

# Comparison of the Epidemiological Profile of Exogenous Poisoning Cases in Bahia Before and During the COVID-19 Pandemic

## Comparação do Perfil Epidemiológico dos Casos de Intoxicação Exógena na Bahia Antes e Durante a Pandemia da COVID-19

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### Abstract

Several chemical substances cause toxicological damage to individuals, triggering Exogenous Intoxication (EI) with relevant fatal potential. It is, therefore, essential to describe and compare the epidemiological profile of EI cases reported in Bahia before and during the COVID-19 pandemic. A quantitative analytical approach was used, and secondary data were extracted, in August 2022, from the Notifiable Diseases Information System, cases of EI between January 2018 and December 2021, Bahia. Age, sex, color, circumstance, and causative agent were analyzed and described in frequency and proportions, 12,838 cases of EI were reported between 2018-2019. The highest incidence occurred in individuals aged 20-59 years (57.8%), females (59%), and browns (48.8%). Among toxic agents, medication (40.3%) stood out, followed by food and beverages (10%), rodenticides (6.8%), and drugs of abuse (6%). Among the circumstances: suicide attempt was highlighted (33.5%). In 2020 and 2021, there were 11,279 cases, higher incidence in individuals aged 20-59 years (59.5%), females (58%), and browns (55%). The toxic agent medication (41.9%) stood out, followed by drugs (10.2%), food and beverages (7.8%), and household products (5.7%). Similar to the previous period, suicide led among circumstances (36.5%). The pandemic did not seem to affect epidemiology significantly. However, the almost 50% increase in the frequency of EI cases due to drug abuse, reinforces the World Report on Drugs (2021), which pointed to a worldwide growth of drugs consumption during the pandemic and alerts attention to mental health of Brazilians.

**Keywords:** Disease Notification. Poisoning. COVID-19. Suicide, Attempted. Mental Health.

### Resumo

*Diversas substâncias químicas causam danos toxicológicos aos indivíduos, podendo deflagrar intoxicação exógena (IE) com relevante potencial fatal. É imprescindível assim, descrever e comparar perfil o epidemiológico dos casos de IE notificados na Bahia antes e durante a pandemia da COVID-19. Utilizou-se abordagem quantitativa analítica, com dados secundários extraídos, em agosto de 2022, do Sistema de Informação de Agravos de Notificação, sobre casos de IE, entre janeiro de 2018 a dezembro de 2021, na Bahia. Variáveis idade, sexo, cor, circunstância, agente causador foram analisadas e descritas em frequência e proporções. Foram notificados 12.838 casos de IE entre 2018-2019, a maior incidência ocorreu em indivíduos de 20-59 anos (57,8%), sexo feminino (59%), pardos (48,8%). Entre agentes tóxicos, a principal causa foi medicamentos (40,3%), seguindo alimentos e bebidas (10%), raticidas (6,8%) e drogas de abuso (6%). Dentre circunstâncias, o principal motivo foi tentativa de suicídio (33,5%). Entre 2020-2021, foram 11.279 casos, maior incidência indivíduos de 20-59 anos (59,5%), sexo feminino (58%) e pardos (55%). Destacou-se o agente tóxico medicamentos (41,9%), seguindo drogas (10,2%), alimentos e bebidas (7,8%), produtos de uso domiciliar (5,7%). Quanto às circunstâncias liderou a tentativa de suicídio (36,5%). A pandemia não pareceu afetar significativamente a epidemiologia, porém, o aumento de quase 50% na frequência dos casos de IE por drogas de abuso, comparativamente ao período anterior; reforça o Relatório Mundial sobre Drogas (2021), que apontou crescimento mundial do consumo na pandemia e sugere-se um alerta sobre a saúde mental dos brasileiros.*

**Palavras-chave:** Notificação de Doenças. Intoxicação. COVID-19. Tentativa de Suicídio. Saúde Mental.

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## 1 Introduction

Exogenous intoxication (IE) is the set of clinical and laboratory presentations resulting from the interaction between toxic agents and the organism, in which several chemicals can cause toxicological damage to the biological system<sup>1</sup>. The patient's clinical evolution in cases of poisoning by external agents is influenced by various factors, including the physical-chemical composition and the amount of the substance involved, the conjecture of intoxication (intentional or accidental), the time elapsed for the introduction of treatment and the lethality of the compound<sup>1</sup>. In addition,

exposure can occur through oral, inhalational, intravenous, cutaneous and mucous pathways, demonstrating that there are numerous ways to be intoxicated from external sources. In this sense, IE expresses a broad spectrum of morbidity for the human being, and therefore, all patients who have such a diagnosis should always be considered as potentially serious, even if they present oligosymptomatic in a first contact<sup>2</sup>.

Therefore, exogenous intoxications are valid as a theme of essential importance for global and Brazilian public health, which is corroborated by policies applied in the national territory. In Brazil, through the Ministry of Health Ordinance N° 264,

of February 17<sup>th</sup>, 2020, IE for chemical substances, covering pesticides, heavy metals and toxic gases, makes up the list of compulsory notification aggravations, in which it is mandatory to notify weekly to public agencies. Except, in cases with association of poisoning and situations of violence, this notification should be carried out in 24h, being an immediate compulsory notification, in order to have the necessary and indispensable directions, such as referrals to Psychiatry, Urgency and Emergency Services, Police Station, among others. In addition, in cases of IE involving not only violence, but also suicide or homicide, the notification form of suspected or confirmed cases of violence needs to be made, with SINAN's own numbering<sup>3</sup>.

From this perspective, we can see the existence of a correlation between exogenous intoxications and mental health problems, a subject of outstanding relevance due to the sequelae arising from the COVID-19 pandemic. According to the report "Preparing Michigan for the Behavioral Health Impact of COVID-19", produced in 2020 and released by Pine Rest Christian Mental Health Services, a non-profit organization that works and studies the psychiatric area, pointed to a forecast increase of 32% in global suicide rates, resulting from factors such as for example, increased substance use during quarantine caused by SARS-CoV-2. This research also indicates that the groups with the highest risk are those of children, adolescents, the elderly, health professionals, among others<sup>4</sup>.

These data are also reflected in the Brazilian reality. In the article "The Relationship between behavior and psychosocial factors among Brazilians in quarantine due to COVID-19", in order to evaluate the effects of social isolation on the psychic suffering of the national population, a study was carried out with a final sample of 1,460 individuals in 23 states of Brazil, with online evaluation of factors related to mental health. As a result of the research, it was shown that, in relation to depression, the cases had an increase of 90.5% compared to the beginning of the study, starting with 4.2% of people with such a report to 8.0%. Still, regarding stress, there was an increase of approximately 40.5%, ranging from 6.9% to 9.7% at the end of the study, and, as for acute anxiety, about 71.2%, starting with 8.7% and ending with 14.9%. Regarding specifically the state of Bahia, there are still no studies on mental health issues during the pandemic<sup>5</sup> period. However, there are records of an increase in the number of visits due to psychiatric reception needs in the public services of Salvador, being young women, aged 20 to 40 years, with depression and anxiety, the ones that sought such units<sup>6</sup> the most.

Thus, the objective of this study was to describe and compare the epidemiological profile of cases of IE notified in Bahia before (2018 and 2019) and during (2020 and 2021) the COVID-19 pandemic, evaluating possible ecological effects associated with this conjuncture.

## 2 Material and Methods

Analytical quantitative study carried out from secondary data extracted from the Notifiable Diseases Information

System (SINAN) through the Tabnet-DATASUS platform. SINAN is an information system powered by the notification of cases of diseases and complications that appear in the national list of diseases of compulsory notification, and its use allows the diagnosis of occurrence of events and can provide subsidies for causal explanations of the diseases, in addition to indicating risks to which people are subject, contributing to the identification of the epidemiological reality of the State<sup>7</sup>.

The information collected was related to cases of exogenous intoxication occurred from 2018 to 2021 in the State of Bahia and the variables analyzed were: toxic agent, age, color, sex, evolution and circumstance. To obtain the results, the variables were described as absolute and relative frequencies, and the relative frequencies of each studied group were used to present the epidemiological profiles of each period and to compare them. They were calculated taking into account the absolute number of exogenous intoxication cases grouped into two groups, which included the period from 2018 to 2019 (before the COVID-19 pandemic) and the other the period from 2020 to 2021 (during the COVID-19 pandemic). Because it is a research with secondary data of public access, it was not necessary to obtain approval by the Ethics Committee.

## 3 Results and Discussion

In the period analyzed before the pandemic (2018 and 2019), 12,838 cases of exogenous intoxication were reported in Bahia. Of the total cases, the highest frequency of cases (57.85%) occurred in individuals aged 20-59 years, 59.13% in females and 48% in brown people. Regarding the toxic agents, the main cause of intoxication where medicines (40.3%) followed by food and beverages (10%), rodenticides (6.8%), and drugs abuse (6%). Regarding the circumstances, the main reason was suicide attempt (33.59%). Of the total cases, 147 died due to intoxication, resulting in a lethality rate of 1.14%.

Whereas in the period during the pandemic (2020 and 2021), 11,279 cases of exogenous intoxication were reported in Bahia. Of the total cases, the highest frequency also occurred in the age group of 20-39 years (42.37%), 58.14% of the cases in the female sex and 55% in brown people. The toxic agent that caused intoxication the most remained as drugs (41.95%), followed by abuse drugs (10.28%), food and beverages (7.84%) and household products (5.72%). The circumstance that caused more intoxication continued to be the suicide attempt (36.5% of cases). Of the total cases, 112 died due to intoxication, resulting in a lethality rate of 0.99%.

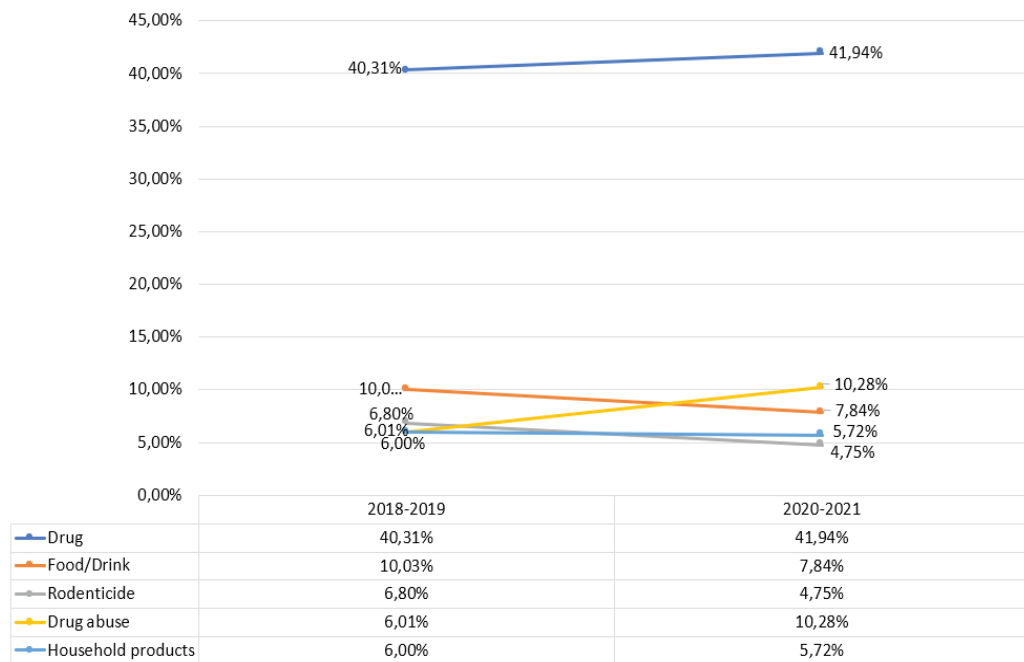
In this context, our findings show that the pandemic did not cause great variation in the total number of IE cases. However, the maintenance of these cases is relevant data, given the greater permanence of the population in home environments. In addition, some social problems were evidenced, such as the growth of suicide attempts and the increase in drug use.

Moreover, the highest incidence of cases in the adult age

group, reported in our results, is generally found in the country as an age group with a higher number of reported cases of self-injury and suicide<sup>7</sup> attempts. Thus, mental health care of this part of the population is necessary, since they are usually responsible for family income and, during the pandemic context, may have felt an increase in fears and desires due to unemployment trends, being forced to maintain their work dynamics, breaking the standards of social isolation and, consequently, placing themselves at risk for infection.

The absolute and relative frequencies of cases according to the main causative agents of intoxication, by period, are shown in Figure 1. There is an increase in the percentage of cases related to the use of drugs of abuse ( 4.27%) and medicines ( 1.43%) and a decrease in the percentage of cases related to food and drink (-2.19%) and rodenticide (-2.05%). In addition, it is observed that the use of household products almost did not change, even considering the longest time inside the house (-0.28%).

**Figure 1** - Percentage of cases according to the main causative agents of intoxication, by period.



Source: based on [datasus.saude.gov.br](https://datasus.saude.gov.br).

Thus, drug abuse, a problem already recurrent in the country, achieved an increase of almost 50% in the frequency of cases of IE due to drugs of abuse (Table 1). This finding reinforces the World Drug Report<sup>8</sup>, which pointed to global growth in drug use in the pandemic. In this sense, based on the report, the COVID-19 pandemic has impacted the numbers related to consumption and influenced the patterns of drug use and commercialization in different countries. Thus, unlike other economic sectors, drug trafficking seemed to quickly adapt to the new circumstances, maintaining or increasing the pace of sales<sup>9</sup>.

**Table 1** - Frequencies of toxic agents in cases of exogenous intoxication

Toxic Agent	Notifications 2018/2019		Notifications 2020/2021	
	N (12.838)	%	N (11.279)	%
Medicine	5175	40.31%	4731	41.94%
Blank/IGN	1962	15.28%	1796	15.92%
Food and Drink	1288	10.03%	885	7.84%
Rodenticide	874	6.80%	536	4.75%
Drugs of Abuse	772	6.01%	1160	10.28%
Product Home Use	771	6.00%	646	5.72%

Toxic Agent	Notifications 2018/2019		Notifications 2020/2021	
	N (12.838)	%	N (11.279)	%
Agricultural Pesticide	523	4.07%	459	4.07%
Another	399	3.10%	284	2.51%
Chemical Product	382	2.97%	273	2.42%
Cosmetic	186	1.44%	134	1.18%
Household Pesticide	152	1.18%	123	1.09%
Veterinary Product	141	1.09%	97	0.86%
Pesticide Public Health	117	0.91%	46	0.40%
Toxic Plant	83	0.64%	67	0.59%
Metal	13	0.10%	42	0.37%

Source: based on [datasus.saude.gov.br](https://datasus.saude.gov.br).

Combined with this, the increase in consumption in the home environment, due to the closure not only of establishments for recreational use, but also of several environments that provided treatments for users and the world socioeconomic changes, exemplifying greater social inequality, poverty and unemployment, corroborate the increase in drug use disorders and the production and trafficking of drugs, which appears to

be strengthened over and over.<sup>9</sup>

The use of medicines also seems to be a constant problem in Brazil, since, in both periods, drugs appeared as agents in more than 40% of the total number of cases of intoxication (Table 1). Thus, it is necessary to analyze the occurrence and dangers of self-medication and how the population access to these drugs is, facilitating the use for improper purposes, such as suicide.

There are several reasons that lead individuals to perform self-medication, such as difficulty in access to health and disinformation, however, there are few campaigns that clarify the dangers of this attitude. Moreover, although there is the regulation, by the National Health Surveillance Agency (ANVISA), of the sale and advertising of medicines that do not require a medical prescription for purchase, there is no guidelines for users, causing in doses and improper uses and possibly leading, possibly, to exogenous intoxications with different outcomes<sup>10</sup>.

In relation to the circumstances that triggered exogenous intoxication cases (Figure 2), an increase of 2.19% of cases of attempted suicide during the period of the pandemic should be highlighted when compared to the previous period. In addition, there is an increase of 3.66% of cases of intoxication due to substance abuse. Both data corroborate possible negative effects triggered by the pandemic period of greater isolation and damages under the mental point of view. Thus, considering that 51% of suicide cases occur in residential<sup>7</sup>

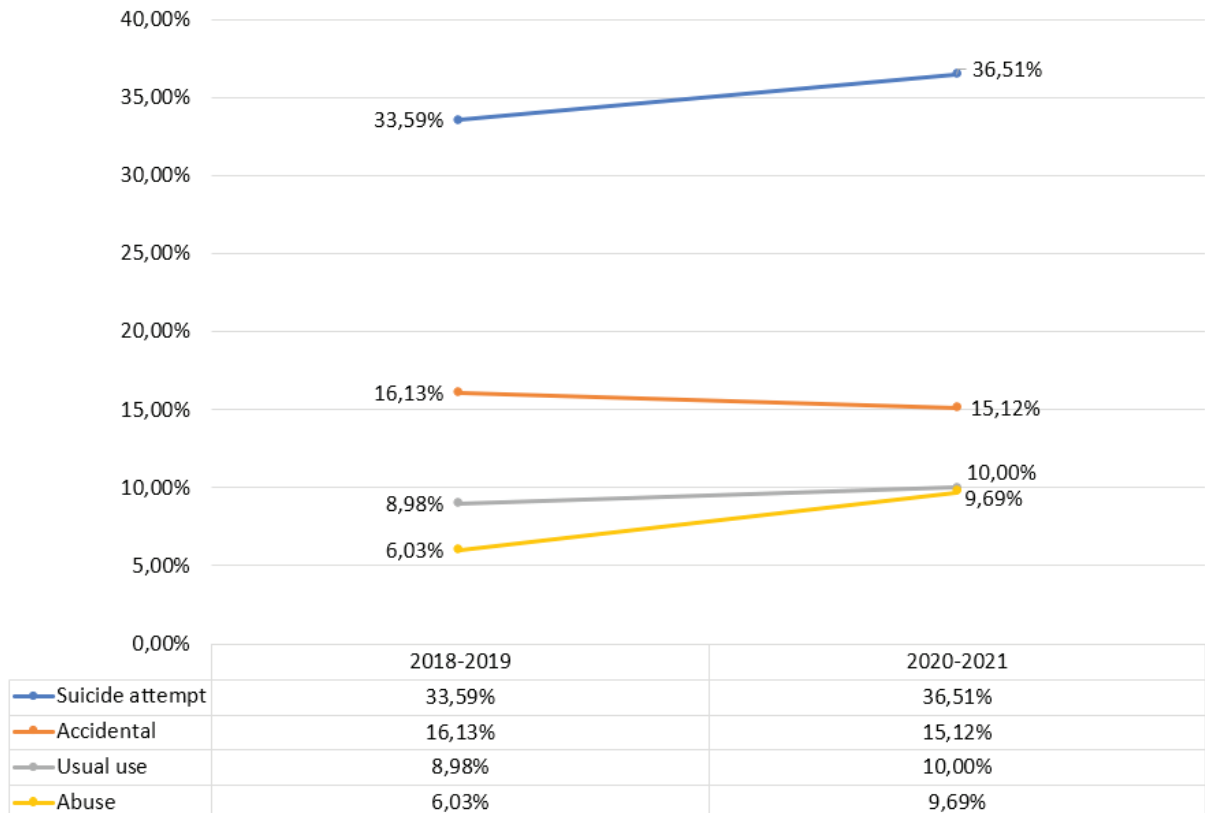
environments, the longer time of the population restricted to the household tends to influence in these cases. Thus, the results that indicate the increase in suicide attempts (Table 2) are expected, and this value can be even higher, since only one in three cases of suicide attempt reaches health services, this hinders the collection of fully faithful data regarding suicide behaviors<sup>8</sup>.

**Table 2** - Frequencies of circumstances in cases of exogenous intoxication

Circumstances	Notifications 2018/2019		Notifications 2020/2021	
	N (12.838)	%	N (11.279)	%
Suicide Attempt	4313	33.59%	4118	36.51%
Blank/IGN	2479	19.30%	1852	16.41%
Accidental	2071	16.13%	1706	15.12%
Normal Use	1153	8.98%	1128	10.00%
Abuse	775	6.03%	1093	9.69%
Food Intake	744	5.79%	469	4.15%
Self-medication	382	2.97%	348	2.19%
Environmental	273	2.12%	133	1.17%
Therapeutic use	219	1.70%	116	1.02%
Another	157	1.22%	111	0.98%
Administration Error	131	1.02%	87	0.77%
Violence/Homicide	94	0.73%	82	0.72%
Abortion Attempt	36	0.28%	22	0.19%
Medical Prescription	11	0.08%	14	0.12%

Source: based on [datasus.saude.gov.br](https://datasus.saude.gov.br).

**Figure 2** - Percentage of cases according to the main circumstances of intoxication, by period.



Source: Own authorship, based on [datasus.saude.gov.br](https://datasus.saude.gov.br).

Finally, it is known the importance of information systems for analysis of health-related situations. In this context, it is essential to have good quality data, and the fields filled as ignored/blank affect the interpretation and fidelity of studies on diseases or complications. In this study, the absence of information occurred mainly in the fields circumstances and toxic agents, that is, the key fields for the surveillance of IE. In addition, the sub-notifications can also affect results. Thus, it is believed that these points are possible limitations and can negatively interfere in the results and discussions on the subject. On the other hand, this study has several benefits, since it is a work with originality and that brings an alert about suicide and about the current context of increasing the use of recreational drugs in the pandemic.

#### 4 Conclusion

When comparing the cases of exogenous intoxication, in Salvador-BA, before and during the COVID-19 pandemic, using data from the Notifiable Diseases Information System, it was evidenced that the context of the pandemic did not seem to affect the frequency of IE cases, however, there was an increase of almost 50% in cases of IE due to abuse drugs. Thus, our results indicate an alert on the mental health of Brazilians and the growing problem involving drug abuse.

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