statistical analysis was performed using Google Sheets and JAMOVI, and Mann-Whitney U-test was applied for comparison of time periods before and during the pandemic. Before data collection, the study was submitted and approved by the Research Ethics Committee of the institution (document number 5.616.556, CAAE: 62621822.50000.5430). **Results:** The admissions presented a mean age of 31.38 years and 17.88% of body surface area burned, 452 women and 712 men, the mean age was 17 for women and 18.6 for men. The main agent was scalding. When it comes to period comparison, during the pandemic direct flaming had an 8% increase over the previous period (35%). The scalds still remained with high prevalence, however it presented a decrease of 2%, as well as the burns by dermabrasion, which had a decrease of 10%. **Conclusion:** The findings of the studies have limits in terms of generalization, and new studies need to be developed. The changes observed in the period were not significant and without clinical relevance.

Keywords: COVID-19; Epidemiology, descriptive; Burns; Burn units; Brazil.

■ RESUMO

Introdução: Embora prevalente, a epidemiologia das queimaduras possui lacunas. Simultaneamente, a COVID-19 estabeleceu um cenário desafiador e com novos comportamentos humanos, que poderiam impactar nas características e na incidência de queimaduras. O objetivo geral do projeto foi descrever o perfil epidemiológico dos pacientes de uma Unidade de Tratamento de Queimados. **Método:** O estudo foi uma revisão prontuários de janeiro de 2018 até maio de 2022, incluindo uma amostra de 1164 admissões do Hospital Padre Albino (Catanduva-SP). A análise estatística foi realizada através do *Google Sheets* e *JAMOVI*, sendo aplicado o Teste U de Mann-Whitney para comparação de períodos de tempo antes e durante a pandemia. Antes da coleta de dados, o mesmo foi submetido e aprovado pelo Conselho de Ética em Pesquisa da instituição (parecer número 5.616.556, CAAE: 62621822.50000.5430). **Resultados:** As admissões apresentaram idade média de 31,38 anos e 17,88% de Superfície Corporal Queimada (SCQ), sendo 452 mulheres e 712 homens; a média de SCQ foi de 17 para mulheres e 18,6 para homens. O principal agente causador foi a escaldadura. No que tange à comparação por períodos, durante a pandemia a chama direta teve um aumento de 8% em relação ao período anterior (35%). A escaldadura ainda permaneceu com prevalência elevada, no entanto, apresentou queda de 2%, assim como as queimaduras por dermoabrasão, com queda de 10%. **Conclusão:** Os achados dos estudos possuem

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limites em termos de generalização e novos estudos precisam ser desenvolvidos. As mudanças observadas no período não foram significativas e sem relevância clínica.

Descritores: COVID-19; Epidemiologia descritiva; Queimaduras; Unidades de queimados; Brasil.

INTRODUCTION

Burning is a potentially serious traumatic condition caused by external physical, chemical, and biological agents capable of causing various forms of damage^{1,2}. One hundred and eighty thousand annual cases are estimated globally, with middle and low-income countries, including Brazil, being the most affected³.

Although they are prevalent and lead to significant public spending^{2,3}, the epidemiological profile of burns still has limited literature, with studies describing the epidemiological profile as important sources for understanding these traumas⁴. Furthermore, COVID-19 inserted a unique context for the population since restrictions and social distancing measures were implemented. The impact of this scenario on burns is still poorly described and varies among available studies.

Thus, the present study aims to describe the epidemiological profile of a Burn Treatment Unit (BTU) in Catanduva, state of São Paulo, during the period from January 2018 to May 2022, using as a basis data obtained from the review of medical records of patients admitted in the period and comparing in subgroups based on sex, age and period concerning the COVID-19 pandemic (before and during).

OBJECTIVE

The general objective of the project was to describe the epidemiological profile of patients in a Burn Treatment Unit, to identify the main causative agent of burns in the population, the most frequent degrees of burns, the average Burned Body Surface (BSS), and age, in addition to analyzing possible impacts of the COVID-19 pandemic on BTU.

METHOD

The work consists of a study based on the review of medical records from the BTU of Hospital Padre Albino (Catanduva-SP). The study was submitted to the institution's Research Ethics Committee (CEP) (opinion number 5,616,556, CAAE: 62621822.50000.5430).

Data were collected at the BTU, previously organized in monthly tables by the service itself, undergoing de-identification for the study. All

admissions of patients between January 2018 and May 2022 were included. For patients who stayed in the service for more than one month, it was considered just one admission.

Three patients without burns- with Stevens-Johnson syndrome or epidermal necrolysis - were excluded from the study.

The sample obtained consisted of 1164 patients. The subgroups were analyzed according to age, with "children and adolescents" individuals aged 0 to 18 years and "adults and seniors" being those over 18 years. Another division was due to the COVID-19 pandemic (before and during). Thus, the months were divided into two groups before the COVID-19 pandemic, considered May 2018 to February 2020, and during the pandemic, March 2020 to December 2021. Such categorizations created periods of analysis with the same time in months, considering March 2020 as the beginning of the COVID-19 pandemic.

The collected variables include age, BSS, burn agent, sex, month, year, and burn classification according to degree. The percentage of the burned surface was collected, which was routinely accessed using Wallace's Rule (Nine) method in the study unit. The age of patients younger than 1 year was used as a function of years, approximated when necessary. Burn agents were grouped into large classes.

Normality was assessed using the Shapiro-Wilk test using the JAMOVI software (version 2.2.5). Thus, it was verified that the data were abnormal, and the Mann-Whitney U Test was applied. Google Sheets online software was used to adjust the statistics of tables and graphs.

RESULTS

The evaluated BTU presented, throughout the period, a total of 10 ward beds: 3 pediatric, 3 male, 3 female, 1 isolation, and 3 adult ICU beds.

The study observed (Table 1) a total of 1164 admitted patients, who had a mean age of 31.38 years and 17.88% of BSS, both of which had non-normal distribution according to the Shapiro-Wilk test ($p < .001$). Regarding the gender of the patients, 452 women and 712 men were admitted throughout the period, with a general mean age of 31 years. The BSS found 17 for women and 18,643 for men.

Table 1. General characterization of patients.

							Shapiro-Wilk	
GENERAL	SUBGROUPS	n	AVERAGE	MEDIAN	STANDARD DEVIATION	MAXIMUM	W	p
	Age	General	1164	31,384	32	21,142	97	0.963 <.001
	BSS	General	1164	17,88	15	13,468	95	0.837 <.001
SEX								
	Age	Feminine	452	31,771	32	21,938	89	0.958 <.001
		Masculine	712	31	32	20,632	97	0.964 <.001
	BSS	Feminine	452	17	15	12,262	95	0.826 <.001
		Masculine	712	18,643	15	14,135	90	0.845 <.001
AGE GROUP								
	Age	Adults and seniors	823	41,932	40	15,456	97	0.961 <.001
		Children and teenagers	341	5,926	4	5,658	18	0.833 <.001
	BSS	Adults and seniors	823	19,157	15	14,374	95	0.84 <.001
		Children and teenagers	341	14,798	11	10,366	65	0.868 <.001
PERIOD								
	Age	Before	560	31,293	31	21,235	93	0.963 <.001
		Durante	428	31,675	32	21,536	97	0.956 <.001
	BSS	Before	560	19,027	15	12,896	80	0.87 <.001
		During	428	17,339	15	14,131	95	0.788 <.001

BSS: burned body surface.

Regarding gender, it was observed that males have burns caused mainly by direct flame (43%), followed by scald (35%) and dermabrasion (12%). The verified prevalence was higher among men, with more adults and elderly (n=505) greater than children and adolescents (n=207). Among females, the same was observed, with an equally higher number of admissions of adult and older women (n=318) compared to children and adolescents (n=134) (Figure 1).

When evaluating the agent and the degree of burn from 2018 to May 2022, we observed that the most prevalent throughout the analyzed period was scald (n=485), with 267 cases of second-degree and 117 of third-degree. The second most frequent agent

was direct flame (n=455), with 187 third-degree and 176 second-degree. The third most common agent was dermabrasion (n=123), 41 of which were second-degree and 42 were third-degree.

Concerning the comparison by periods, it could be observed that the direct flame increased by 8% during the pandemic compared to the previous period (35%). Scalding still had a high prevalence; however, it showed a 2% drop, and dermabrasion burns with a 10% drop (Figure 2).

According to the analysis of the months evaluating admissions from 2018-2022 (Table 2), June did not show an increase in admissions. When analyzed before and during the pandemic, the previous period showed more admissions, 38 and 33, respectively.

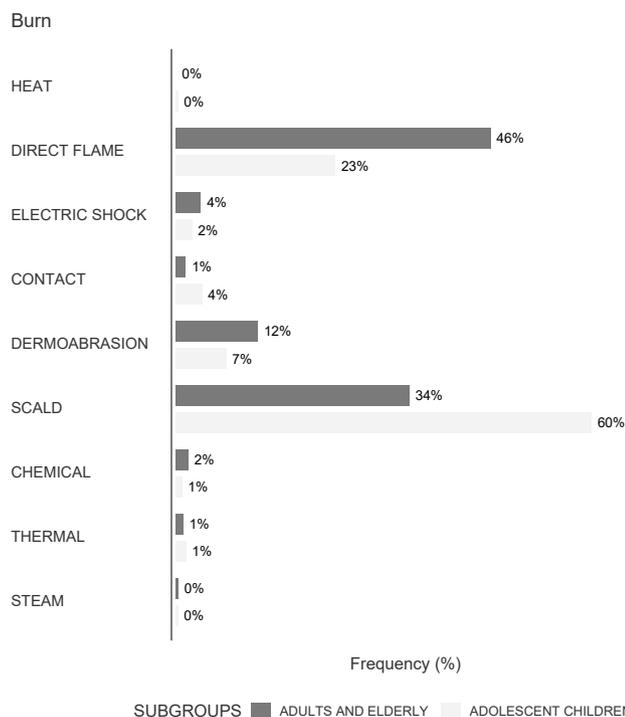


Figure 1. Distribution of patients according to age group and the causative agent of burns.

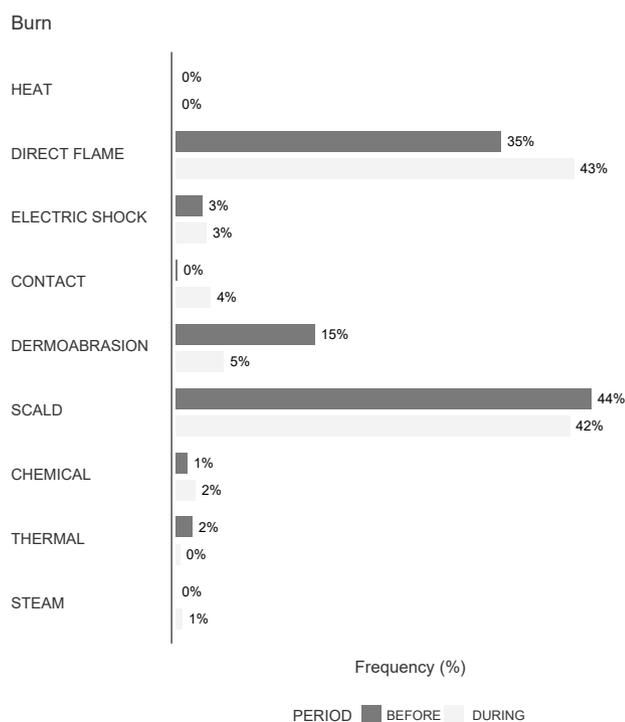


Figure 2. Distribution of patients according to period and the causative agent of burns.

Considering that the variables do not show normal behavior and according to the analysis using the Mann-Whitney U test (Table 3), it can be observed

that there was no statistically significant difference for age ($p=0.660$; $r=0.016$) and percentage of body surface burned ($p=0.002$; $r=0.112$) between the previous period and during the pandemic.

DISCUSSION

Regarding the epidemiological profile, the prevalence of males in the samples was found in several analyses⁵⁻⁸ and in the present study, in which 61.1% of patients were male. Concerning age, a study on the epidemiological profile of burn victims hospitalized in a unit in the Federal District of Brazil obtained a mean age of 32.5 years, with data from this present study being similar since it was 31.38 years. Regarding the most affected population, numerous studies have shown that the most affected are adults^{5,6,9-11}, agreeing with data from our study, in which adults and older people represented 70.7% of the sample.

The mean BSS found was 17.88%, within the range found in other analyses in which the BSS ranged from 15 to 19.88%^{7,10}.

This finding contrasts with demonstrations from other studies, which show peaks in hospitalizations and deaths from burns during June and July, which is attributed to the school vacation period, during which there is a significant increase in the risk of domestic accidents.¹⁰

In addition, an increase in hospitalizations was expected in June, as the June festivities take place during this period of the year, when the impact of cultural and regional factors typical of our country is weighed, such as the use of fireworks and the burning of bonfires, which also increase the risk of incidents.^{9,12,13} A limitation of the study is not considering data from denied hospitalization requests, which could reveal seasonal or non-seasonal epidemiological changes.

Considering that the pandemic established new behavior patterns and a new context, the hypothesis of changes in the clinical aspects of burns (percentage of burned surface and age) seemed plausible. However, in the face of the study, this was not confirmed. The generality of the findings is limited, and new works need to be done on the subject, according to the scarcity of reviews and similar studies in the literature - especially in Brazil.

Another investigation in a metropolitan center in the United States, gathering 1261 patients, converged with the findings of our study, as it did not show significant changes in age, being the mean before the pandemic 36.6 years and during the pandemic 38 ($p=0.416$) and burned body surface area of 4.5% before and 5% during ($p=0.289$)¹⁴.

A study in 14 burn care centers, including 7061 patients from 1999 to 2020 in Tokyo, found a small

Table 2. Monthly patient admissions.

MONTH	YEAR				
	2018	2019	2020	2021	2022
1	23	31	29	19	11
2	17	22	16	17	17
3	25	29	25	16	19
4	25	35	22	12	21
5	21	25	22	13	17
6	21	17	17	16	0
7	27	25	16	18	0
8	24	18	21	21	0
9	25	29	24	21	0
10	34	27	28	15	0
11	26	23	21	21	0
12	27	29	29	15	0

Table 3. Comparison between the period before and during the pandemic.

		STATISTIC	<i>p</i>	EFFECT SIZE	
BSS (%)	Mann-Whitney U	106426	0.002	Rank biserial correlation	0.112
Age (years)	Mann-Whitney U	117886	0.66	Rank biserial correlation	0.016

increase in mean %BSS in partial thickness burns from 3% to 4% ($p \leq 0.001$) in the pandemic period, without differences for total thickness ($p = 0.486$) and increase in mean age from 50 to 58 ($p \leq 0.001$)¹⁵. The slight difference between the two studies in the increase in the average BSS percentage does not seem clinically relevant.

In the analysis of the services provided in the present study, comparing the first four months of 2019 with the first four months of 2020, a reduction of 11.5% was observed. A study in Minas Gerais evaluated the impact of the COVID-19 quarantine, showing a 22.25% reduction in attendances⁵.

Despite presenting an absolute decrease in admissions, this pattern does not seem to confirm that there was a reduction in the number of burns since, due to the COVID-19 pandemic, other aspects may have affected our study: individuals who suffered burns may have stopped looking for the hospital for fear of becoming contaminated, the service may have received fewer transfers for reasons that are not necessarily the reduction of cases in other cities, the burns that occurred may have been less complex resulting in less search for medical care or no need for admission in the Burn Treatment Unit. Therefore, the data do not seem to be sufficient to conclude that the decrease in cases

of burns due to the COVID-19 pandemic, requiring more data.

An investigation using data from the Unified Health System from 2016 to 2020 showed that during the entire period, there were no statistically significant changes in the national hospitalization rate¹⁶.

A national multicenter study evaluated the incidence of alcohol burns during the COVID-19 pandemic¹⁷. Alcohol was already an important cause of burns due to its use for cleaning in the domestic environment. However, with the pandemic, in which people began to spend more time at home and children stopped attending schools, there was an increase in the incidence of alcohol use and, consequently, burns.

Our study - analyzing the periods before and during the pandemic - observed that during the pandemic, there was an 8% increase in direct flame burns, including alcohol burns. This increase may be related to the facts mentioned in the multicenter study, but a direct comparison is impossible since direct flame burns include other types of burns¹⁷.

Regarding the etiological agents, scalding was the most frequent in the two analyzed periods; only a 2% reduction was noted during the pandemic, coinciding with data found in the literature^{6,18,19}.

A limitation of the study is calculating the burned surface using Wallace's Rule (Rule of Nines), which presents variability according to the observer and may introduce a possible observer bias. Furthermore, another limitation is that the research did not collect data about the anatomical locations of the burns, comorbidities, causes of death, and the context in which the burns occurred, such as at home or work.

CONCLUSION

The study was able to demonstrate details of the epidemiology of the evaluated BTU. Although changes in the epidemiological profile were expected during the pandemic, this was not observed, with slight changes in the period. There were no statistically significant changes in the BSS analysis and patient age. New studies are needed to investigate changes in a multicentric way and explore the location of burns, causal agents, and contexts in which burns occurred.

COLLABORATIONS

TF	Analysis and/or data interpretation, Conception and design study, Conceptualization, Final manuscript approval, Formal Analysis, Investigation, Methodology, Supervision, Writing - Original Draft Preparation, Writing - Review & Editing.
MVG	Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Methodology, Writing - Original Draft Preparation, Writing - Review & Editing.
CCO	Analysis and/or data interpretation, Conception and design study, Final manuscript approval, Formal Analysis, Methodology, Writing - Original Draft Preparation, Writing - Review & Editing.
WFN	Analysis and/or data interpretation, Conception and design study, Conceptualization, Final manuscript approval, Methodology, Writing - Original Draft Preparation, Writing - Review & Editing.
JFP	Analysis and/or data interpretation, Conception and design study, Conceptualization, Final manuscript approval, Formal Analysis, Writing - Original Draft Preparation, Writing - Review & Editing.

RCOMK Analysis and/or data interpretation, Conception and design study, Conceptualization, Final manuscript approval, Formal Analysis, Supervision, Writing - Original Draft Preparation, Writing - Review & Editing.

PHSS Analysis and/or data interpretation, Conception and design study, Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing.

JAS Analysis and/or data interpretation, Conception and design study, Conceptualization, Methodology, Supervision, Writing - Original Draft Preparation, Writing - Review & Editing.

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