Tanzania Journal of Health Research
Volume 23, Number 4, October 2022 https://dx.doi.org/10.4314/thrb.v23i4.10

Exogenous poisoning in Tocantins, Northeast Brazil: a retrospective study from 2017 to 2021

Dany Geraldo Kramer[1] and Amanda Pereira Ferreira[2]

[1] *POSTGRADUATE PROGRAM IN FAMILY HEALTH – RENASF, Federal University of Rio Grande do Norte.*
[2] *POSTGRADUATE PROGRAM IN FAMILY HEALTH – RENASF, Federal University of Rio Grande do Norte*

Abstract:
Background: Exogenous intoxication occurs due to the interaction with some chemical substances that lead to the appearance of varied signs and symptoms, from topical exanthema to severe systemic complications, hemorrhages, shock, coma and death. Therefore, it is important to report cases to epidemiological surveillance for the implementation of practices and actions that lead to their prevention. Thus, the objective was to analyze the compulsory notifications for exogenous intoxication in the Brazilian Northeast from 2014 to 2017.
Methods: For that, a descriptive, retrospective and quantitative study were developed from cases reported in the National System of Diseases and Notifications (SINAN) in the Northeast region of Brazil.
Results: A total of 101,845 cases of exogenous intoxication were reported, with a greater predominance among: women (52.74%); brown race/colour (61.42%) and age group from 20 to 39 years (37.88%). The drug was the main cause of intoxication with 35,646 cases (34.99%). The suicide attempt stood out in the circumstances studied (24.54%). The acute clinical criterion was the most relevant with 54,836 cases and the most observed clinical course was cure without sequelae (65.61%). There were no records for the following variables: Ethnicity (27.90%); Education (20.33%); Toxic agent (19.10%); Clinical course (30.10%) and Circumstance (23.84%).
Conclusion: Thus, it was possible to verify that an exogenous intoxication is an investigation event of extreme relevance to public health. This fact suggests the need for preventive actions and health education for the population of the region.

Keywords: Epidemiology, Poisoning, Exogenous, Tocantins, Brazil.

***Corresponding author:** dgkcs@yahoo.com.br

INTRODUCTION

Exogenous intoxications occur through contact with chemical substances present in synthetic or natural products, which may be intentional or accidental. Among the items with the highest occurrence of exogenous intoxications in Brazil are medicines, food/alcohol and household products (Perez *et al.,* 2018; Chaves *et al.,* 2017). In addition, other frequent causes of exogenous intoxication are observed, such as pesticides, rodenticides, cosmetics, drugs of abuse and toxic plants. In Brazil, this represents 4,800,000 new cases each year. (Hassanian et *al.,* 2015; Viera *et al.,* 2016; Brasil, 2016; Carvalho *et al.,* 2017). As for the circumstances, there is a higher frequency of accidents among children, and intentional cases among adolescents and young adults, mainly to carry out the act of suicide by medication. Among the elderly, however, they occur due to ingestion of products in wrong doses or exchanges without proper guidance from Caregivers (Perez *et al.,* 2018; Chaves *et al.,* 2017; Marino *et al.,* 2017).

Exposure to these toxic agents can lead to clinical course at varying levels, depending on the dose, nature of the chemical agent, exposure time, route of contact and individual

susceptibility. Topical rash, nausea, headache and generalized complications (bronchoaspiration, gastrointestinal tract injuries, liver disease, hemorrhages, cardiovascular changes, shock, coma and death may be observed. (Klassen & Watkins, 2015; Perez *et al.,* 2018; Bouchard *et al.,* 2017)

The symptoms of intoxication associated with some of the most frequent toxic agents are reported, such as pesticides (nausea, vomiting, diarrhoea, colic, headache, dizziness and dermatitis); psychotropic and analgesic drugs (rash, vomiting, fever, intense sweating and convulsions (Rangel & Francelino, 2018); rodenticides (Strychnine – lead and coumarins) which can lead to nausea, vomiting or bleeding (Martin *et al.,* 2016) and beverages, cosmetics, drugs of abuse and toxic plants that can lead to nausea, vomiting, liver and cardiovascular disorders (Cavalcante *et al.,* 2015; Rodrigues *et al.,* 2019; Bacheti *et al.,* 2017; Maciel *et al.,* 2018).

In Brazil, there is a predominance of exogenous intoxications among women, the circumstance being most frequently related to a suicide attempt. In addition, adolescents and young adults between 15 and 30 years old are included, with the use of medication as the most predominant toxic agent (Silva & Costa, 2018). Similar to what happened in other countries, Gonzalez *et al.,* (2018) pointed out, in a study in Ecuador, cases of exogenous intoxication are predominant among young adults between 19 and 30 years old, and pesticides, alcohol and medicines as the most frequent toxic agents. In turn, Mendoza *et al.,* (2018), in a study in Angola, observed a higher occurrence of intoxications among children up to 10 years of age, with the most frequent toxic agents being chemicals (51.5%) and drugs of abuse 22.1%.

In Brazil, exogenous intoxications are compulsory notifications, where the health service at the entrance of the patient must register the occurrence in the government system according to the Brazilian Ministry of Health. However, in several Brazilian regions, notifications are not made or there are incomplete information records, which makes epidemiological assessment difficult, as well as the elaboration of intervention practices (Chaves *et al.,* 2017; Ribas *et al.,* 2019).

In this sense, discussing this topic is relevant, since there are hundreds of thousands of deaths annually and tens of millions of people with compromised health, which are more prevalent in developing countries (Maia *et al.,* 2019). Thus, the objective was to analyze the compulsory notifications for exogenous intoxication in the Brazilian Northeast from 2014 to 2017.

METHODS

Setting

The state of Tocantins is located in the northern region of Brazil, with a population of approximately 1,607,363 inhabitants, distributed in 139 municipalities (Ibge, 2021). The state has a geographic area of 277,720.41 km² with a population density of 4.98 inhab/km² and a human development index of 0.699 (Nascimento et al., 2021). Tocantis is divided into 08 micro-regions (Araguaína -323,491 inhabitants; Bico do Papagaio - 217,560 inhabitants; Dianopólis - 124,820 inhabitants; Gurupi - 151,930 inhabitants; Jalapão - 80,915 inhabitants; Miracema do Tocantins - 149,583 inhabitants; Porto Nacional - 413,057 inhabitants and Rio Formoso 128,892 inhabitants (Ibge, 2021).

Study design

It was exploratory (in which it brings the researcher closer to facts and phenomena related to the study problem); transversal (where data collection and analysis takes place at a specific time defined by the researcher) and retrospective (information is collected prior to the exposure facts) (Prodanov & Freitas, 2013). (Prodanov & Freitas, 2013).

Data sources and ethical aspects

Data were collected from the SINAN database – National System of Diseases and Notifications, related to reported cases of exogenous intoxication in the Tocantins - Brazil were analyzed. SINAN is a database system with the registration of information in the public domain, in which there is no record of personal data, for which authorizations from the ethics committee are waived.

Variables

The SINAN system was consulted regarding records of information associated with cases of exogenous intoxication, for the period corresponding the years 2017 to 2021. The variables consulted were socio-demographic aspects, etiological agent, disease evolution, circumstances and type of exposure. Data were recorded in Excel software and analyzed descriptively.

Results

From the data collected at SINAN, 8,639 cases of exogenous intoxication reported in the state of Tocantins - Brazil was observed between 2017 and 2021. As for the geographical distribution of cases in the microregions of the state, there was a greater predominance in Porto national (36.28%) and Araguaína (31.22%), as illustrated in Figure 01.

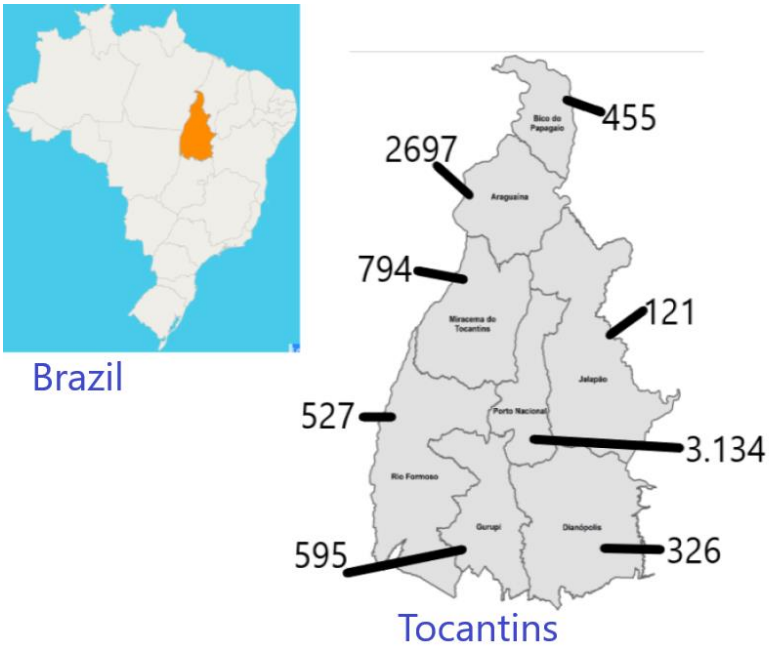

Figure 01: Reported cases of exogenous intoxication in Tocantins – Brazil, between 2017 and 2022. Source: Adapted from IBGE, 2021; Nascimento *et al.*, 2021; Ministry of Health/SVS, 2022.

Regarding the incidence of cases, per year of occurrence, there was an increase between the years 2017 and 2019, followed by a decrease and stability in the following periods, as illustrated in Figure 02.

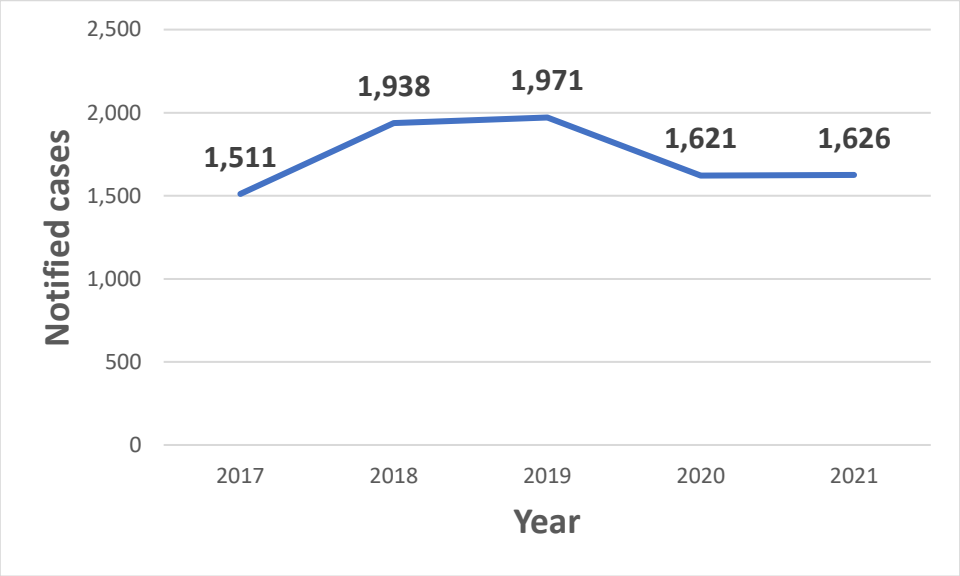

Figure 02: Reported cases of exogenous intoxication in Tocantins – Brazil – cases per year.

As for the sociodemographic profile of the reported cases with exogenous intoxication, a greater predominance was observed among people aged between 20 and 39 years (37.86%); higher occurrence among women (60.19%) and of mixed race (80.69%), as shown in Table 1.

Table 1 - Socio-demographic profile of exogenous intoxication cases in the State of Tocantins - Brazil from 2017 to 2021

Variable	Notified cases (n)
Age group (years)	
Until 1 year	219
01 - 04	**1360 (15,34%)**
05 - 09 a	337
10 - 14	450
15 – 19	**1.503 (17,40%)**
20 - 39	**3.271 (37,86%)**
40 - 59	1.185
60 or more	343
Sex	
Feminine	**5.200 (60,19%)**
Male	3.467
Ethnicity	
White	1.037
Black	270
Yellow	208
Brown	**6.971 (80,69%)**
Indigenous	35
Missing report	146

Another item investigated referred to the toxic agent, with drugs as the main cause with 44.66%. The suicide attempt (41.54%) stood out in the circumstances studied and the type of single acute exposure was recorded as the most frequent (82.54%), according to the results described in table 2.

Table 2 - Profile of types of exogenous intoxication in Tocantins/Brazil from 2017 to 2021

Variable	Notified cases (n)
Toxic agent	
Medication	**3.858 (44,66%)**
Agricultural pesticide	643
Household pesticide	344
Rodenticide	318
Household products	**669 (7,74%)**
Drugs of abuse	190
Toxic plant	142
Chemicals	247
Veterinary products	195
Food and drinks	**796 (9,21%)**
Others	600
Missing report	691
Circumstance	
Usual Use	517
Accidental	**2.439 (28,23%)**
Environmental	209
Therapeutic use	109
Self-medication	232
Abuse	202
Food intake	**696 (8,06%)**
Suicide attempt	**3.589 (41,54%)**
Others	327
Missing report	347
Type of exposure	
High-single	**7.131 (82,54%)**
High-repeated	**815 (9,43%)**
Chronicle	51
Acute over chronic	27
Missing report	643

As for the clinical course, in the present study, a higher frequency of patients who evolved without sequelae (76.93%) - Figure 03.

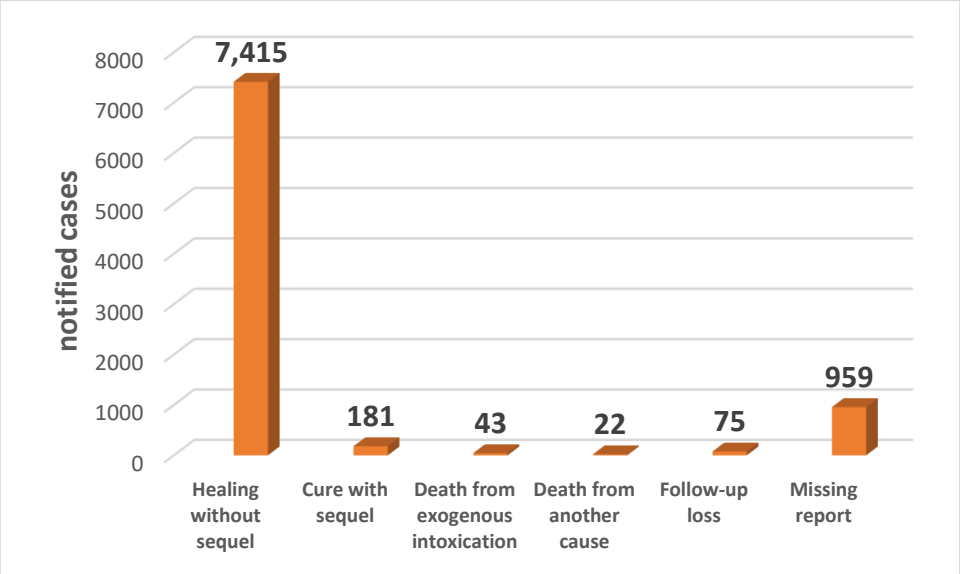

Figure 03: Profile of the final classification of cases of exogenous intoxication in the regions of the State of Tocantins from 2017 to 2021.

Discussion

As illustrated in Figure 01, the highest incidence of reported cases for the analyzed period occurred in the micro-regions of Porto Nacional (413,057 inhabitants) and Araguaína (323,091 inhabitants). This fact can be partly explained by the fact that they are the most populous regions, which would lead to greater exposure of people and greater notification of cases in absolute numbers. On the other hand, these are regions where high-complexity health services are located, or referral services, in which patients from locations without such services are referred.

The decrease, figure 02, observed after 2019 could be due to a process of health education on the subject or awareness of the population. On the other hand, the years 2020 and 2021 were characterized by the COVID 19 pandemic with measures to restrict the movement of people in several countries and states, including Tocantins, this may have contributed to the reduction of exposure to intoxication since such as bars were closed, or even an underreporting of cases, and there may have been no searches for health services by the intoxicated patient, or the overload of medical services with cases of COVID 19, contributing to the non-recording of relevant information.

Of the 8,639 cases of exogenous intoxication reported between 2017 and 2021 in Tocantins, 5,200 cases occurred in females (Table 01). This collaborates with the study by Guimarães *et al.,* (2020) and Gonzalves *et al.,* (2018), in which the authors justify this finding in part, because women in general are people who use a greater amount of medicines and cosmetics, in addition to in this group the greatest practice of self-medication. In the present study, it was observed the occurrence of 60.19% among women of notified cases - Table 01.

As for the age range variable (Table 01), similarities were observed with the studies by Maia *et al.,* (2019) and Rangel; Francelino (2018), in which there was a predominance of cases in the 20-39 age group (37.86%). This fact can be justified by the fact that this age group has an economically active population with greater access to medicines and chemical products in general. Circumstances of accidents, allergies and suicides are also associated.

Regarding ethnicity (Table 01), Gonçalves *et al.,* (2018) comment that the greater number of cases reported in a particular ethnic group may be associated with the ethnic predominance of the population of a region. In the case of Tocantins, there is a predominance of the mixed-race population, which would partly explain why 80.69% of the reported cases belong to this group.

The data found in the present study correlate with those observed in the literature in general, in which the main causes of exogenous intoxication (Table 02) in Brazil are associated with medication intake (Cavalcante *et al.,* 2015; Maria *et al.,* 2019; Range; Francelo, 2018). This can be partly explained by the high rate of self-medication, associated with the circumstances of medical prescription and medication administration errors (Vieira *et al.,* 2016; Cavalcanti *et al.,* 2015).

Regarding the clinical circumstance of intoxication, the predominance of suicide (Table 02) was in first place, followed by the accidental form. This is not only a Brazilian reality, but it was also reported in Ecuador by Gonzalez *et al.,* (2018), indicating the use of medication as the main cause of suicide attempt. The use of psychotropic drugs stands out as the main group used for this purpose, especially among women, since suicide attempts are more frequent among men through violent methods. The increasing rate of this circumstance has multifactorial causes, although some authors point to the main causes of vulnerability to conflicts and life problems (Maronezi *et al.,* 2021; Machado & Santos, 2015).

The population of the present study presented acute exposure as prominence (82.54% - Table 02) similar to what was observed by Gonçalves *et al.,* (2018) where more than 70% of the reported cases presented this condition. This factor may be important for the morbidity and mortality of this clinical condition, since it intensifies in multiple exposures, which can lead to sequelae and chronic effects.

As for the final classification profile, Figure 03, it can be said that the prognosis of intoxication cases depends on the composition, toxicity, dose, exposure time, rescue time and route of contact with the toxic agent (Aguiar *et al.,* 2017; Bouchard *et al.,* 2017; Castillo *et al.,* 2019; Klaassen & Watkins, 2015).

Observing the data described above, it is important to reinforce health education actions, especially in the aspects of self-medication and mental health, so that the reported rates can be reduced, especially in suicide attempts and drug intoxications, mitigating them. impacts on public health, already lacking in resources in Brazilian states. And for valuing the life of the general population, especially the socially vulnerable.

Finally, in numerous variables, a large number of ignored/blank data was observed, a fact that can mask the real situation of the analyzed cases, being important actions of sensitization and inspection of the professionals involved in the sectors for the adequate registration, so that programs and /or public policies can be properly directed to the problem of exogenous intoxication in Tocantins-Brazil.

As the study of the study refers to the number of data that were not registered in the system, keeping several variables, affecting the real profile of the registered cases and their associations.

Conclusion

Based on the data presented, it was possible to characterize the exogenous intoxications recorded in Tocantins - Brazil, from 2017 to 2021, with a predominance of young adults, females, mixed race, drug agents, the circumstance of suicide attempt, single acute exposure and evolution without sequel. And numerous variables with ignored/blank data.

This missing information jeopardizes the process of monitoring higher quality cases of introxiations. In addition, the State of the problem cantins must be mentioned, the State of the study of incidents, which presents an alert of problems - Brazil, being reduced the cited cases of health problems, must be cited to the profile of intoxication, being one of the cited cases of health problems, of cases of incidents of inclusion, being an alert for health problems, of occurrences of incidents of inclusion, being an alert for health problems of the mental health of the local population.

Thus, it is concluded about the importance of implementing active surveillance programs in Tocantins-Brazil, seeking reliable records of exogenous intoxication cases that have occurred, which can contribute to education/prevention programs seeking to improve the quality of care. to users and reduction of cases.

Declaration of Conflicting Interests

The Author(s) declare(s) that there is no conflict of interest.

Reference

Aguiar, K VCS; Cruz, R. C; Silva, R. T. A. Intoxicação exógena acidental em crianças no estado da Bahia: 2013 a 2017 REAS/EJCH | Vol.12(11) | e3422 |, 2020

Amaro, D. M. C.; Padron, J. L. C.; Lopex M A. H. Comportamiento de las intoxicaciones agudas en la unidad de cuidados intensivos pediátricos de Cienfuegos. Medisur vol.15 no.4 Cienfuegos jul.-ago, 2017.

Bachetti, L. S., Sergio S F, Quagllica M. , A C. O efeito do álcool na percepção visuoespacial e na cognição do espaço. PSICOLOGIA,SAÚDE & DOENÇAS, , 18(2), 451-461, 2017

Batista LA, Sousa MDR, Rocha RJ. Perfil epidemiológico dos casos de intoxicação notificados no Estado do Maranhão. Rev. Investig, Bioméd. São Luís, 9(2): 129-137, 2017

Bouchard, J.; Lavergne, V.; Roberts, D.M.; Cormier, M. Availability and cost of extracorporeal treatments for poisonings and other emergency indications: a worldwide survey. Nephrol Dial Transplant.;32(4):699–706. 2017.

Brasil, Ministério da Saúde. PORTARIA NO – 204/2016. Lista Nacional de Notificação

Compulsória de doenças, agravos e eventos de saúde pública. 2016.
Carvalho FSA, Mororo WMD, Alencar YCA, Sousa MNA. intoxicação exógena no estado DE MINAS GERAIS, BRASIL. C&D-Revista Eletrônica da FAINOR, Vitória da Conquista, v.10, n.1, p.172-184, jan./abr. 2017
Castillo YQ, Rodriguez YN, Rodriguez Y. Intoxicaciones exógenas por intentos suicidas en una unidad de cuidados intensivos. MEDISAN vol.23 no.6 Santiago, 2019.
Cavalcante, T. B. S.; Silva, F. S. H.; Menezes, S. A. Uso de cosméticos: riscos a saúde oriundos da automedicação, IN: Encontro de Extensão, Docência e Iniciação Científica (EEDIC), 2015.
Chaves LHS, Viana AC, Mendes Junior WPM. Silva AL. Intoxicação exógena por medicamentos: aspectos epidemiológicos dos casos notificados entre 2011 e 2015 no Maranhão. Tentativa de suicídio por intoxicação exógena na faixa etária de 10-19 anos no Brasil. ReonFacema. Abr-Jun; 3(2)477-482, 2017
Epifanio, I. S.; Magalhaes, L. M. V.; Brandespim, D. F. Casos de intoxicação exógena no estado de Pernambuco no ano de 2017. Revista Informação Em Cultura, 1(2), p. 27-42. 2019.
Gonzalez, C. M. R.; Ponce, A. G.; Serrano, A. B. Características clínicas y epidemiológicas de las intoxicaciones en el Hospital General Docente Ambato de Ecuador, 2013 a 2014. Revista Virtual Sociedad Paraguaya de Medicina Vol. 5 Num. 1 2018.
Guimarães, T. R. A.; Lopes, R. K. B.; Burns G. V.. Perfil epidemiológico das vítimas de intoxicação exógena em Porto Nacional (TO) no período de 2013 a 2017. Scire Salutis, v.9, n.2, p.37-48, 2019
Gonçalves e Silva, H. C., & Costa, J. B. da. INTOXICAÇÃO EXÓGENA: CASOS NO ESTADO DE SANTA CATARINA NO PERÍODO DE 2011 A 2015. Arquivos Catarinenses De Medicina, 47(3), 02–15. (2018).
Guzman EM, Cha CB, Ribeiro JD. Suicide risk around the world: a meta-analysis of longitudinal studies Social Psychiatry and Psychiatric Epidemiology December, Volume 54, Issue 12, 2019
Hassanian MH, Ranjbar M, Fanarghi F, Zamani F. Stimulant toxicity in children: a retrospective study on 147 patients. Pediatr Crit Care Med.;16(8):e290–6. 2015.
Ibge. Instituto Brasileiro de Geografia e Estatística. Dados sobre cidades. 2021.
Klaassen, C.; Watkins, J. B. Fundamentos Em Toxicologia de Casarett e Doull. Amgh Editora , 4ª Ed. 472 P. 2015
Machado DB, Santos DN. Suicídio no Brasil, de 2000 a 2012. Jornal Brasileiro de Psiquiatria; 64(1):45-54; 2015.
Machado FP, Soares MH, Francisquini PD. Profile of cases suspected of attempted suicide by exogenous intoxication. Journal of Nursing Education and Practice, , Vol. 9, No. 2, 2019.
Maciel, J. M. M.; Brito, R. C.; Sousa, E. R. Análise retrospectiva das intoxicações por plantas no brasil no período de 2000-2015 Revinter, v. 11, n. 03, p. 74-86, out. 2018.
Maia, S. S.; Souza, V. S.; Souza, E. D.; Faustino, T. N. Anos potenciais de vida perdidos por intoxicação exógena no Brasil no período de 2007 a 2017. Rev Enferm Contemp.;8(2):135-142, 2019.
Marino P, Zlateva S. Bonchev G. acute narcotic drug intoxications: etiology, sex/age distribution and clinical outcome. Journal of IMAB - Annual Proceeding. vol. 23, issue 1,2017.
Maronezi, L. F. C.; Felizari, G. B.; Gomes, A. G. Prevalence and characteristics of self-inflicted exogenous violence and intoxication: a study from a database on notifications. J. bras. psiquiatr. 70 (4), 2021
Martin, B. F.; Hungaro, A. A.; Santos, J. A. T. Intoxicação por raticida em um Centro de Assistência Toxicológica Revista da Rede de Enfermagem do Nordeste, vol. 17, núm. 1, enero-febrero, , pp. 3 -9, 2016
Menck, V. F.; Serafim, M. P.; Oliveira, J. M. Intoxicação do(a) trabalhador(a) rural por

Agrotóxicos: (sub)notificação e (in)visibilidade nas políticas públicas de 2001 a 2015. Segur. Aliment. Nutr., Campinas, v. 26, p. 1-10. 2019

Mendoza, M. A.; Estrada, F. R.; Aguila, H. T. Las intoxicaciones exógenas y el funcionamiento de las familias en Malanje, República de Angola. IN: Convención Internacional de Salud, Cuba Salud 2018.

Nascimento, R. L. X.; Souza, C. C.; Oliveria, M. A. N. Caderno de caracterização: estado do– Brasília, DF : Codevasf, 2021.

Prodanov, C.C.; Freitas, E. C. de. Methodology of scientific work: methods and techniques of research and scientific work. 2nd ed. New Hamburg: Feevale, 2013

Pérez TY, Pérez MY, Fernández, V.M. Some clinical and epidemiological aspects related to the exogenous intoxications in children and adolescentes MediSan; 22, 2018.

Rangel, N. L.; Francelino, E. V. Caracterização do Perfil das Intoxicações Medicamentosas no Brasil, durante 2013 a 2016. Id on Line Rev. Mult. Psic. V.12, N. 42, p. . 121-135, 2018

Ribas, A.; MendonçA, A.; Sabino, D.; Teixeira, I. Tentativa de suicídio por intoxicação exógena na faixa etária de 10-19 anos no Brasil CADERNO DE PUBLICAÇÕES UNIVAG – n.09, 2018.

Rodrigues, T. F. C. S.; Oliveira, R. R.; Decesaro, M. N. Aumento das internações por uso de drogas de abuso: destaque para mulheres e idosos. J Bras Psiquiatr.;68(2):73-82. 2019

Santana, V. T. P.; Suchara, E. A.; Carreto, R. Perfil das Intoxicações Medicamentosas Notificadas ao SINAN no Município de Primavera do Leste – MT, Entre os Anos de 2007 a 2014. Ensaios e Ciênc., v. 23, n. 3, p. 230-237, 2019.

SILVA E. S. F. DA, SOUSAW. R. M., SoaresJ. S., Macêdok. P. C., Lealb. DE S., Oliveirad. A., Perfil epidemiológico das intoxicações exógenas no Piauí nos anos de 2013 a 2017. Revista Eletrônica Acervo Saúde, (44), (2020).

Sene, E. R.; Masccarenhas, A. B. R.; Macedo, M. K. P. Intoxicação exógena no estado de Goiás. Brazilian Journal of Health Review Curitiba, v.4, n.6, p.25854-2586 6, 2021

Silva, H. C. G.; Costa, J. B. Intoxicação exógena: casos no estado de santa catarina no período de 2011 a 2015. Arq. Catarin Med. jul.-set. 47(3):02-15, 2018.

Vieira NRS, Dantas RAN, Dantas DV. Caracterização da produção científica sobre intoxicações exógenas: revisão integrativa da literatura. Revista Saúde-UNG-Ser, 10(1-2), 47-60. (6). (2016).