Received: 8 November 2020 | Revised: 1 December 2020 | Accepted: 4 December 2020

DOI: 10.1111/iwj.13539

ORIGINAL ARTICLE

IWJ WILEY

The effects of lockdown measures due to COVID-19 pandemic on burn cases

Mehmet Fatih Akkoç[1] | **Semra Bülbüloğlu**[2] | **Mehmet Özdemir**[1]

[1]Faculty of Medicine, Department of Plastic Reconstructive and Aesthetic Surgery, Dicle University, Diyarbakır, Turkey

[2]Nursing Department, Erbaa Health Sciences Faculty, Gaziosmanpasa University, Tokat, Turkey

Correspondence
Semra Bülbüloğlu, Nursing Department, Erbaa Health Sciences Faculty, Gaziosmanpasa University, Tokat, Turkey
Email: semrabulbuloglu@hotmail.com

Abstract

In this study, it was aimed to investigate the effects of lockdown measures implemented due to COVID-19 on aetiology, sociodemographic characteristics, and clinical status of burn cases. This study was carried out retrospectively at the Burn Unit of Dicle University Medical Faculty Hospital. The burn cases during the COVID-19 outbreak were compared with those of the previous 2 years. Statistical analyses were carried out using the IBM SPSS (Statistics Package for Social Sciences) Statistics 25. Descriptive statistics, independent samples *t*-test, Kolmogorov-Smirnov test, and Shapiro-Wilk test were used for data evaluation. Results were evaluated at 95% confidence interval and $P < .05$ significance level. It was determined that burn cases were reduced by half during the COVID-19 compared to the previous 2 years. Despite the increase in the number of third-degree burns and surgeries, it was determined that the length of hospital stay decreased by an average of two thirds. Hot liquids have been identified as the most important cause of burns in all years. New studies should be conducted in order to examine the social dimension of COVID-19 pandemic in burn cases and to prevent these cases completely. The short hospital stay preferred by clinicians after COVID-19 and possible problems that may arise should be investigated.

KEYWORDS

burn, COVID-19, lockdown

1 | INTRODUCTION

Many people apply to health facilities every year as a result of burn injuries.[1] Although some of the burns are very simple injuries, some carry a life-threatening risk. According to reports from the World Health Organisation (WHO), the American Burn Association, and the Centers for Disease Control and Prevention (CDC), 1.1 million people a year in the United States are injured by burns. Low- and middle-income countries are considered to be at a higher risk for burn injuries.[2-4]

Burns are one of the most important public health problems in Turkey that the Ministry of Health focuses on. In recent years, there has been a significant increase in the number of burn treatment units.[5] Reporting and continuous monitoring of the effectiveness of the initiatives implemented in these units are very important in terms of improving the quality of burn care and

treatment. Burns are a major problem for individuals and communities due to their mortality and morbidity.[6]

Mortality rates due to burn injuries are declining in parallel with the advancement of care and treatment opportunities in this area.[1] Burns are not only a localised event that affects the skin, but they are a comprehensive trauma that affects the whole organism and determines the physiopathological effects and prognosis.

Although the consequences of burn trauma are known, it has not been prevented under today's conditions. Burn trauma affects physically and psychologically not only the person who is burned and his family, but also the healthcare professionals who intervene in these patients, society, countries, and humanity. In this context, it is possible to state that the progression of burn cases is affected by social events.

The coronavirus outbreak, which emerged in Wuhan, China, causing the COVID-19 pandemic, infecting millions of people in the world and thousands in our country, continues to spread. COVID-19 pandemic is a very important health problem with serious morbidity, associated with many mortalities, whose aetiology is not yet fully understood and affects the whole world.[7,8]

In Turkey, limited curfew across the country was imposed from March 16 to June 12 020 due to COVID-19. In this process, individuals mostly spent time at home with their families. It is believed that there are differences in parameters such as aetiology, sociodemographic characteristics, clinical status, and hospitalisation duration of burn cases compared to the previous 2 years. In our study, it was aimed to investigate these differences.

Key messages

- burns are a major problem for individuals and communities due to their mortality and morbidity
- mortality rates due to burn injuries are declining in parallel with the advancement of care and treatment opportunities in this area
- however, the changes in the type and number of burn injuries caught our attention in COVID-19 pandemic time

2 | MATERIALS AND METHODS

This study was done descriptively and retrospectively. In this study, patients treated at the Burn Unit of Dicle University Medical Faculty Hospital due to exposure to burn trauma between 16 March and 30 May of 2018, 2019, and 2020 were evaluated. Second- and third-degree burns and those with a burn percentage above 10% are treated in the burn unit. In this study, all inpatient and outpatient burn patients who applied to the burn unit were included in the sample. The patient data were analysed retrospectively using computer logs, patient files, and burn unit records.

Sociodemographic characteristics, burn aetiology, mortality rates, intervention, and hospital stay of the patients were recorded. The statistical analysis of the results of the research was carried out with the IBM SPSS (Statistics Package for Social Sciences) Statistics 25. Descriptive statistics (frequency, standard deviation, average) were used in data evaluation. Independent samples *t*-test was performed to determine the statistical significance of the differences between the averages of the groups. Kolmogorov-Smirnov and Shapiro-Wilk tests were performed to find normal distribution assumptions. Results were evaluated with 95% confidence interval and $P < .05$ significance level.

3 | RESULTS

In the burn unit where this retrospective study data were obtained, it was found that N = 49 patients were followed up as a result of burns within approximately 2.5 months of the curfew due to the COVID-19 pandemic. When the previous 2 years of data were examined in the same months, N = 93 patients in 2018 and N = 88 patients in 2019 were followed. Looking at Table 1, according to the 2020 data, 67.3% of patients were between the ages of 1 and 5 years, 51% were female, 61% were admitted to the unit between 08:01 and 16:00, 51% had burns due to hot fluid, and 67% had third-degree burns. It was determined that 28% of the patients had burns in the left upper extremity, 61% had surgery, the duration of hospitalisation was 4.34 ± 2.71, and all of them were discharged.

When the data obtained in 2019 were examined, it was determined that 38.6% of the patients were between the ages of 1 and 5, 42% were female, 62% applied to the unit between 08:01 and 16:00, 69% had burns due to hot fluid, and 72% had third-degree burns. It was also determined that 19% of the patients had burns on the anterior trunk, 72% received medical treatment, the duration of hospitalisation was 16.09 ± 15.11, and 96% was discharged.

When the data obtained in 2019 were examined, it was determined that 59% of the patients were between

TABLE 1 Descriptive characteristics of burn patients

Descriptive characteristics	16 March 2020 to 30 May 2020 (N=49)		16 March 2019 to 30 May 2019 (N=88)		16 March 2018 to 30 May 2018 (N=93)	
	n	%	n	%	n	%
Age group (years)						
<1	5	10.2	10	11.4	12	12.9
1 to 5	33	67.3	34	38.6	55	59.1
6 to 10	1	2	9	10.2	8	8.6
11 to 20	1	2	11	12.5	6	6.4
21 to 40	4	8.2	12	13.6	8	8.6
>41	5	10.2	12	13.6	4	4.4
Gender						
Female	24	49	37	42	42	45.2
Male	25	51	51	58	51	54.8
Admission hour						
08:01 to 16:00	30	61.2	55	62.5	54	58.1
16:01 to 24:00	11	22.4	28	31.8	36	38.7
24:01 to 08:00	8	16.3	5	5.7	3	3.2
Type of burn						
Hot liquid	25	51	61	69.3	77	82.8
Electrical	6	12.2	15	17	8	8.6
Flame	11	22.4	6	6.8	7	7.5
Contact	7	14.3	6	6.8	1	1.1
Burn level						
First-degree	7	14.3	—	—	—	—
Second-degree	9	18.4	64	72.7	79	84.9
Third-degree	33	67.3	24	27.3	14	15.1
Percentage of burn						
10 to 20	19	38.8	73	83	73	78.5
21 to 40	27	55.1	14	15.9	15	16.1
41 to 50	3	6.1	1	1.1	2	2.2
51 and above	—	—	—	—	3	3.2
Location of burn						
Head-neck	—	—	9	10.2	9	9.7
Anterior trunk	11	22.4	17	19.3	11	11.8
Posterior trunk	6	12.2	8	9.1	10	10.8
Right upper extremity	16	32.7	16	18.2	18	19.4
Left upper extremity	14	28.6	12	13.6	17	18.3
Right lower extremity	1	2	17	19.3	15	16.1
Left lower extremity	1	2	9	10.2	13	14
Intervention applied						
Operation	30	61.2	24	27.3	15	16.1
Medical treatment	19	38.8	64	72.7	78	83.9
Days of hospital stay						
Mean±SD	4.34±2.71 (min 1, max16)		16.09±15.11 (min 2, max 77)		12.3±8.26 (min 2, max 44)	
Result						
Discharged	49	100	85	96.6	89	95.7
Death	—	—	3	3.4	4	4.3

TABLE 2 Independent samples test between 2018 and 2020

		Levene's test for equality of variances		*t*-test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean difference	SE difference	Lower	Upper
Intervention	Equal variances assumed	29.473	.000	−6.143	140	.000	−.45095	.07341	−.59609	−.30581
	Equal variances not assumed			−5.630	77.222	.000	−.45095	.08010	−.61045	−.29146
Area	Equal variances assumed	11.728	.001	−1.596	140	.113	−.47400	.29708	−1.06133	.11334
	Equal variances not assumed			−1.797	131.903	.075	−.47400	.26376	−.99575	.04776
Outcome	Equal variances assumed	18.640	.000	−1.983	140	.049	−.22581	.11387	−.45094	−.00067
	Equal variances not assumed			−2.736	92.000	.007	−.22581	.08252	−.38969	−.06192
Percentage	Equal variances assumed	.457	.500	3.268	140	.001	.37239	.11396	.14709	.59769
	Equal variances not assumed			3.401	109.224	.001	.37239	.10950	.15537	.58942
Grade	Equal variances assumed	51.244	.000	4.127	140	.000	.38007	.09208	.19802	.56213
	Equal variances not assumed			3.395	60.235	.001	.38007	.11194	.15617	.60398
Type	Equal variances assumed	52.074	.000	4.645	140	.000	1.00176	.21566	.57538	1.42813
	Equal variances not assumed			3.989	66.043	.000	1.00176	.25115	.50032	1.50320
Appeal time	Equal variances assumed	10.946	.001	.881	140	.380	.09941	.11279	−.12358	.32240
	Equal variances not assumed			.802	75.919	.425	.09941	.12390	−.14736	.34617
Gender	Equal variances assumed	.407	.524	−.431	140	.667	−.03818	.08861	−.21337	.13701
	Equal variances not assumed			−.430	96.948	.668	−.03818	.08887	−.21457	.13820
Age	Equal variances assumed	2.457	.119	.620	140	.536	.23436	.37814	−.51324	.98197
	Equal variances not assumed			.586	83.637	.560	.23436	.40019	−.56150	1.03023
Hospital stay	Equal variances assumed	34.356	.000	−6.547	140	.000	−7.95414	1.21484	−10.35594	−5.55233

TABLE 3 Test of normality between 2018 and 2020

	Years	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Age	2020	.443	49	.000	.619	49	.000
	2018	.377	93	.000	.681	93	.000
Gender	2020	.344	49	.000	.637	49	.000
	2018	.365	93	.000	633	93	.000
Appeal time	2020	.376	49	.000	.691	49	.000
	2018	.370	93	.000	.688	93	.000
Type	2020	.311	49	.000	.742	49	.000
	2018	.477	93	.000	.438	93	.000
Grade	2020	.411	49	.000	.643	49	.000
	2018	.512	93	.000	.427	93	.000
Percentage	2020	.322	49	.000	.745	49	.000
	2018	.458	93	.000	.504	93	.000
Outcome	2020		49			49	
	2018	.536	93	.000	.290	93	.000
Area	2020	.211	49	.000	.888	49	.000
	2018	.132	93	.000	.929	93	.000
Intervention	2020	.397	49	.000	.618	49	.000
	2018	.507	93	.000	.442	93	.000
Hospital stay	2020	.286	49	.000	.745	49	.000
	2018	.160	93	.000	.880	93	.000

[a]Lilliefors significance correction.

the ages of 1 and 5, 45% were female, 58% applied to the unit between 08:01 and 16:00, 82% had burns due to hot fluid, and 82% had third-degree burns. It was also determined that 19% of the patients had burns in the right upper extremity, 83% received medical treatment, the duration of hospitalisation was 12.3 ± 8.26, and 96% were discharged.

As a result of the *t*-test, there was a statistically significant difference between 2020, 2018, and 2019 in terms of intervention, length of hospital stay, type of burns, and percentage ($P = .000$) (Tables 2 and 3).

When Tables 3 and 4 were examined, it was determined that there was no symmetry between 2020, 2018, and 2019 based on the results of the normality test and that the patient characteristics were statistically different in all areas ($P = .000$).

4 | DISCUSSION

Burns are significantly common trauma all over the world. After the burn injury, individuals, community, and healthcare workers play important roles and responsibilities. Burn cases occur as self-injuries as a consequence of a momentary carelessness of people who are able to take care of themselves, or it happens as a result of the momentary indifference or carelessness of caregivers of people who cannot take care of themselves. The common detail in both cases is that burn cases are preventable (Table 5).

In Turkey, due to the COVID-19 pandemic, the public was largely prevented from taking to the streets between 16 March and 30 May 2020. In addition, family members generally spent this time together at home. During this period, it was found that the cases that applied to the burn unit where the study was conducted decreased by half compared with the previous 2 years.

Literature reviews have shown that, due to the COVID-19 pandemic, strategies have been developed by the burn clinic for treating patients with severe burns in general operating rooms and patients with stable, small, and uncomplicated burns as an outpatient.[9] In another study, it was seen that all patients with burn injuries coming to the hospital were screened for COVID-19. Patients with suspected and confirmed COVID-19 diagnoses were provided or forced to have infectious diseases

TABLE 4 Independent samples test between 2019 and 2020

		Levene's test for equality of variances		*t*-test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean difference	SE difference	Lower	Upper
Age	Equal variances assumed	2.373	.126	−1.719	135	.088	−.78873	.45879	−1.69607	.11861
	Equal variances not assumed			−1.772	108.484	.079	−.78873	.44507	−1.67090	.09344
Gender	Equal variances assumed	1.202	.275	−.779	135	.437	−.06934	.08904	−.24544	.10676
	Equal variances not assumed			−.775	97.905	.440	−.06934	.08948	−.24692	.10823
Hospital stay	Equal variances assumed	32.725	.000	−5.381	135	.000	−11.74397	2.18233	−16.05995	−7.42799
	Equal variances not assumed			-7.085	96.763	.000	-11.74397	1.65747	-15.03369	-8.45425
Appeal time	Equal variances assumed	6.576	.011	1.006	135	.316	.11920	.11855	-.11525	.35365
	Equal variances not assumed			.940	81.492	.350	.11920	.12682	-.13311	.37151
Type	Equal variances assumed	18.854	.000	2.890	135	.004	.70826	.24505	.22362	1.19290
	Equal variances not assumed			2.672	78.971	.009	.70826	.26507	.18065	1.23587
Grade	Equal variances assumed	23.057	.000	2.544	135	.012	.25788	.10137	.05742	.45835
	Equal variances not assumed			2.226	68.082	.029	.25788	.11585	.02672	.48905
Percentage	Equal variances assumed	19.712	.000	5.677	135	.000	.49165	.08660	.32038	.66292
	Equal variances not assumed			5.153	75.035	.000	.49165	.09541	.30158	.68172
Area	Equal variances assumed	13.892	.000	-.753	135	.453	-.22913	.30419	-.83072	.37246
	Equal variances not assumed			-.845	131.330	.400	-.22913	..27120	-.76561	.30735
Intervention	Equal variances assumed	2.195	.141	-4.042	135	.000	-.36224	.08963	-.53950	-.18499
	Equal variances not assumed			-4.080	102.102	.000	-.36224	.08880	-.53837	-.18612

TABLE 5 Test of Normality between 2019 and 2020

		Tests of normality					
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Years	Statistic	df	Sig.	Statistic	df	Sig.
Age	2020	.443	49	.000	.619	49	.000
	2019	.254	88	.000	.839	88	.000
Gender	2020	.344	49	.000	.637	49	.000
	2019	.381	88	.000	.627	88	.000
Hospital stay	2020	.286	49	.000	.745	49	.000
	2019	.176	88	.000	.774	88	.000
Appeal time	2020	.376	49	.000	.691	49	.000
	2019	.388	88	.000	.679	88	.000
Type	2020	.311	49	.000	.742	49	.000
	2019	.398	88	.000	.589	88	.000
Grade	2020	.411	49	.000	.643	49	.000
	2019	.456	88	.000	.557	88	.000
Outcome	2020		49			49	
	2019		88			88	
Percentage	2020	.322	49	.000	.745	49	.000
	2019	.490	00	.000	.470	88	.000
Area	2020	.211	49	.000	.888	49	.000
	2019	.153	88	.000	.920	88	.000
Intervention	2020	.397	49	.000	.618	49	.000
	2019	.416	88	.000	.605	88	.000

[a]Lilliefors significance correction.

consultation, and nucleic acid tests and computed tomography (CT) were performed.[10]

In this study, it was determined that cases of third-degree burns that developed during the COVID-19 period were seen more than in previous years, and although most of them were operated, hospital stays were kept short and early discharges were made. In parallel, it was determined that outpatient treatment was not performed, and all patients were given a minimum of 1 day, a maximum of 16 days, and an average of 4.34 ± 2.71 days.

Although the number of patients decreased during the COVID-19 period, it was observed that children between the ages of 1–5 are in the majority in every 3 years examined. Some studies in Turkey support our results in this sense.[11-13]

Considering the reasons for the development of burn cases, it was determined that the most important factor in all three groups was hot fluids. In addition, it was found that women and men suffered from burn trauma at similar rates. Similar results have been obtained in the literature and these studies support the results of our study.[11-13]

According to this study data in COVID-19 time, 67.3% patients were with a third-degree burn, and it was 27% and 15% in previous years. On the other hand, there is a significant reduction in the covid period in second-degree burns (in COVID-19 time 18.4% patients, 72.7% and 84.9% in previous years). The increase in third-degree burns during the COVID-19 period can be explained as the effect of the increasing population due to burn unit is the centre of the region and the recent migration. However, the decrease in second-degree burns may be an indication that the public does not want to approach hospitals due to the pandemic. As a matter of fact, the risk of COVID-19 transmission is most common in hospitals. First- and second-degree burns are easy to manage at home. Therefore, it may not be necessary to apply to the burn unit for manageable burn wounds at home during the pandemic process.

The characteristics of burn cases are affected by the social changes caused by COVID-19. These changes have reduced the progression of burn incidents by almost half. This can be interpreted as family members being at home all the time, so that children are less at risk of burns and more protected by family members. Other noteworthy parameters are the shortened hospital stay. The outbreak of COVID-19 has significantly altered the balance on international platforms and in many areas in Turkey. The system and organisational structure of the health care system are completely arranged according to COVID-19. This has been compulsory in the management of the healthcare system in Turkey as well.

5 | CONCLUSION

Although the problems caused by COVID-19 are known worldwide, their negative effects have not been fully understood. Pandemic has many bad effects, including social, communal, individual, material, and spiritual. There has been a decrease in burn cases due to curfew restrictions imposed in Turkey. This indicates that burn cases can be further reduced with a little more care and attention. For this reason, it is important that individuals and those who care for children and adults who are unable to care for themselves concentrate on being more careful. In addition, it is very important to predict the factors that cause burns and to eliminate the risks.

Parents who have a child at the age of 1 to 5, the riskiest group for burns, should be more careful and supported in childcare. In addition, keeping the hospital

stay short is an important strategy according to this study, but the potential problems need to be investigated.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

No fund. APC will be pay by yhe authors

ORCID

Mehmet Fatih Akkoç https://orcid.org/0000-0002-5714-0499
Semra Bülbüloğlu https://orcid.org/0000-0002-7252-9478
Mehmet Özdemir https://orcid.org/0000-0003-2901-5145

REFERENCES

1. Abazari M, Ghaffari A, Rashidzadeh H, Badeleh SM, Maleki Y. A systematic review on classification, identification, and healing process of burn wound healing. *Int J Low Extrem Wounds*. 2020;32524874:1-13. https://doi.org/10.1177/1534734620924857.
2. World Health Organization. Burns. http://www.who.int/mediacentre/factsheets/fs365/en/. Accessed May 25, 2020.
3. American Burn Association. Burn incidence and treatment in the United States: 2016. http:// ameriburn.org/who-we-are/media/burn-incidence-fact-sheet/. Accessed May 25, 2020.
4. Schmid DM. The National Law Review: burn injuries: statistics, classifications, & causes. *Stark Stark Personal Injury law J*. 2015;17:Accessed May 25, 2020. https://www.natlawreview.com/article/burn-injuriesstatistics-classifications-causes.
5. Çıkman M, Çandar M, Kandiş H, Baltacı D, Sarıtaş A. The factors affecting mortality in adults due to high voltage electrical injuries. *Duzce Med J*. 2011;13(3):29-33.
6. Pruit BA, Wolf SE, Mason AD. *Epidemiological Demographic and Outcome Characteristics of Burn Injury*. In: Herndon D, ed. Total Burn Care. Philadelphia: Elsevier; 2012:15-45.
7. Mehta P, McAuley DF, Brown M, Sanchez E, Tattersall RS, Manson JJ. COVID-19: consider cytokine storm syndromes and immunosuppression. *The Lancet*. 2020;395(10229):1033-1034.
8. Ruan Q, Yang K, Wang W, Jiang L, Song J. Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan, China. *Intensive Care Med*. 2020;46(5):846-848. https://doi.org/10.1007/s00134-020-05991-x.
9. Ilenghoven D, Hisham A, Ibrahim S, Yussof SJM. Restructuring burns management during the COVID-19 pandemic: a Malaysian experience. *Burns*. 2020;46:1236-1239.
10. Barret JP, Chong SJ, Depetris N, et al. Burn center function during the COVID-19 pandemic: an international multi-center report of strategy and experience. *Burns*. 2020;46:1021-1035.
11. Günay K, Taviloğlu K, Eskioğlu E, Ertekin C. A study of epidemiology and mortality in burn patients. *Turkish J Travma Emer Surg*. 1995;2:205-208.
12. Çıkman M, Çandar M, Kandiş H, Baltacı D, Sarıtaş A. Retrospective analysis of judicial burn cases admitted to our clinic: 4-year experience. *Düzce Med Faculty J*. 2011;13(3):29-33.
13. Özkan Z, Alataş ET. Surgical management of burns and our clinical experiences. *J Clin Exp Invest*. 2014;5(1):76-79.

How to cite this article: Akkoç MF, Bülbüloğlu S, Özdemir M. The effects of lockdown measures due to COVID-19 pandemic on burn cases. *Int Wound J*. 2021;18:367–374. https://doi.org/10.1111/iwj.13539