

# Domestic Accidents in Under-Fives: Epidemiology, Diagnosis, Management, and Outcomes

Florent Tshibwid A. Zeng<sup>1\*</sup>, Papa Alassane Mbaye<sup>1</sup>, Doudou Gueye<sup>1</sup>, Papa Mamadou Ndoye<sup>1</sup>, Ibrahima Bocar Wellé<sup>1</sup>, Ndeye Fatou Seck<sup>1</sup>, Mbaye Fall<sup>2</sup>, Ndeye Aby Ndoye<sup>1</sup>, Aloïse Sagna<sup>1</sup>, Oumar Ndour<sup>2</sup>, Gabriel Ngom<sup>1</sup>

<sup>1</sup>Department of Pediatric Surgery, Albert Royer National Children's Hospital Centre, Université Cheikh Anta Diop, Dakar, Senegal

<sup>2</sup>Department of Pediatric Surgery, Aristide Le Dantec University Teaching Hospital, Université Cheikh Anta Diop, Dakar, Senegal

Email: \*tshibwidflo@gmail.com

**How to cite this paper:** Zeng, F.T.A., Mbaye, P.A., Gueye, D., Ndoye, P.M., Wellé, I.B., Seck, N.F., Fall, M., Ndoye, N.A., Sagna, A., Ndour, O. and Ngom, G. (2022) Domestic Accidents in Under-Fives: Epidemiology, Diagnosis, Management, and Outcomes. *Open Journal of Pediatrics*, 12, 726-736.

<https://doi.org/10.4236/ojped.2022.125074>

**Received:** August 20, 2022

**Accepted:** October 25, 2022

**Published:** October 28, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Introduction:** Domestic accidents are a public health problem, and under-fives are particularly affected. We report these accidents' epidemiology, diagnosis, management, and outcomes through this study. **Patients and Methods:** We conducted a prospective descriptive study for four months in the Albert Royer National Children's Hospital Center pediatric surgery department in Dakar, Senegal. Of the 149 cases of domestic accidents, 109 were included in this study. **Results:** Infants (59.6%) were the most affected, with a slight male predominance (50.5%). Accidents occurred on Tuesday in 22.9% of cases and the afternoon in 38.5% of cases. Playing (59.6%) was the main activity, and falling (44%) was the most found mechanism. 78.9% of accidents occurred in the house, with the bedroom (27.5%) being the most represented place. In most cases (67.9%), the consultation was done within the first 24 hours. The upper limbs (48.6%) were the most affected, and fractures (31.2%) were the most frequent injuries. The outcomes were unremarkable in 94.5% of cases, as complications occurred in five patients with three who had an infection, one a persistent limping, and the last, a dental avulsion. No mortality was recorded. **Conclusion:** Domestic accidents among under-fives are frequent in our environment. Compared to those in older children, they occur similarly in both sexes, more often in the bedroom, and have a better prognosis.

## Keywords

Domestic Accidents, Under-Fives, Infants, Preschool Children, Senegal

## 1. Introduction

Injuries are the leading cause of death worldwide, thus being a public health problem [1]. It is estimated that 10 million children are victims of trauma and 10% die each year [2]. Everyday life accidents are unintentional traumas that can occur in different locations. Those occurring in or around the house are domestic accidents (DAs) [3]. Generally considered a safe place, the house is not necessarily so since most children experience their first trauma there [4].

In high-income countries (HICs), measures are implemented to reduce these accidents in the pediatric population so that morbidity and mortality from DAs in children are more frequent in low-income countries (LICs), where few preventive measures are applied [5]. These accidents mainly affect the under-fives [6] [7] [8] [9] [10]. This is mainly linked to the specificity of psychomotor development in this age group with the learning of walking, the narrowness of the visual field, and the exploration of the environment, which is potentially dangerous [11].

Several studies have assessed the extent of the problem in Senegal, confirming the higher frequency among under-fives [12] [13] [14]. However, no study on this age group has been carried out in our environment, which justifies the present study, aiming to describe under-fives DAs' sociodemographic, diagnostic, therapeutic, and evolutionary aspects.

## 2. Patients and Methods

We conducted a prospective cross-sectional descriptive study within the Albert Royer National Children's Hospital Centre (ARNCHC), Senegal's main pediatric surgery department. The hospital is located in Dakar and serves the pediatric population coming from the 14 regions of Senegal and those from some neighboring countries such as Mauritania, Guinea, and the Gambia.

The study extended over four months (from October 2019 to January 2020) and considered under-five patients who consulted at the emergency for a DA, defined as any non-intentional trauma occurring at home or its immediate neighboring [3]. Patients whose parents did not give consent to participate were excluded.

The data were collected on a pre-established survey form. The parameters considered in this study were sociodemographic (age, sex, schooling, rank and number of children in the siblings, professional activities of the parents, place, date and time of the accident, activity at the time of the accident, date of consultation, mode of transport and recruitment), diagnostic (nature and topography of the injury), therapeutic (treatment, hospitalization, referral) and evolutionary (healing, complications, sequelae, death). The data were encoded on an Excel spreadsheet (Microsoft Office™ 2010) and analyzed with EpiInfo 7.2™. The quantitative data were presented as frequencies.

We included all patients managed at our department during the study period for DA. All patients whose parents or tutors did not consent to participate in the

study were excluded. Among 149 patients managed for DA, 40 were excluded.

Our study received authorization from our Institutional Ethics Committee, and for each patient included, informed consent was obtained from their parents.

### 3. Results

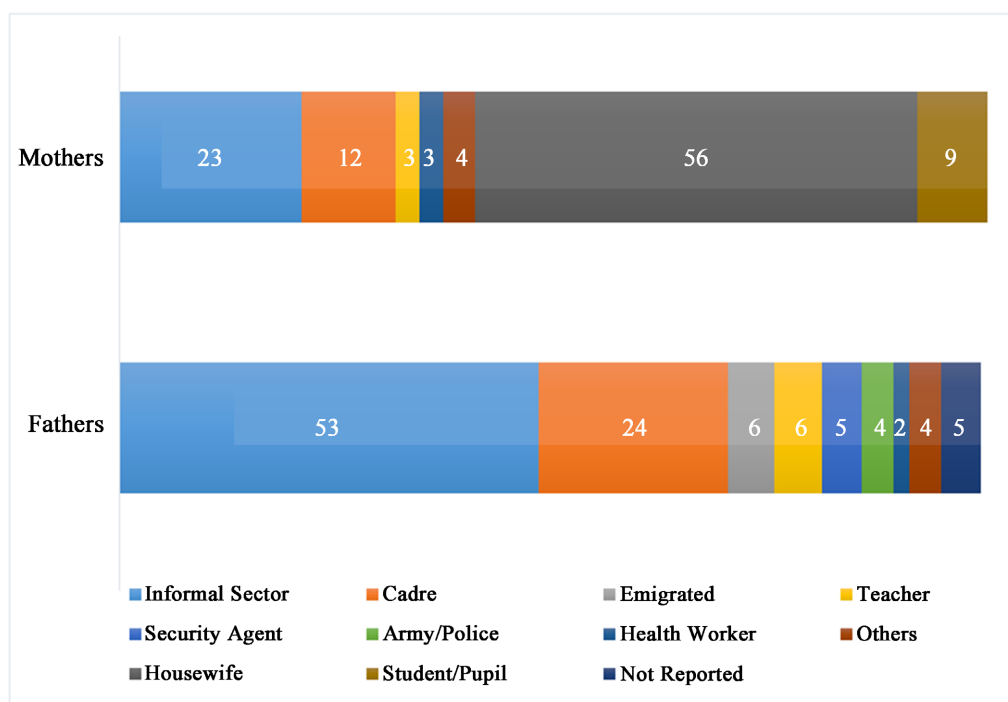
During our study period, 405 consultations were made in our emergency department, including 149 concerning DAs in under-five patients, *i.e.*, a frequency of 36.8% of the emergencies, with 37 cases per month. Forty parents declined to participate in our study, so 109 patients were included.

Among our patients, 55 were males (50.46%), with a sex ratio of 1.02. Sixty-five (59.6%) were infants, and 76 patients (69.7%) were not schooled. Regarding the rank of the siblings, there were 38 elders (34.9%). One-child siblings were found in 33 patients (30.3%). Sociodemographic data are summarized in **Table 1**.

According to the mother's profession, 56 cases (51.4%) were homemakers, and for the fathers, 53 (48.6%) worked in the informal sector, as detailed in **Figure 1**.

**Table 1.** Sociodemographic characteristics of patients.

Variable	Number	Percentage
<b>Sex</b>		
Male	55	50.5
Female	54	49.5
<b>Age category</b>		
Neonate	1	0.9
Infant	65	59.6
Preschool	43	39.5
<b>Schooled</b>		
Yes	33	30.3
No	76	69.7
<b>Ranking among siblings</b>		
Elder	38	34.9
Second	29	27.5
Third	20	18.3
Fourth	14	12.8
Fifth	4	3.8
Above fifth	3	2.7
<b>One-child siblings</b>		
Yes	33	30.3
No	76	69.7



**Figure 1.** Representation of cases according to the parental profession.

About the circumstances of the accident, they occurred on Tuesday in 25 patients (22.9%) and the afternoon in 42 cases (38.5%). Playing was the activity at the time of the accident in 65 cases (59.6%), and falling was found in 48 patients (44%). These elements of the circumstances of the accident are reported in **Table 2**.

The accident occurred in the house in 86 patients (78.9%) and its immediate surroundings in 23 cases (21.1%). The bedroom was the place of accident in 30 patients (27.5%). The places where the accident occurred are shown in **Figure 2**.

For the clinical aspect, concerning the consultation time, 74 patients (67.9%) reached our department within the first 24 hours following the accident, 11 (10.1%) between 24 and 48 hours, 10 (9.2%) between 48 and 72 hours, and 14 (12.8%) after 72 hours. Fifty-seven patients (52.3%) came directly from home, and 52 patients (47.7%), were referred. The used means of transportation were the taxi for 71 patients (64.1%), the family vehicle for 28 patients (25.7%), public transport for eight patients (7.3%), and the ambulance in 2 cases (1.8%).

Concerning injuries, the upper limbs were affected in 53 patients (48.6%). Note that multiple lesions were reported in 17 patients (15.6%). There were fractures in 34 patients (31.2%) among the diagnoses reported, including 14 in the upper limbs and 10 in the lower limbs, and ten thoracic. The diagnostic data are summarized in **Table 3**.

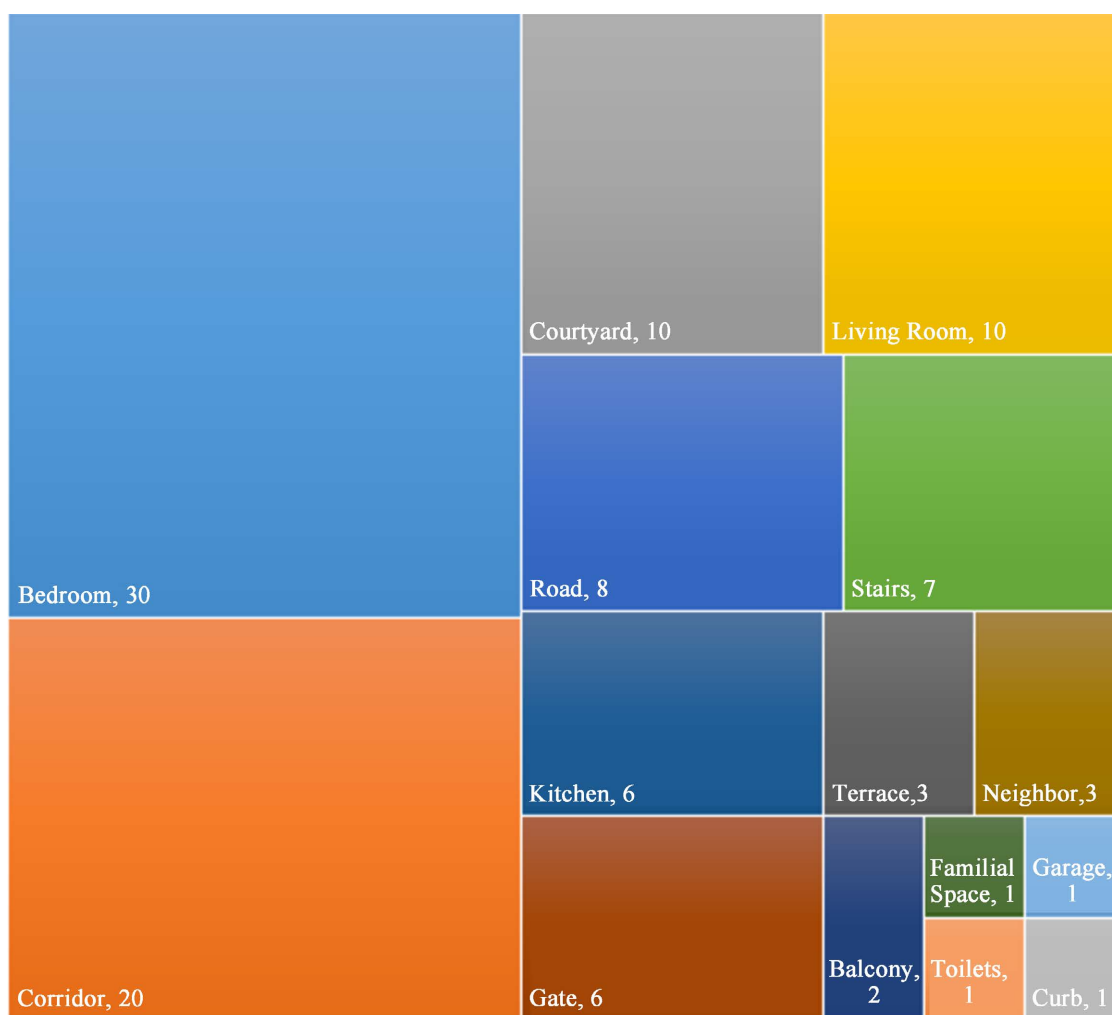
Management required hospitalization for 11 patients (10.1%), including eight cases of thermal burns and three cases of fracture. The treatment was medical and orthopedic for 59 patients (54.2%), solely medical for 33 patients (30.3%), and medical and surgical for 14 patients (12.8%). Two patients were not treated due to parental denial of consent, and one was referred to the neurosurgery de-

partment for further care.

The outcome was unremarkable in 103 patients (94.5%), one referred to the neurosurgery department, and five (4.6%) presented complications, including infection in three patients, persistent limping, and dental avulsion in one patient each.

**Table 2.** Elements of the circumstances of domestic accidents.

Variable	Effective	Percentage
<b>Day</b>		
Monday	10	9.2
Tuesday	25	22.9
Wednesday	16	14.7
Thursday	10	9.2
Friday	12	11
Saturday	20	18.3
Sunday	16	14.7
<b>Period</b>		
Morning	26	23.8
Afternoon	42	38.5
Evening	37	33
Night	5	4.6
<b>Activity during the accident</b>		
Playing	65	59.6
Walking	8	7.3
Carried by another person	8	7.3
Massage	6	5.5
Sitting	6	5.5
Sleeping	5	4.6
Pica	4	3.7
Others	7	6.4
<b>Mechanism</b>		
Fall	48	44
Burn	25	22.9
Limb traction	16	14.7
Crushing	10	9.2
Object/Caustic Ingestion	4	3.8
Wound	3	2.7
Others	3	2.7



**Figure 2.** Distribution of patients by place of occurrence of the domestic accident.

**Table 3.** Distribution of patients according to lesions and their topography.

Variable	Number	Percentage
<b>Topography of injuries</b>		
Upper limbs	53	48.6
Multiple lesions	17	15.6
Lower limbs	14	12.8
Thorax	11	10.1
Head	7	6.4
Abdomen	2	1.8
Others	5	4.6
<b>Injuries</b>		
Fracture	34	31.2
Burn	25	22.9
Contusion	17	15.6

**Continued**

Nursemaid's elbow	15	13.8
Wound	14	12.4
Non complicated digestive foreign body	4	3.8

**4. Discussion**

Domestic accidents among under-fives are frequent events [8] [9] [10]. Our series reported a frequency of 37 cases per month. This is greater than a previous study in our department, where DAs among under-fives had a monthly frequency of 6 cases [14]. A Nigerian study reported an in-hospital frequency of 20 cases per month [2], similar to another local study, which reported 18 cases per month [12]. The higher frequency in our series is justified by the prospective nature of our study, on the one hand, and the other hand, by the fact that we are the main pediatric surgery department in Senegal.

Our series did not demonstrate a clear male predominance as reported by other authors, where the clear male predominance is classic in all DAs among children (from 0 to 15 years old) [12] [14] [15] [16] [17]. This difference could be related to the fact that we only considered the under-fives. Authors have shown a low male predominance in children under five (sex ratio of 1.25) compared to older children (sex ratio of 3) [8]. The authors who found a male predominance linked it to the more aggressive behavior of boys [18]. Our series showed that two-thirds of the patients were infants. Other studies have shown similar trends [14] [16] [17]. The particularity of psychomotor development in this age group, combining poor motor coordination and the instinct of exploration, exposes this category to DAs [18].

Regarding the rank in the family, the eldest was more affected in nearly a third of the cases. Other authors have reported the same trend in an under-twos study [19]. This could be explained by the young age of the parents, which is also a predisposing factor to DAs [19]. The other explanation would be the lack of supervision of the elders in a family with several children.

Two-thirds of the accidents occurred in the afternoon or evening. Other authors have also reported this tendency, ranging from 60% to 70% [4] [12] [14] [17]. The poor surveillance would justify this since this time interval corresponds to the rest period for adults, most often after household chores. Slightly more than half of the accidents occurred during a play, with falling as the mechanism found in just over half of the cases. Several other studies have reported the same results [3] [8] [12] [14] [17] [20] [21]. This could be related to children having play as their main activity at home. Given the poor motor coordination, falls are frequent [18].

In our series, about three-quarters of DAs occurred in the house, close to the frequencies reported by other authors, around 70% [15]. However, the location of the accident varies between cultures. Considering the Senegalese studies, the occurrence of DAs inside houses is much higher than that reported, varying

from 52.9% to 55.6% [12] [14]. This could be justified because under-fives are less independent and are mostly inside houses. This also shows that the bedroom is the most frequent place for DAs, with just over a quarter of the cases. In studies including all age groups, the most frequent places vary significantly from one country to another: living room [17], kitchen [22], and courtyard [3]. In local studies, the principal places are the surroundings of the house [13] [14] and the courtyard or garden [12].

In our study, fractures are the most frequent injuries, with almost one-third of the cases. These results are identical to local studies, which reported fractures as the first injuries [12] [14]. However, other authors have reported the predominance of other injuries, with significant variability depending on the country: contusions [20] [23], wounds and minor burns [22], and burns [8]. This variability may be related to differences in the accident's location, which depend on the patient's culture and age.

In our series, no mortality was reported. However, authors have reported mortality varying from 1.2% to 13.9% [6] [12] [23] [24]. It should be noted that these studies included all age groups in children. This difference may be related to the fact that we only included under-fives, that patients with moderate to severe traumatic brain injury are referred to the neurosurgery department and were not included in our series and those with foreign body ingestion within ears-nose-and-throat (ENT) location.

## 5. Limitation of the Study

This prospective study took place over four months; a study over a more extended period would have made it possible to recruit more patients, which would make it possible to analyze the predictors of the delay in consultation and the differences in the mechanism of the accident between boys and girls. Nevertheless, this being a descriptive study, these limitations do not reduce its merit in reporting the different aspects of domestic accidents among children under five in our environment, showing their particularities.

## 6. Conclusion

Domestic accidents among under-fives are frequent in our environment and have the particularity of not having preponderance according to sex, of occurring more frequently inside houses, more precisely in the bedroom, with overall, a better prognosis.

## Ethics Approval and Consent to Participate

Our review received approval from the Ethics Committee of ARNCHC. Consent to participate was obtained from the parents of patients.

## Availability of Data and Material

The datasets used and analyzed during the current study are available from the



corresponding author upon reasonable request.

### Authors' Contributions

Florent Tshibwid A. Zeng analyzed and interpreted findings and wrote the manuscript. Papa Alassane Mbaye participated in data acquisition and contributed to writing the manuscript. Doudou Gueye interpreted data and proceeded to a critical review of the manuscript. Papa Mamadou Ndoye acquired data, analyzed, and interpreted them. Ibrahima Bocar Wellé acquired data and analyzed and interpreted them. Ndeye Fatou Seck participated in the study design, acquired data, and contributed to writing the manuscript. Mbaye Fall analyzed data and interpreted them. Ndeye Aby Ndoye participated in the conception of the study, interpreted data, and revised the manuscript critically. Aloïse Sagna participated in the study design, and the critical revision of the manuscript. Oumar Ndour participated in the conception of the study and made critical revisions of the manuscript. Gabriel Ngom participated in the conception and design of the study, interpreted data, and made a significant contribution by critically revising the manuscript. All authors read and approved the final manuscript.

### Acknowledgements

The author Florent Tshibwid A. Zeng is grateful to the NGO Förderverein Uni Kinshasa e.V., fUNIKIN through the excellence scholarship program “Bourse d'Excellence Bringmann aux Universités Congolaises, BEBUC”, which funds his specialization in pediatric surgery.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] World Health Organization (2021) Injuries and Violence. <https://www.who.int/news-room/fact-sheets/detail/injuries-and-violence>
- [2] Acar, E., Dursun, O.B., Esin, I.S., Öntülü, H., Özcan, H., Mutlu, M., *et al.* (2015) Unintentional Injuries in Preschool Age Children: Is There a Correlation with Parenting Style and Parental Attention Deficit and Hyperactivity Symptoms. *Medicine*, **94**, e1378. <https://doi.org/10.1097/MD.0000000000001378>
- [3] Ategbo, S., Minto'o, S., Koko, J. and Mba-Meyo, S.M. (2012) Aspects épidémiologiques des accidents domestiques de l'enfant à Libreville (Gabon). *Clinics in Mother and Child Health*, **9**, 1-3. <https://doi.org/10.4303/cmch/C120201>
- [4] Rostami-Moez, M., Kangavari, M., Teimori, G., Afshari, M., Khah, M.E. and Elahi, K.B. (2019) Cultural Adaptation for Country Diversity: A Systematic Review of Injury Prevention Interventions Caused by Domestic Accidents in Children under Five Years Old. *Medical Journal of the Islamic Republic of Iran*, **33**, 741-750. <https://doi.org/10.47176/mjiri.33.124>
- [5] Ghailan, K., Almalki, M.J., Jabour, A.M., Al-Najjar, H., Khormi, A., Magfori, H., *et al.* (2021) Children Domestic Accidents Profile in Jazan Region, a Call for New Pol-

- icies to Improve Safety of Home Environment. *Saudi Journal of Biological Sciences*, **28**, 1380-1382. <https://doi.org/10.1016/j.sjbs.2020.11.074>
- [6] Rafai, M., Mekaoui, N., Chouaib, N., Bakkali, H., Belyamani, L., Koraichi, A.E., et al. (2015) Épidémiologie Des Accidents Domestiques Graves De L'Enfant Admis En Réanimation Pédiatrique Polyvalente À L'Hôpital D'Enfants De Rabat-Maroc. *Pan African Medical Journal*, **20**, Article No. 28. <https://doi.org/10.11604/pamj.2015.20.28.5760>
- [7] Mutto, M., Lawoko, S., Nansamba, C., Ovuga, E. and Svanstrom, L. (2011) Unintentional Childhood Injury Patterns, Odds, and Outcomes in Kampala City: An Analysis of Surveillance Data from the National Pediatric Emergency Unit. *Journal of Injury and Violence Research*, **3**, 13-18. <https://doi.org/10.5249/jivr.v3i1.56>
- [8] Usha Rani, S. and Swetha, R. (2022) Pattern of Domestic Accidents among Children in Tumkur City—A Cross Sectional Study. *National Journal of Community Medicine*, **11**, 196-200. <https://doi.org/10.5455/njcm.20200319050247>
- [9] Maaloul, I., Kmiha, S., Yaich, S., Thouraya, K., Damak, J., Aloulou, H., et al. (2019) Epidémiologie des accidents domestiques de l'enfant: expérience d'un Service de Pédiatrie Générale du sud tunisien. *The Pan African Medical Journal*, **33**, Article No. 108. <https://doi.org/10.11604/pamj.2019.33.108.12022>
- [10] Abubakar, S., Ahmed, A., Farouk, Z., Gadanya, M. and Jimoh, M. (2018) Prevalence and Pattern of Unintentional Domestic Accidents and Trauma amongst Children Attending Public Hospitals in Kano, Nigeria. *Sahel Medical Journal*, **21**, 6-12. <https://doi.org/10.4103/1118-8561.232787>
- [11] de Assis Brito, M., Santiago da Rocha, S., Pereira Borges, J.W., De Araújo, T.M.E., Teles de Oliveira Gouveia, M., do Amaral Gubert, F., et al. (2016) Risk Factors for Occurrence of Domestic Accidents Involving Children under the Age of Five: Implications for Nursing Care. *International Archives of Medicine*, **9**, 1-10. <https://doi.org/10.3823/1991>  
<https://kipdf.com/risk-factors-for-occurrence-of-domestic-accidents-involving-children-under-the-a-5ac773291723dd3c875185fe.html>
- [12] Mohamed, A.S., Omid, A., Fall, A.L., Mbaye, P.A., Seck, N.F., Ndour, O., et al. (2015) Les accidents domestiques chez l'enfant à Dakar: A propos de 555 cas. *Journal de Pédiatrie et de Puériculture*, **28**, 217-222. <https://doi.org/10.1016/j.jpp.2015.07.003>
- [13] Mohamed, A.S., Mbaye, P.A., Fall, M., Diouf, A., Ndoye, N.A., Diaby, A., et al. (2017) Les accidents de la vie courante chez l'enfant à Dakar: A propos de 201 cas. *The Pan African Medical Journal*, **27**, Article No. 272. <https://doi.org/10.11604/pamj.2017.27.272.6759>
- [14] Mohamed, A.S., Sagna, A., Fall, M., Ndoye, N.A., Mbaye, P.A., Fall, A.L., et al. (2019) Épidémiologie des Accidents Domestiques chez l'Enfant à Dakar (Sénégal). *Health Sciences and Disease*, **20**, 18-23.
- [15] Djibo, H., Badio, S., Guida, S., Issa Kamaye, I. and Touré, I.A. (2011) Les accidents domestiques chez les enfants de moins de 5ans: A propos de 752 cas recensés à l'hôpital national de Niamey. *Journal Africain d'Imagerie Médicale*, **7**, 363-367. <https://doi.org/10.5001/omj.2020.03>
- [16] Al Rumhi, A., Al Awisi, H., Al Buwaiqi, M. and Al Rabaani, S. (2020) Home Accidents among Children: A Retrospective Study at a Tertiary Care Center in Oman. *Oman Medical Journal*, **35**, e85. <https://omjournal.org/articleDetails.aspx?coType=1&aId=2530>

- [17] Bhuvaneswari, N., Prasuna, J.G., Goel, M.K. and Rasania, S.K. (2018) An Epidemiological Study on Home Injuries among Children of 0-14 Years in South Delhi. *Indian Journal of Public Health*, **62**, 4-9.
- [18] Reboli, E. (2006) Les accidents de la vie courante: étude descriptive à partir du recueil de 10177 données, EPAC 2004 du service des urgences pédiatriques du Havre et projets de prévention pour l'agglomération havraise. Faculté mixte de Médecine et de Pharmacie de Rouen.
- [19] Piffer, S., D'Alpaos, A., Demonti, S. and Ramponi, C. (2020) Home Accidents in the First Two Years of Life and the Relationship with Parent Characteristics. An Information Flow-Based Study. *Nursing & Primary Care*, **4**, 1-6.  
<https://doi.org/10.33425/2639-9474.1160>
- [20] Pédrono, G.B. and Thélot, B. (2016) Enquête permanente sur les accidents de la vie courante (EPAC). Résultats 2010 en France métropolitaine. *Institut de Veille Sanitaire, Paris*, 100 p.  
<https://www.santepubliquefrance.fr/docs/enquete-permanente-sur-les-accidents-de-la-vie-courante-epac--resultats-2010-en-france-metropolitaine>
- [21] Flajolet, A. (2008) Mission au profit du gouvernement relative aux disparités territoriales des politiques de prévention sanitaire. 91 p.  
[https://solidarites-sante.gouv.fr/IMG/pdf/Rapport\\_Flajolet.pdf](https://solidarites-sante.gouv.fr/IMG/pdf/Rapport_Flajolet.pdf)
- [22] Piffer, S., Demonti, S., Ramponi, C., Giustini, M. and Pitidis, A. (2021) Home Accidents in the Province of Trento. Ten Years of Observations Regarding Admissions to the Emergency and First Aid Department. *Annali di igiene. Medicina preventiva e di comunita*, **33**, 152-162.
- [23] Raju, K., Jagdish, S., Kumar, G., Anandhi, D. and Antony, J. (2020) Profile of Pediatric Trauma among the Patients Attending Emergency Department in a Tertiary Care Hospital in South India. *Journal of Emergencies, Trauma, and Shock*, **13**, 62-67.
- [24] Fomeza, O.D. (2017) Accidents domestiques chez l'enfant et facteurs de mauvais pronostic à l'hôpital Gynéco-Obstétrique et Pédiatrique de Yaoundé. Université de Yaoundé, Yaoundé.  
<https://livre.fnac.com/a13233916/Ornela-Fomeza-Accidents-domestiques-chez-l-enfant-et-facteurs-de-mauvais-pronostic>