



# COVID-19 pandemic and lockdown: what has changed in common home accidents such as foreign bodies and corrosive injuries?

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## Abstract

**Background** COVID-19 pandemic greatly affected our lives in all areas. Due to the social isolation policies implemented during this period, the majority of parents and all school-age children spent their lives at home. This study aims to investigate the effects of pandemic and isolation on home accidents treated in our center.

**Methods** Foreign body ingestion (gastric foreign bodies: G.FB), foreign body aspiration (respiratory foreign bodies: R.FB), and corrosive substance (CS) ingestion cases admitted to our hospital between March 11, 2019, and March 10, 2021, were retrospectively analyzed. Demographic data, type and cause of home accidents, the time of the accident and the admission to the hospital, the location of the foreign body, and the follow-up data were recorded. The patients were divided into two groups: the pre-pandemic period (11 March 2019–10 March 2020) and the COVID pandemic period (11 March 2020–10 March 2021), and the data were evaluated between two groups as < 6 years old and 6–18 years old.

**Results** During the 2 years, a total of 982 patients were admitted to our hospital for G.FB, R.FB, or CS. Four hundred and eighty-three of them (49.2%) were in the pre-pandemic period and 499 (50.8%) were in the pandemic period ( $p=0.206$ ). The mean age of the patients was  $3.63 \pm 3.32$  years; 82.4% of the patients in the pre-pandemic group and 85.4% of the patients in the pandemic group were children < 6 years old. While the F/M ratio was 1/1.5 during the pre-pandemic period, it was 1/1.1 during the pandemic period. Of the cases, 73.3% were G.FB, 4.6% were R.FB, and 22.1% were CS. Almost half of the accidents occurred between the hours of 16 and 24. During the pandemic period, the accidents increased to occur between 0 and 8 am in children < 6 years old, and between 8 am and 4 pm in children 6–18 years old ( $p=0.003$ ). All of the home accidents in the 6–18 age group between 0 and 8 o'clock were girls ( $p<0.0001$ ). During the pandemic period, the frequency of button batteries and food products increased in G.FB. Also, the frequency of R.FB increased significantly ( $p=0.006$ ) and the most common R.FB was the food products. The frequency of CS increased in girls during the pandemic period, and CSs were brought to the hospital in a shorter time after the accident during the pandemic period ( $p=0.007$ ).

**Conclusions** It can be thought that the main reason why home accidents are common in the 0–6 age group is due to the developmental characteristics of the child rather than the longer time spent at home. The pandemic and isolation increase the frequency of foreign body aspirations and home accidents in girls.

**Keywords** Child · Injury · Home accidents · COVID-19 · Pandemic · Foreign bodies · Lockdown

## Introduction

Home accidents are common in children under the age 6 who spend most of their lives at home. For school-age children, home accidents are more common, especially in the evening hours and on weekends [1]. During the pandemic period, all

of the children and the majority of parents spent most of their times at home due to lockdown policies [2]. The real impact of social distancing and stay-at-home guidelines on home accidents is not yet known. Theoretically, prolonged home isolation could potentially increase the risk of home accidents in children [2–4]. Here, we wanted to investigate this hypothesis based on our hospital data. Our hospital is a tertiary pediatric specialized hospital and continued to serve for non-COVID patients while other hospitals in the region were dedicated to COVID patients. Therefore, patient admissions to our hospital

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continued at similar rates before and after the pandemic. This study aims to investigate the effects of isolation and lockdown on home accidents during the pandemic period. For this purpose, the most common home accidents treated in our department, namely foreign body ingestions, aspirations, and corrosive substance ingestions were evaluated.

## Materials and methods

This is a retrospective review of the database of a tertiary pediatric hospital, and pediatric surgery center to evaluate the impact of COVID-19 on home accidents such as gastrointestinal tract foreign body and corrosive substance ingestions and respiratory tract foreign body aspirations. This study was approved by the Ethics Committee of the University of Health Sciences Turkey, Ankara Dr. Sami Ulus Maternity and Children Health and Research Application Center (2020-KAEK-141/213- E-21/09-206).

All the children between 0 and 18 years old who were admitted to our hospital with gastrointestinal tract foreign bodies (G.FB), respiratory foreign bodies (R.FB), and ingestion of corrosive substances (CS), were included in the study. Patients > 18 years and patients with missing file information were excluded from the study. Demographic data such as the sex and age of the child, the type and cause of the home accident, the time of the accident, the date and time of admission to the hospital, the location of the foreign body, and the exit time of the foreign body were recorded. Since the official start date of the COVID-19 pandemic in our country is accepted 11 March 2020, the data were divided into two groups according to the date: the pre-pandemic period (11 March 2019–10 March 2020) and the COVID pandemic period (11 March 2020–10 March 2021). Since home accidents are more common in the 0–6 age group, the cases were also evaluated by grouping them as younger than 6 years old and 6–18 years old.

The data were evaluated using the SPSS 20 statistical program. Categorical variables were given as frequency and percentage. After checking the compliance of numerical values with a normal distribution, they were expressed as mean  $\pm$  standard deviation or median (minimum–maximum). Categorical variables were evaluated by the chi-square test and Fisher's exact test, and numerical variables were evaluated by the Student's *t* test or Mann–Whitney *U* test. *p* values < 0.05 were considered significant.

## Results

A total of 982 pediatric patients were admitted to our hospital for G.FB, R.FB, and CS, in these two years. Of those, 483 (49.2%) were in the pre-pandemic period, and 499 (50.8%) were in the pandemic period. The mean age

of the patients was  $3.63 \pm 3.32$  years, 553 boys (56.3%), and 429 girls (43.7%). In the pre-pandemic period, 289 of the patients were boys (60%), 194 were girls (40%), while 264 of the patients in the pandemic period were boys (53%) and 235 were girls (47%) ( $p=0.029$ ). Seven hundred and twenty (73.3%) of them were admitted to the hospital for G.FB, 45 (4.6%) for R.FB, and 217 (22.1%) for CS. The time of the accident was unknown in 162 of the cases (16.5%). Accidents had occurred between 0 and 8 o'clock in 35 cases (3.6%), between 8 and 16 o'clock in 327 cases (33.3%) and between 16 and 24 o'clock in 458 cases (46.6%) (Table 1). The median time passed from the accident to the hospital admission was 3 h (1–192 h) in the pre-pandemic group and 2 h (1–168 h) in the pandemic group ( $p=0.179$ ). The median time of hospital admission was 2 h (1–192 h) in G.FB, 18 h (1–96 h) in R.FB, and 2 h (1–72 h) in CS ( $p < 0.0001$ ).

The mean age of the patients was  $3.8 \pm 3.54$  years in the pre-pandemic period and  $3.47 \pm 3.1$  years in the pandemic period ( $p=0.124$ ). Although there was an increase in accident rates in the 0–6 age group during the pandemic period (82.4% and 85.4%), the difference was not statistically significant. While 62.6% of the patients < 6 years old were boys during the pre-pandemic period, there were almost similar rates were found between boys and girls in the 6–18 age group ( $p=0.008$ ). On the other hand, during the pandemic period, the ratio of girls to boys in the < 6 age group was similar. During the pandemic period, there was an increase in accident rates between the 0 and 8 o'clock period in the < 6 years group and between 8 and 16 o'clock in the 6–18-year group compared to the pre-pandemic period. All of the children in the 6–18-year group who had home accidents between 0 and 8 o'clock were girls.

The time of home accident rates decreased slightly between 16 and 24 o'clock during the pandemic period and increased at a similar rate between the 0 and 8 o'clock (3.5–5.1%), but the difference was not statistically significant ( $p=0.506$ ). When the patients were grouped according to accident types, there was no difference between the groups in terms of the age of the child and the time of the accident. (Table 1). While the duration of admission to the hospital was similar in G.FB and R.FB, CS was admitted within a median of 3 h (1–72 h) during the pre-pandemic period and within a median of 2 h (1–10 h) during the pandemic period. The difference was statistically significant ( $p=0.007$ ).

The most common G.FBs were household items such as pins, safety pins, beads, and earrings ( $n=268$ , 32.7%), followed by coins ( $n=215$ , 29.9%) and toy pieces ( $n=113$ , 15.7%). Button batteries were detected in 58 cases (8.1%), food products such as bony meat in 41 cases (5.7%), and magnets in 25 cases (3.5%). It was determined that the frequency of button batteries ( $n=20$ , 34.5% vs.  $n=38$ , 65.5%) and food products such as meat with bones ( $n=13$ , 31.7% and  $n=28$ , 68.3%) increased during the pandemic period

**Table 1** Data of patients during pre-pandemic and pandemic periods

	Pre-pandemic ( <i>n</i> = 483)		Pandemic ( <i>n</i> = 499)		<i>p</i>
	< 6 years	6–18 years	< 6 years	6–18 years	
Home accident, <i>n</i> (%)	398 (82.4%)	85 (17.6%)	426 (85.4%)	73 (14.6%)	0.206
Gender					
Male	249 (62.6%)	40 (47.1%)	218 (51.2%)	46 (63%)	0.602
Female	149 (37.4%)	45 (52.9%)	208 (48.8%)	27 (37%)	
Accident type					
G.FB	285 (71.6%)	72 (84.7%)	303 (71.1%)	60 (82.2%)	0.006
R.FB	9 (2.3%)	1 (1.2%)	31 (7.3%)	4 (5.5%)	
CS	104 (26.1%)	12 (14.1%)	92 (21.6%)	9 (12.3%)	
Event time (o'clock)					
0–8	8 (2.4%)	6 (9%)	16 (4.5%)	5 (8.3%)	0.003
8–16	142 (42%)	19 (28.4%)	147 (41.4%)	19 (31.7%)	
16–24	188 (55.6%)	42 (62.7%)	192 (54.1%)	36 (60%)	
Accident type/gender					
G.FB	173 M/112F	34 M/38F	152 M/151F	40 M/20F	0.869
R.FB	5 M/4F	0 M/1F	21 M/10F	3 M/1F	1.000*
CS	71 M/33F	6 M/6F	45 M/47F	3 M/6F	0.150
Event time (o'clock)/ gender (M–F)					
0–8	6 M/2F	0 M/6F	9 M/7F	0 M/5F	<0.0001*
8–16	79 M/63F	12 M/7F	82 M/65F	15 M/4F	0.072
16–24	131 M/57F	16 M/26F	95 M/97F	23 M/13F	0.123

Chi-squared test, \*Fisher's exact test

( $p = 0.025$ ). There was no significant difference between the type of ingested substance according to gender ( $p = 0.061$ ). At the time of admission, 3 of the G.FBs were in the mouth (0.4%), 46 (6.4%) were in the esophagus, 191 (26.5%) were in the stomach, 198 (27.5%) were in the intestine, 282 of the foreign bodies (39.2%) could not be located. A total of 74 (10.2%) G.FBs required intervention. FBs were removed by endoscopy in 33 of 46 cases (71%) who presented with esophageal FB. Of the patients with esophageal FB, 5 of them vomited at the time of admission and removed FB, while the others had FB descended to the stomach on the control X-ray. Twenty-nine FBs in the stomach were removed by endoscopy (15.1%). Six intestinal FBs were removed by laparotomy and 3 were removed by colonoscopy (4%)., Other G-FBs (89.8%) spontaneously left the gastrointestinal tract within median 2 (0.3–92) days follow-up. Five of the R.FBs, the localization could not be determined because the patient coughed up FB at the time of admission (11.1%). Of the remaining R.FBs, 2 of them were located in the larynx (4.4%), 19 in the right main bronchus (42.2%), 15 in the left main bronchus (33.3%), and 4 in the left upper lobe bronchus (8.9%). The aspirated substances were food products (82.2%) in 37 patients, and inorganic substances such as toys (17.8%) in 8 patients. The aspirated content was not statistically different in the pre-pandemic and pandemic periods ( $p = 0.661$ ). The most frequently aspirated foreign

bodies were nuts (hazelnuts and peanuts) ( $n = 26$ , 57.7%). Aspiration of the inorganic substances; toys, etc. were more common in girls than boys ( $p = 0.017$ ). The median time of admission to the hospital in R.FB was similar between pre-pandemic and pandemic groups ( $p = 0.685$ ).

The ingested agents in the CSs were; 88 bleach, 48 dishwasher rinse aids, 30 drain cleaners, 18 surface cleaners, 14 descalers, 10 degreasers, 8 batteries, and one automobile battery water. The median time to hospital admission in CS was 3 h (1–72 h) during the pre-pandemic period and 2 h (1–10 h) during the pandemic period, the difference was statistically significant ( $p = 0.007$ ). The type of ingested corrosive substance is similar in both genders and pre-pandemic/pandemic periods ( $p > 0.05$ ). The frequency of CS in girls increased significantly during the pandemic period (from 33.6% to 52.5%;  $p = 0.005$ ).

## Discussion

Accidental injury is one of the leading causes of preventable mortality and morbidity among children and youth. Especially children and individuals over age 65 are mostly injured at home or in their near surroundings. According to the literature 91% of unintentional injuries occur in or around children's homes, where they need to feel safer [5].

The most common types of injuries are foreign bodies, poisoning, falling, drowning, and burns [5, 6]. It has been determined that 55% of the victims of home accidents are pre-school children [7]. Children younger than 6 years old were 84% of the cases in our study, although this rate is higher than the literature, it was thought that this situation could be attributed to the fact that only three types of home accidents were evaluated in our study.

As it is known, from the age of 6 months, children tend to recognize the objects around them by putting them in their mouths, which is one of the most important reasons for home accidents such as FB aspiration, swallowing, and drinking corrosive substances. The home contains many potential hazards for the child who starts to do various physical activities such as walking, running, and climbing furniture and stairs from the age of one. Although foreign body ingestion can be seen at any age, it is more common in infants who tend to recognize the surrounding objects by putting them in their mouths, and toddlers who have more accidental foreign body ingestion. The most frequently ingested foreign bodies can be listed as coins, toys, magnets, and batteries [8]. In our study, the most frequently ingested foreign bodies were household items such as pins and earrings, coins, and toy pieces, respectively. Most of the ingested foreign bodies pass the gastrointestinal tract spontaneously (80–90%) and leave the body without causing mortality or morbidity [9]. Similar to the literature, 89.8% of G.FBs in our study left the gastrointestinal tract without any intervention.

Aspiration of foreign bodies into the respiratory tract is one of the serious home accidents that can be life-threatening and even fatal. In the USA, death from foreign body aspiration is reported to be the leading cause of death from unintentional injury in children younger than 1 year old [8]. Accidental ingestion of corrosive substances may cause severe burns in the esophagus and stomach, and serious morbidities that may require repeated interventions and operations due to life-threatening conditions such as esophagus/stomach perforation, and stenosis that may develop in the esophagus and stomach [10]. G.FBs, on the other hand, includes a wide spectrum from situations that require emergency intervention, depending on the nature of the ingested foreign body, such as batteries in the esophagus, to the cases where the foreign bodies pass the entire gastrointestinal tract spontaneously and only intermittent outpatient controls are required [8, 9]. According to TUIK (Turkish Statistical Institute), 2020 data, external causes of injury and poisoning took the first place in childhood deaths with a rate of 20.8% [11]. In their study Aşirdizer M, et al. found that 26% of the deaths in children under the age of 18 were due to home accidents. It has been determined that 4.1% of deaths due to home accidents occur as a result of aspiration of a FB to the respiratory tract [7]. The most satisfactory result of our

study is that there was no death due to the aforementioned home accidents.

During the pandemic period, it can be thought that most of the wrong and incomplete information, which can be easily accessed on television, newspapers, and social media, whose source is not clear and does not contain expert opinion, may have affected the admission of patients to the hospital. In the literature, it has been reported that concerns about exposure to the virus in hospitals may cause delayed admission of patients to the hospital and delayed treatment that should be applied [12]. However, our study showed that the duration of admission to the hospital after a home accident did not change during the pandemic period, and even the duration of admissions due to CS was significantly shortened.

The results of this study showed that there was a slight increase in home accidents in children during the pandemic period, and this increase was in the < 6 age group (82.4% versus 85.4%) instead of 6–18 years old children who had to stay at home. For this reason, it can be thought that the main reason for home accidents is due to their developmental characteristics rather than the spending more time at home in the 0–6 age group. It is reported in the literature that home accidents are more common in boys [8]. Similarly, in our study, home accidents were found to be higher in boys, but it was found that the frequency of home accidents in girls increased significantly during the pandemic period (F/M ratio pre-pandemic 1/1.5-pandemic 1/1.1). In our study, it was determined that foreign body aspirations increased up to 3 times during the pandemic period. It was thought that this might be a result of the more time spent at home with the whole family together due to social isolation and lockdown, and possibly the increased consumption of nuts such as hazelnuts/pistachios during these times. Chaveepojnkamjorn et al. reported that most of the injuries occurred between 16.00 and 19.00 h (32.2%) [13]. In our study, it was determined that most of the accidents occurred between 16 and 24 o'clock, similar to the literature. It was found that there was an increase in home accidents between 0 and 8 o'clock during the pandemic period, which was thought to be the result of children probably staying awake until later hours.

Our study has limitations as it is a retrospective review of electronic medical records and includes the experiences of a single center. Long-term home isolation is expected to potentially increase the risk of home accidents in children. However, our study showed that home accidents in children during the COVID-19 pandemic were at similar rates to the pre-pandemic period. This may suggest that adults are paying more attention to their children than usual, especially because of increased health concerns due to the pandemic. One other limitation is that we have not investigated the number of siblings in each house which may also be a contributing factor in the ratio of home accidents.

Pediatric surgery emergency conditions are not limited only to accidents. The continuity of the treatments in special cases such as newborns, acute abdomen, and tumors is also important. We believe that it is important to identify regional "clean" hospitals where families can safely take their children for their treatments during pandemic quarantine periods. Based on what we learned from the COVID-19 pandemic, which is defined as the most important global health crisis of our time, it may be possible to alleviate the anxiety of families about the pandemic by informing them through social media, television, and press during the pandemic period and also informing parents that their children will be examined in non-pandemic areas may prevent possible delays in treatments.

**Author contributions** ÖB: Data Collections and patients follow-up, wrote the main manuscript, language editing AK: Study planning, statistical analyses, wrote the main manuscript BK: Data collection ÖÇ: Data Collections and patients follow-up NA: Data Collections and patients follow-up AT: Data Collections and patients follow-up CDK: Study design, Data Collections and patients follow-up İFÖ: Study planning, manuscript preparation and review İK: Study planning, manuscript preparation and review

## Declarations

**Conflict of interest** The authors declare that there is no conflict of interest regarding the publication of this article.

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