

Epidemiological Profile of Exogenous Intoxications in the State of Santa Catarina From 2012 to 2022

Perfil Epidemiológico das Intoxicações Exógenas no Estado de Santa Catarina de 2012 a 2022

Perfil Epidemiológico de las Intoxicaciones Exógenas en el Estado de Santa Catarina de 2012 a 2022

RESUMO

A intoxicação exógena representa um problema relevante de saúde pública. **Objetivo:** Caracterizar a prevalência, os fatores associados e os estágios finais das intoxicações exógenas no estado de Santa Catarina no período de 2012 a 2022. **Metodologia:** Estudo transversal, descritivo e retrospectivo com abordagem quantitativa, baseado em dados do SINAN. Foram analisadas variáveis como sexo, faixa etária, agentes tóxicos e desfechos clínicos. **Resultados e Discussão:** Dos 67.026 casos notificados, predominou o sexo feminino (62,61%) e a faixa etária de 21 a 39 anos (43,79%). Os medicamentos foram os principais agentes (61,52%), e 57,47% dos casos estiveram relacionados a tentativas de suicídio. A Grande Florianópolis apresentou maior prevalência (15,49%), com pico em 2019. A maioria dos casos evoluiu para cura sem sequelas (84,35%), apesar da taxa de letalidade de 1,01%. **Conclusão:** Ações regionais de prevenção, regulação do acesso a medicamentos e fortalecimento da saúde mental são fundamentais para a redução da morbimortalidade e aprimoramento da vigilância.

DESCRIPTORES: Intoxicações exógenas; Saúde pública; Medicamentos; Tentativa de suicídio; Vigilância epidemiológica.

ABSTRACT

Exogenous intoxication represents a significant public health issue. **Objective:** To the prevalence, associated factors, and outcomes of exogenous intoxications in the state of Santa Catarina from 2012 to 2022. **Methodology:** This is a cross-sectional, descriptive, and retrospective study with a quantitative approach, based on data from SINAN. Variables such as sex, age group, toxic agents, and clinical outcomes were analyzed. **Results and Discussion:** Among the 67,026 reported cases, females predominated (62.61%), particularly in the 21–39 age group (43.79%). Medications were the main toxic agents (61.52%), and 57.47% of cases were related to suicide attempts. The Greater Florianópolis region showed the highest prevalence (15.49%), with a peak in 2019. Most cases evolved to cure without sequelae (84.35%), despite a lethality rate of 1.01%. **Conclusion:** Regional preventive actions, regulation of access to medications, and strengthening of mental health services are essential to reduce morbidity and mortality and to improve epidemiological surveillance.

DESCRIPTORS: Exogenous poisoning; Public health; Drugs; Suicide attempt; Epidemiological surveillance.

RESUMEN

La intoxicación exógena representa un problema relevante de salud pública. **Objetivo:** Caracterizar la prevalencia, los factores asociados y los desenlaces de las intoxicaciones exógenas en el estado de Santa Catarina en el período de 2012 a 2022. **Metodología:** Estudio transversal, descriptivo y retrospectivo, con enfoque cuantitativo, basado en datos del SINAN. Se analizaron variables como sexo, grupo etario, agentes tóxicos y desenlaces clínicos. **Resultados y Discusión:** De los 67.026 casos notificados, predominó el sexo femenino (62,61%) y el grupo etario de 21 a 39 años (43,79%). Los medicamentos fueron los principales agentes involucrados (61,52%), y el 57,47% de los casos se relacionaron con intentos de suicidio. La región de Gran Florianópolis presentó la mayor prevalencia (15,49%), con un pico en 2019. La mayoría de los casos evolucionó hacia la curación sin secuelas (84,35%), a pesar de una tasa de letalidad del 1,01%. **Conclusión:** Las acciones regionales de prevención, la regulación del acceso a medicamentos y el fortalecimiento de la salud mental son fundamentales para reducir la morbimortalidad y mejorar la vigilancia epidemiológica.

DESCRIPTORES: Intoxicaciones exógenas; Salud pública; Medicamentos; Intento de suicidio; Vigilancia epidemiológica

Bárbara Luísa Severgnini Ribeiro

Nursing student. Alto Vale do Rio do Peixe University - UNIARP
ORCID: <https://orcid.org/0009-0003-3998-3518>

Paola Ribas Gonçalves dos Santos

Medical student. Alto Vale do Rio do Peixe University - UNIARP
ORCID: <https://orcid.org/0000-0003-2882-5592>

Flávia Eduarda Cachoeira

Medical student. Alto Vale do Rio do Peixe University - UNIARP
ORCID: <https://orcid.org/0000-0002-1043-9813>

Alesandra Perazzoli de Souza

Master in Nursing
Alto Vale do Rio do Peixe University - UNIARP
ORCID: <https://orcid.org/0000-0001-6115-1388>

André Trevisan

PhD in Zoology. Alto Vale do Rio do Peixe University - UNIARP
ORCID: <https://orcid.org/0000-0002-5897-2828>

Recebido em: 21/06/2025
Aprovado em: 07/07/2025

INTRODUCTION

Exogenous intoxication is a serious public health problem, affecting individuals on a global and national level. This condition results from exposure to toxic substances from the environment and is characterized by clinical and/or biochemical manifestations that compromise the body's homeostatic balance. The intoxication process comprises four distinct pha-

ses: exposure, toxicokinetics, toxicodynamics and the consequent clinical effects⁽¹⁾.

They can occur by various routes, such as ingestion, inhalation, skin contact and eye exposure, with symptoms ranging from mild to life-threatening. These manifestations include nausea, vomiting, dizziness, convulsions and, in cases of severe toxicity, death⁽²⁾. In Brazil, approximately 70% of reports of exogenous poisoning are due to intentional causes, such as suicide attempts, and are predominantly registered among women, reflecting the seriousness of the problem and the need for appropriate prevention and management actions⁽³⁾.

According to Ordinance No. 5.201, of August 15, 2024, exogenous intoxications are notifiable diseases and must be reported within 24 hours⁽⁴⁾. Data from the National Toxic-Pharmacological Information System (SINITOX) indicate that in 2017, drugs were responsible for 27.11% of poisoning incidents in the country, followed by pesticides (3.34%) and household chemicals (1.09%). With regard to deaths resulting from exogenous poisoning, the highest rates were observed in pesticide poisoning (30.42%), medication (25%), drugs of abuse (8%) and industrial chemicals (8%)⁽⁵⁾. However, only around 25% of poisoning victims seek health services, which limits the capacity for preventive action and leads to under-reporting, as well as increasing the harmful consequences for the body⁽⁶⁾.

Santa Catarina has specific characteristics which justify a detailed analysis of the epidemiological profile of exogenous poisoning. The state, with approximately 7.6 million inhabitants⁽⁷⁾ stands out for its socio-economic and demographic differences in relation to other regions of Brazil. Preliminary data shows that medicines, pesticides and drugs of abuse

are the main toxic agents recorded, with serious consequences for both individuals and health services^(8,9,10).

In addition, it can have a considerable economic impact on health systems, including direct costs for medical consultations, diagnostic tests, medication, hospitalization and specialized treatments. We must also consider the indirect costs associated with loss of productivity at work and the socio-economic consequences of the temporary or permanent incapacity of affected individuals⁽¹⁰⁾.

The additional demand that exogenous poisoning places on emergency services and health professionals is another important aspect to consider. Responding to these emergencies requires resources and the ability to respond quickly and effectively. Early identification of intoxication, appropriate treatment and symptom management are key to avoiding serious complications and reducing the burden on the health services affected⁽⁹⁾.

In view of this, it is essential to understand the patterns, determinants and trends of exogenous poisoning in Santa Catarina, with a view to developing better prevention and intervention strategies. Although there are national studies on the subject, there is a lack of comprehensive and up-to-date regional data, especially considering the importance of compulsory notification for public health.

This study seeks to test the following hypotheses: main hypothesis (H1): The sociodemographic characteristics, the circumstances of exposure and the most prevalent toxic agents in cases of exogenous intoxication in the state of Santa Catarina show distinct patterns in relation to the different regions of the state, being influenced by local factors such as population profile, cultural and economic habits. And the null hypothesis (H0): There are no significant differences in sociodemographic characteristics, ex-

posure situations and toxic agents in cases of exogenous poisoning in Santa Catarina when comparing the different regions of the state.

The aim is to fill the gaps in the scientific literature by answering the guiding question: What are the prevalence, characteristics and factors associated with exogenous intoxication in the state of Santa Catarina between 2012 and 2023. And the objective of analyzing the prevalence, characteristics and factors associated with exogenous intoxications that occurred in the state of Santa Catarina between 2012 and 2022.

The results obtained can support evidence-based decisions, as well as contributing to the development of more effective public policies. Understanding risk factors and regional patterns can direct health resources and actions, promoting a reduction in the morbidity and mortality associated with exogenous intoxications and improving the quality of life of the affected population.

METHODOLOGY

This study is characterized as a cross-sectional, retrospective and descriptive epidemiological survey, with a quantitative approach, carried out with the aim of analyzing the epidemiological profile of exogenous intoxications in the state of Santa Catarina from 2012 to 2022. This design was chosen for its suitability for describing phenomena in populations and for its ability to identify patterns and trends in data collected retrospectively.

The data was obtained from the Notifiable Diseases Information System (SINAN), made available by the SUS Information Technology Department (DATASUS) through the TabNet platform. This database is publicly accessible and includes information on compulsory notifications, hospital records and emergency care, and

is widely used in epidemiological studies due to its reliability and comprehensiveness. The population data used to calculate the indicators was obtained from the IBGE⁽⁷⁾.

All confirmed cases of exogenous poisoning in the state of Santa Catarina, registered on SINAN between 2012 and 2022, were included. Cases of exogenous poisoning recorded in SINAN that were not resident in the state were excluded.

Among the possible biases, we assume underreporting, which may have occurred due to a lack of proper notification or flaws in the recording systems. This factor may have had a significant impact on the validity of the results, underestimating the real prevalence of exogenous poisoning in the state. In addition, recording errors, such as incorrect or incomplete data, may also have compromised the accuracy of the proven information. These aspects must be taken into account, as they may have influenced the generalization of the results and the interpretation of intoxication patterns in the population studied.

The variables analyzed were organized into three main categories: (1) Sociodemographic: age group, gender, pregnant woman and race; (2) Exposure Characteristics: type of exposure (acute, repeated or chronic), toxic agent, circumstance (accidental, intentional, substance abuse), and environment (home or work) and (3) Outcomes: final classification of the case, confirmation criteria and evolution (cure, sequelae or death). These variables were selected for their relevance in identifying epidemiological patterns and defining public health intervention strategies.

The data was collected in November 2023, following the steps: (1) Access to the DATASUS TabNet platform, browsing the "Health Information", "Epidemiology and Morbidity"; "Notifiable Diseases" and "Exogenous Poi-

soning" sections; (2) Selection of the variables of interest: sociodemographic information (age group, gender, pregnant woman and race), exposure characteristics (work exposure, toxic agent, circumstance and type of exposure) and clinical outcomes (final classification, confirmation criteria and evolution) and health region of residence: Far West, West, Xanxerê, Alto Vale do Itajaí, Foz do rio Itajaí, Médio vale do Itajaí, Grande Florianópolis, Meio oeste, Alto Vale do Rio do Peixe, Alto Uruguai, Nordeste, Planalto Norte, Serra Catarinense, Extremo Sul, Carbonífera, Laguna and

Vale do Itapocu.

Although the database is public, the data was processed anonymously, guaranteeing the privacy of the information collected.

Initially, the data was subjected to a descriptive analysis, calculating absolute and relative frequencies. Epidemiological indicators, such as incidence, prevalence and lethality coefficients, were calculated using IBGE population estimates.

The following formulas were used to calculate the prevalence (1), incidence (2) and lethality (3) coefficients:

$$(1) \text{ Coeficiente de Prevalência} = \frac{\text{Número de casos existentes do agravo (novos+antigos)}}{\text{Total de indivíduos na população}} \times 1000$$

$$(2) \text{ Coeficiente de Incidência} = \frac{\text{Número de casos novos do agravo}}{\text{Total de indivíduos na população}} \times 1000$$

$$(3) \text{ Taxa de Letalidade} = \frac{\text{Número de óbitos pelo agravo no período}}{\text{Número de casos do agravo no mesmo período}} \times 100(\%)$$

The data was analyzed using descriptive statistical techniques. Initially, absolute and relative frequencies were calculated for categorical variables (such as gender, age group, race, type of toxic agent, circumstances of exposure and clinical outcomes). In addition, relevant epidemiological indicators were estimated, such as incidence, prevalence and lethality rates, using IBGE population estimates to standardize the data. The analysis was structured to identify temporal and regional patterns, as well as possible inequalities related to sociodemographic determinants.

The interpretation of the results was guided by a critical and comparative approach, comparing the findings with national and international scientific literature, in order to contextualize the data and broaden the understanding of the factors that influence exogenous poisoning in the state. All the analyses were carried out using BioEstat 5.3 software, which is widely

recognized in epidemiological studies for its accessibility, practicality and reliability in the analysis of public health data.

As this is a study using a public domain database, it did not need to be submitted to the Research Ethics Committee (REC). However, it followed the ethical guidelines established for conducting studies with secondary data from public sources, set out in National Health Council Resolution 510/2016(12) which deals with the use of information in the public domain.

RESULTS

This study analyzed 67,026 cases of exogenous poisoning in the state of Santa Catarina between 2012 and 2022, revealing important regional, sociodemographic and clinical trends.

In terms of regional and temporal distribution (Graph 1), the Greater Florianópolis region had the highest number of accumulated cases during

the period, accounting for 15.49% (n=10,388) of the total, followed by the Middle Itajaí Valley (9.01%; n=6,045) and the Carboniferous re-

gion (8.93%; n=5,986). The peak in occurrences was in 2019, with 13.82% (n=9,264) of the cases recorded that year. These data suggest

demographic and socioeconomic influences on poisoning rates, as well as the importance of more solid monitoring of these regions.

Graph 1 - Occurrence of exogenous poisoning in the regions of the state of Santa Catarina between 2012 and 2022. (N=67.026)



Source: TabNet⁽¹³⁾.

The sociodemographic profile (Table 1) found was characterized by the fact that the majority of poisonings occurred in women (62.61%; n=41,969)

and in the 21 to 39 age group (43.79%; n=29,353), white race/color (86.96% (n=58,285) and complete high school (19.49%; n=13065). These data point to a greater vulnerability to poisoning

among young people and those with completed or incomplete medical education, especially women.

Tabela 1 – Perfil sociodemográfico dos casos de Intoxicação Exógena em Santa Catarina no período de 2012 a 2022. (N=67.026)

Variables	Absolute frequency (n)	Percentage (%)	Standard deviation (SD)
Gender			
Male	25055	37,38	16,4
Female	41969	62,62	20,0
Unknown/blank	2	0,00	0,0
Age group (years)			
<1	1191	1,78	8950,544
1 – 4	4985	7,44	9199,019
5 – 9	1069	1,59	18764,67
10 – 14	3382	5,05	18679,46
15 – 19	9597	14,32	18945,97

20 – 39	29353	43,79	19197,56
40 – 59	14865	22,18	18684,86
60	2580	3,85	18789,82
Ignored/White	4	0,01	19934,31
Race/Color			
White	58285	86,96	33,82
Black	2021	3,02	2,22
Yellow	292	0,44	2,47
Brown	4354	6,50	2,44
Indigenous	303	0,45	4,88
Ignored/White	1771	2,64	7,51
Schooling			
Illiterate	386	0,58	9,82
Completed elementary school	8246	12,30	9,33
Elementary school incomplete	12866	19,20	10,05
High School (MS) Incomplete	7126	10,63	10,76
High School (MS) Complete	13065	19,49	11,92
Higher Education (HE) Incomplete	1970	2,94	13,33
Higher Education (HE) Complete	2292	3,42	14,01
Ignored/White /NA	21075	31,44	0,00

Source: TabNet⁽¹³⁾.

The most common age group was 20-39 years old, with 43.79% (n=29,353), followed by 40-59 years old, 22.18% (n=14,865) and 15-19 years old, 14.32% (n=9,597). As for gender, there was a higher frequency of females, 62.62% (n=41,969) and males 37.38% (n=25,055). Regionally, Greater Florianópolis had the highest proportion of cases in the 20 to 39 age group (15.50%; n=10,388), also predominantly female (9.42%; n=6,315). This was followed by the Middle Itajaí Valley

(6.16%; n=4,126) and the Carboniferous region (5.96%; n=3,393), both with a predominance of cases in women.

As for race, 86.96% (n=58,285) of the cases self-declared as white, 6.50% (n=4,354) as brown and 3.02% (n=2,021) as black. When this data was analyzed by region of the state, the highest rate of these three races was found in the Greater Florianópolis region, with 12.23% (n=8,200) white, 1.03% (n=693) brown and 0.68% (n=455) black.

With regard to schooling, 19.49%

(n=13,065) of the cases had completed primary education, 19.20% (n=12866) had incomplete primary education and 12.30% (n=8246) had completed primary education. It is noteworthy that 31.44% (n=21075) of the individuals were not classified in terms of their level of education, and were considered to be unknown/white or not applicable.

Analysis of the characteristics of exposure included the type of exposure, toxic agent, circumstance and environment (Table 2).

Table 2 - Exposure characteristics of cases of exogenous poisoning in Santa Catarina between 2012 and 2022. (N=67.026)

Variable	Absolute frequency (n)	Percentage (%)	Standard deviation (SD)
Type of exposure			
Acute	47714	71,19	26,99
Repeated acute	10611	15,83	4,78
Chronic	2830	4,22	26,01
Ignored/White	5871	8,76	25,50

Toxic Agent			
Medication	41233	61,52	17,41
Pesticides	4132	6,16	3,01
Rodenticides	2001	2,99	3,07
Chemical products	4989	7,44	25,96
Cosmetics	257	0,38	25,99
Metal	99	0,15	27,12
Drugs of abuse	4088	6,10	28,35
Toxic plant	514	0,77	30,22
Other	4486	6,69	31,85
Ignored/White	5227	7,80	34,43
Circumstance			
Habitual use	3259	4,86	14,56
Accidental	10659	15,90	15,10
Environmental	455	0,68	15,50
Therapeutic use	309	0,46	16,08
Medical prescription	35	0,05	16,72
Administration error	734	1,10	17,41
Self-medication	2464	3,68	18,25
Abuse	5430	8,10	19,36
Food intake	1230	1,84	20,89
Suicide attempt	38524	57,48	22,45
Attempted abortion	118	0,18	1,57
Violence/murder	306	0,46	1,60
Other	736	1,10	1,52
Ignored/White	2767	4,13	0,00
Environment			
Environment	4622	6,90	37,65
Other	58034	86,58	40,03
Ignored/White	4370	6,52	0,00

Source: TabNet⁽¹³⁾.

Medicines were the main cause of poisoning in the state, accounting for 61.52% (n=41,233), followed by chemical products (veterinary, household, chemical) 7.44% (n=4989), and other types of agents 6.69% (n=4486). Pesticides accounted for 6.16%

(n=4132) of cases and drugs of abuse for 6.10% (4088).

Greater Florianópolis led the way in drug-related incidents (9.12%; n=6,114), followed by the Médio Vale do Itajaí (6.95%; n=4,659) and Carbonífera (6.55%; n=4,393). As for pesticides, the Alto Vale do Itajaí re-

gion had the highest number of cases 0.08% (n=675). Drugs of abuse accounted for 2.28% (n=1,531) and household products for 0.87% (581) cases, again concentrated in Greater Florianópolis (Table 3).

Table 3 - Representation of the main toxic agents responsible for cases of exogenous poisoning by region, Santa Catarina, 2012 to 2022. (N=67.026)

Region	Toxic Agents							
	Medicines		Drugs of Abuse		Agricultural pesticides		Household products	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Far West	978	1,46	388	0,58	227	0,34	103	0,15
West	1955	2,92	485	0,72	242	0,36	258	0,38
Xanxerê	1809	2,70	165	0,25	239	0,36	158	0,24

Itajaí River mouth	3367	5,02	500	0,75	72	0,11	201	0,30
Middle Itajaí Valley	4659	6,95	141	0,21	121	0,18	192	0,29
Greater Florianópolis	6114	9,12	1531	2,28	159	0,24	581	0,87
Midwest	823	1,23	110	0,16	58	0,09	45	0,07
Upper Rio Do Peixe Valley	2106	3,14	40	0,06	86	0,13	97	0,14
Upper Uruguay	646	0,96	18	0,03	34	0,05	17	0,03
North East	4246	6,33	167	0,25	91	0,14	282	0,42
North Plateau	1531	2,28	36	0,05	243	0,36	111	0,17
Serra Catarinense	1098	1,64	13	0,02	43	0,06	21	0,03
Far South	1713	2,56	32	0,05	104	0,16	52	0,08
Carboniferous	4393	6,55	203	0,30	132	0,20	248	0,37
Laguna	2851	4,25	133	0,20	121	0,18	133	0,20
Itapocu Valley	1807	2,70	70	0,10	190	0,28	93	0,14
Total	41233	61,52	4088	6,10	2837	4,23	2701	4,03

Source: TabNet⁽¹³⁾.

As for circumstance of intoxication, attempted suicide was identified as the most prevalent in the state, accounting for 57.47% (n=38,524) of cases in the period. The Greater Flo-

rianópolis region had the highest frequency (15.50%; n=10,388), followed by the Middle Itajaí Valley (9.02%; n=6,045) and the Carboniferous region (5.44%; n=3,647). Accidental poisonings accounted for 15.90%

(n=10,659) in the state, and were also more prevalent in Greater Florianópolis (2.40%; n=1,660). Medication abuse (8.10%; n=5,430) of the cases was more prevalent in Greater Florianópolis (2.39%; n=1,604) (Table 4).

Table 4 - Representation of the main circumstances of exposure responsible for cases of exogenous poisoning by region, Santa Catarina, 2012 to 2022. (N=67.026)

Region	Circumstance of Exposure							
	Suicide Attempt		Accidental poisoning		Medication Abuse		Self-medication	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Far west	933	1,39	591	0,88	455	0,68	110	0,16
West	1495	2,23	1075	1,60	799	1,19	128	0,19
Xanxerê	1515	2,26	737	1,10	309	0,46	181	0,27
Upper Itajaí Valley	1216	1,81	763	1,14	96	0,14	56	0,08
Mouth of the Itajaí River	3384	5,05	698	1,04	600	0,90	118	0,18
Middle Itajaí Valley	4453	6,64	602	0,90	369	0,55	190	0,28
Greater Florianópolis	5728	8,55	1606	2,40	1604	2,39	229	0,34
Midwest	741	1,11	206	0,31	171	0,26	96	0,14
Upper Rio Do Peixe Valley	1991	2,97	421	0,63	77	0,11	195	0,29
Upper Uruguay	679	1,01	117	0,17	26	0,04	38	0,06
North East	4098	6,11	809	1,21	213	0,32	166	0,25
North Plateau	1543	2,30	463	0,69	72	0,11	118	0,18
Serra Catarinense	1001	1,49	110	0,16	15	0,02	63	0,09
Far South	1524	2,27	326	0,49	76	0,11	114	0,17
Carboniferous	3647	5,44	1126	1,68	247	0,37	305	0,46
Laguna	2554	3,81	674	1,01	172	0,26	306	0,46
Itapocu Valley	2022	3,02	335	0,50	129	0,19	51	0,08
Total	38524	57,48	10659	15,90	5430	8,10	2464	3,68

Source: TabNet⁽¹³⁾.

The occurrence of exogenous intoxications in pregnant women during the period was 1.09% (n=735) of the cases, of which 0.51% (n=344) occurred during the 1st trimester of pregnancy, 0.34% (n=225) in the 2nd trimester and 0.16% (n=108) in the 3rd trimester. Around 49.42% (n=33,127) were classified as "no" and 46.55% (n=31,200) as "not applicable". The "no" and "not applicable" classifications apply respectively to cases where the female patient is not in the gestational period, and male patients. The Greater Florianópolis region had the highest number of cases of poisoning in pregnant women (0.16%; n=109), followed by Carbonífera (0.09%; n=62) and Laguna (0.09%; n=61).

With regard to the environment of exposure, the majority of poisonings (86.58%; n=58,034) occurred in the home environment, followed by 6.90% (n=4,622) in the workplace and 6.52% (n=4,370) were classified as unknown/white. The regions of the state with the highest frequency of exposure during working hours were Alto Vale do Itajaí with 1.35% (n=907), followed by Oeste with 0.79% (n=531) and Grande Florianópolis with 0.72% (n=482). The regions with the highest number of cases outside the workplace were Greater Florianópolis (13.06%; n=8754), followed by Médio Vale do Itajaí (8.46%; n=5671) and Carbonífera (8.16%; n=5467).

As for the type of exposure (Table

5), single acute exposure was predominant (71.19%; n=47,714), with the highest incidence in Greater Florianópolis (15.50%; n=10,388). The clinical criterion was the most used to confirm cases, accounting for 72.71% (n=48,732). It is worth noting that 7.83% (n=5251) cases were registered as unknown or white.

The majority of cases (84.35%; n=56,538) had a favorable outcome, with a cure without sequelae, predominantly in Greater Florianópolis (13.06%; n=8,754). Deaths accounted for (1.01%; n=677) cases in the period. However, a significant proportion were recorded as "unknown/white" (10.34%; n=6,930) and loss to follow-up (2.04%; n=1364) cases (Table 5).

Table 5 - Characterization of the type of exposure, confirmation criteria and outcome of cases of Exogenous Poisoning in Santa Catarina, 2012 to 2022. (N=67.026)

Variables	Absolute frequency (n)	Percentage (%)
Type of exposure		
Single acute	47.714	71,19
Repeated acute	10.611	15,83
Chronic	1.757	2,62
Acute over chronic	1.073	1,60
Ignored/White	5.871	8,76
Confirmation criteria		
Clinical	48.732	72,71
Clinical epidemiological	8.067	12,04
Clinical laboratories	4.976	7,42
Ignored/White	5.251	7,83
Outcome		
Cure without sequelae	56.538	84,35
Cure with sequelae	1.358	2,03
Death	677	1,01
Death from other causes	159	0,24
Loss of follow-up	1.364	2,04
Ignored/White	6.930	10,34

Source: TabNet⁽¹³⁾.

In the analysis of epidemiological indicators, the Incidence Coefficient (IC),

Prevalence Coefficient (PC) and Lethality Rate. These figures indicate the severity and impact of exogenous poisoning on

the population of Santa Catarina, with the highest rates concentrated in the Greater Florianópolis region (Table 6).

Table 6 - Representation of Epidemiological Indicators of IC, PC and overall Lethality Rate of cases of exogenous intoxication in Santa Catarina, 2012 to 2022. (N=67.026)

Year	População (IBGE)	CI (10,000 inhab.)	CP (10,000 inhab.)	Lethality (Average)
2012	6.530.943	5,0	102,6	1,01%
2013	6.620.186	5,9	101,2	
2014	6.710.154	6,7	99,9	
2015	6.802.306	7,7	98,5	
2016	6.894.058	7,5	97,2	
2017	6.984.749	9,0	96,0	
2018	7.075.494	10,8	94,7	
2019	7.164.788	12,9	93,5	
2020	7.252.502	9,5	92,4	
2021	7.338.473	9,3	93,1	
2022	7.610.361	10,6	88,1	
Average		8,6	96,0	

Source: Own elaboration.

Between 2012 and 2022, the epidemiological indicators of CI, PC and lethality rate reveal significant trends that deserve attention for analysis and development of public policies in the state. During this period, the state's population, according to IBGE data, grew from 6,530,943 inhabitants in 2012 to 7,610,361 in 2022, which may have a direct influence on the absolute number of cases recorded⁽⁷⁾.

The incidence rate, which reflects the number of new cases of poisoning per 10,000 inhabitants, showed a significant increase, from 5.0 in 2012 to a peak of 12.9 in 2019. This increase may indicate several factors, such as greater exposure of the population to toxic agents, including medicines, pesticides and chemical substances, or a possible improvement in the surveillance and case notification system. After 2019, there was a slight reduction in the incidence coefficient, which stabilized at 10.6 in 2022, which may be related to better prevention strategies or changes in the exposure pattern, especially during the COVID-19 pandemic.

On the other hand, the prevalence coefficient, which measures the total number of cases (new and existing) per 10,000 inhabitants, showed a downward trend, falling from 102.6 in 2012 to 88.1 in 2022, with an average of 96.0 over the period.

The average fatality rate, which remains stable at 1.01% throughout the period, indicates that the proportion of fatal cases in relation to the total number of cases registered has not changed much. This stability can be interpreted in different ways. On the one hand, it may indicate that clinical management is adequate to prevent the progression of serious cases; on the other, the maintenance of these rates highlights that there are still challenges in the early identification and treatment of more serious situations.

DISCUSSION

The results of this study reveal a detailed epidemiological profile of exogenous poisonings in the state of Santa Catarina between 2012 and 2022, providing relevant evidence for planning public health policies and

preventive interventions. The analysis shows a high concentration of cases in the Greater Florianópolis region, which recorded the highest incidence (15.49%), possibly due to the higher population density and greater coverage of health services, as reported by similar studies⁽⁷⁾. In contrast, less populous regions, such as Alto Uruguai Catarinense, had a lower number of cases (1.47%), suggesting possible underreporting or less exposure to risk factors.

Other factors such as access to health services, education levels and socio-economic conditions may also play an important role in the distribution of these cases in the state. Thus, urban regions or regions with better infrastructure and access to health services may have a population that is more aware of the risks associated with the consumption of toxic substances, resulting in a lower incidence of poisonings. In contrast, more distant regions or even rural areas or those with lower socioeconomic development may have a prevalence of poisoning related to a combination of factors, such as less access to health information and health services, exposure to

chemical agents such as pesticides and agricultural chemicals, as well as underreporting of cases⁽¹⁴⁾.

The predominance of cases in women (62.61%), especially in the 21-39 age group (43.79%), is consistent with national and international data that indicates greater vulnerability of this group to intentional poisoning and self-medication⁽¹⁾. Passo et al.⁽¹⁵⁾ and Rios et al.⁽¹⁶⁾ identified in their studies that young women have higher rates of exogenous intoxication and self-extermination practices due to emotional vulnerability, ease of access to medication and information, excessive workloads and cultural aspects.

Other factors that may be associated with these high rates in the female population can be attributed to the fact that women are more prone to suicidal behavior than men, as well as a higher consumption of medication, which results in a higher intentional exposure to drug poisoning⁽¹⁷⁾.

Previous studies have also highlighted the relationship between lower levels of education and a higher risk of poisoning⁽⁸⁾. In this study, although a large percentage of schooling data was recorded as unknown/white (21.32%), the majority of cases had completed or incomplete high school. In contrast to these findings, Valente et al. found that the majority of cases had incomplete primary education, with 9.2% of notifications, and 51.0% had this information ignored or blank⁽¹⁸⁾.

Alvim et al. point out that there is a scarcity of studies addressing the impact of schooling on exogenous poisoning in Brazil⁽⁸⁾. However, Silva and Costa⁽¹⁾ suggest that low schooling is associated with a higher risk of suicide. They also highlight the importance of further exploring the role of education in preventing and understanding exogenous intoxication.

Individuals with a higher level of education tend to have a better understanding of the dangers associated

with toxic substances, as well as the appropriate preventative measures. On the other hand, low levels of education may be associated with a lack of awareness of health risks and a lower ability to understand safety and prevention information⁽¹⁴⁾.

Figueiredo et al. emphasize the importance of considering education as a determining factor when developing and implementing prevention and intervention strategies in public health⁽¹⁹⁾. In this context, educational programs should be prioritized, with the aim of making the population aware of the risks associated with intoxication. Developing decision-making skills can be fundamental to reducing these events, making a significant contribution to improving the population's health conditions.

The study revealed that, in the state of Santa Catarina, a significant proportion of cases of exogenous intoxication (86.96%) occurred among self-declared white individuals, while 6.49% involved brown people and 3.01% affected black people. These results contrast with the findings of Nepomuceno, Figueiredo and Santos⁽²⁰⁾ Dias et al.⁽²¹⁾ and Valente et al.⁽¹⁸⁾ who observed a higher prevalence of poisoning in the brown population in other regions of Brazil, such as the Northeast and North, especially in the states of Bahia, Rondônia and Piauí, reflecting the population profile of these areas. On the other hand, national data indicates that the white population is the most affected⁽¹⁾.

Santa Catarina is known for its strong influence of European immigration, especially from countries such as Germany and Italy, which have historically contributed to the ethnic composition of the region. This European cultural heritage can influence the ethnic self-perception of the Santa Catarina population, as well as their behavior and health patterns⁽²²⁾.

With regard to the toxic agents

involved in poisoning, medicines emerged as the main toxic agents, accounting for 61.52% of cases, followed by drugs of abuse (6.10%) and agricultural pesticides (4.23%). Similar results were found by Valente et al. in which drug poisoning accounted for 58.5% of cases⁽¹⁸⁾ and by Frazão et al. in a national study, where drugs accounted for 74% of cases⁽²³⁾. These data corroborate studies which point to self-medication and easy access to medicines as determining factors for the high incidence, highlighting opioid classes and sedatives such as clonazepam as the main agents causing intoxication, overdose and addiction⁽²⁴⁾.

Another category that stood out was agrochemicals, commonly used in agriculture, although in a smaller proportion (4.23%), they require special attention due to the high risk of mortality associated with these substances⁽²⁵⁾. While occurrences related to household pesticides accounted for 1.83% of events.

Within this category, the most commonly used agrochemicals include pesticides such as organophosphates (OPs), carbamates (CAs), pyrethroids (PIs) and neonicotinoids (NEs), which act by blocking essential processes in the central nervous system of insects, such as the inhibition of acetylcholinesterase (AChE). These products cause harmful effects on the brain, manifesting visual symptoms such as irritation, burning, stinging and pain in the eyes. Patients' main complaints regarding the visual system include changes in near and far vision, as well as blurred vision⁽²⁵⁾.

In addition, the use of drugs of abuse such as alcohol, cocaine, crack, marijuana and tobacco represents a growing challenge, especially in young adults, where the abuse of these substances is related to adverse social and psychological conditions. Cases of intoxication by these drugs are mainly associated with two situations. The

first is acute or binge use, characterized by excessive consumption in a short period of time, which results in rapid impairment of vital functions and increases the risk of death. The second situation refers to the chronic use of these substances, in which users often develop secondary complications due to continuous use⁽²⁶⁾.

Poisoning by domestic pesticides, such as rodenticides, can even be fatal, as they affect the blood coagulation cascade, resulting in epistaxis, gastrointestinal and conjunctival hemorrhages and severe metrorrhagia. Previous studies have shown rodenticide poisoning to be one of the main causes of poisoning and suicide attempts⁽²⁷⁾.

The expansion of existing public policies, such as Law No. 7.802 of 1989, known as the Agrototoxic Law, could be an important strategy for dealing with the problem of pesticide poisoning in Santa Catarina and throughout Brazil. This law currently regulates the production, registration, marketing, use and transportation of pesticides, with the aim of protecting human health and the environment⁽²⁸⁾.

In addition, it is essential to strengthen inspection and monitoring mechanisms to ensure effective compliance with the legislation and to quickly identify cases of inappropriate or abusive use of pesticides. Implementing actions such as training health professionals and farmers to recognize the symptoms of pesticide poisoning and report suspected cases to the competent health authorities can be an effective strategy for protecting the health of the population and promoting more sustainable agricultural practices⁽²⁹⁾.

As for the circumstance of exposure, suicide attempts were the main circumstance of exposure (57.47%), reaffirming the need to strengthen mental health policies. These findings are in line with data from the World Health Organization (WHO) and other

national studies that identify attempted suicide as one of the main causes of exogenous poisoning in young people and adults^(9,18,23).

However, 2019 stands out as having the highest rate of suicide cases and attempts, a phenomenon associated with the SARS-CoV-2 pandemic, which has profoundly impacted the population's routine due to social distancing measures. Studies indicate that social exclusion has been one of the main factors behind the uncontrolled increase in psychological disorders in recent years^(30,31,32,33).

Accidental poisoning (15.90%) occurred predominantly in children and rural producers. Silva et al. point out that accidental poisonings, especially among children and farmers, can be caused by a lack of supervision, inadequate storage of toxic substances and dangerous working conditions⁽³⁴⁾. It is essential to develop prevention and intervention strategies that consider the immediate causes of exposure as well as the social determinants involved. These strategies include strengthening mental health systems, promoting safe environments in communities and workplaces, and investing in public education and awareness programs on mental health and suicide prevention.

This study also identified cases of exogenous intoxication in pregnant women, representing 1.09% of cases in the period analyzed. Among these pregnant women, 16.05% suffered intoxication as a result of abortion attempts. These data are relevant, considering that prenatal depression affects around 20% of pregnant women in Brazil, highlighting the importance of assessing mental well-being during prenatal consultations. Unfortunately, this aspect often receives little attention, despite the availability of tools such as the Edinburgh Scale, which makes it possible to assess satisfaction with interpersonal relationships and outlook on life, which are fundamental

to mental health⁽³⁵⁾.

With regard to where the poisoning occurred, this study showed that 86.58% of the cases occurred in the domestic environment, while only 6.90% occurred during working hours. Similar results were observed in the studies by Santos and Cunha⁽³⁶⁾ and Valderrama⁽³⁷⁾ who reported that more than 50% of incidents occurred in the home environment. These data suggest a possible association with suicide attempts. Bussolotto⁽³⁸⁾ reinforces this hypothesis, pointing out that the home is a facilitating place for such practices due to the easy availability of drugs such as anxiolytics, chemicals, food and alcoholic drinks. These substances, when ingested inappropriately, can become toxic agents^(1,39).

Another important characteristic in this study was the type of exposure, where the majority of exposures were of the single acute type (71.19%) and confirmed by clinical criteria (72.71%). This type of exposure reflects a pattern in which intoxication occurs rapidly and in a single instance, as opposed to chronic or repeated exposures over time. Symptoms develop acutely and immediately after this exposure^(40,41).

A study by Valente et al. carried out in Piauí revealed that this type of exposure predominated in 48.5% of cases⁽¹⁸⁾. Seeking health services in good time contributes to the low fatality rate in cases of exogenous poisoning^(23,42). Armond et al.⁽⁴³⁾ and Valente et al.⁽¹⁸⁾ state that in cases of exogenous poisoning, immediate intervention is necessary, which makes waiting for laboratory results unfeasible, making clinical diagnosis the main choice and improving patient survival.

As for the evolution of the cases, the vast majority of cases, 84.35%, had a favourable clinical outcome, characterized by a cure without sequelae. Similar results were found by Valderrama in 65.57% of cases⁽³⁷⁾ and Valente et al. in 66.9%⁽¹⁸⁾. Similarly, Dias et

al. observed in Rondônia a favorable clinical evolution in the cases analyzed during the period studied, with more than 80% of patients recovering completely, without presenting sequelae⁽²¹⁾. This data is extremely relevant, indicating that the majority of patients were able to recover completely from the intoxication without any long-term consequences for their health.

However, it is also important to note the presence of cases registered as "Ignored" or "White", which represent 10.34% (n=6,930) of the total. This category of cases suggests a lack of available information on the clinical evolution of these patients, either due to failures in registration or loss of follow-up after the initial diagnosis of intoxication^(21, 44). This information gap underscores the importance of implementing effective systems for monitoring and recording intoxication cases, ensuring that all patients receive adequate follow-up over time.

Furthermore, it is worrying to note that there was a proportion of cases, representing 2.04% (n=1,364), which were classified as "lost to follow-up". This suggests that these patients were lost from view after the initial diagnosis of intoxication, which may result in a lack of follow-up and ongoing care. This loss to follow-up can represent a significant challenge for public health, since patients can be left unattended and not receive the treatment or monitoring necessary for a full recovery.

As for epidemiological indicators, the average incidence coefficients of 8.6 cases per 10,000 inhabitants and average prevalence of 96 cases per 10,000 inhabitants indicate a significant increase in poisoning cases over the period, with a peak in incidence in 2019. This trend may be related to the economic crises and adverse social conditions, which have amplified the risk factors for toxic exposures, such as the SARS-CoV-2 pandemic^(30,31,32,33).

The reduction in prevalence, de-

spite the increase in incidence, can be explained by greater efficacy in the treatment and recovery of patients, resulting in fewer active cases remaining over time. Although cases are increasing, this suggests that medical and public health interventions may be contributing to a faster and more effective resolution of cases, as pointed out by Frazão et al.

Despite this, the fatality rate remained stable at 1.01%, possibly reflecting the effectiveness of emergency services in the clinical management of acute cases. This indicator is fundamental for assessing the severity of poisonings and the risk of mortality associated with them⁽⁷⁾.

These indicators together reflect the complexity of exogenous intoxications as a public health problem. The increase in incidence and the stability of lethality point to the need to strengthen prevention actions, such as educational campaigns on the risks of self-medication, inappropriate use of chemical products and consumption of toxic substances.

In addition, it is essential to improve access to health services for rapid diagnosis and treatment, as well as to implement more specific regional strategies, taking into account the variations observed in demographic and geographical data. These results emphasize the importance of external public policies to reduce exposure to toxic agents and to improve the epidemiological surveillance system, ensuring more effective and comprehensive interventions.

However, the high proportion of ignored or blank records found in the different variables highlights the need to improve reporting and data collection systems. Similar data was found by Valderrama⁽³⁷⁾, Frazão et al.⁽²³⁾ Valente et al.⁽¹⁸⁾.

Although this study provides an overview of the epidemiological profile of exogenous poisoning in Santa

Catarina, it has some limitations that should be considered. Firstly, the reliance on secondary data from notification systems such as SINAN may have resulted in inconsistencies and under-reporting. This is particularly evident in the high proportion of records classified as "ignored/white", which limits the interpretation of some variables, such as schooling and circumstances of exposure⁽⁴⁵⁾.

In addition, the absence of qualitative data prevents a deeper understanding of the social, cultural and psychological factors underlying poisoning cases. Nor were advanced statistical techniques explored, such as time series analysis or regression models, which could identify more complex patterns and predict future trends.

Another relevant limitation is the possible generalization of the results. Although the findings are relevant to the state of Santa Catarina, their application in other regions of the country or in international contexts should be done with caution, due to the cultural, economic and structural particularities of the region. Finally, the impact of macro-social factors, such as economic crises or pandemics, was not explored in depth, despite its relevance to understanding the increase in incidence in specific periods, such as the 2019 peak.

This study offers several contributions to public health and scientific research. The detailed analysis of epidemiological profiles updates knowledge about exogenous poisoning in Santa Catarina, highlighting more vulnerable population groups, such as young women, and highlighting medicines as the main toxic agents.

This data can serve as a basis for planning public health policies, emphasizing the importance of an integrated multidisciplinary and intersectoral approach. The promotion of educational campaigns, the strengthening of mental health policies and

stricter regulation of access to medicines and pesticides are essential to mitigate the impact of this disease on the health of the population. In addition, the regional characterization of cases allows for a more efficient allocation of resources and the development of specific interventions

Finally, the training of health professionals and the implementation of more efficient epidemiological surveillance systems are essential for improving data quality and enabling more effective interventions.

FINAL CONSIDERATIONS

This study has revealed an overview of the epidemiological profile of exogenous poisoning in Santa Catarina between 2012 and 2022, showing a predominance of cases in young women, mainly in the domestic envi-

ronment, with drugs as the main toxic agent and evidence of suicide as the most frequent circumstance. The characteristics of acute-single exposure and the effectiveness of medical interventions resulted in predominantly developed stages, highlighting the system's ability to respond.

The data obtained confirms the main hypotheses, showing significant differences in sociodemographic characteristics, exposure situations and toxic agents between the regions of the state, influenced by local factors such as population density, socioeconomic structure and access to health services. These results reinforce the need for specific regional strategies, integrating prevention actions, strengthening mental health and health education, with a focus on reducing the morbidity and mortality associated with the disease.

The expansion of educational campaigns, stricter regulation of access to medicines and pesticides, and the improvement of epidemiological surveillance systems are essential measures to mitigate the risks to public health. In addition, improving reporting and data collection systems could contribute to a more accurate understanding of poisoning patterns, guiding more concrete public policies.

Finally, the results of this study provide important input for planning preventive and interventional actions, emphasizing the relevance of intersectoral and multidisciplinary approaches to tackling this serious public health problem in Santa Catarina and promoting the population's quality of life.

References

1. Silva HCGS, Costa JB. Intoxicação exógena: casos no estado de Santa Catarina no período de 2011 a 2015. *Arq Cat Medicina*[Internet]. 2018 [cited 20 Jun. 2023];47(3):2-15. Available from: <https://doi.org/10.63845/3nnbv281>
2. Rodrigues FPM, Campos ASS, Moraes KGC, Costa MMR, Maia SC, Pontes SRS, et al. Intoxicação exógena: análise epidemiológica dos casos notificados em menores de cinco anos em São Luís-MA. *Braz J Development*[Internet]. 2021 [cited 22 Jun. 2023];7(1):9978-9995. Available from: <https://doi.org/10.34117/bjdv7n1-676>
3. Maronezi LFC, Felizari GB, Gomes GA, Fernandes JF, Riffe RT, Lindemann IL. Prevalência e características das violências e intoxicações exógenas autoprovocadas: um estudo a partir de base de dados sobre notificações. *J Bras Psiquiatria*[Internet]. 2021 [cited 25 May 2023];70(4):293-301. Available from: <https://doi.org/10.1590/0047-2085000000349>
4. Brasil. Ministério da Saúde. Portaria GM/MS Nº 5.201, de 15 de agosto de 2024. Dispõe sobre a Lista Nacional de Notificação Compulsória. *Diário Oficial da República Federativa do Brasil (DF)*; 2024 ago. 15. Seção 1, p.127.
5. FIOCRUZ. Fundação Oswaldo Cruz. Centro de Informação Científica e Tecnológica. Sistema Nacional de Intoxicações Tóxico-Farmacológicas. Casos, Óbitos e Letalidade de Intoxicação Humana por Agente e por Região: Brasil, 2017. Rio de Janeiro: FIOCRUZ, 2020.
6. Diógenes IV, Evangelista BP, Freitas TS, Silva IF, Freitas KM, Duarte RB. Perfil dos casos notificados de intoxicação exógena em um município cearense no período de 2017 a 2021. *Res Soc Dev*[Internet]. 2022 [cited 25 Jun. 2023];11(12):1-12. Available from: <https://doi.org/10.33448/rsd-v11i12.34477>
7. IBGE. Instituto Brasileiro de Geografia e Estatística. Cidades e Estados: Santa Catarina. Rio de Janeiro: IBGE, 2022.
8. Alvim ALS, França RO, Assis BB, Tavares MLO. Epidemiologia da intoxicação exógena no Brasil entre 2007 e 2017. *Braz J Dev*[Internet]. 2020 [cited 22 Apr. 2023];6(8):63915-63925. Available from: <https://doi.org/10.34117/bjdv6n8-718>
9. Silva Neto IF, Ricardino IEF, Marques AEF. Intoxicações exógenas por medicamentos no Brasil entre os anos 2010 e 2017: um estudo transversal retrospectivo. *Diversitas J*[Internet]. 2021 [cited 16 May 2023];6(3):3293-3306. Available from: https://doi.org/10.48017/Diversitas_Journal-v6i3-1318
10. Zanette CM, Evangelista FF. Intoxicação exógena:

análise epidemiológica dos casos notificados em crianças no Município de Maringá (PR). *Saud Pesq*[Internet]. 2022 [cited 10 Jun. 2023];15(4):1-15. Available from: <https://doi.org/10.17765/2176-9206.2022v15n4.e11113>

11. RIPSAs. Rede Interagencial de Informação para a Saúde. Organização Pan-Americana de Saúde (OPAS). Indicadores básicos para a saúde no Brasil: conceitos e aplicações. Brasília: Organização Pan-Americana da Saúde, 2008 [cited 13 Dec. 2024]. Available from: <http://tabnet.datasus.gov.br/tabdata/livroidb/2ed/indicadores.pdf>

12. Brasil. Resolução nº 510, de 07 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais. *Diário Oficial da República Federativa do Brasil*(DF); 2016 maio 24 may 2016.

13. Brasil. Ministério da Saúde. Departamento de Informática do SUS - DATASUS. Informações de Saúde - TABNET[Internet]. Brasília: Ministério da Saúde, s.d. [cited 10 July 2024]. Available from: <https://datasus.saude.gov.br/informacoes-de-saude-tabnet/>

14. Lima Filho CA, Silva MVB, Bernardino AO, Vieira CM, Nunes AMB, Souza KRF, et al. Perfil das intoxicações exógenas por medicamentos na região Nordeste do Brasil. *Res Soc Dev*[Internet]. 2022 [cited 25 Apr. 2024];11(14):1-10. Available from: <https://doi.org/10.33448/rsd-v11i14.36371>

15. Passo MS, Viana ML, Figueredo AS, Freitas AC. Perfil epidemiológico das intoxicações exógenas em uma cidade do sudoeste maranhense. *Rev Pesq Saúde*[Internet]. 2021 [cited 25 Feb. 2024];21(3):101-104. Available from: <https://periodicoeletronicos.ufma.br/index.php/revistahuufma/article/download/17640/9610>

16. Rios ISR, Santos JPM, Borges UA, Falcão LF. Perfil epidemiológico dos casos de intoxicação exógena no estado de Mato Grosso. *Rev Ciência Est Acad Medicina*[Internet]. 2022 [cited 10 Mar. 2024];16(2):8-24. Available from: <https://periodicos.unemat.br/index.php/revistamedicina/article/view/6236>

17. Mota AND, Pereira RR, Franck JG, Polisel CG. Caracterização das intoxicações agudas registradas em São Luís/MA: a importância das instituições hospitalares como centros notificadores. *Rev Bras Farm Hosp Serv Saúde*[Internet]. 2015 [cited 26 Mar. 2024];6(3):6-11. Available from: <https://rbfhss.emnuvens.com.br/sbrafh/article/view/228>

18. Valente IA, Varão CA, Silva MG, FéYM, AndradeALDC, Andrade GC. Perfil epidemiológico de pacientes com intoxicações exógenas no estado do Piauí. *Rev Epidem Saúde Pub*[Internet]. 2024 [cited 13 Dec. 2024];2(3):32-49. Available from: <https://doi.org/10.59788/resp.v2i3.93>

19. Figueiredo KC, Costa FL, Sangioni LA, Brondani ER,

Piva C, Campos MMA, Weiller TH. O papel da escola no controle e prevenção das intoxicações por medicamentos e saneantes em crianças. *Rev Gest Saúde*[Internet]. 2013 [cited 01 May 2024];4(4):1545-1555. Available from: <https://periodicos.unb.br/index.php/rgs/article/view/401>

20. Nepomuceno AFSF, Figueiredo MS, Santos LO. Análise do perfil de intoxicação exógena no estado da Bahia entre 2012 a 2021. *Rev Ciênc Plural*[Internet]. 2023 [cited 01 May 2024];9(1):1-14. Available from: <http://dx.doi.org/10.21680/2446-7286.2023v9n1id30340>

21. Dias AB, Guimarães AS, Lima JP, Moraes VNE, Souza LFB. Intoxicação exógena: perfil epidemiológico do estado de Rondônia nos anos de 2015 a 2020. *Ver Mult Saúde*[Internet]. 2022 [cited 20 Apr. 2024];3(1):1-9. <http://dx.doi.org/10.51161/rem/3138>

22. Pimenta MCA. Percursos históricos e paisagens culturais: o legado dos imigrantes em Santa Catarina. *Caminhos Geografia*[Internet]. 2018 [cited 01 May 2024];19(67):126-142. Available from: <https://doi.org/10.14393/Hygeia196709>

23. Frazão LFNF, Hussein HE, Silva AM, Monteiro PAA, Lopes GF, Moreira LA, et al. A epidemiologia das intoxicações exógenas das regiões brasileiras no período de 2017 a 2023. *Contrib las Cienc Sociales*[Internet]. 2023 [cited 13 Dec. 2024];16(10):24113–24122. Available from: <https://doi.org/10.55905/revconv.16n.10-318>

24. Santos MCP, Brasil TN, Rabelo MWF, Pinho LL, Monteiro DLM, Moreira MCC, et al. Análise de intoxicação por medicamentos. *Arq Ciênc Saúde Unipar*[Internet]. 2023 [cited 13 Dec. 2024];27(4):1617-1632. Available from: <http://dx.doi.org/10.25110/arqsaude.v27i4.2023-004>

25. Barbosa IAJ, Alvarez MFR, Bechara LCB, Khuu SK. Impairment of visual and neurologic functions associated with agrochemical use. *Plos One*[Internet]. 2023 [cited 20 Apr. 2024];18(8):1-12. Available from: <http://dx.doi.org/10.1371/journal.pone.0290263>

26. Santana CJ, Hungaro AA, Cristophoro R, Elvira IKS, Gavioli A, Oliveira MLF. Caracterização de pacientes intoxicados por drogas de abuso em terapia intensiva. *Rev Elet Saúde Ment Álcool Drog*[Internet]. 2020 [cited 20 Apr. 2024];16(1):1-8. Available from: <http://dx.doi.org/10.11606/issn.1806-6976.smad.2020.151960>

27. Martins BF, Hungaro AA, Santos JAT, Meschial WC, Correia LM, Oliveira MLF. Intoxicação por raticida em um Centro de Assistência Toxicológica. *Rev Rede Enf Nordeste*[Internet]. 2016 [cited 01 May 2024];17(1):3-9. Available from: <https://www.redalyc.org/journal/3240/324044160002/html/>

28. Lopes CVA, Albuquerque GSC. Agrotóxicos e seus impactos na saúde humana e ambiental: uma revisão

- sistemática. *Saúde Debate*[Internet]. 2018 [cited 24 Feb. 2024];42(117):518-534. Available from: <https://doi.org/10.1590/0103-1104201811714>
29. Dantas JSS, Uchôa SL, Cavalcante TMC, Pennafort VPS, Caetano JA. Perfil do paciente com intoxicação exógena por “chumbinho” na abordagem inicial em serviço de emergência. *Rev Elet Enf*[Internet]. 2013 [cited 20 Apr. 2024];15(1):54-60. Available from: <http://dx.doi.org/10.5216/ree.v15i1.15506>
30. Greff AP, Melo BD, Lima CC, Pereira DP, Alves EGR, Cornejo E, et al. Saúde mental e atenção psicossocial na pandemia COVID-19: suicídio na pandemia COVID-19. *FIOCRUZ*, 2020.
31. Schuck FW, Weber GMF, Schaefer CK, Reinheimer MW, Rockenbach DM. A influência da pandemia de COVID-19 no risco de suicídio. *Braz J Health Rev*[Internet]. 2020 [cited 13 Dec. 2024];3(5):13778-13789, 2020. Available from: <https://doi.org/10.34119/bjhrv3n5-194>
32. Pedreira RBS, Santos L, Vilela ABA, Rocha RM, Borey RNSO. Impactos reais e/ou potenciais da pandemia de Covid-19 na saúde mental de idosos. *Arq. Ciênc Saúde UNIPAR*[Internet]. 2022 [cited 13 Dec. 2024];26(3):441-457. Available from: <https://pesquisa.bvsalud.org/portal/resource/pt/biblio-1399128>
33. Silva Junior AP, Silva Junior FJG, Sales JCS, Monteiro CFS, Miranda PIG. Estratégias para prevenção e posvenção do suicídio em tempos de pandemia de Covid-19. *Interface-Comunic Saúde Educ*[Internet]. 2023 [cited 13 Dec. 2024];27:1-14. Available from: <https://doi.org/10.1590/interface.230181>
34. Silva EV, Soares DVM, Santos RRB. Perfil das tentativas de suicídio por intoxicação exógena no Brasil no período de 2007 a 2017. *Trabalho de Conclusão de Curso [Graduação em Farmácia] – Faculdade Pernambucana de Saúde*, 2019.
35. Steen M, Francisco AA. Bem-estar e saúde mental materna. *Acta Paul Enf*[Internet]. 2019 [cited 01 May 2024];32(4):3-6. Available from: <http://dx.doi.org/10.1590/1982-0194201900049>
36. Santos RR, Almeida Neto OP, Cunha CM. Perfil de vítimas de intoxicações exógenas agudas e assistência de enfermagem. *Rev Enf Atenção à Saúde*[Internet]. 2015 [cited 29 Mar. 2024];4(2):45-55. Available from: <https://seer.ufm.edu.br/revistaeletronica/index.php/enfer/article/view/978>
37. Valderrama IS. Perfil epidemiológico das intoxicações exógenas no Estado da Bahia, 2011 a 2019. 2020. *Trabalho de Conclusão de Curso [Especialização em Epidemiologia Aplicada aos Serviços do SUS] - Escola Fio-cruz de Governo, Fundação Oswaldo Cruz*, 2020.
38. Bussolotto F. Prevalência de intoxicação exógena em um município do centro-oeste do Paraná. *Trabalho de Conclusão de Curso [Graduação em Enfermagem] - Faculdade Guairacá*, 2019.
39. Amaral VGAS, Silva MT, Lima RQ. Intoxicação exógena causada por produtos de uso domiciliar em Manaus-AM. *Braz J Develop*[Internet]. 2020 [cited 20 Apr. 2024];6(12):100126-100133. Available from: <https://doi.org/10.34117/bjdv6n12-487>
40. Bortolotto CC, Hirschmann R, Martins-Silva T, Facchini LA. Exposição a agrotóxicos: estudo de base populacional em zona rural do sul do Brasil. *Rev Bras Epidemiol*[Internet]. 2020 [cited 20 Apr. 2024];23:1-11. Available from: <http://dx.doi.org/10.1590/1980-549720200027>
41. Carvalho KP, Corassa RB, Petarli GB, Cattafesta M, Zandonade E, Salaroli LB. Intoxicações exógenas por agrotóxicos no Espírito Santo, 2007-2016: distribuição espacial e tendências da taxa de incidência e letalidade dos casos notificados. *Epidemiol Serv Saúde*[Internet]. 2022 [cited 20 Apr. 2024];31(2):1-17. Available from: <http://dx.doi.org/10.1590/s2237-9622202000200008>
42. Rodrigues N, Mansos TPC, Carvalho MS, Oliveira JDD. Perfil epidemiológico das intoxicações exógenas no Tocantins de 2014 a 2019. *Rev Patologia Tocantins*[Internet]. 2022 [cited 20 Apr. 2024];9(1):14-20. Available from: <http://dx.doi.org/10.20873/10.20873/ufmt.2446-6492.2022v9n1p14>
43. Armond JE, Armond TE, Pereira TC, Chinaia C, Vendramini TL, Rodrigues CL. Self-injury and suicide attempt among the elderly population in the city of São Paulo. *J Bras Psiquiatria*[Internet]. 2017 [cited 20 Apr. 2024];66(2):83-88. Available from: <http://dx.doi.org/10.1590/0047-2085000000154>
44. Campos ON, Pinto RMF. A responsabilização do médico pela ausência de informações no tratamento e a necessidade de humanização. *Unisantia Law Soc Sci*[Internet]. 2020 [cited 01 May 2024];8(2):252-270. Available from: <https://periodicos.unisantia.br/index.php/lss/article/view/2507>
45. Pagnoncelli C, Chagas SL, Souza AP, Zanella CL, Borille DC, Jardim JKB, Amaral RF. Analysis of the epidemiological profile of suicide cases in a municipality in the midwest of Santa Catarina state. *Res Soc Dev*[Internet]. 2022 [cited 25 Apr. 2024];11(17):1-17. Available from: <https://doi.org/10.33448/rsd-v11i17.39092>