Panafrican Journal of Plastic Reconstructive and Aesthetic Surgery Vol. 1 No. 2 December 2024
BURN INJURIES BEFORE AND DURING COVID-19 PANDEMIC PERIOD AS SEEN AT A TERTIARY REFERRAL HOSPITAL IN EASTERN AFRICA
Adegu W, P. O. Box 1663-50100, Kakamega, Kenya, **B. Wabwire,** Kenyatta National Hospital, **M. Meme,** Kenyatta National Hospital, **A. Muoki,** University of Nairobi, department of plastic, reconstructive and aesthetic surgery, P. Kituyi, Moi University, department of surgery and anaesthesiology, **S. Khainga,** University of Nairobi, department of plastic, reconstructive and aesthetic surgery and **F. Nang'ole**, University of Nairobi, department of plastic, reconstructive and aesthetic surgery

Corresponding author: Dr. Adegu William, Tel +254-796-688-828. Email address: jacobadegu@yahoo.com.

BURN INJURIES BEFORE AND DURING COVID-19 PANDEMIC PERIOD AS SEEN AT A TERTIARY REFERRAL HOSPITAL IN EASTERN AFRICA

ADEGU W, B. WABWIRE, M. MEME, P. KITUYI, S. KHAINGA and F. NANG'OLE

ABSTRACT

Background: **COVID-19 pandemic has worldwide social-economic effect. However, there's paucity of knowledge in the nature and severity of burn injuries before and during Covid-19 pandemic era.**

Objectives: **To determine the difference in burn injuries witnessed before and during COVID-19 pandemic period**

Design: **Descriptive retrospective study covering the period between 12th March 2018 to 12th March 2021. This encompassed the pre-Covid-19 era as well as the Covid-19 pandemic era. Data from all burn's unit/wards spanning 3 years was retrieved. Data was cross checked and only complete and accurate data was incorporated. Data analysis was done using chi square test and Fisher's exact test. P-value was set at 0.05.**

Results: **There was generally an increase in the number of patients who sustained thermal and electrical burns during Covid-19 pandemic period. More males sustained burn injuries in the Covid-19 pandemic period, accounting for 56.6% of all burn injuries compared to their female counterparts (43.4%). This was statistically significant (P= <0.005)**

Conclusion: **The present study demonstrated that there was a significant increase in thermal and electric burns during the covid-19 pandemic period. These burns involved all the various age groups especially the preschool going children. The current study postulated probable explanations of this increase in thermal and electric burns during Covid 19 pandemic period to be due to the forced lockdowns, children left unattended to or under insufficient supervision.**

Key words: **Thermal burns, Electrical burns, Covid-19, burns unit**

INTRODUCTION

COVID-19, which is also known as Corona virus disease 2019 broadly refers to a disease or illness that is propagated by a new (novel) type of Corona virus that is also referred to as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (3). It is important to note that this novel Covid-19 virus was first identified in Hubei province of China. This Covid-19 disease was then reported to the WHO (World Health Organization) on December 31st 2019. (4,5). A few months later, the WHO declared the Covid-19 outbreak as a global pandemic in March 11, 2020.

Corona viruses are enveloped positive-stranded RNA viruses. Beta Corona virus is the Corona virus known to cause COVID-19. The Middle East respiratory syndrome (MERS) virus is also another Beta Corona virus related to the Covid-19 virus. The host receptor for SARS-CoV-2 cell entry is the same as for the angiotensin-converting enzyme 2 (ACE2) (8). SARS-CoV-2 binds to ACE2 during the receptor-binding domain of its spike protein. The cellular protease TMPRSS2 is also an important factor for SARS-CoV-2 cell entry. Other variants that are associated with Covid-19 include Delta and Omicron.

Due to the nature of spread, infectivity rate as well as severity of the infection, COVID-19 pandemic has

led to adverse socio-economic effects throughout the globe (1). This can be attributed to COVID-19 itself as well as the COVID-19 related restrictions e.g. lockdowns, restriction of movements, curfews, restriction of public gatherings as well as stay at home orders (1,2). These orders being well-intentioned, apart from leading to depression, attempted suicide, homicides, anxiety and stress, they also led to loss of livelihoods and subsequent increase in crime, substance abuse, domestic violence as well as burns (3-5). However, there is paucity of knowledge in the nature of burns cases witnessed locally during the COVID-19 pandemic period. The objective of the current study was to demonstrate the difference in burn injuries between the pre and during COVID-19 pandemic period as seen in a tertiary hospital in Kenya.

MATERIALS & METHODS

The current study was a descriptive retrospective study for a period of 3 years from 12th March 2018 to 12th March 2021. The study was conducted at KNH which is the largest national referral hospital, besides attending to numerous burns patients. It also provides better representation of the disease burden and hence the most probable outcomes can be conclusively reached at due to the diversity of patients seeking treatment at the facility. All records of patients with diagnosis of burns between 12th March 2018 to 12th March 2021were sampled and analyzed. Files with incomplete or missing data were excluded from the study. Ethical approval to carry out the current study was given by the KNH / UON Ethics Research Committee.

RESULTS

A total of 905 patients' records met the inclusion criteria, 407 and 498 records for patients treated for burn injuries during the pre-Covid 19 and during Covid-19 pandemic period respectively. The demographic characteristics of the patients treated for thermal burn injuries is shown in table 1 below. There was generally an increase in the number of patients who sustained thermal and electrical burns during covid-19 pandemic period throughout the age groups. More males sustained burn injuries in the Covid-19 pandemic period, accounting for 56.6% of all burn injuries compared to their female counterparts (43.4%). Most of the individuals who got burnt during the Covid-19 pandemic period were pre-school children (39%), followed by those in primary school (30.3%) and those aged between 4-10 years (11%). There was however a decrease in number of chemical burns in the Covid-19 pandemic period. The least group of patients who sustained burns during Covid 19 pandemic period were those with tertiary level knowledge, accounting for 0.8%. These differences were statistically significant (P Value=0.008.)

Table 1: *Demographic characteristics*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
Age in years			
≤ 10	249 (61.2)	280 (56.2)	0.255
11 – 20	37 (9.1)	64 (12.9)	
21 – 30	59 (14.5)	79 (15.9)	
> 40	62 (15.2)	75 (15.1)	
Gender			
Male	217 (53.3)	282 (56.6)	0.319
Female	190 (46.7)	216 (43.4)	
Education			
Adult 18+ years (unknown)	17 (4.2)	33 (6.6)	**0.008**
Child 11 – 17 years	0 (0.0)	8 (1.6)	
Child 4 – 10 years	28 (6.9)	55 (11)	
Pre-school level	187 (45.9)	198 (39.8)	
Primary	119 (29.2)	151 (30.3)	
Secondary	50 (12.3)	49 (9.8)	
Tertiary	6 (1.5)	4 (0.8)	

Various types of Burn injuries

The various descriptions of the types of burns sustained between the 2 study periods are documented in table 2 below. There was a decrease in chemical burn injuries during the Covid-19 pandemic period. However, there was an increase in both thermal and electrical burns in the Covid-19 pandemic period (98.9%) compared to the pre-Covid 19 pandemic period (91.9%). This increase was significantly significant (P =0.001). More than 50% of all the thermal burns witnessed between the two periods were in form of scalds, which was followed by open flame (> 20%). There was a significant increase in inhalational burn injuries in the Covid 19 pandemic period (4.4%). It is also important to note that besides there being more patients treated for scald burns in the Covid 19 pandemic period compared to pre-Covid 19 pandemic period, there was an overall decrease in the proportion of scald burns by 4.1% in the Covid 19 pandemic period. The chemical burns witnessed were primarily due to assault with domestic cleaning products.

Table 2: *Types of burn injuries*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
Chemical	4 (1.0)	2 (0.4)	**0.001**
Electrical	29 (7.1)	35 (0.7)	
Flame	108 (26.5)	120 (24.1)	
Flame and Inhalational	26 (6.4)	47 (9.4)	
Inhalational Burns	1 (0.2)	22 (4.4)	
Scald	239 (58.7)	272 (54.6)	

Burn injuries according to TBSA

There was marginal increase in TBSA burned in the Covid 19 pandemic period for those burns involving between 11-20% of TBSA, and those burns involving more than 31% of the TBSA. However, this increase was not statistically significant as shown in table 3 below.

Table 3: *TBSA*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
≤ 10%	118 (29.0)	143 (28.7)	0.095
11 – 20%	179 (44.0)	224 (45.0)	
21 – 30%	76 (18.7)	69 (13.9)	
31 – 40%	25 (6.1)	34 (6.8)	
41 – 50%	3 (0.7)	6 (1.2)	
> 50%	1 (0.2)	8 (1.6)	
Unknown	5 (1.2)	14 (2.8)	

Burn injuries according to depth

The table 4 bellow indicates the burn depths witnessed during the two comparative periods. Apart from 2nd degree deep and 2nd degree mixed burns, there was an increase in all the other burn depths in the Covid 19 pandemic period. However, this increase was not statistically as evidenced by the P-value in the table below.

Table 4: *Depth*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**Suggested Class**
2nd degree deep	17 (4.2)	19 (3.8)	0.121
2nd degree mixed	101 (24.8)	94 (18.9)	
2nd degree superficial	267 (65.6)	341 (68.5)	
3rd degree	10 (2.5)	15 (3)	
4th degree	1 (0.2)	1 (0.2)	
Unknown	11 (2.7)	28 (5.6)	

Management

Most of the thermal burn injuries across the 2 periods (>50%) were managed conservatively as indicated in the table 5 below. However, there was a significant increase (P=0.024) in the number of pure debridement, pure grafting, debridement coupled with amputations, debridement coupled with grafting as well as flap cover in the Covid 19 pandemic period.

Table 5: *Management*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
Conservative	256 (62.9)	297 (59.6)	**0.024**
Debridement	3 (0.7)	6 (1.2)	
Debridement, Amputation	1 (0.2)	6 (1.2)	
Debridement, Grafting	125 (30.7)	143 (28.7)	
Debridement, Grafting, Amputation	9 (2.2)	4 (0.8)	
Debridement, Grafting, Flap	0 (0.0)	1 (0.2)	
Grafting	3 (0.7)	7 (1.4)	
Unknown	10 (2.5)	33 (6.6)	

Complications

The table 6 bellow shows the complications encountered when managing thermal burn patients between the two study periods. The complications were classified into 4 main categories i.e. anemia, acute kidney injury (AKI), contractures and sepsis. This was based on the nature of complications documented in the treatment records. Apart from an increase in the number of patients who contracted sepsis during covid19 pandemic period, there was a decrease in all the other complications. However, these differences were not statistically significant as evidenced in the table 6 bellow.

Table 6: Complications

	Pre-Covid *(n=407)*	During-Covid *(n=498)*	p-value
Anaemia			
Yes	111 (27.3)	115 (23.1)	0.148
No	296 (72.7)	383 (76.9)	
AKI			
Yes	6 (1.5)	5 (1.0)	0.521
No	401 (98.5)	493 (9.09)	
Contractures			
Yes	11 (2.7)	11 (2.2)	0.631
No	396 (97.3)	487 (97.8)	
Sepsis			
Yes	31 (7.6)	43 (8.6)	0.578
No	376 (92.4)	455 (91.4)	

Outcome

There were 3 main outcomes as indicated in the table 7 below. There was a significant reduction in the number of patients who were discharged on follow up in the Covid-19 pandemic period (P=0.002). There was an increase in mortality (P=0.004) in the Covid-19 pandemic period, as shown in the table below.

Table 7: *Outcome*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
D on follow up			
Yes	404 (99.3)	478 (96.0)	**0.002**
No	3 (0.7)	20 (4.0)	
Mortality			
Yes	2 (0.5)	16 (3.2)	**0.004**
No	405 (99.5)	482 (96.8)	
Permanent incapacitation			
Yes	10 (2.5)	8 (1.6)	0.362
No	397 (97.5)	490 (98.4)	

DISCUSSION

The current study was objectively set out to determine the difference in the various types of burn injuries between the pre-Covid-19 and during Covid-19 pandemic period as seen in a tertiary hospital in Kenya. Of the targeted 2,000 files, only 45% that met the inclusion criteria could be analyzed. This is because most of the files had missing data while some were untraceable. Various parameters were assessed including demographic characteristics, nature and depth of burn injuries, TBSA involved, management, complications and outcome.

There was a pattern of increase in number of patients treated for thermal and electrical burn injuries across all the age groups in the Covid19 pandemic period. Majority of the patients in both study periods were preschool going children (19). The authors hypothesized that the significant increase in thermal and electrical burns in pre-school going children during Covid 19 pandemic period (P= 0.008) could have been due to closure of schools during the pandemic period, and hence most of the children who should have been in schools were still at home. Another school of thought by the authors accounting for the higher incidence of thermal burn injuries in the preschool going age group was due to lack of

adequate supervision by their parents, guardians, elder siblings and or neighbors, lack of protector cages as well as lack of health education (20). Most of the thermal and electrical burns involving children occurred within indoors while those involving adults occurred in outdoor settings including places of work, social places and the streets (20). There was however a statistically significant difference in reduction of the number of individuals managed for thermal and electrical burns with tertiary level education in the Covid 19 pandemic period. This could be attributed to the effect of knowledge, exposure and responsibility that is imparted on students in higher institutions of learning.

Scald burns were the most common type of thermal burns witnessed during the two study periods (20 & 21). The number of patients managed for scald burns significantly increased during the Covid-19 pandemic period (p=0.001). This was followed by open flame burns. The least type of thermal burns was inhalational burns, which despite significantly increasing to more than twenty fold in the Covid-19 pandemic period, it only accounted for 4.4% of the total burns. This increase in scald burns during the Covid-19 pandemic period could be attributed due to the low socio-economic status of the family involved, lack of safety measures and lockdown measures. Most of these burns occurred in single room homes, where cooking activities take place next to the children's beddings. The children then accidentally hit kettles of boiling water or foods such as porridge ending up sustaining splash burns. In such environments, due to limitation of space, the inhabitants of these houses especially children sustain accidental burns during playing. The lock down measures on the other hand increased children's time in these houses hence increasing their chances of getting into contact with fire and hence end up sustaining thermal burns. Such was the case with thermal burns that occurred due to a house catching fire, secondary to children playing with matchsticks and exploring the consequences of fire.

Moreover, a few thermal burns occurred outdoors. In such instances, children playing with minimal supervision ended up lighting fires and throwing canisters containing inflammable materials to fire thereby inadvertently sustaining thermal burns.

For the thermal burns involving adults, most of the injuries were accidental and or due to intoxication. A few were secondary to assault. In contrast to another almost similar study where burn injuries involving adults were documented to have occurred in their workplaces, these burns in our set up occurred outside their working areas (21). Accidental burns in adults included gas explosion when lighting a gas cooker, sparks from cigarette near a fuel tanker, forgotten candle lights which eventually burn the beddings and the house at large as well as explosion from a generator. The thermal burns involving intoxicated adults were due to accidentally falling on a source of fire e.g. Jiko or gas and not being able to perceive that they were being burnt. The reasons given for intoxicating themselves with drugs of abuse included being sacked from their jobs, psychological stress as well as the difficult economic times, making it difficult for them to afford a meal. The thermal burns that were due to assault were secondary to being set on fire by mob justice, as a way of punishing the individual for stealing. Some of the reasons given by the culprits for stealing included so as to get food, to be able to pay rent as well as get money to buy drugs of abuse.

Chemical burns captured involved adults and were due to assault by persons known to the subjects. This was done using locally available cleaning materials and almost always involved the face region. The decrease in chemical burns in the Covid-19 pandemic period could however be explained by the financial implications associated with their acquisition, hence making their use unpopular, especially during the Covid-19 pandemic period, when the social-economic status was dwindling worldwide.

As regards the TBSA burns involved, most of the burns in both study periods involved between 11 to 20% of the total body surface area, compared to less than 4% of the total burns sustained involving more than 40% of the TBSA. This could be explained by the fact that burns involving more than 40% of the TBSA are severe burns and probably the patients did not make it in time to the tertiary level hospital. Besides, most individuals successfully rescued from thermal burns in our setting usually sustain between 10 and 20% TBSA.

In terms of burn depth, most of the patients managed for the various types of burn injuries in both study periods suffered 2nd degree superficial burns (> 60%), compared to 3rd and 4th degree burns which contributed to less than 4% of the total burns.

CONCLUSION

The COVID-19 outbreak and subsequent lockdown gave us the opportunity to look into the various causes and conditions that predispose to burn injuries in such unusual and unforeseeable circumstances.

Burns are common, preventable injuries with serious consequences for patients, their families, and healthcare providers. Understanding the link between certain circumstances and a person's susceptibility to burn injuries is critical for guiding prevention strategies and planning burn units.

The present study demonstrated that there was a significant increase in the various types of burn

injuries during the Covid-19 pandemic period. These burns involved all the various age groups especially the preschool going children. The least affected were individuals with tertiary level education. The current study postulated probable explanations of this increase in thermal and electrical burns during the Covid 19 pandemic period to be due to the forced lockdowns, children left unattended to or under insufficient supervision, intoxication, psychological stresses due to loss of livelihoods low socioeconomic status and lack of fire safety mechanisms in the respective households. The decrease in chemical burns in the Covid-19 pandemic period could however be explained by the financial implications associated with their acquisition, hence making their use unpopular, especially during the Covid-19 pandemic period, when the social-economic status was dwindling worldwide.

The current study seeks to recommend that the government to consider fire safety dynamics before approval of rental buildings. Individuals living in informal settlement to also undergo fire safety training. Moreover, the present study also emphasizes on the need of the burn society in Kenya to conduct fire safety drills targeting the people living in the informal settlement. Electric wires should never be left hanging and every construction site should be properly secured to cushion children from sustaining electrical burns. Team building activities should also form part and parcel of employees' activities, especially those involved with direct handling of electrical power lines. More plastic surgeons should also be trained so as to match the need of thermal burns burden in the country. Besides, fire safety as well as first aid lessons should be included in elementary school lessons. Furthermore, further studies to investigate other possible reasons behind increase in thermal burns in the Covid-19 pandemic period are recommended

In a nutshell, these findings from the current study may help us better understand the inherent susceptibility of various situations to burn injuries, as well as aid in the development of burn prevention strategies, such as campaigns or guides that will instruct parents in the event of future lockdowns or similar situations.

REFERENCES

1. Ali, A., Ahmed, M., Affairs, N. H.-J. of P., & 2020, undefined. (2020). Socioeconomic impact of COVID-19□19 pandemic: Evidence from rural mountain community in Pakistan. *Wiley Online Library*. https://doi.org/10.1002/pa.2355
2. Poudel, K., Social, P. S.-I. J. of, & 2020, undefined. (2020). Impact of COVID-19-19 pandemic on socioeconomic and mental health aspects in Nepal. *Journals.Sagepub.Com*, *2020*(8), 748–755. https://doi.org/10.1177/0020764020942247
3. Gopalan, H., Research, A. M.-D. & M. S. C., & 2020, undefined. (n.d.). COVID-19-19 pandemic and challenges for socio-economic issues, healthcare and National Health Programs in India. *Elsevier*. Retrieved October 7, 2021, from https://www.sciencedirect.com/science/article/pii/S1871402120301600
4. Yamamoto, R., Sato, Y., Matsumura, K., & Sasaki, J. (2021). Characteristics of burn injury during COVID-19 pandemic in Tokyo: A descriptive study. *Burns Open*, *5*(4), 40–45. https://doi.org/10.1016/J.BURNSO.2021.06.007
5. D'Asta, F., Choong, J., Thomas, C., Adamson, J., Wilson, Y., Wilson, D., Moiemen, N., & Farroha, A. (2020). Paediatric burns epidemiology during COVID-19 pandemic and 'stay home' era. *Burns*, *46*(6), 1471. https://doi.org/10.1016/J.BURNS.2020.06.028
6. Bodrud-Doza, M., Shammi, M., Bahlman, L., Islam, A. R. M. T., & Rahman, M. M. (2020). Psychosocial and Socio-Economic Crisis in Bangladesh Due to COVID-19-19 Pandemic: A Perception-Based Assessment. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/FPUBH.2020.00341/FULL
7. Maria, N., Zaid, A., Catrin, S., Surgery, K. A.-… J. of, & 2020, undefined. (n.d.). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *Pdfs.Semanticscholar.Org*. https://doi.org/10.34293/commerce.v8i4.3293
8. Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 2020; 579:270.
9. Parvathi Varma, MBChB, BSc (Hons), MRCS(Eng), Diana Kazzazi, MBChB, MRCS, Mohammad Umair Anwar, MBBS, FCPS(Surg),
10. Stojkoski, V., Utkovski, Z., … P. J.-A. at S., & 2020, undefined. (2020). The socio-economic determinants of the coronavirus disease (COVID-19-19) pandemic. *Papers.Ssrn.Com*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3598631
11. Alradhawi, M., Shubber, N., … J. S.-I. journal of, & 2020, undefined. (n.d.). -19 pandemic on mental well-being amongst individuals in society-A letter to the editor on "The socio-economic implications of the coronavirus and COVID-19-19 …. *Ncbi.Nlm.Nih.Gov*. Retrieved October 7, 2021, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7198428/
12. Nicola, M., Alsafi, Z., Sohrabi, C., … A. K.-I. journal of, & 2020, undefined. (n.d.). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *Elsevier*. Retrieved October 7, 2021, from https://www.sciencedirect.com/science/article/pii/S1743919120303162
13. Mishra, N., Das, S., Yadav, S., Khan, W., … M. A.-S., & 2020, undefined. (n.d.). Global impacts of pre-and During-COVID-19-19 pandemic: Focus on socio-economic consequences. *Elsevier*. Retrieved October 7, 2021, from https://www.sciencedirect.com/science/article/pii/S2666351120300425
14. Gopalan, H. S., & Misra, A. (2020). COVID-19-19 pandemic and challenges for socio-economic issues, healthcare and National Health Programs in India. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *14*(5), 757–759. https://doi.org/10.1016/J.DSX.2020.05.041

15. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *International Journal of Surgery*, *78*, 185–193. https://doi.org/10.1016/J.IJSU.2020.04.018
16. Cheng, S. O. (2020). Xenophobia due to the coronavirus outbreak – A letter to the editor in response to "the socio-economic implications of the coronavirus pandemic (COVID-19-19): A review." *International Journal of Surgery*, *79*, 13–14.
17. Sardar, S., Abdul-Khaliq, I., Ingar, A., Amaidia, H., & Mansour, N. (2020). 'COVID-19-19 lockdown: A protective measure or exacerbator of health inequalities? A comparison between the United Kingdom and India.' a commentary on "the socio-economic implications of the coronavirus and COVID-19-19 pandemic: A review." *International Journal of Surgery*, *83*, 189–191.
18. Niu, J., Rodriguez, J. A., Sareli, C., Goldman, J., Puga, M., & Eckardt, P. A. (2021). COVID-19-19 infection among first responders in Broward County, Florida, March–April 2020. *Journal of Public Health*, *43*(3), 450–454. https://doi.org/10.1093/PUBMED/FDAA231
19. Xiang-jun Chen, Wei-jing Sun, Jing Wang, De-zhi Han, Guo-zhen Gao, De-xiong Yan, Xiao-chun Zhao, Xing-wei Yao, Li Wang, Gong-sheng Wang, Epidemiology of bedside stove burns in a retrospective cohort of 5089 pediatric patients, Burns, Volume 40, Issue 8, 2014,Pages 1761-1769, ISSN 0305-4179, https://doi.org/10.1016/j.burns.2014.03.018.
20. Dani Kruchevsky, MD, Shir Levanon, BA, Adi Givon, BSc, Moran Bodas, PhD, Israeli Trauma Group, Yitzchak Ramon, MD, Yehuda Ullmann, MD, Assaf A Zeltzer, MD, PhD, Burns During Coronavirus Disease 19 Lockdown: a Multi-Center Retrospective Study in Israel, *Journal of Burn Care & Research*, 2022;, irac078, https://doi.org/10.1093/jbcr/irac078
21. Dani Kruchevsky, MD, Maher Arraf, MD, Shir Levanon, BA, Tal Capucha, PhD, Yitzchak Ramon, MD, Yehuda Ullmann, MD, Trends in Burn Injuries in Northern Israel During the COVID-19 Lockdown, *Journal of Burn Care & Research*, Volume 42, Issue 2, March/April 2021, Pages 135–140, https://doi.org/10.1093/jbcr/iraa154
22. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *International Journal of Surgery*, *78*, 185–193. https://doi.org/10.1016/J.IJSU.2020.04.018
23. Zaami, S., Marinelli, E., & Varì, M. R. (2020). New Trends of Substance Abuse During COVID-19-19 Pandemic: An International Perspective. *Frontiers in Psychiatry*, *0*, 700. https://doi.org/10.3389/FPSYT.2020.00700
24. Chiang, C. H., Chiang, C. H., & Chiang, C. H. (2020). Letter to editor - Can universal masking help with our recovery from the COVID-19-19 pandemic? *International Journal of Surgery*, *79*, 125–126.
25. Saffle, J. R., Davis, B., Williams, P., & Group, T. A. B. A. R. P. (1995). Recent Outcomes in the Treatment of Burn Injury in the United States: A Report From the American Burn Association Patient Registry. *The Journal of Burn Care & Rehabilitation*, *16*(suppl_3_pt_1), 219–232. https://doi.org/10.1097/00004630-199505000-00002
26. *Friction Blisters: Background, Pathophysiology, Etiology*. (n.d.). Retrieved November 4, 2021, from https://emedicine.medscape.com/article/1087613-overview#a5