Childhood accidents treated in a Brazilian prehospital service during the COVID-19 pandemic

Acidentes na infância atendidos em um serviço pré-hospitalar brasileiro na pandemia da COVID-19

Accidentes infantiles atendidos en un servicio prehospitalario brasileño durante la pandemia de COVID-19

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Abstract

Objective: To characterize accidents involving children and adolescents attended by the Mobile Emergency Care Service (SAMU) - Campo Grande before and during the COVID-19 pandemic.
Methods: This was a descriptive, exploratory, cross-sectional and quantitative study carried out at the SAMU in the municipality of Campo Grande, Mato Grosso do Sul. The non-intentional sample consisted of 1,544 accidents involving children and adolescents between March and December 2019 (n=823) and the same period in 2020 (n=721). Data was collected from the service's physical and electronic medical records and analyzed using descriptive and inferential statistics.
Results: Accidents involving children and adolescents accounted for 29.1% of care provided in 2029 and 31.6% in 2020. In both periods, there was a predominance of accidents among adolescents (p<0.001) and among male children. Traffic accidents, falls and trauma were the most frequently recorded types of accident in both years (p=0.003).
Conclusion: The analysis of data from 2019 and 2020 highlights a significant increase in accidents involving children and adolescents in 2020, especially during the months of social isolation. There have been changes in the profile of accidents, with an increase in cases at home, at night, airway obstruction, poisoning and burns.

Keywords
Pediatric nursing; Accidents; Child; Pandemics

Resumo

Objetivo: Caracterizar os acidentes com crianças e adolescentes atendidos pelo Serviço de Atendimento Móvel de Urgência (SAMU) - Campo Grande antes e durante a pandemia da COVID-19.
Métodos: Estudo descritivo, exploratório, transversal e quantitativo, realizado no SAMU do município de Campo Grande, Mato Grosso do Sul. A amostra não-intencional foi composta por 1.544 acidentes ocorridos com crianças e adolescentes nos meses de março a dezembro de 2019 (n=823), e no mesmo período de 2020 (n=721). Os dados foram coletados a partir de prontuários físicos e eletrônicos do serviço, analisados segundo estatística descritiva e inferencial.
Resultados: Os acidentes com crianças e adolescentes corresponderam a 29,1% dos atendimentos realizados em 2029, e a 31,6% em 2020. Nos dois períodos, foi identificada predominância de acidentes entre adolescentes (p<0,001) e entre crianças do sexo masculino. Acidentes de trânsito, quedas e traumas configuraram os tipos mais frequentemente registrados em ambos os anos (p=0,003).
Conclusão: A análise dos dados de 2019 e 2020 destaca um aumento significativo nos acidentes envolvendo crianças e adolescentes em 2020, especialmente durante os meses de isolamento social. Houve mudanças no perfil dos acidentes, com aumento de casos domiciliares, noturnos, obstrução das vias aéreas, intoxicações e queimaduras.

Descritores
Enfermagem pediátrica; Acidentes; Criança; Pandemias

Resumen

Objetivo: Caracterizar los accidentes de niños y adolescentes atendidos por el Servicio Móvil de Atención de Emergencias (SAMU) - Campo Grande antes y durante la pandemia de COVID-19.
Métodos: Estudio descriptivo, exploratorio, transversal y cuantitativo, realizado en el SAMU de la ciudad de Campo Grande, Mato Grosso do Sul. La muestra no intencional estuvo compuesta por 1.544 accidentes ocurridos con niños y adolescentes de marzo a diciembre de 2019 (n=823), y en el mismo periodo de 2020 (n=721). Los datos fueron recolectados de los registros físicos y electrónicos del servicio, analizados mediante estadística descriptiva e inferencial.

Descriptores
Enfermería pediátrica; Accidentes; Niño; Pandemias

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Resultados: Los accidentes que involucran a niños y adolescentes correspondieron al 29,1% de la atención prestada en 2029, y al 31,6% en 2020. En ambos períodos, se identificó predominio de los accidentes entre los adolescentes (p<0,001) y entre los niños del sexo masculino. Los accidentes de tránsito, caídas y traumatismos fueron los tipos más frecuentemente registrados en ambos años (p=0,003).
Conclusión: El análisis de los datos de 2019 y 2020 destaca un aumento significativo de los accidentes que involucran a niños y adolescentes en 2020, especialmente durante los meses de aislamiento social. Hubo cambios en el perfil de la accidentalidad, con aumento de casos en el domicilio, nocturnos, obstrucción de las vías respiratorias, intoxicaciones y quemaduras.

Introduction

Childhood accidents constitute a public health problem because they are one of the leading causes of morbidity and mortality in this age group. They also represent a challenge for the country's economy, accounting for approximately 25% of the causes of morbidity and mortality in Brazil.[1] These accidents are unintentional traumatic events that cause physical and/or psychological harm and the determining factors related to their occurrence are associated with unfavorable environmental conditions, risk behaviors, and lack of preventive measures.[2]

In the Brazilian context, accidents emerge as the leading cause of mortality in children aged 1-14 years and occur predominantly in the family home or nearby. Note that approximately 90% of them could be avoided with the implementation of simple prevention strategies.[3]

Among childhood accidents, traffic accidents and drowning have the highest morbidity and mortality rates, followed by suffocation, burns, falls, and poisoning. The types of accidents also vary in terms of the place of occurrence, which can be outdoors and at home, highlighting the need to evaluate both places of occurrence in 2019 and 2020.[4]

Amid the pandemic triggered by the SARS-CoV-2 Coronavirus (COVID-19), measures were adopted to contain the spread of the virus and mitigate the health system burden, with emphasis on social distancing and restricted movement. This context imposed the need to reorganize routines, adapt to restrictions, and reduce social interaction, including the suspension of school activities. This change had adverse impacts on the social development, health, and physical and mental integrity of young people, exposing them to domestic risks, accidents, violence, and other adversities.[5]

Before the start of the pandemic, domestic accidents were more frequent in children under 6 years of age, who generally spent most of their time at home. With the implementation of social isolation policies as a measure to control the spread of the virus, children in other age groups began to spend more time at home.[6] This new reality raises the need to think about possible consequences resulting from the isolation measures implemented regarding the rates of childhood accidents and their profile. The aim of this study was to characterize accidents involving children and adolescents treated by the Mobile Emergency Care Service (SAMU) - Campo Grande before and during the COVID-19 pandemic.

Methods

This is a descriptive, exploratory, cross-sectional and quantitative study systematized by the guidelines of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE). The study was conducted at the SAMU in the city of Campo Grande, Mato Grosso do Sul, which has four Advanced Support Units (USA), 10 Basic Support Units (UBS) and one motorcycle ambulance that serve the capital and the districts of Anhanduí and Rochedinho. According to the Brazilian Institute of Geography and Statistics, the population of Campo Grande in 2022 was 898,100 inhabitants.[7] SAMU Campo Grande receives, on average, 397 thousand calls per year, of which approximately 5 thousand are related to pediatric care.

The non-probabilistic intentional sample was composed of records of accidents involving children and adolescents aged zero to 18 years between March and December 2019 and the same period in 2020. The period selected was justified by the implementation of restrictive measures related to the first cases of COVID-19 in Brazil. A total of 823 records related to 2019 and 721 occurrences in 2020 were included, comprising a sample of 1,544 accidents.

Records of incidents related to domestic violence, medical records with incomplete information — such

as lack of age or description of the accident — and records marked as QTA ("disregard last message"), which correspond to canceled appointments, were excluded.

An accident was defined as an unintentional traumatic event that causes physical and/or psychological harm.[2] Data were collected between July and November 2022, from physical and electronic medical records of the service, through a structured questionnaire containing the following variables: date of occurrence, age, gender, type of accident (fall, trauma, airway obstruction, poisoning, venomous animals, burns, electric shock, traffic accident, drowning, venomous animal bite, injuries and others), location of the accident, month of occurrence, day of the week, time of occurrence, type of care, response time, and region of occurrence.

A database was organized in Microsoft Excel 2016®, and descriptive and correlation analyzes were performed. Categorical variables were described by means of absolute and relative frequencies, and quantitative variables by means of measures of central tendency. The Chi-square and Fisher's exact tests were used in correlation analysis, adopting a significance level of 5%.

The study was approved by the Research Ethics Committee of the Universidade Federal do Mato Grosso do Sul (UFMS) under opinion number 4.407.818 and Certificate of Presentation of Ethical Appreciation 34295120.1.0000.0021. The provisions of Resolution 466/12 of the National Health Council were complied with at all stages of the study.

Results

Between March and December 2019, 2,824 clinical-pediatric emergency calls were recorded at the SAMU - Campo Grande, of which 823 (29.1%) corresponded to accidents involving children and adolescents. In 2020, accidents accounted for 31.6% (n=721) of the 2,284 calls recorded. There was no relationship between the occurrence of accidents and the year analyzed (p=0.06). In both periods, a predominance of accidents among adolescents (p<0.001) and among male children (p=0.609) was identified. Accidents occurred mainly during the day (p=0.015), in external environments (p<0.001) and required primary care (p<0.001) *(Table 1).*

Table 1. Characterization of care service for accidents involving children and adolescents at the SAMU

Characteristics	2019 n(%)	2020 n(%)	*p-value*
Age			
Up to 1 year	103(12.5)	135(18.8)	<0.001
1 - 6 years	215(26.2)	202(28.1)	
6 - 12 years	149(18.1)	136(18.9)	
> 12 years	354(43.1)	245(34.1)	
Gender			
Male	507(61.6)	435(60.3)	0.609
Female	316(38.4)	286(39.7)	
Month			
≤5 months (March - July)	357(43.4)	367(50.9)	0.003
>5 months (August - December)	466(56.6)	354(49.1)	
Day of the week			
Monday to Friday	581(70.6)	529(73.4)	0.226
Weekend	242(29.4)	192(26.6)	
Period			
Day	499(62.1)	368(54.0)	0.015
Evening/Late at night	305(37.9)	313(46.0)	
Region			
Center	79(9.8)	49(6.9)	0.127
Another region	709(88.2)	644(91.2)	
Districts	16(2.0)	13(1.8)	
Location			
Home	235(30.2)	279(42.0)	<0.001
Outdoor environment	543(69.8)	386(58.0)	
Type of service			
Primary	716(87.1)	568(78.8)	<0.001
Secondary	106(12.9)	153(21.2)	
Response time			
Up to 20 min	629(88.1)	511(88.0)	0.937
> 20 min	85(11.9)	70(12.0)	
Type of vehicle			
Basic	665(80.8)	585(81.1)	0.867
Advanced	158(19.2)	136(18.9)	

There was a statistically significant difference in the type of accident in the periods analyzed. Traffic accidents, falls and traumas were the most frequently recorded types in both years (p=0.003) *(Table 2).*

Although accidents, falls and traumas prevailed, there was a decrease in their frequency in 2020 compared to 2019, while there was an increase in the occur-

Table 2. Frequency of types of accidents involving children and adolescents treated at the SAMU

Type of accident	2019 n(%)	2020 n(%)	p-value
Traffic accident	267(32.4)	194(26.9)	0.003
Drowning	8(1.0)	16(2.2)	
Venomous animals	10(1.2)	11(1.5)	
Electric shock	3(0.4)	4(0.6)	
Injuries	33(4.0)	33(4.6)	
Poisoning	32(3.9)	42(5.8)	
Animal bite	2(0.2)	10(1.4)	
Foreign Body Airway Obstruction (FBAO)	68(8.3)	87(12.1)	
Fall	258(31.3)	196(27.2)	
Burn	13(1.6)	19(2.6)	
Trauma	122(14.8)	101(14.0)	
Others	7(0.9)	8(1.1)	
Total	823(100)	721(100)	

rence of almost all other types of accidents between the two periods *(Table 2)*. Likewise, there was a significant increase in the occurrence of accidents at home between the periods analyzed, as well as an increase in secondary care *(Table 1)*. Primary data also indicate a longer response time to calls in 2020 (12.81±13.3 minutes) compared to 2019 (12.34±10.3 minutes) although without a statistically significant difference (p=0.808). The partitioning of data indicated a significant association between age groups and types of accident *(Table 3 and 4)*.

In 2019 and 2020, airway obstruction was associated with the age group under 1 year, falls predominated among children aged 1-6 years and 6-12 years, and traffic accidents were related to adolescents *(Tables 3 and 4)*. Additionally, in 2020, traumas were associated with the age group of 1-6 years, and falls were associated with those over 12 years.

Discussion

In this study, accidents involving children and adolescents treated by the SAMU in Campo Grande before and during the COVID-19 pandemic were characterized, revealing a higher proportion of events in 2020 compared to 2019. This trend reflects changes in the pattern of behavior and exposure during the pandemic period, especially due to confinement measures, although the difference between the years was not statistically significant. The prevalence of accidents found in this study is higher than that reported in other studies,[4-8,9] highlighting the relevance of the topic and its local magnitude.

Distinct age patterns were observed, confirming findings in the literature. Adolescents had a higher frequency of traffic accidents, while younger children were more vulnerable to falls and choking.[10,11] In the case of younger children, the home environment stands out as a risky place during confinement, with an increase in episodes related to the ingestion of foreign bodies, poisoning and burns. This pattern was observed in another study in which there was a transition in accident patterns in contexts of social isolation.[12]

Table 3. Correlation between type of accident with children and adolescents treated at the SAMU

Type of accident	Up to 1 year		1 - 6 years		6 - 12 years		> 12 years		*p-value*
	N	%	n	%	n	%	n	%	
Traffic accident	7	8.2	47	28.1	40	35.7	173	64.1	<0.001
Fall	27	31.8	74	44.3	65	58.0	92	34.1	0.013
FBAO	45	52.9	21	12.6	0	-	1	0.4	<0.001
Venomous animals	0	-	3	1.8	5	4.5	2	0.7	0.04
Poisoning	6	7.1	22	13.2	2	1.8	2	0.7	<0.001
Total	85		167		112		270		

Table 4. Correlation between type of accident with children and adolescents treated at the SAMU

Type of accident	Up to 1 year		1 - 6 years		6 - 12 years		> 12 years		*p-value*
	n	%	n	%	N	%	n	%	
Traffic accident	3	2.3	26	14	37	31.4	165	46.9	<0.001
Fall	34	26	55	29.6	49	41.5	107	30.4	<0.001
FBAO	68	51.9	14	7.5	4	3.4	5	1.4	<0.001
Trauma	9	6.9	52	28	15	12.7	40	11.4	<0.001
Poisoning	10	7.6	23	12.4	3	2.5	9	2.6	0.001
Drowning	6	4.6	10	5.4	0	-	0	-	<0.001
Injuries	1	0.8	6	3.2	10	8.5	26	7.4	<0.001
Total	131		186		118		352		

Data from the present study also corroborate the literature by identifying traumas, such as fractures, lacerations and bruises accounting for 21% of pediatric calls to the SAMU. The predominance of male victims,[13] that associate the greater involvement in accidents with culturally encouraged behaviors, such as practices that require strength, speed and impact, in contrast to supervised activities that are more common among girls.[8]

The analysis by age group revealed that children aged 1-4 years have a higher incidence of episodes such as burns, poisoning and ingestion of foreign bodies, while falls, shocks and animal bites are more frequent among children aged 5-9 years. Adolescents, on the other hand, stand out for the high incidence of traffic accidents. These findings highlight the need for preventive strategies targeted at the different stages of child and adolescent development, considering the specificities of each age group.[8-14]

Social and environmental factors also play a crucial role in childhood accidents, including inadequate housing conditions and insufficient supervision by caregivers. These aspects reinforce the need for integrated public policies that prioritize health education, housing improvements and community prevention actions.[15]

Globally, accidents are one of the leading causes of death among children and adolescents, with one million deaths annually attributed to preventable events such as falls, drowning, suffocation, traffic accidents and poisoning. In Brazil, 3,300 children aged 1-14 years have died and another 112,000 children are hospitalized in serious condition as a result of accidents, especially traffic accidents and drowning. These figures reflect the severity of the problem and reinforce the urgency of effective preventive measures, such as environmental changes and public policies aimed at child safety.[16]

In this context, health professionals, especially nurses, play an essential role in promoting safe environments and leading preventive actions. The COVID-19 pandemic has highlighted both the adaptive capacity and the vulnerabilities of emergency services, such as the SAMU. Despite the challenges, the average response time has remained stable, demonstrating the resilience of the service. Nevertheless, the higher frequency of secondary care in 2020 may indicate the need for improvements in the access and support for primary health services.

The results of this study reinforce the importance of investing in education and accident prevention, especially in home settings, and highlight the strategic role of the SAMU in providing data for descriptive and epidemiological studies, which are essential for planning public policies aimed at promoting the safety and well-being of children and adolescents, ensuring rapid and efficient responses even in emergency situations, such as the COVID-19 pandemic.

The limitations of the study include the restriction of the sample to a single SAMU in a Brazilian capital. In addition, the possibility of underreporting in the source of data collection should be considered due to the reduced quality and quantity of the information recorded and incomplete completion of the variables in the notification forms. These factors highlight the need for improvements in accident recording systems.

Conclusion

There was a higher proportion of accidents involving children and adolescents in 2020 compared to 2019, and a higher prevalence than that identified in the literature. The events occurred predominantly among male adolescents and children during the day and in outdoor environments, requiring primary care. Recognizing these changes favors the development of strategies that promote a safe environment and the healthy development of children and adolescents, especially given the changes in the profiles of child accidents over time.

Collaborations

Gonçalves MFMP, Souza IS, Barros ISP, Anacleto ASCB, Fogaça KS, Luizari MRF, Marques FRB and Marcheti MA declare that they contributed to the design of the study, collection, analysis and interpretation of data, writing of the article, relevant critical review of the intellectual content and approval of the final version to be published.

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