

BURNS DURING COVID-19 PANDEMIC: DEMOGRAPHICS, ETIOLOGICAL AND CLINICAL TRENDS IN 2021 AT THE NATIONAL BURN CARE CENTRE IN ISLAMABAD, PAKISTAN

BRÛLURES DURANT LA PANDÉMIE COVID 19: ÉTUDE ÉPIDÉMIOLOGIQUE EN 2021 DANS LE CTB NATIONAL D'ISLAMABAD, PAKISTAN

Rehan M.,  Iqbal T., Khan M.S., Tariq M.H., Khokhar O.K., Ain Q., Waheed U.


Department of Burn and Reconstructive Surgery, National Burn Care Centre, Pakistan Institute of Medical Sciences, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan

SUMMARY. The scarcity of data on burn-related injuries in Pakistan prompted this study. The study is specifically aimed at assessing the burn patients who were admitted to a national burn care center (BCC) in Pakistan. This single-center retrospective analysis was conducted for 12 months from January to December 2021. During this time period, 14,069 patients visited BCC with burn injuries of diverse natures while 613 of them were admitted. The patients' information was abstracted from the hospital database. This information included age, sex, diagnosis, burn depth/degree, time of arrival, circumstances of burn injury, TBSA (total burn surface area), complications, outcome, and management plan. This information was shifted to Microsoft Office Excel Worksheet 2015 and then coded into the IBM Statistical Package for the Social Sciences (SPSS) version 24.0. Armonk, NY: IBM Corp. Of 14,069 patients, 613 were admitted to the burn care center, indicating an admission rate of 4.35%. Among these 613 patients, there was a high proportion of males (58.89%) and a mean age of 20.2 ± 12.5 years. Most patients (40.4%) visited within the first hour after being burnt and flame burns were the most common (41.10%). Most patients were burnt due to accidents (97.7%). The mean length of hospital stay was 15.5 days. Flames were the main cause of burns among our cohort of patients. Most patients had a TBSA of $>10\%$ and generally had a second-degree burn, mostly in the pediatric population. An urgent appraisal of burn policies and related legislation is needed to halt the burn burden in the country.

Keywords: burn, epidemiology, Pakistan

RÉSUMÉ. Cette étude a été décidée en raison de la pauvreté des données épidémiologiques concernant les brûlures au Pakistan. Il s'agit d'une étude monocentrique rétrospective sur dossier conduite dans le CTB national d'Islamabad sur l'année 2021. Sur les 14 069 patients brûlés qui s'y sont présentés, 613 (4,35%) ont été hospitalisés. Nous avons recueilli l'âge, le sexe, la SCB, la profondeur, la cause, le délai de présentation, la stratégie thérapeutique, les complications et le devenir des patients. Les données ont été implantée dans Excel et analysées avec SSPS 24.0. Parmi les patients hospitalisés, 58,89% étaient des hommes âgés de $20,2 \pm 12,5$ ans. Le délai de présentation était de moins de 1h dans 40,4% des cas et l'atteinte était quasiment toujours accidentelle (97,7%), majoritairement par flamme (41%). La DMS était de 15,5 j. L'atteinte était le plus souvent $>10\%$ SCT, habituellement au 2^{ème} degré en particulier en population pédiatrique. Une évaluation de la législation préventive est urgente, afin de mettre fin au fardeau que représentent les brûlures dans notre pays.

Mots-clés : brûlures, épidémiologie, Pakistan

 Corresponding author: Muhammad Rehan, Department of Burn and Reconstructive Surgery, National Burn Care Centre, Pakistan Institute of Medical Sciences, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan. Email: mrehan93@gmail.com
Manuscript: submitted 04/12/2022, accepted 12/12/2022

Introduction

Burns are a serious public health problem globally. The mortality rate because of burn injuries varies by as much as a factor of ten across the various parts of the world. Not surprisingly, the low and middle HDI (human development index) countries account for 95% of all burn-related mortalities and almost two-thirds in the African and South-East Asia regions of the World Health Organization (WHO).¹ On the other hand, many developed nations around the globe have made significant progress in lowering rates of burn-related deaths, through a combination of prevention approaches and advances in the care of individuals affected by burns.^{2,3}

Burns are among the foremost causes of DALYs (disability-adjusted life-years) in low HDI countries. Fire-related burns single-handedly account for over 300,000 mortalities per annum, with more mortalities from scalds, electricity, chemical burns and other types of burns.⁴ However, mortality is only a fragment of the problem; for every individual who passes away as a result of their burn injuries, many more are left with life-long disabilities and disfigurements. For some, this implies living with the stigma and rejection in addition to the disability and/or disfigurement.

Contrary to the developed countries, burn care was long overlooked as a specialized subspecialty in Pakistan, a developing country in South Asia with a population of 220 million. However, with an increased understanding of the magnitude, severity and prolonged needs of burn injuries, it became evident that specialized burn care centers are required to efficiently address the needs of burn patients. This necessitated the development of specialized regional burn centers. Hence, the Government of Pakistan in 2003 formulated an astounding plan and strategy to build a regional burn center in the federal capital, Islamabad, with cutting-edge technology. This plan eventually came to reality when a Burn Care Centre (BCC) was made operational in 2007 as a flagship organization of the federal government to provide specialized burn care services.⁵

Over the last 15 years, more burn centers emerged on the medical map of Pakistan, mostly in the public sector. However, they are still insufficient to cover the entire country and meet the demand. In addition, many burn care centers are also beleaguered with meager resources, a lack of trained manpower, and a shortage of

operating time, among others. Likewise, most burn centers are positioned in larger cities and are not enough for the high frequency of burn injuries. Resuscitation is mostly delayed as burn patients have to travel long distances and transport facilities are not optimum. This scenario coupled with the lack of an epidemiological database further compounds the problem.

Sensitivity in the care of burn patients especially during the COVID-19 pandemic has had a major impact on the healthcare system and infection control policies in this cohort of patients. During COVID-19's first three waves in 2020 through 2021, the number of patients visiting the BCC decreased, mostly due to lockdown and transport restrictions as burn-injured patients frequently travel long distances to regional burn centers like ours. At most healthcare centers of the country, social distancing even exacerbated the difficulties surrounding OPD visits for non-emergency burn care. Nevertheless, the BCC remained fully functional during the COVID-19 era and provided services round the clock to both OPD and IPD patients.

The scarcity of burn centers and consequently the data on burn-related injuries in Pakistan encouraged this study. The objective of this data collection and analysis exercise was to generate credible statistics and analyze them for improvement in services, policy forecasting, actionable insights and better utilization of the meagre national resources. The study is specifically aimed at assessing the demographics, etiological and clinical trends, and mortality rate of burn patients who were admitted to the Intensive Care Unit (ICU) at the Burn Care Centre (BCC) of the Pakistan Institute of Medical Sciences, a tertiary care university teaching hospital in Islamabad, Pakistan.

Methodology

Study design and setting

This was a single-center, cross-sectional, retrospective observational study with a review of the HMIS software database (hospital management information system) from January to December 2021. The study was executed at the National Burn Care Centre (BCC), Pakistan Institute of Medical Sciences (PIMS), which is a tertiary care university teaching hospital in Islamabad. The hospital receives patients

from the northern region of the country including the state of Azad Jammu and Kashmir, the provinces of Gilgit-Baltistan, Khyber Pakhtunkhwa, and Punjab (northern part). The burn care center serves as the Department of Burn and Reconstructive Surgery for post-graduate training affiliated with the Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad.

All the patients presenting with burns at the PIMS are escorted to the BCC where a specialized team start emergency management of burns and gathers epidemiological data through HMIS.

The BCC has four functional units, namely (1) two advanced fully operational operation theatres; (2) an intensive care unit with an attached bath having air fluidized beds, low air loss mattresses, and water therapy rooms; (3) general ward; and (4) emergency 24/7. There are separate rooms for each patient with special burn unit monitoring equipment. The total bed capacity is 20 with 12 in ICU and 8 allocated to the general ward. The BCC performs skin grafting including split-thickness skin grafting, full-thickness skin grafting, and flap reconstruction. The BCC unit is headed by a Plastic Surgeon specialized in Burn Care and Management.

Study population

From January to December 2021, 14,069 patients visited BCC with burn injuries of diverse natures. The study population in the current study consisted of burn patients (n=613) who were admitted to the burn care center during this time period. Almost all of them belonged to the northern part of the country.

Inclusion and exclusion criteria

All burn patients admitted to the burn care center over a period of 12 months were included in the study. All OPD patients, and patients whose data in the HMIS database is incomplete or inadequate, were excluded.

Data collection and statistical analyses

The variables of all patients were extracted from the HMIS files, i.e. age, sex, diagnosis, burn depth/degree, time of arrival, circumstances of burn injury, TBSA (total burn surface area), complications, outcome, and management plan. This information was shifted to Microsoft Office Excel Worksheet 2015 and then coded into the IBM Statistical Package for the Social Sciences (SPSS) version 24.0. Armonk, NY: IBM Corp.

Ethical approval and consent to participate

The study was approved by the ethical review board of Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad. As this was a retrospective analysis, the patient informed consent to review their medical records was waived by the ethics review board. The patient's data confidentiality was ensured as access to data for collection and analysis was limited to the investigators, who stick to the principles of the World Medical Association Declaration of Helsinki 2013.⁶

Results

Of 14,069 burn patients, 613 were admitted to the burn care center, indicating an admission rate of 4.35%. These 613 included 58.89% males (n=361) and 41.11% (n=252) females. The age range was from 1 year to 94 years with a mean age of 20.2±12.5 years. The three most affected age groups were patients aged 0-1 years, 1-12 years, and 13-20 years (*Table I*). The vast majority of burns were ac-

Table I - Age distribution of the patients (n=613) attending BCC in 2021

Patients	Age groups	N (%)
Infants	Up to 1 year	70 (11.41%)
Children	1-12 years	292 (47.63%)
Adults	13-20 years	89 (14.51%)
	21-30 years	47 (7.66%)
	31-40 years	39 (6.36%)
	41-50 years	31 (5.05%)
	51-60 years	28 (4.56%)
	61-70 years	8 (1.30%)
	71-80 years	7 (1.147%)
	80-94 years	2 (0.32%)

cidental (97.7%), while the rest of them were suicide attempts (1.30%) and assaults (0.97%) (Table II).

Table II - Burn backgrounds

Settings	Number	Percentage
Accident	599	97.7%
Assault	6	0.97%
Suicide attempt	8	1.30%
Total	613	100%

The majority of patients reported within the first hour of burning (49.26%) followed by those reporting between 9 to 24 hours (18.10%) (Table III).

Table III - Time of arrival after burn injury

Time of arrival after burn	Number	Percentage
0 – 1 hour	302	49.26%
2 – 8 hours	97	15.82%
9 – 24 hours	111	18.10%
25 – 48 hours	59	9.62%
> 48 hours	44	7.17%
Total	613	100

Most burns occurred at home (74.22%) followed by the workplace (13.0%) (Table IV). The type of burn injuries in our patients (n=613) is shown in Fig. 1. Flames were the most common (41.10%; n=252) burn injuries followed by scald burns (27.89%; n=171). About 13% (80/613) of patients were burnt >50% in terms of TBSA. The median TBSA burn was 26.7% (Table V). The total number of deaths that occurred in 2021 was 52. Hence, the mortality rate was 8.4% (52/613). The average duration of stay at the burn care center was 15.5 days. The burn victims with electrical burns stayed longer in BCC than patients with other types of burn injuries. The percentage of patients included in the list of Leave Against Medical Advice (LAMA) was 6.03%

Table IV - Place of burn injuries among patients attending BCC in 2021

Place of burn injury	Number	Percentage
Home	455	74.22%
Workplace	112	18.27%
Street/Bazar	43	7.01%
Roadside	2	0.32%
Miscellaneous	1	0.16%
Total	613	100

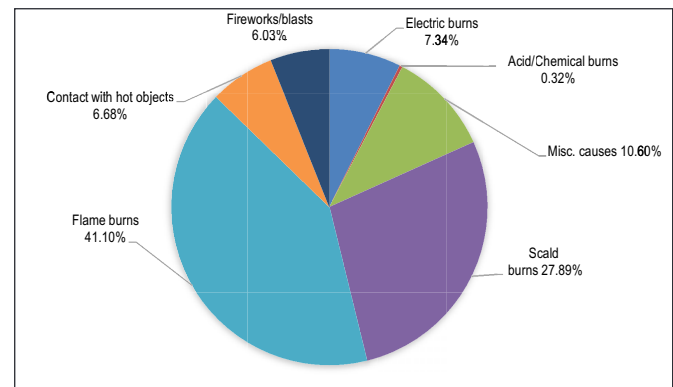


Fig. 1 - Types of burn injuries

Table V - Distribution of burns according to total body surface area

Patients	Number	Percentage
0 – 10%	277	45.1%
11 – 20%	101	16.47%
21 – 30%	63	10.27%
31 – 40%	54	8.80%
41 – 50%	38	6.19%
> 50%	80	13.05%
Total	613	100%

(37/613). Only 14 patients had comorbidity that was pre-existing (2.28%) (Table VI). A number of complications were experienced by the patients, the most common being sepsis and wound infection (55.30%) (Table VII).

Table VI - Co-morbidities

Co-morbidity	Number	Percentage
Diabetes mellitus	6	42.85%
Hepatitis	5	35.71%
Hypertension	4	28.57%
Epilepsy	2	14.28%
Tuberculosis	2	14.28%
Asthma	1	7.14%
Total	14	100%

Table VII - The mortality rate with regards to complications

Complication	Number	Percentage
Sepsis and wound infection	27	51.92%
Shock	15	28.84%
Acute respiratory distress (ARD)	5	9.61%
Renal failure (acute)	4	7.69%
Gangrene	1	1.92%
Total	52	100%

Discussion

The current study reports an annual review of burn cases admitted to the Burn Care Centre of the

Pakistan Institute of Medical Sciences in Islamabad, Pakistan. To the best of our knowledge, the present study is the largest regional epidemiological study of burn ICU patients in Islamabad.

The results showed that there was a high proportion of males (58.89%), which is consistent with findings from earlier studies from Pakistan (54%),⁷ China (66.33),⁸ Brazil (68.30%),⁹ and Cameroon (52.9%).¹⁰ A possible rationale for this attribute is that males are by and large more adventurous and engaged in activities to earn income.

The mean age in our study was 20.2±12.5 years, indicating a trend toward the lower age group. The mean age of our study was comparable to studies from Iran,¹¹ Nigeria¹² and Ethiopia,¹³ but lower than studies conducted in Cameroon,¹⁴ the Gabonese Republic,¹⁵ and China.⁸ The difference was because of variations in the age ranges of the patients in these studies. In the current study, the age range was from 1 year to 94 years while in China it was seven days to 90 years, in Cameroon it was 5 months to 81 years, and in the Gabonese Republic, it was 7 months to 79 years.

In the current study, most patients (49.26%) arrived within the first hour after burn injury, which was consistent with a study by Forbinake et al.¹⁴ However, a study by Etoundi et al,¹⁶ reported an arrival time of greater than 12 hours in 79% of cases. This was because patients were kept in peripheral health centers before transfer to the subject burn center.

With regards to burn depth, the most common were 2nd-degree burns (63%) (Fig. 2), which is in contrast to studies from Iran,¹¹ China,¹⁷ Korea¹⁸ and Albania¹⁹ where most of the patients had third-degree burns. A possible reason for this feature is the high incidence of pediatric burn population which are usually scalding

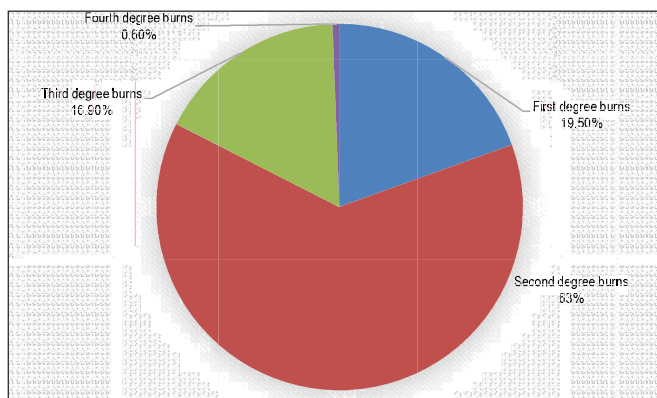


Fig. 2 - Burn depth

burns and of 2nd degree. The finding of our study was, however, similar to studies from Mongolia²⁰ and Tanzania²¹ where the depth of injuries was 2nd degree.

The mortality rate in our study was 8.4%, which is in contrast to that reported from Iran¹¹ (24.9%) and China⁸ (0.9%). Flame burns were the most common burn agents in the current study, similar to studies conducted in Brazil,⁹ Nigeria¹² and Cameroon.¹⁴ This was however contrary to studies conducted in China⁸ and Iran¹¹ where the commonest source of burns was scald burns.

The BCC in Islamabad is the only national burn center that caters for the pediatric population, including infants of less than one year. Out of a total of 613 admissions in 2021, 59.05% were below 12 years of age. In contrast, a study from Rawalpindi, Pakistan reported that 28.23%²² of patients were children (0-10 years). In another study from China, 34.7% of burn victims were preschool children.⁸

The vast majority of burns in our study were of accidental nature (97.7%). In contrast, the majority of burns in India²³ were suicidal (38.6%) followed by accidental (37.3%).

The mortality rate in our study was 8.4%, which is a very promising finding when compared with the mortality rate of countries like Nigeria (20%),²⁴ Iran (51% in males and 69% in females)²⁵ and Cameroon (23.4%).²⁶ An earlier study from Karachi reported a mortality rate of 36.12%.²⁷ However, it was on the lower side when compared with developed countries like the Netherlands (4.9%),²⁸ Canada (1.0%),²⁹ Singapore (4.61%),³⁰ and middle-income countries like Egypt (9.8%).³¹

The percentage of patients included in the list of Leave Against Medical Advice (LAMA) was 6.03% (37/613). Earlier studies have shown that patients who leave against medical advice have higher readmission rates and mortality. A study from the USA on 208,236 trauma patients showed that there is a 44.83% chance of readmission at different hospital settings.³²

About 13% (80/613) of patients were burnt 50% or more in terms of TBSA. The median TBSA burn was 26.7%, which is comparable to a study from Lahore³³ (32.68% ± 25.3), while it is less when compared to a study from Central India (40.0%).³⁴ Developed countries like Australia and China have reported a comparatively reduced TBSA, e.g. Aus-

tralia 5.1%³⁵ and China 13.4%.³⁶ Another study from Turkey³⁷ reported a TBSA of 36±7%, which is higher than our finding of 26.7%.

The mean length of stay (LOS) in our study was 15.5 days. In contrast, the mean LOS was 20.4 days in Canada,²⁹ 23.58 days in Lebanon,³⁸ 73±33 days in Turkey,³⁷ 30 days in Ethiopia,¹³ 17 days in China,⁸ and 24.23 days in Egypt.³⁵ Studies from Iran¹¹ (4.49±4.67 days), India (8 days),³⁴ and Israel² (13.7 days) reported high mean LOS, while a study from Karachi, Pakistan (16.45 days)³⁹ has reported a mean LOS which is comparable to our study.

In summary, male adults with a mean age of 20.2±12.5 years were the most common burn victims. Flames were the main cause of burns among our cohort of patients. Most patients had a TBSA of >10% and generally had a second-degree burn, mostly in the pediatric population. A large portion of patients reached the burn care center within one hour subsequent to burning and the average length of stay was 15.5 days. The mortality rate was not high when compared with the available literature.

Conclusion and recommendations

Burns present a global public health concern, especially in the pediatric population and in developing countries. To stop this global burden, wide-ranging pre-emptive measures and early diagnosis and treatment of burn injuries should be implemented. Sensitizing the community about the burn risk factors, household safety precautions, and seeking early burn care may lessen the occurrence and resulting morbidity of burn patients. The Pakistan government is planning to launch a national vertical health program under the patronage of the national health ministry titled "National Burns Control Program".⁴⁰ It is hoped that the implementation of this program will halt the occurrence of burns in the country and those in need of burn care will receive efficient and adequate services.

Limitations

Our study is a single-center experience. Hence, the generalization of the results to other institutional settings should be considered with caution.

BIBLIOGRAPHY

- 1 WHO: WHO Fact Sheet on Burns. Available from <https://www.who.int/news-room/fact-sheets/detail/burns>, Accessed 12/08/2022.
- 2 Haik J, Liran A, Tessone A, Givon A et al.: Israeli Trauma Group. Burns in Israel: demographic, etiologic and clinical trends, 1997-2003. *Isr Med Assoc J*, 9(9): 659-62, 2007.
- 3 Kopel J, Brower GL, Sorensen G, Griswold J: Application of beta-blockers in burn management. *Proc (Bayl Univ Med Cent)*, 35(1): 46-50, 2021.
- 4 WHO: A WHO Plan for Burn Prevention and Care. WHO Document Production Services, Geneva, Switzerland, 2008.
- 5 Iqbal T, Rehan M: Annual Report. 1st ed. 2021. Burn Care Centre, Pakistan Institute of Medical Sciences, Ministry of National Health Services, Regulations & Coordination, Islamabad, Pakistan.
- 6 World Medical Association: World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA*, 310(20): 2191-4, 2013.
- 7 Khan MS, Rehan M, Ali U, Iqbal T: Epidemiology of burns: a decade experience. *JSM Burns Trauma*, 3(2): 1042, 2018.
- 8 Li H, Yao Z, Tan J et al.: Epidemiology and outcome analysis of 6325 burn patients: a five-year retrospective study in a major burn center in Southwest China. *Sci Rep*, 7: 46066, 2017, doi:10.1038/srep46066
- 9 Queiroz LF, Anami EH, Zampar EF, Tanita MT et al.: Epidemiology and outcome analysis of burn patients admitted to an Intensive Care Unit in a University Hospital. *Burns*, 42(3): 655-62, 2016.
- 10 Amengle LA, Bengono RB, Mbengono JM, Beyiha G et al.: Aspects épidémiologiques et pronostiques des brûlures graves chez l'enfant. *Orthop Emerg Afr*, 1(2): 15-44, 2015.
- 11 Alipour J, Mehdipour Y, Karimi A: Epidemiology and outcome analysis of 3030 burn patients with an ICD-10 approach. *Ann Burns Fire Disasters*, 33(1): 3-13, 2020.
- 12 Olaitan PB, Fadiora SO, Agodirin OS: Burn injuries in a young Nigerian teaching hospital. *Ann Burns Fire Disasters*, 18: 18-24, 2007.
- 13 Mulugeta T, Alemayehu H, Gerema U: Clinical profiles and the outcomes of burn patients admitted to the Burn Unit of Jimma Medical Center. *Clin Cosmet Investig Dermatol*, 14: 859-866, 2021.
- 14 Forbinake NA, Dongmo G, Ohandza CS, Chichom-Mefire A et al.: Epidemiologic and clinical profile of burns in a tertiary hospital in Sub-Saharan Africa. *Burns Open*, 4(1): 22-27, 2020.
- 15 Nguema PN, Matsiegui PB, Nsafu DN: Severe burns patients: epidemiology and treatment (a study of 104 Gabonese cases). *Cahiers d'Études et de Recherches Francophones/Santé*, 10(1): 37-42, 2000.
- 16 Etoundi PO, Ela AA, Esiene A, Ngayap G, Nguéné NN: Facteurs d'allongement du délai d'admission des brûlés graves à l'hôpital central de Yaoundé, Cameroun. *Health Sci Diseases*, 1(2): 33-37, 2014.
- 17 Wang KA, Sun Y, Wu GS, Wang YR, Xia ZF: Epidemiology and outcome analysis of hand burns: a 5-year retrospective review of 378 cases in a burn center in Eastern China. *Burns*, 41: 1550-1555, 2015.
- 18 Yoon C, Cho YS, Park S, Chung SP, Choi YH: Epidemiology of burns caused by mobibustion in Korea. *Burns*, 42: 1588-1592, 2016.
- 19 Belba MK, Petrela EY, Belba AG: Epidemiology and outcome analysis of sepsis and organ dysfunction/failure after burns. *Burns*, 43(6): 1335-1347, 2017.
- 20 Khandarmaa T-O, Harun-Or-Rashid M, Sakamoto J: Risk factors of burns among children in Mongolia. *Burns*, 38: 751-757, 2012.
- 21 Ringo Y, Chilonga Y: Burns at KCMC: epidemiology, presentation, management and treatment outcome. *Burns*, 40: 1024-1029, 2014.
- 22 Chaudhary IA: Burns: frequency and mortality related to various age groups. *Journal of Surgery Pakistan (International)*, 14(2): 67-71, 2019.
- 23 Kumar S, Ali W, Verma AK, Pandey A, Rathore S: Epidemiology and mortality of burns in the Lucknow Region, India - a 5 year study. *Burns*, 39(8): 1599-605, 2013.
- 24 Olaitan PB, Jiburum BC: Analysis of burn mortality in a Burns Centre. *Ann Burns Fire Disasters*, 19(2): 59-62, 2006.
- 25 Soltani K, Zand R, Mirghasemi A: Epidemiology and mortality of burns in Tehran, Iran. *Burns*, 24(4): 325-8, 1998.
- 26 Forbinake NA, Ohandza CS, Fai KN et al.: Mortality analysis of burns in a developing country: a CAMEROONIAN experience. *BMC Public Health* 20, 1269 (2020). <https://doi.org/10.1186/s12889-020-09372-3>
- 27 Ibran Ea, Mirza FH, Memon AA et al.: Mortality associated with burn injury - a cross sectional study from Karachi, Pakistan. *BMC Res Notes* 6, 545 (2013). <https://doi.org/10.1186/1756-0500-6-545>
- 28 Bloemsma GC, Dokter J, Boxma H, Oen IM: Mortality and causes of death in a burn centre. *Burns*, 34(8): 1103-7, 2008.
- 29 Burton KR, Sharma VK, Harrop R, Lindsay R: A population-based study of the epidemiology of acute adult burn injuries in the Calgary Health Region and factors associated with mortality and hospital length of stay from 1995 to 2004. *Burns*, 35(4): 572-9, 2009.
- 30 Song C, Chua A: Epidemiology of burn injuries in Singapore from 1997 to 2003. *Burns*, 31(Suppl 1): S18-S26, 2005.
- 31 AbdelWahab ME, Sadaka MS, Elbana EA, Hendy AA: Evaluation of prognostic factors affecting length of stay in hospital and mortality rates in acute burn patients. *Ann Burns Fire Disasters*, 31(2): 83-88, 2018.
- 32 Olufajo OA, Metcalfe D, Yorkgitis BK et al.: Whatever happens to trauma patients who leave against medical advice? *Am J Surg*, 211(4): 677-83, 2016.
- 33 Bajwa MS, Sohail M, Ali H, Nazir U, Bashir MM: Predicting thermal injury patient outcomes in a Tertiary-Care Burn Centre, Pakistan. *medRxiv* 2021.06.14.21258932; doi: <https://doi.org/10.1101/2021.06.14.21258932>
- 34 Bain J, Lal S, Baghel VS, Yedalwar V et al.: Decaderial of a burn center in Central India. *J Nat Sci Biol Med*, 5(1): 116-122, 2014.
- 35 Stefani K, Wagstaff M, Damkat I, Greenwood J: Mortality data 2004-2019: an audit of the Royal Adelaide Hospital Adult Burn Service. *ANZ Journal of Surgery*, 91(1-2): 77-82, 2020.
- 36 Tian H, Wang L, Xie W, Shen C et al.: Epidemiologic and clinical characteristics of severe burn patients: results of a retrospective multicenter study in China, 2011-2015. *Burns Trauma*, 6: 14, 2018.
- 37 Sahin I, Ozturk S, Alhan D, Açikel C, Isik S: Cost analysis of acute burn patients treated in a burn centre: The Gulhane experience. *Ann Burns Fire Disasters*, 24(1): 9-13, 2011.
- 38 Bourgi J, Yaacoub E, Berberi M, Chedid M et al.: Factors affecting length of stay among pediatric and adult patients admitted to the Lebanese Burn Centre: a retrospective study. *Ann Burns Fire Disasters*, 32(3): 216-221, 2019.
- 39 Ali SA, Hamiz-Ul-Fawwad S, Al-Ibran E, Ahmed G et al.: Clinical and demographic features of burn injuries in Karachi: a six-year experience at the burns centre, civil hospital, Karachi. *Ann Burns Fire Disasters*, 29(1): 4-9, 2016.
- 40 Rehan M, Iqbal T: Pakistan plans to launch a national programme on burn prevention. *Burns*, 48: 1021-1022, 2022.

Available data and material. The datasets generated during and/or analyzed during the current study are not publicly available due to confidentiality issues but are available from the corresponding author on request.

Acknowledgements. Our entire team at the Burn Care Centre deserves appreciation for their hard work and cooperation in the compilation of data used in this manuscript.