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## Epidemiological profile of children and adolescents affected by exogenous intoxication in Brazil from 2015 to 2017

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**Abstract:** Intoxication can be defined as the manifestation of toxic signs and symptoms caused by one or more chemicals (exogenous) when it comes into contact with the living organism. The composition, dose and route of exposure are key factors that indicate the severity of intoxications, such as simultaneous exposure and other toxics, the form of nutrition of the child, age and pre-existing health conditions. Accidents with children in this age group is one of the main public health problems in the world. And in developed countries, it composes the main cause of mortality in children over one year of age, contributes considerably as morbidity in childhood. The process of human exogenous intoxication is characterized as one of the most significant public health problems, due to the lack of control and care strategies, related to the easy access of the population to

licit and illicit substances with a high degree of toxicity. To analyze cases of exogenous intoxication in children and adolescents aged 0 to 14 years in Brazil from 2015 to 2017. Through secondary databases of the Notifiable Diseases Information System (SINAN), provided by DATASUS/Ministry of Health, and the National System of Toxic-Pharmacological Information (SINITOX), is responsible for the compilation, collection, dissemination and analysis of cases of intoxication and poisoning. The population was registered in the compulsory notification forms in the SINAN Database in Brazil, in the year 2015 to 2017. The results show that the female sex is the most affected, with a percentage of (52%), in the region stands out in the Southeast region (43%). Among the age group, it is the 1–4-year-old group with the highest incidence, totaling 40,255 reported cases. The study made it possible to identify the epidemiological profile of exogenous poisoning in Brazil from data from DATASUS, which showed that medications and household use, food and beverages are the most involved toxic agents, however children aged 1 to 4 years were the most affected, with the most prevalent female gender.

**Keywords:** Epidemiological Profile. Exogenous intoxication. Children. Adolescents

## 1. Introduction

Intoxication can be defined as the manifestation of toxic signs and symptoms, caused by one or more chemical substances (exogenous) when it enters into contact with the living organism. The composition, dose and route of exposure are key factors that indicate the severity of intoxications, such as simultaneous and other toxic exposure, the form of nutrition of the child, age and pre-existing health conditions (DOMINGOS *et al.*, 2016).

Accidents with children in the age group is one of the main public health problems in the world. And in the developed countries, it composes the main cause of mortality in crianças above one year of age, contributes considerably as morbidity in childhood. In addition, non-fatal accidents end up representing an important expense for the health system. On the other side there are adolescents who are one of the groups most susceptible to the serious global problems of actuality: poverty, malnutrition, hunger, violence, illiteracy, family abandonment (ALMEIDA *et al.*, 2016).

Around 1.5% to 3% of the population is intoxicated all years. In Brazil, 4,800,000 new cases are reported every year. The process of human exogenous intoxication is characterized as one of the most significant public health problems, due to the lack of control and care strategies, related to the easy access of the population to licit and illicit substances with a high degree of toxicity (MEDEIROS; MEDEIROS, MEDEIROS. SILVA, 2014).

In 2004, acute poisoning caused more than 45,000 deaths among children and young people under the age of 20 - 13% of all lethal poisoning cases in the world. The graph of mortality from intoxication is the highest in children under one year, pointing to another index, around 15 years. Exogenous intoxications in this age group are often accident and preventable from facilitating situations, special characteristics, the stages of child development and little encouragement to parents or family members on preventive measures (OLIVEIRA *et al.*, 2014)

Information in Brazil about exogenous intoxications is available in the annual publications of the National System of Toxic pharmacological Information (SINITOX), it associates information from 36 centers of poison control (CCIs) these are located in 19 states and the federal district, sinitox

data from 2017 report 4,016 cases recorded for intoxication in children from 0 to 4 years and 1,454 cases of intoxication in adolescents aged 10 to 14 years, with a higher prevalence in drugs as a toxic agent, and aged 1 to 4 years Brazil 2015.

The identification and description of the epidemiological characteristics of exogenous intoxication in childhood are significantly relevant for treatment planning and prevention of measures. From this perspective, the present study aimed to analyze and verify the cases of exogenous intoxication that occurred in children and adolescents aged 0 to 14 years in Brazil.

## 2. Methodology

This is a cross-sectional and descriptive epidemiological study, whose data were collected through secondary databases of the Notifiable Diseases Information System (SINAN), provided by DATASUS/Ministry of Health, and the National System of Toxic-Pharmacological Information (SINITOX). SINITOX is a system linked to the Oswaldo Cruz Foundation - FIOCRUZ - which is responsible for the compilation, collection, dissemination and analysis of cases of intoxication and poisoning. The population was registered in the compulsory notification forms in the SINAN Database in Brazil, from 2015 to 2017. The Department of Informatics of the Health System (DATASUS) provides information that can serve to finance objective analysis of sanitary situations, deliberation based on evidence and development of programs in health actions.

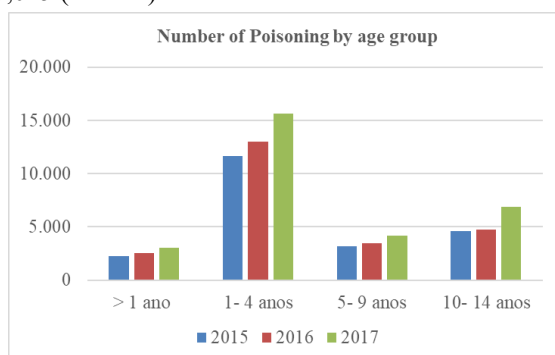
The tabulation of data in the Department of Informatics of the Unified Health System (DATA/SUS) was processed through SINAN, where it is fed by the notification and investigation of cases, where they are included in the list of cases of compulsory notification, such as exogenous intoxication that is the target of the study. The variables studied in the Exogenous Intoxication database were: age group and regions of Brazil.

## 3. Results and Discussion

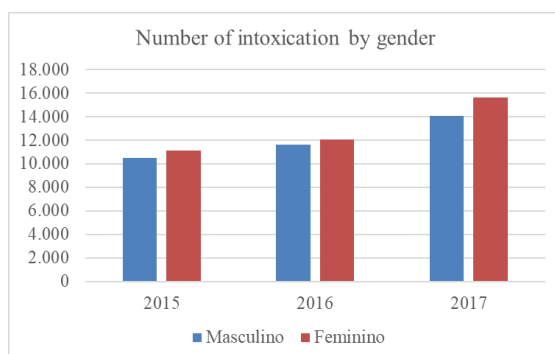
A total of 75 was observed. 102 (Figure 1), cases due to exogenous intoxication in children and adolescents aged 0 to 14 years in Brazil from 2015 to 2017. Of these, a higher

incidence was observed in the age group from 1 to 4 years (Figure 1) considered preschool phase, so we found a total of 40,255 cases (Figure 1). The region with the highest number of cases recorded is the Southeast region with 32,488 cases representing 43%, followed by the Northeast region with 21,837 registered cases, representing 29% (Figure 3). There were a large number of cases in female children (Figure 2), there were 38,870 cases recorded, reaching 52% (Figure 2).

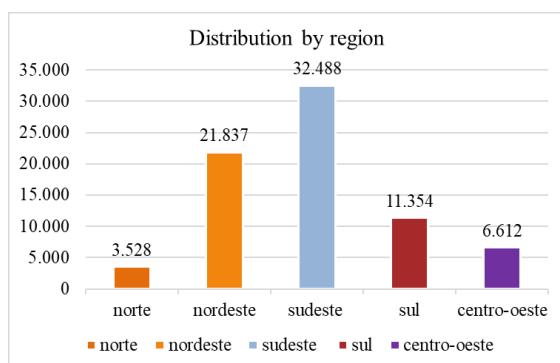
And it can be observed that over the years the number of poisonings in these age groups only grows (Table 1, 2 and 3). In relation to the toxicological agent, drug poisoning is the cause that most affects children and adolescents with a total of 33,015 (Table 4).



**Figure 1.** Distribution by age group of exogenous intoxication in Brazil from 2015 to 2017



**Figure 2.** Gender distribution of exogenous intoxication in Brazil from 2015 to 2017.



**Figure 3.** Distribution by Region of Exogenous Intoxication in Brazil from 2015 to 2017.

**Table 01.** Number of exogenous intoxications by region and age group from 0 to 14 years in 2015.

Notification Region	Notifications
Northern Region	1.131
Northeast Region	6.469
Southeast Region	9.061
Southern Region	3.008
Midwest Region	2.021
<b>Total</b>	<b>21.717</b>

**Source:** Ministry of Health/ - Notifiable Diseases Information System - Sinan Net. Access on 09/18/19

**Table 02.** Number of exogenous poisonings by region and age group from 0 to 14 years in 2016 .

Notification Region	Notifications
Northern Region	1.205
Northeast Region	6.733
Southeast Region	10.271
Southern Region	3.533
Midwest Region	2.040
<b>Total</b>	<b>23.782</b>

**Source:** Ministry of Health/ - Notifiable Diseases Information System - Sinan Net. Access on 09/18/19

**Table 03.** Number of exogenous poisonings by region and age group from 0 to 14 years in 2017.

Notification Region	Notifications
Northern Region	1.192
Northeast Region	8.635
Southeast Region	13.156
Southern Region	4.813
Midwest Region	2.551
<b>Total</b>	<b>30.347</b>

**Source:** Ministry of Health/ - Notifiable Diseases Information System - Sinan Net. Access on 09/18/19

**Table 4.** Division by toxic agent in the age faxes, focusing from 0 to 14 years in Brazil from 2015 to 2017.

Toxic Agent	< 1 year	1-4 years	5-9 years	10-14 years	TOTAL
Drug	3.283	15.793	5.226	8.713	<b>33.015</b>
Pesticide Agricultural	160	531	154	279	<b>1.124</b>
Agrotoxic Domestyc	156	1.011	177	153	<b>1.497</b>
Agrotoxic public health	8	31	10	42	<b>91</b>
Raticide	385	1.879	233	434	<b>2.931</b>
Prod. Vet	68	790	84	119	<b>1.061</b>
Prod. Home use	856	8.671	786	564	<b>10.877</b>
Metal	16	140	71	26	<b>253</b>
Drugs of abuse	444	151	65	1.228	<b>1.888</b>
Cosmetic	327	1.328	116	145	<b>1.916</b>
Toxic plant	100	787	351	150	<b>1.388</b>
Food and drink	731	1.722	1.571	2.081	<b>6.105</b>
Prod. Chemist	255	2.232	270	203	<b>2.960</b>
Other	307	1.297	341	435	<b>2.380</b>
<b>TOTAL</b>	<b>8.313</b>	<b>40.359</b>	<b>10.863</b>	<b>16.311</b>	<b>75.846</b>

**Source:** Ministry of Health/ - Notifiable Diseases Information System - Sinan Net. Access on 09/18/19

Accord to Sallum and Paranhos (2010), exogenous intoxication is defined by all contact with any external substance with the body, determining several changes, which cause signs and symptoms that require urgent or emergency assistance due to the great health risk. These substances are easily accessible and are more obtained in the form of drugs, household and industrial products, pesticide. In addition, they can still be found in foods, such as in natural resources, water, near, poisonous plants and animals.

Some drugs can cause exogenous intoxication for several reasons, such as self-medication, which is the most common of all, because it is being practiced by the general population. However, responsibility cannot be blamed for all cases, as there are some assumptions in which errors occur in the prescription, failures in dosage, the numerous lacks of guidance or the non-understanding of the patient, which also contributes to cases of intoxication.

Exogenous intoxications currently reprimand an important and serious public health problem in Brazil, due to its high prevalence rate. That is proven by the data of the Department of Informatics of the Unified System of Health (DATASUS, 2016) that points out in the years 2015 to 2017 the record of 75,819 cases, and only in the last year, 30,347 cases were registered. Several factors can lead to exogenous intoxicating. Identify which toxic agent is extremely important for the adoption of preventive measures and consequently will reduce the number of cases. The dates obtained show that, in the last five years, the most toxic and most present agents are drugs (DATASUS, 2016).

Among all the regions studied in the southeast was the

highlight with the most index of intoxication, followed by the northeast, note the range with the highest exposure were 10-14 years.

According to the WHO report, effective intervention to reduce poisoning should cover, the condemnation of toxic substances, and a broader method that covers the legal requirement for the adoption of preventive measures and special packaging for children (EEPC) packaging and marketing with non-lethal doses. Also, according to the report, the use of drawer keys and cabinets are effective practices in prevention. There is no scientific and considerable evidence confirming that, in the same way, guidance to parents and children, home education actions tend to reduce childhood poisoning (CONTR SAF PROMOT, 2015)

It is noted that, gradually, society has been suffering from a process of medicalization and the amount of drug consumption, and reaches incalculable dimensions, because they are kept at home with easy access, and without restriction, constituting a great risk for consumers. Another important factor, some adults inadequately when administering the medication to the child adopt some concepts such as, "it's tasty, sweet" to facilitate the acceptance of the child, which, later, when seeing the medication, makes this association of the sweet and thus increases the chance of ingesting.

Basing the cases reported in this study, and reinforcing the need and importance of investment in health control measures, promoting education, accessibility in information to prevent the occurrence of these intoxications.

## 4. Conclusions

The study made it possible to identify the epidemiological profile of exogenous poisonings in Brazil from data from DATASUS, which showed that drugs, pesticides, chemicals, household use, rodenticides and food and beverages are the most involved toxic agents, however, children aged 1 to 4 years were the most affected, females with the highest prevalence. The region with the highest number of reported cases was in the Southeast followed by the Northeast region, the most reported causative agent was drug intoxication.

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