Did COVID-19 Pandemic Conditions Change the Features of Pediatric Minor Burn Injuries? A Single-Center Experience

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ABSTRACT

OBJECTIVES: Social life changes during the COVID-19 pandemic may have influenced burn injury characteristics among children. Here, we compared features among pediatric burn outpatients who were treated at our burn center before and during the COVID-19 pandemic.

MATERIALS AND METHODS: We compared medical records of 217 patients treated between March 2018 and May 2019 (pre-pandemic; group I) and 212 patients treated between March 2020 and May 2021 (during the pandemic; group II). *P* < .05 was significant.

RESULTS: In group I versus group II, mean age was 4.19 ± 0.4 versus 4.25 ± 0.3 years, male-to-female ratio was 0.9:1 versus 1.1:1, and mean total surface area burned was 1.87 ± 0.2% versus 1.93 ± 0.3%, respectively (*P* > .05). Most patients in both groups lived in urban settings, had mostly day-time injuries, and were under the umbrella of the social security system, with cause of burns being mostly scalds (*P* > .05). Injuries occurred mostly at home in both groups, but more patients in group II had outdoor burns (*P* < .05). Hands, head, and neck regions were more commonly involved in group I than in group II (*P* < .05). Group II patients were more frequently admitted on the same day as injury (*P* < .05), but rates of direct burn center admission were similar with resembling numbers of other medical center admissions before reaching to our burn-center (*P* > .05).

CONCLUSIONS: The COVID-19 pandemic did not change primary burn injury features among our pediatric outpatients. Decreases in burns to hands, head, and neck and increases in admissions on the same day as injury during the pandemic may be a clue for enhanced caregiver precaution against injuries to children during lockdowns. Increased admissions on the same day as injury may reflect our uninterrupted burn care service, because many other medical centers had to serve COVID-19 patients rather than burn victims.

KEY WORDS: *Burns, Children, Coronavirus, Lockdown, Outpatient*

INTRODUCTION

COVID-19 resulted in limitations to most activities for children all around the world. It affected their psychological and emotional health and their social and cognitive lives.[1] During the pandemic period, injuries to children have of course continued to occur but have required medical attention with additive approaches for special protection against COVID-19 infection.[2] With burn injuries being one of the most common causes of trauma in childhood, social life changes as a result of the COVID-19 pandemic may have influenced the features of burn injuries among children. Many studies from different world regions on pediatric trauma, including burns, during the pandemic revealed that characteristics of pediatric burns differed among various regions, with differences considerable even in various locations in a single country.[3-8] Investigations of minor burns during the pandemic may reveal a clear picture of burn injuries because most burn trauma in childhood are minor injuries.[9] During the pandemic, long obligatory homestays with subsequent unfamiliar and astonishing limited social life may have influenced the occurrence of minor burns more than moderate and major burns. Here, we compared the features of pediatric patients with minor burns who were

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treated at our burn center before and during the COVID-19 pandemic.

MATERIALS AND METHODS

When choosing the study periods and study groups, our national "lockdown" and "new normal social life" periods were taken into account; the national lockdown period for children started within 1 week after the declaration of the pandemic by World Health Organization on March 11 and included Spring 2020 (March, April, May). The "new normals with limited social life" started in Summer 2020 (June to present). Meanwhile, our burn center has continuously served both adult and pediatric patients with burn injuries.

In total, there were 429 children who were treated at the outpatient service in 2 different periods of time: group I (pre-pandemic) included children who were treated between March 2018 and May 2019 (n = 217), and group II (pandemic) included children treated between March 2020 and May 2021 (n = 212).

Age, sex, social security status, place of residence, environment in which burn injury occurred, causes of burns, extent of burns, major body sites affected, time of day when injury occurred, environment in which the injury occurred, time interval between injury and admission to the burn center, and number of other medical center admissions were collected for each patient. We also separately compared features of minor burns in the lockdown subgroup of group II versus similar dates in group I and features of minor burns in the new normal subgroup of group II versus similar dates in group I.

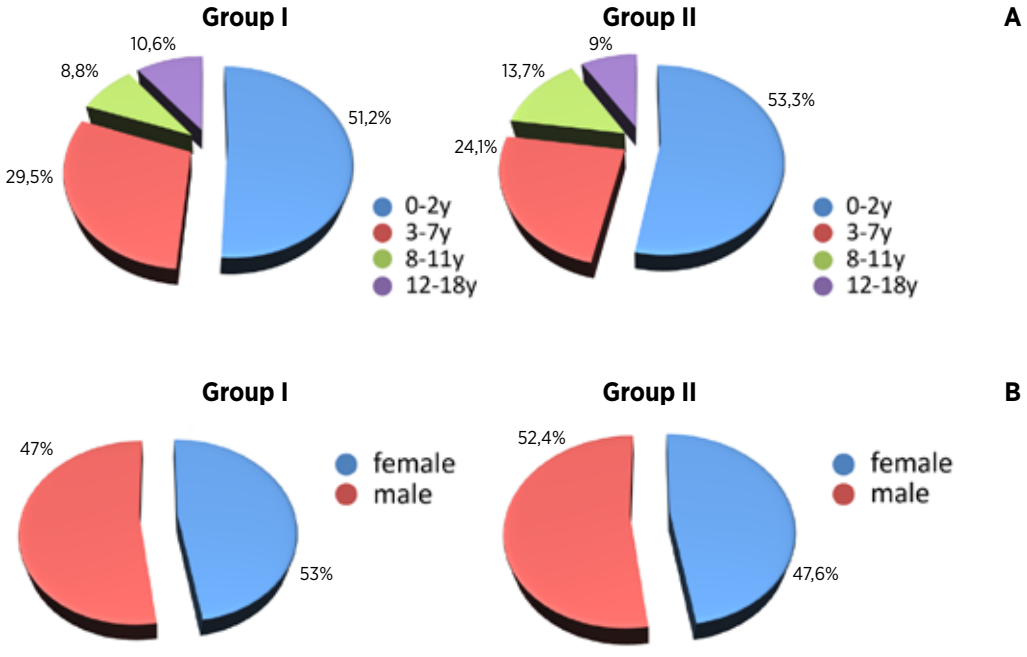
The Pearson chi-square tests with Monte Carlo exact significance were used for statistical evaluations. Numerical data are presented as medians or means ± SE. $P < .05$ was considered as significant.

RESULTS

Group I and Group II patients had comparable characteristics, with similar mean age, male-to-female ratio, and mean total surface area burned ($P > .05$). Mean age was 4.19 ± 0.4 years (range, 0-18 years) for group I and 4.25 ± 0.3 years (range, 0-18 years) for group II. Male-to-female ratio was 0.9:1 in group I and 1.1:1 in group II. Mean total surface area burned was 1.87 ± 0.2% (range, 0.5%-16%) in group I and 1.93 ± 0.3% (range, 0.1%-22%) in group II. In both groups, the most common age group was 0 to 2 years old, with similar distribution of sex. Most children in both groups lived in urban settings and were under the umbrella of social security insurance provided by the government ($P > .05$) (Figure 1 and Figure 2).

In both groups, the most common cause of burns was scalds, followed by contact burns, flame burns, and other ($P > .05$). Burns to head and neck were also less frequent in group II ($P < .05$). Injuries frequently occurred between 06:00 and 18:00 in both groups ($P > .05$). In both groups, the most common environment for injury was in the home; however, there were more outdoor burns in group II ($P < .05$).

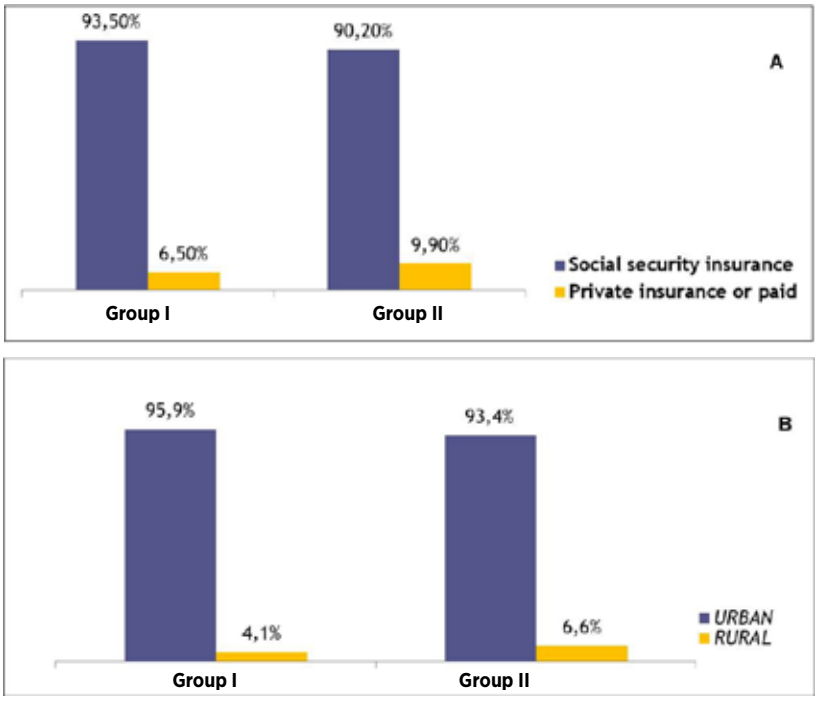
FIGURE 1. Mean Age, Age Groups, and Male-to-Female Ratio in Group I (Pre-Pandemic) Versus Group II (Pandemic)



(A) Age group results. **(B)** Male-to-female ratio results. Results were not significant ($P > .05$).

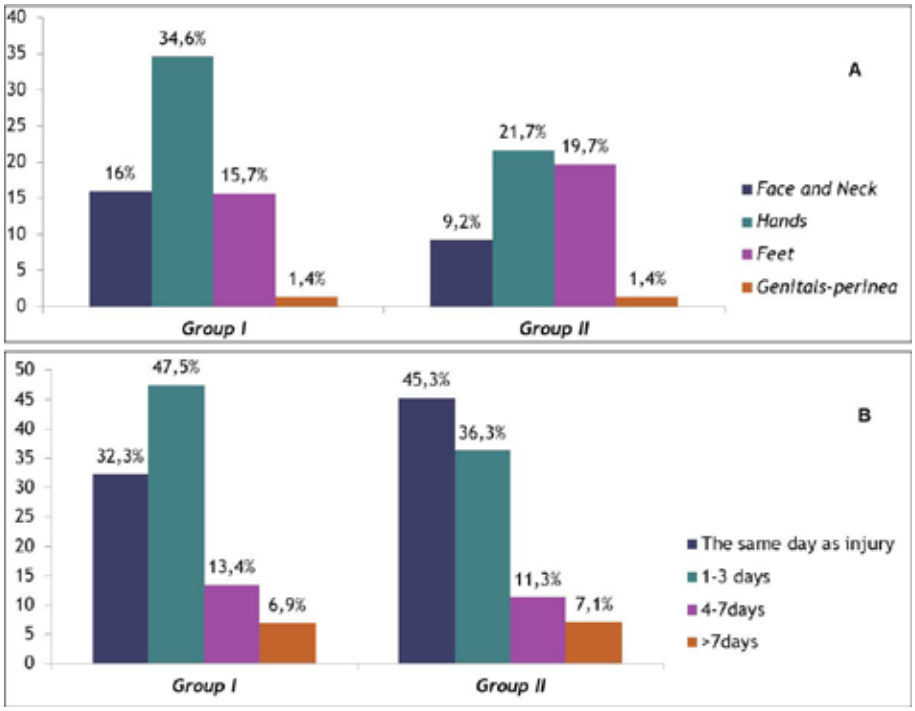
Children in both groups were admitted in the initial 3 days postinjury, but there were more admissions on the same day as injury in group II ($P < .05$). Direct admissions were somewhat higher than referrals from other medical centers in both groups ($P > .05$) (Figure 3).

FIGURE 2. Number of Patients with Social Security Insurance and in Rural Versus Urban Settings in Group I (Pre-Pandemic) Versus Group II (Pandemic)



(A) Insurance type**. (B)** Patient environment. Results were not significant ($P > .05$).

FIGURE 3. Major Body Sites of Injury and Time of Injury in Group I (Pre-Pandemic) Versus Group II (Pandemic)



(A) Major body site of injury**. (B)** Presentation to burn unit after injury. Results were significant with regard to hand injuries and admission on same day as injury in Group II versus Group I ($P < .05$).

Comparison of lockdown and new normal periods versus similar time periods before the pandemic

Among the lockdown and new normal subgroups versus group I, there were no significant differences in age, sex, social security status, place of residence, extent of burns, body site affected; time when injury occurred; time interval between injury and admission to the burn center; and number of other medical center admissions ($P > .05$).

Although there were no significant differences in numbers of admissions in the lockdown period, a considerable increase was found in the new normal period compared with the previous similar time period before the pandemic. The home was the most common environment for burns during the lockdown period as it was in similar previous dates, although outdoor burns increased in the new normal period compared with similar dates before the pandemic ($P < .05$) (Figure 4 and Figure 5).

DISCUSSION

In the present study, we found that most features of pediatric patients with minor burns treated at our outpatient burn unit were not affected by the pandemic. These results confirmed our recent retrospective study in which we investigated the main characteristics of all pediatric burn cases who were treated at our burn center during the pandemic. In that study, we had found that characteristics of pediatric burn injury patients were similar to those shown in various previous studies conducted before the pandemic.[10] The present study added to these conclusions by objectively comparing data of minor burns in pediatric patients treated at our burn center before and during pandemic.

In this study, we made several new observations. Although the number of admissions did not change pre-pandemic versus during the pandemic, there were more admissions on the same day of injury in our pandemic group (group II). This result may be a reflection of our uninterrupted burn care service. During the pandemic (especially in the initial months), many other medical centers that had 24-hour pediatric emergency room services and/or burn care units/centers had to care for patients with COVID-19 rather than burn victims without COVID-19. This resulted in diminished resources, although burn units and centers were open in these medical centers.[11,12] Thus, we believe that the other medical centers had to refer patients with minor burn injuries to our burn center as quickly as possible to lower the case load for themselves and to provide safer burn care for children who were negative for COVID-19. This suggestion seems to be confirmed by the similar direct admission rates and unchanged numbers of medical center admissions before patients were seen at our burn center in the pre-pandemic group I versus the pandemic group II. Another reason for increased admissions on same day as injury may be because parents and caregivers had to work at home during the pandemic. These parents who had to work at home could have sought medical help earlier than parents during the pre-pandemic period.

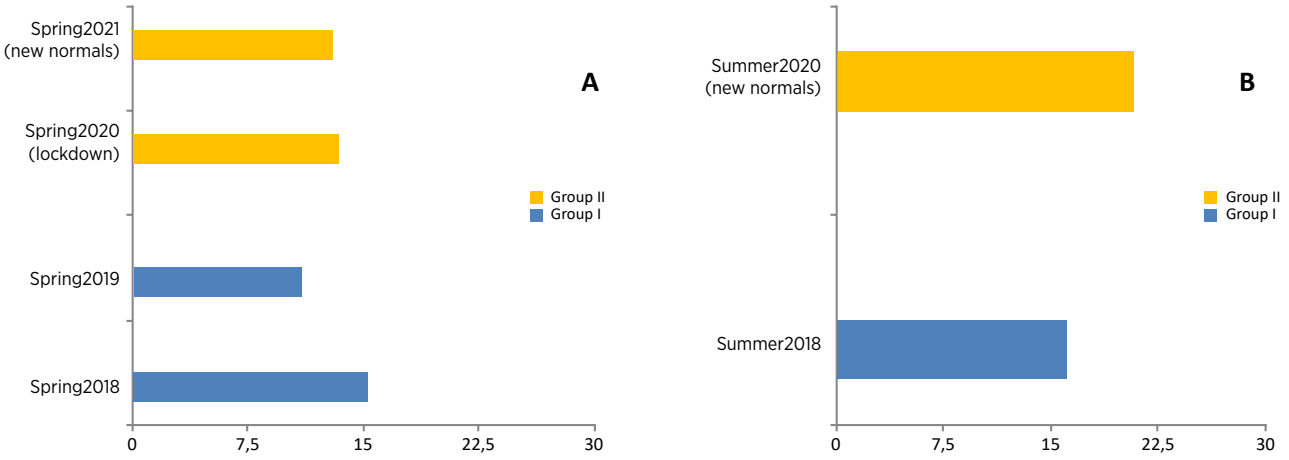
Findings of a recent study from the United Kingdom, which also had approximately similar dates to ours and similar results to ours, showed decreased burn rates in the 2- to 3-year age group but unchanged rates of emergency department presentations of trauma during their lockdown period.[4] The reduced number of burns to hand, head, and neck in the pandemic group (group II) is another important result from our study, which suggested that caregivers may have had opportunities to take precautions and have care for near to hand incendiary objects, especially for infants and toddlers. However, this suggestion might be invalid for older populations, as some previous studies from different world regions have found increased incidence of severe burns despite decreased admissions during the lockdown periods, which is in contrast to our pediatric study results.[6,12]

An increase in admissions and outdoor burns in the initial months during the new normal period deserves further investigation, as this result may indicate the psychological and social consequences of the lockdown period on children during new normal social life. Kourti and colleagues confirmed this suggestion, noting decreases in play behaviors in outdoor activities due to confinement during quarantine days in various countries.[1] We suggest that the new normal period, after a long period of confinement, may have resulted in an uncontrolled curiosity and eagerness for outdoor activities among the children. Behaviors of caregivers may have been also affected by this lockdown period. Instincts and reflexes to outdoor dangers for their children may have been lost, increasing injury risk and occurrence.

A limitation of our study was that most of our study group were from urban settings with similar socioeconomic conditions. Thus we could not compare influences of the pandemic in children with burn injuries from rural areas with different socioeconomical status. The effects of the pandemic on rural areas with different socioeconomical status will require further investigations.

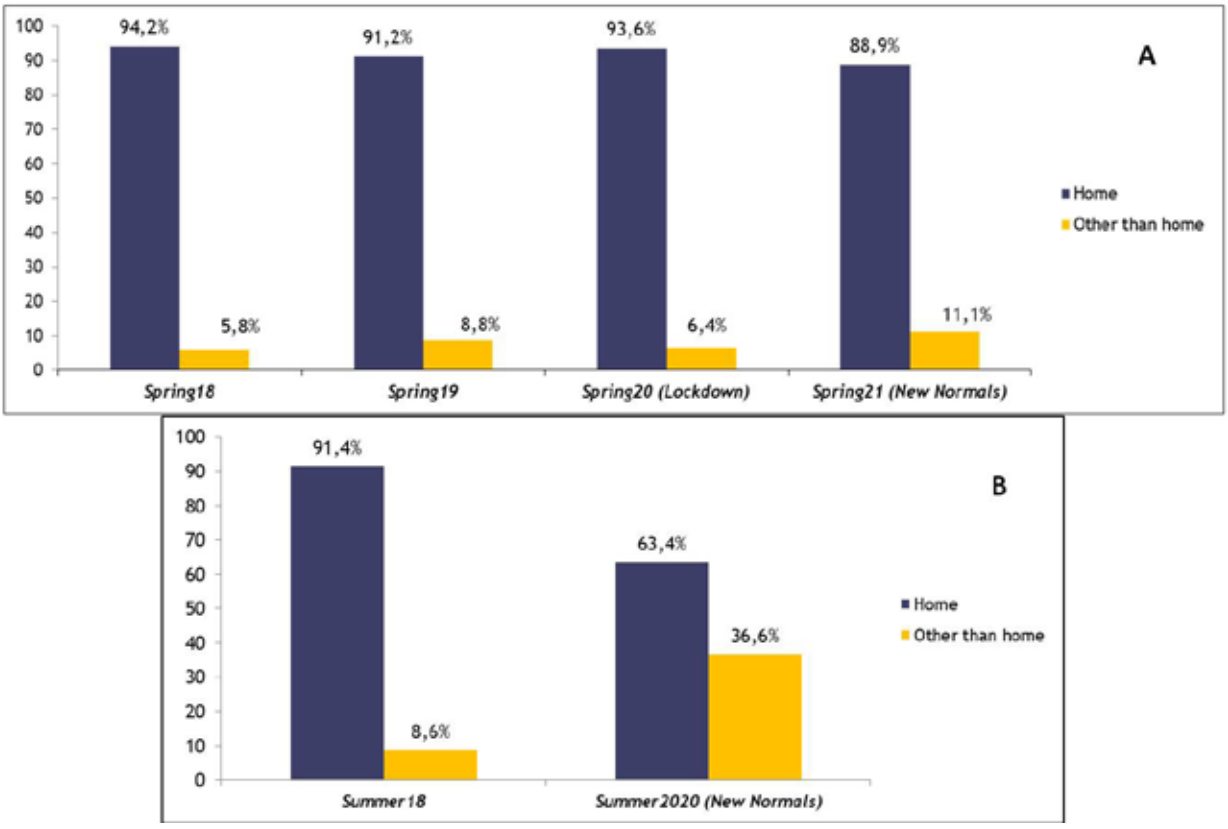
In conclusion, the current new normal period may have influenced features of pediatric burn trauma as much as the lockdown period. Investigations on minor burn injuries may provide useful data on this issue. Data from various regions must be collected to evaluate the real dimensions of the influence of the pandemic on frequency and nature of pediatric burns. These investigations will help guide prevention strategies for burn injuries in the future.

FIGURE 4. Comparisons of Lockdown and New Normal Patients in Group I: Number of Patients and Admission Rates



(A) No significant differences were found between number of lockdown period patients and patients in Group I at similar dates ($P > .05$). **(B)** There was a significant increase in admission rates in the new normal period compared with that shown in previous similar dates ($P < .05$).

FIGURE 5. Comparisons of Lockdown and New Normal Patients in Group I: Place of Burn



(A) Home was the most common environment in the lockdown period, similar to that shown at previous dates ($P > .05$). **(B)** Outdoor burns increased in the new normal period compared with similar dates before the pandemic ($P < .05$).

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