

Epidemiological Profile of Exogenous Drug Intoxication in Brasília

Perfil epidemiológico de intoxicação exógena por medicamentos em Brasília

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Abstract

Introduction: In Brazil, exogenous intoxications are extremely relevant public health problems, since they have a high frequency and morbidity in the general population of the country. **Aim:** To describe effective intervention measures to reduce cases and deaths from drug exogenous intoxication based on the epidemiological profile of these intoxications in the city of Brasilia-DF. **Method:** an epidemiological, descriptive study, where data from the Information System for Notifiable Diseases were analyzed, referring to the city of Brasilia-DF, including the reported cases of exogenous drug intoxication in the period from 2011 to 2017, were analyzed. To support the discussion and the intervention proposal, a literature review was carried out on Scielo and LILACS databases. **Results:** 22 publications were selected after applying the analysis criteria and served as the basis for the intervention proposal of this article. **Conclusion:** We note the importance of strategies such as the promotion of quality of life, education, protection, recovery for the prevention of suicide, implementation of child protection medication packaging, among other intervention strategies.

Keywords: epidemiological monitoring; pharmaceutical preparations; toxicology; poisoning. Projects

Resumo

Introdução: No Brasil, as intoxicações exógenas são problemas de saúde pública extremamente relevantes, uma vez que apresentam elevada frequência e morbidade na população geral do país. **Objetivo:** Descrever medidas de intervenção eficazes para redução de casos e óbitos por intoxicações exógenas por medicamentos baseadas no perfil epidemiológico dessas intoxicações na cidade de Brasília-DF. **Método:** estudo epidemiológico, descritivo, em que foram analisados dados do Sistema de Informação de Agravos de Notificação, referentes à cidade de Brasília-DF compreendendo os casos notificados de intoxicação exógena por medicamentos no período entre os anos de 2011 a 2017. Para subsidiar a discussão e a proposta de intervenção, foi realizada uma revisão integrativa da literatura nas plataformas Scielo e LILACS. **Resultados:** 22 publicações foram selecionadas após aplicação dos critérios de análise e serviram como base para a proposta de intervenção do presente artigo. **Conclusão:** Nota-se a importância de estratégias como a promoção de qualidade de vida, educação, proteção, recuperação para a prevenção do suicídio e implantação de embalagens de medicamentos de proteção à criança dentre outras estratégias de intervenções.

Palavras-chave: vigilância epidemiológica; medicamentos; toxicologia; intoxicação; projetos

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Introdução

In Brazil, exogenous intoxications are extremely relevant public health concerns, owing to the high frequency of occurrence and morbidity in the general population¹. According to the basis of the National System of Toxic-Pharmacological Information of the year 2017, 27.11% of the intoxications registered in the country were caused by drugs. In turn, 3.34% were caused by agricultural pesticides and 1.09% by domestic pesticides. Regarding the deaths caused by human poisoning, the highest rates were: 30.42% for agricultural pesticides; 25% for drugs; 8% for drugs of abuse and 8% for industrial chemicals. Therefore, in Brazil, drugs are a relevant cause of intoxication and death by harmful agents².

The pharmaceutical industry has developed in recent decades, hence generating new products and exercising remarkable transformations in the scope of medicines worldwide. However, the great diversity of drugs available in the Brazilian trade also leads to the emergence of concerns, including intoxication³. Thus, it is worthwhile noting that this dilemma is a public health issue, which requires due attention, both by professionals of this field area and by public bodies, as well as by the society as a whole^{4,5}. Importantly, this phenomenon can be avoided, above all, by the previous identification and measures that aim to mitigate possible data⁵.

According to data from the Ministry of Health of Brazil, the Federal District has a high annual frequency of exogenous intoxications when compared to other Brazilian capitals⁴. In comparison to other capitals of the same size, in the same period, Brasília demonstrates an average annual prevalence of drug poisoning higher than Salvador and Fortaleza. However, considering the federative units, the Federal District is the 10th with the highest incidence of drug poisoning, a reasonably significant position⁶.

In this context, the present study aims to describe effective intervention measures to reduce the number of cases and deaths caused by exogenous intoxications by drugs based on the epidemiological profile of these intoxications in the city of Brasília – DF, in the period 2011-2017.

Materiais e Métodos

Sample and type of study

This is an exploratory ecological study with a literature review, based on data provided by the Department of Informatics for the Unified Health System (DATASUS) and from the Information System for Notifiable Diseases (SINAN), under the responsibility of the Health Surveillance Secretariat. This system stores information about the notification and investigation of diseases and conditions contained in the National List of Compulsory Notification, governed by Consolidation Ordinance n. 4⁴.

The focus of the study was the federal capital, Brasília, which had an estimated population of 2,974,703 inhabitants in 2018. Considering the health care, the city had 1756 health establishments and 5294 hospital beds in 2009. Regarding the economy, per capita monthly income in 2016 was the seventh highest in Brazil, but 30.9% of the population received less than 1/2 minimum wage per month, thus demarcating the social inequality of the capital⁷.

Study design

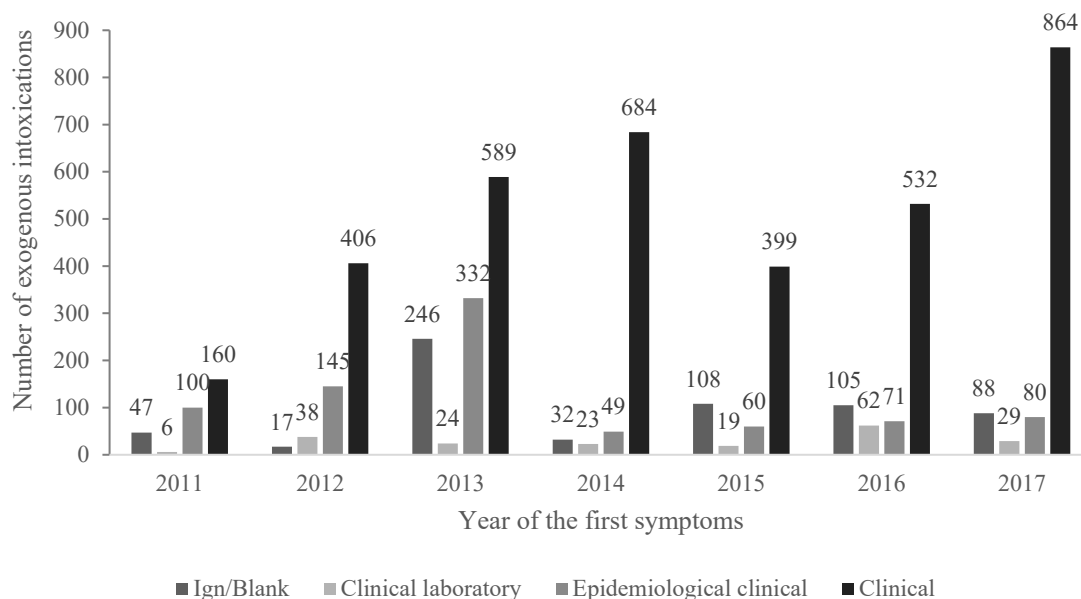
Data were obtained and filtered through the TabNet system, which is the DATASUS data tab. In this system, the section “Epidemiological and Morbidity” and the group “Diseases and Notifiable Conditions” were selected. Among the injuries, the option “Exogenous Intoxications” was chosen, whose notification region was the Federal District, in the city of Brasília.

Posteriorly, the intoxications were filtered for the toxic agent "drug". The analyzed time series starts in 2011, as the number of notifications prior to that year is negligible, probably due to the underreporting; and ends in 2017, the last year with available data.

In order to support the discussion and the intervention proposal to reduce exogenous poisoning by drugs in Brasília, an integrative literature review was conducted using the PRISMA® tool (Figure 4). The databases searched were Scielo and LILACS, which are among the main ones in Latin America.

Inclusion and Exclusion Criteria

Figure 4: Flowchart of the literature review.



Source: The authors.

In the identification phase, the terms "intoxication" and "drugs", chosen from the Health Sciences Descriptors (DeCS) of the Virtual Health Library (VHL), were used. In both databases, the search combination "intoxication AND drugs" was used. From the results obtained, all articles published from 2012 to 2017, in Portuguese and English, were included. After applying the inclusion criteria, duplicate publications between both databases were excluded.

In the analysis phase, the abstract of the articles was read independently among the authors who applied the following exclusion criteria: articles that did not address exogenous intoxications by drugs; articles that did not present an intervention proposal. Finally, the included papers were read in full and a chart was constructed with

the information: title, authors, year of publication, aim, main results and intervention proposal (Chart 1).

Procedures

Statistical analysis and the elaboration of graphs and tables were performed using Microsoft Office Excel (2019) software. The data were analyzed according to the variables: year of the first symptoms, age group, sex, circumstance, place of exposure, evolution and final classification. Ignored or blank information will be displayed.

Statistical analysis was performed with determination of the mean, median and standard deviation of the data. For the calculation of incidence, official demographic data from the Brazil in

Synthesis portal were used, under responsibility of the Brazilian Institute of Geography and Statistics (IBGE)⁷.

Ethical aspects

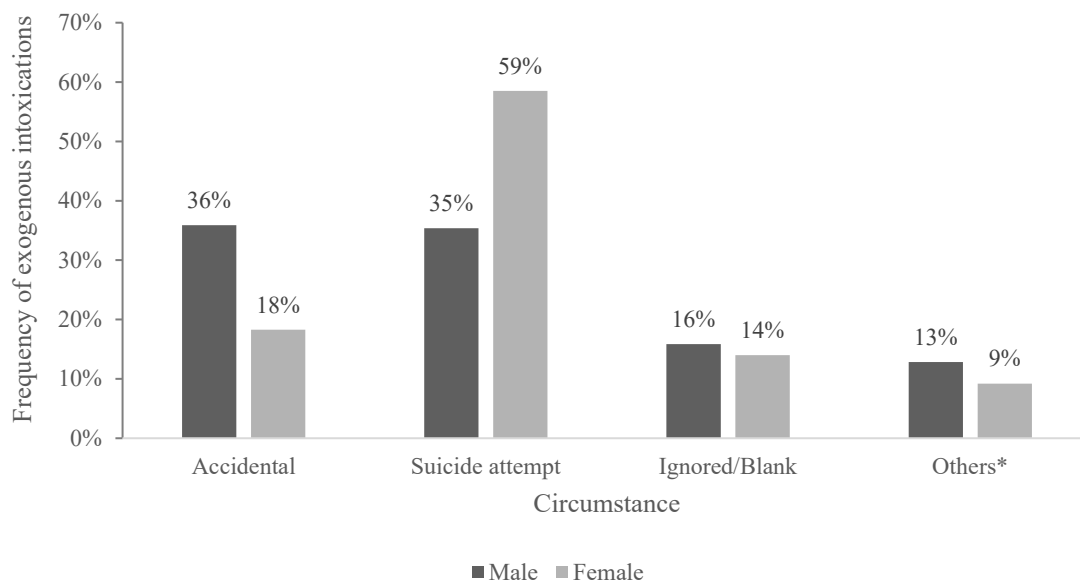
All data used in this article, as well as the review publications, are derived from secondary databases, in the public domain, which will be presented in an aggregated form, thereby preventing the identification of the research subjects. Thus, there was no need for the appraisal of a research ethics committee.

Resultados

In the period analyzed, from 2011 to 2017, there were 5,315 exogenous poisonings by drugs in the city of Brasília, corresponding to an average of 759 cases per year. The median in those years was 770 cases and the standard deviation of the data

was 275.433 cases. Additionally, the average incidence in this time series was 26.6 cases per 100 thousand inhabitants. Regarding the sex, in Brasília, the average proportion of cases was 2.07 women (W) intoxicated for each men (M), and this rate reached its peak in 2017, with a proportion of 2.54 (W/M). Moreover, when combining sex with the circumstance of drug intoxication, it is possible to visualize the frequency in the distribution between men and women (Figure 1). Among men, most cases are due to accidental poisoning (36%), but with a similar value considering suicide attempts (35%). However, among women, the number of suicide attempts is 68.6% higher than that of men, hence representing 59% of total intoxications, while accidental intoxication represents only 18% of cases.

Figure 1: Frequency of exogenous intoxications by drugs in Brasília, according to sex and circumstances of the episode.



Data from the Information System for Notifiable Diseases, Brasília, 2011 to 2017. *In the category others, the following groups are included: habitual use, environmental use, therapeutic use, medical prescription, administration error, self-medication, abuse, food intake, attempted abortion and violence/homicide.

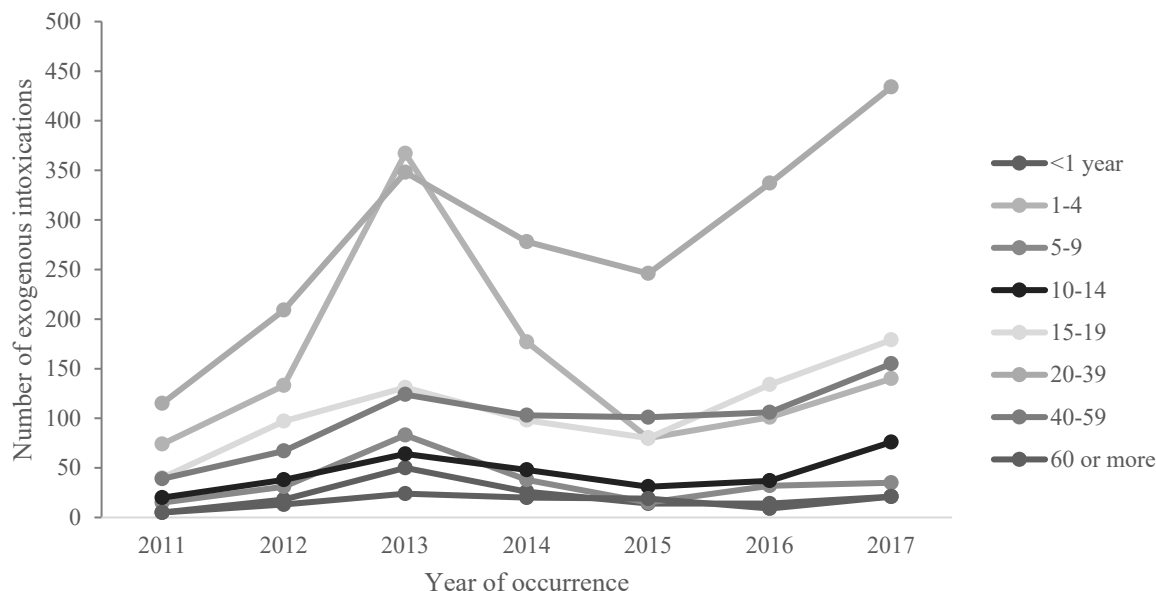
With regard to the age, the age group with more cases in the entire historical series analyzed was 20 to 39 years and represented 37% of the cases. Accordingly, from 2011 to 2013, there was an increase in

the cases reported at these ages, followed by a reduction until 2015 and a new increase until 2017. The second age group with the highest prevalence was 1 to 4 years, representing 20% of the cases in the same

period. Despite that fact, this age group revealed a strong growth from 2011 to 2013, when it exceeded the age group of 20 to 39 years. Remarkably, after that year, there was a significant reduction in cases

until 2015, and in 2017, the age group of 1 to 4 years occupied the fourth position among the others (Figure 2).

Figure 2: Total number of cases of exogenous intoxications by drugs in Brasília, according to the age group and year of the episode.



Data from the Information System for Notifiable Diseases, Brasília, 2011 to 2017.

The majority of drug intoxications that occurred from 2011 to 2017 were acute single and represented 57% of the total (Table 1). Notwithstanding that, there was a significant number of cases in which this category was ignored or left blank, which

precludes a more comprehensive analysis of the type of exposure. Despite cases of repeated acute exposure represented only 7%, 87% of them are due to attempted suicide.

Table 1: Frequency of exogenous intoxications by drugs, according to the type of exposure.

Type of exposure	2011	2012	2013	2014	2015	2016	2017	Total
Acute–single	42%	43%	71%	77%	47%	51%	50%	57%
Acute–repeated	2%	5%	5%	9%	7%	7%	12%	7%
Chronic	0%	0%	0%	1%	1%	1%	1%	1%
Acute over chronic	0%	0%	1%	1%	1%	0%	0%	0%
Ignored or in blank	56%	52%	23%	12%	44%	41%	36%	34%

Data from the Information System for Notifiable Diseases, Brasília, 2011 to 2017.

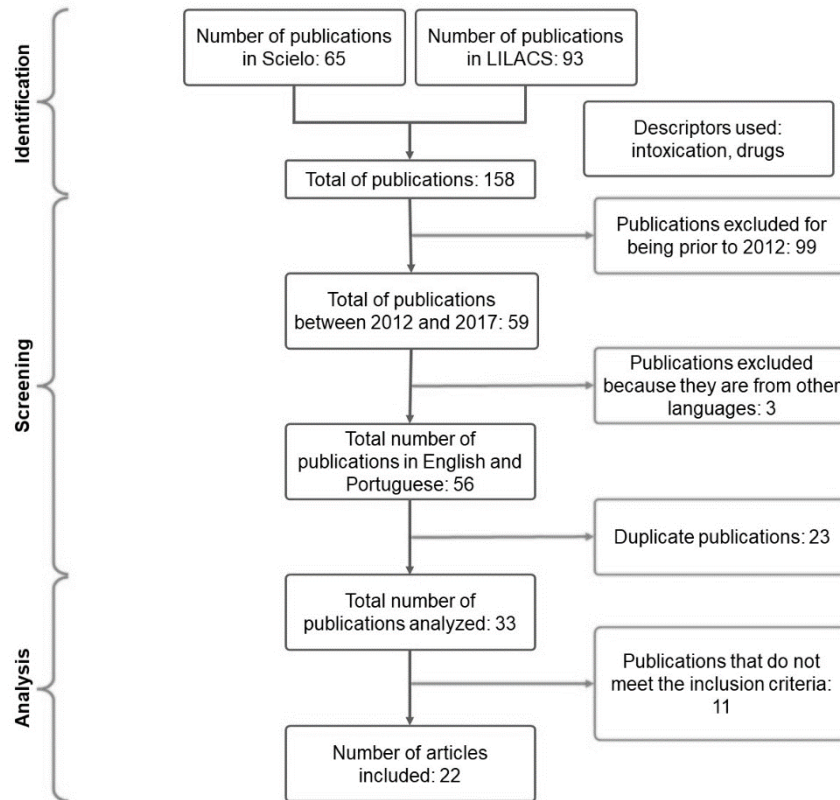
Among all poisonings reported from 2011 to 2017, 72% of them were confirmed, and 11% were only exposure to the toxic

agent, but this information was omitted in 15% of the cases. In view of these aspects, the main confirmation criterion in all years

was the clinical, in 68% of them, while the others were little used. However, in 2012 and 2013, the clinical-epidemiological criterion was also relevant in the

confirmations and represented 27.9% and 23.9% of the cases in each year, respectively (Figure 3).

Figure 3: Confirmation criteria of cases of exogenous poisoning by drugs in Brasília according to the year of occurrence.



Data from the Information System for Notifiable Diseases, Brasília, 2011 to 2017. Ign/ = Ignored.

After drug intoxication, the evolution of cases was not reported in 40% of them. In this sense, the data show that 57% of the cases evolved to cure, and less than 1% evolved with sequelae or to death. When considering the year 2014, which had the lowest ignored rate, 11%, the number of cases that evolved with cure without sequelae was 85%, cure with sequelae 1% and deaths due to intoxication or another

cause 0.5% each one. Therefore, it is possible to observe that the majority of cases of drug intoxication, in Brasília, evolve favorably (Table 2).

Finally, when analyzing whether the exposure was at work, 31.58% of cases was completed as ignored or left blank considering the entire historical series analyzed, and no reported cases were related to the work.

Table 2: Frequency of exogenous intoxications by drugs according to the evolution.

Evolution	2011	2012	2013	2014	2015	2016	2017	Total
Cure without sequelae	45%	35%	66%	85%	52%	49%	51%	57%
Cure with sequelae	0%	0%	1%	1%	1%	0%	1%	1%
Death due to exogenous intoxication	1%	0%	0%	1%	0%	0%	0%	0%

Death from another cause	0%	0%	0%	1%	0%	0%	0%	0%
Loss of follow-up	0%	0%	2%	2%	3%	1%	2%	1%
Ignored or in blank	54%	65%	31%	11%	44%	49%	46%	40%

Data from the Information System for Notifiable Diseases, Brasília, 2011 to 2017.

Literature review

The literature review allowed the identification of 158 publications considering the Scielo and LILACS platforms based on the descriptors "intoxication" and "drugs". During the screening phase, 102 results were excluded for being prior to 2012 or because they were published in languages other than Portuguese and English. 23 duplicates were also excluded. Finally, 11 articles were excluded for not addressing exogenous intoxications or for not bringing intervention proposals (Figure 4).

Chart 1: Results of the literature review

Thus, 22 publications met the analysis criteria and were grouped in a chart with the following information: title, authors, year of publication, aim, main results and intervention proposal (Chart 1). These publications served as basis for elaborating the discussion and the intervention proposal of this article and cover the topic of exogenous intoxications by drugs in different populations, mainly in pediatrics; with designs mostly observational; and some with a focus on suicide.

Authors	Year	Aim	Main Results	Intervention Proposal
Magalhães et al. ¹	2014	To investigate the characteristics of the victims of attempted suicide treated in prehospital service and the time consumed in this phase of care.	Women, older than men, were the ones who most attempted suicide, and drug intoxication was the most used method. The time spent for prehospital care varied from 34.4 to 40.5 minutes.	To establish a protocol of interventions and a strict control in the distribution of drugs and pesticides. To train and articulate health services to deal with suicidal behavior, ensuring an appropriate approach and treatment follow-up.
Mota DM et al. ⁵	2012	To describe the epidemiological profile of mortality caused by drug poisoning in the Brazilian population between 1996 and 2005.	The majority of deaths occurred in males, in singles, aged 20-39 years. The main cause was intentional self-poisoning. The mortality rate was higher in the Midwest and the Potential Years of Life Lost increased by 15.5% in the period.	The importance of the potential use of the Mortality Information System as a source of information in pharmacoepidemiology is evident to support the improvement of health surveillance policies.
Amorim MLP et al. ⁸	2017	To assess the clinical and epidemiological profile of poisoning in children and adolescents under 12 years of age.	92.2% of the poisonings were accidental; 56.3% were due to chemicals; 43.7% were caused by venomous animals. The frequency of chemical intoxication was higher in children under 5 years old. There was no difference	Surveillance and assistance actions; mobilization of society to develop campaigns with health professionals, educators and the population; training of professionals who act actively in the prevention, diagnosis and treatment of these conditions; to pressure the approval of

			between the sexes and 99.6% of them occurred at home.	legislative proposals related to the prevention of accidents with children that are being processed in the National Congress.
Teles ADS et al. ¹⁰	2013	To describe the profile and evolution of intoxications in Feira de Santana, Bahia, from 2007 to 2010, and to assess the morbidity and mortality caused by drugs.	33% of intoxications were due to medication, and suicide attempt was the major cause. Most cases occurred in females, children aged 1 to 4 years and young adults. Lethality in Feira de Santana was higher when compared to the regional and national average.	Health Surveillance must prioritize educational, preventive and intersectoral actions that ensure the correct use of drugs, as well as investing in the continued awareness of Primary Care professionals to improve the notification of this condition.
Vieira et al. ¹¹	2015	To present the profile of the victims of suicide attempts due to exogenous intoxications in the municipality of Barra do Garças.	The most frequent toxic agents were medicines (50%) and pesticides (26.2%). Attempts were more frequent among females (71.1%) and adults.	Awareness campaigns on the rational use of medicines, greater control of sales of pesticides and support and assistance programs for victims.
Domingos SM et al. ¹²	2016	To describe the profile of the intoxications that led to the admission of children in the Regional University Hospital of Maringá from 2006 to 2011.	Medicines were the main responsible for the intoxications that caused hospitalizations. Most of them occurred in the age group 1-4 years old and in the male gender.	To train health professionals at all levels, improved emergency care, laws to promote and encourage the production of child-protection packaging, campaigns to prevent child accidents.
Antunes F, Oliveira MLFD ¹³	2013	To characterize the clinical and demographic profile of patients hospitalized due to poisoning by substances of abuse of a university hospital, between 2004 and 2010.	Alcohol was the substance related to the highest number of hospitalizations (77%), followed by psychoactive drugs (14%). Most patients are men of economically active age, with a relevant number of deaths.	The nurse must develop preventive activities, monitoring and guidance, in addition to training the professionals involved through continuing education, to provide more humane and less stigmatizing care for drug addicts.
Carvalho ILDN et al. ¹⁴	2017	To characterize intoxications by psychotropic drugs with suicidal motivation in the elderly.	Drug intoxication with suicidal motivation is more frequent among older adults aged 60-69 years, in females and in retired elderly.	Promotion of active aging by a multidisciplinary health team of primary care, access and rational use of psychotropic drugs and psychotherapy.
Moreira DL et al. ¹⁵	2015	To characterize patients treated for suicide attempt at the Toxicological Assistance Center of a hospital in Fortaleza.	Suicide acts by self-medication predominated in females, young adults, students and individuals from urban areas.	Psychological support to the patient with suicidal ideals; planning effective public policies for health promotion and prevention; effort of managers, health professionals and family

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				members in suicide prevention actions.
Oliveira JDFMD ¹⁶	2017	To describe deaths and hospitalizations caused by poisoning with drugs in the state and municipality of São Paulo, and to investigate the associated factors.	Women and the elderly had higher hospitalization coefficients and there was an increasing trend in mortality caused by drug intoxication.	Suicide prevention strategies, health education measures. Encouraging rational use, access control and monitoring of practices associated with medicines and training of prescribers.
Carvalho IV ¹⁷	2013	To analyze the incidence of adverse drug events and adherence to pharmacotherapy of continuous use in pediatric patients in an emergency unit.	There is a high incidence of adverse drug events in the admission of pediatric patients to the emergency unit, representing 11.5% of the total, of which 39.3% are due to inappropriate use.	The development of pharmacovigilance actions and social education programs are essential to promote the rational use of medicines, being able to significantly reduce adverse events.
Oliveira FFS, Suchara EA ¹⁸	2014	To characterize the epidemiological profile of exogenous intoxications in children and adolescents in Barra do Garças.	Exogenous intoxications occurred predominantly in children up to 4 years after the consumption of food or drinks, and accidentally.	Investment in health control measures and in education to prevent the occurrence of these intoxications.
Oliveira JDFMD et al. ¹⁹	2017	To present the assessment of the magnitude and trend of deaths caused by drug intoxication in the state of São Paulo, Brazil, from 1996 to 2012.	There was an increasing trend of adjusted mortality from 2005, which became more pronounced in 2009. Intentional self-poisoning by drugs was the one that grew the most in the period, as well as mortality among the youngest.	Educational and regulatory actions for continuous awareness of health professionals, to ensure the generation of complete and quality information, and for the commitment to patient monitoring and proper prescription, combined with non-drug therapies.
Takahama CH et al. ²⁰	2014	To describe the epidemiological data related to drug exposures by women of childbearing age attended by a Toxicological Information Center.	The majority of the occurrences (90.5%) were intentional; in 33.7% of the cases, two to three medications were used, and the frequency of hospitalization was 35.6%. Drugs acting on the Central Nervous System were responsible for 59.9% of the occurrences.	To reduce acute poisoning in women of the susceptible age group, efforts are needed to guide and raise awareness of prescribing professionals and users about the risks of indiscriminate use of these drugs, as well as interventions to reduce the damage caused by self-inflicted injuries.
Maior MDCLS ²¹	2015	To describe hospital admissions due to drug poisoning in children under five years in	The most frequent therapeutic classes in intoxications were unspecified drugs (38%),	To restrict children's access to medicines, by promoting a culture of domestic security among parents and guardians. It

		Brazil, from 2003 to 2012.	antiepileptics/sedative-hypnotics/ antiparkinsonians (19.8%) and systemic antibiotics (13.4%), varying according to the region of the country and the children's age.	is also necessary to discuss the adoption of special packages to protect the child.
Tavares ÉO et al. ²²	2013	To assess the factors associated with intoxication in children, based on cases registered at the Intoxications Control Center of the Regional University Hospital of Maringá	The factors associated with child poisoning are male gender and the age group 0-4 years; as a predisposing factor, the residence, in which the presence of the adult did not prevent the occurrence; and as triggering factors, facilitated access to drugs and oral exposure.	Guidance on the packaging of toxic agents, surveillance of families with awareness about the risks of the domestic environment. Implementation of child protection packaging, with tamper-proof lid and provision of fractional doses.
Sales CCF et al. ²³	2017	To identify the presence and actions of adults at the place of the occurrence of childhood poisoning accidents and the first aid performed.	Most toxicological accidents in early childhood occurred with male children, aged 1 to 2 years; the main agents were drugs and unintentional intoxications predominated.	Training in first aid for poisoning accidents and intoxications with children by health services and addressing the issue with society.
Paula et al. ²⁴	2012	To determine the major therapeutic classes involved in hospitalizations of the elderly due to intoxication and adverse effects of drugs and their injuries.	There is a growing trend in the concerns associated with the use of drugs by the elderly and the consumption profile is not enough to explain the concentrations of cases in the main therapeutic classes.	Adoption of more effective pharmacovigilance programs, capable of monitoring the different stages of the drug use process: prescription, dispensing, marketing, administration and adherence.
Toscano MM et al. ²⁵	2016	To describe the clinical and sociodemographic profile of cases of acute poisoning recorded by Ceatox-PB in 2012.	Most cases of intoxication were related to drugs taken accidentally, most often by women and under 18 years.	Proper completion of the notification form, and preventive and prophylactic measures performed by competent health and education bodies.
Santos SA et al. ²⁶	2013	To describe the profile of suicides and attempts by exogenous intoxication among different information systems, for the state of Rio de Janeiro.	The female sex, the 20-39 age group and the use of toxic agents predominated. Over 70% of the drugs were psychotropic. SINAN exhibited the worst performance for toxic agents.	To solve problems regarding the coverage provided by the systems and the need to improve its quality in order to safely subsidize health policies and actions.
Mendes LA, Pereira BB ²⁷	2017	To conduct an epidemiological analysis of drug poisoning cases in	Higher number of cases in the female population, attempted suicide is the most important circumstance and	Use of SINITOX data for effective health promotion and adoption of health surveillance measures.

		Brazil registered by SINITOX.	the child population is the most susceptible.	
Santos SA et al. ²⁸	2013	To estimate the frequency of the use of toxic substances as a means for suicide attempts, as a basis for discussing preventive and restrictive measures.	About 70% of the individuals who attempted suicide ingested toxic substances, of these 46.2% were drugs, with a predominance of the male gender and the 30-49 age group. Regarding the suicide, the group of adolescent women predominated.	There is a need to consider suicidal behavior as a public health concern on the rise in Brazil and to invest in public policies for its prevention.

Source: Research data.

Discussion

According to Amorim et al.⁸, exogenous intoxications are extremely relevant public health concerns in Brazil, due to the high frequency of occurrence and morbidity in the general population of the country. Data from the National System of Toxic-Pharmacological Information revealed that, in 2017, more than 27% of the intoxications registered in Brazil were due to drugs, and 25% of the deaths caused by human intoxication were due to this same agent².

The Federal District is a federative unit with a considerable number of cases of exogenous poisoning during a significant period. In order to reduce these rates, Dial-Intoxication was implemented, a 0800 coordinated by the National Network of Centers for Toxicological Information and Assistance (Renaciat), which aims to provide clarifications to the population and to facilitate the provision of first aid and the prescription of the therapeutic treatment for each category of toxic substance. However, although the number is mandatorily warned on labels and package inserts of products regulated by Anvisa and indicative reports in clinics, hospitals and laboratories, Dial-Intoxication is not yet widely known by the population⁹.

Brasília, when compared to different capitals of the same size, in the same period, has an average annual prevalence of drug poisoning lower than that of Belo

Horizonte, which had 27.2 cases per hundred thousand inhabitants, and higher than Salvador and Fortaleza, with 12.9 and 9.1 cases per hundred thousand inhabitants, respectively. Nevertheless, considering the federative units, the Federal District is the 10th with the highest incidence of drug poisoning, a reasonably significant position. Espírito Santo ranks first, with 74.1 cases per hundred thousand inhabitants, and Amapá ranks last, with a rate of 0.6^{4,6}.

The high number of cases related to this category of agents is associated with suicide attempts, in which the intoxications by drugs and other toxic substances are the methods of self-extermination used predominantly by women and, usually, in the age group of 20 to 59 years; and with accidental exposure, mainly related to children under five and the elderly^{5,10}.

The present study showed that cases of exogenous intoxication by drugs, in general, were predominant in females, with a higher percentage of cases whose circumstance of poisoning was due to suicide attempt, with a significant difference for accidental intoxications. Regarding the males, it is possible to conclude that both eventualities are equally relevant.

The findings of a study conducted by Magalhães et al.¹ in Arapiraca, located in the state of Alagoas, 136km from Maceió, which addressed the care for suicide attempts, demonstrated that adult women tend to commit more suicide attempts than men. Furthermore, they usually use drug

intoxication for being a less invasive way, which would not affect aesthetics. An analysis developed by Vieira et al.¹¹, in the municipality of Barra do Garças, state of Mato Grosso, also reported the prevalence in female sex. This result reflects a trend, perceived in the literature and verified by the analysis, that women are more likely to attempt suicide through self-poisoning.

However, most of the reviewed articles showed no similarity between the percentage of cases in which the cause of the intoxication was suicide attempt and events related to accidental causes observed in the present study. In turn, the study performed by Mota et al.⁵ expressed that the mortality rate in Brazil due to suicide was higher, in both sexes, than the other circumstances of death due to exogenous poisoning. Furthermore, in the category of accidental intoxications, mortality rates for men were higher than those for women, which could explain the numerical equivalence between the percentage of cases due to attempts at self-extermination and accidental causes, which means that both causes are relevant.

Regarding the age range in which such toxic events occur, this analysis revealed that the number of cases of notified exogenous intoxication was predominant in the age group 20-39 years old, followed by the age range 1-4 years. According to Mota et al.⁵, the first is correlated with suicidal/intentional exposure, generally corresponding to the majority of people who die from exogenous intoxication.

The second is characteristically associated with accidental exogenous poisoning, caused mainly by factors intrinsic to children's development, such as the exploration of the environment and the curiosity, which may eventually lead members of this age group to ingest substances and objects, according to Magalhães et al.¹. Additionally, Domingos et al.¹² highlight that there are factors related to drugs that contribute to the relevance of exogenous intoxication in children, which are the lack of control in the

commercialization of medicines, the presence of drugs prescribed for adults in the domestic environment, usually at the reach of the child, the use of these agents in front of the child, the offer of prescribed drugs for children with the argument that they are candies or sweets, inadequate supervision of the members belonging to this age group and the carelessness in the custody and disposal of these products.

Furthermore, in this study, it is also possible to notice that the categories of the notification form obtained through SINAN, including the information about the type of exposure, the criterion for confirming exogenous intoxication, the evolution of the case and whether the exposure was at work, reported a significant amount of ignored or blank information. Thus, this finding reflects the underreporting caused by failure to complete the compulsory notification form, thereby portraying an adversity of the awareness of health professionals regarding the importance of correctly filling out the document¹⁰.

Thus, the variables intrinsically associated with the exogenous intoxication by drugs are mainly the age and sex of the patient, which predispose certain types of circumstances, essentially accidental and intentional/suicidal. Further, the proper completion of the form has a great impact on the collection and use of data related to the context of exogenous poisoning, which requires that intervention measures be linked to these aspects.

Therefore, the interventions that could be applied to improve the reality of drug interactions in Brasília must be based on scientific literature, showing effectiveness in the respective studies. However, during the systematic review, the articles found did not address the implementation and results of the measures presented to reduce the number of cases, which is a limitation of this study.

In this sense, it is necessary to develop strategies to promote quality of life, education, health protection and recovery, damage prevention¹³⁻¹⁵, and the permanent

education of health professionals in primary care units, including the Family Health Program, mental health services, urgent and emergency units, according to the principles of integrality and humanization^{8, 12, 13, 16}. Besides that, strengthening health education with educational campaigns^{8, 16-20}, as well as inspection by government agencies¹⁶ aiming at improving the population's quality of life can contribute to the reduction of the number of cases caused by exogenous intoxication.

Regarding the specific approach of suicide, it is essential to improve strategies of information, communication and awareness in society that self-extermination is a preventable public health concern¹⁶. Other measures that could be adopted are the training of health professionals in the management of suicidal behavior¹; the use of validated instruments for detecting suicidal ideation during anamnesis, especially in patients with risk factors¹⁶; the organization of a comprehensive care line (promotion, prevention, treatment and recovery) at all levels of care¹⁴, thereby ensuring access to different therapeutic modalities, in order to improve the health system, so that it can guarantee early access to adequate clinical assessments, which allow psychological and/or psychiatric support to patients with suicidal behavior^{11, 14, 15}; and increasing the safety and effectiveness of treatments for psychiatric disorders with a high risk of suicide.

Further, other measures can contribute to the reduction of suicide attempt rates, such as the identification of the prevalence of both attempts and suicide determinants and conditions, as well as protective factors^{14, 16}; the development of intersectoral actions to prevent suicide¹⁶ of public responsibility, without excluding the responsibility of the whole society; and educational projects, with the aim of increasing public and professional knowledge about the risk factors for self-extermination^{1, 16}. The development of investigations on suicide prevention¹⁴, which through medical research can

elucidate local, regional and national patterns of suicide, the triggering mechanisms¹⁶, specific benefits and risks of medical treatments and psychosocial interventions^{14, 16} that can prevent self-extermination, would also contribute to the reduction of the number of suicides.

The measures aimed at preventing accidental circumstances, mainly concerning the children's age group, include the use of medication packages to protect the child, with tamper-proof lid and fractional doses^{8, 12, 21, 22} in order to hamper the access of these children to the toxic agents. The role of the State is pivotal through legislative support, as well as that of the industry that produces the packaging of these drugs^{8, 12}. Moreover, instructions for parents on proper packaging of toxic substances and surveillance of families with awareness of the risks of the domestic environment²² are essential for preventing this type of poisoning. Finally, training in first aid needed to manage these injuries and to improve emergency care are also very effective measures to reduce mortality from drug intoxication^{12, 23}.

Other measures that could potentially contribute to the reduction of cases of exogenous intoxication would be the strengthening of health awareness campaigns aimed at patients, drug prescribers and dispensers^{16, 20, 24}; the consolidation of pharmacovigilance programs, which would monitor the entire process of drug use, thus comprising the prescription, dispensing, marketing, administration and adherence to the proposed treatment^{16, 24}; and the change of drug consumption patterns through legislative alterations, with consequent greater inspection by government agencies^{11, 16}.

Additionally, it is essential that Health Surveillance promotes investments in the continued awareness of Primary Care professionals in order to improve the notification of this condition^{1, 10, 19, 21, 25, 26}. The expansion of the integration between the different surveillance information

systems^{5, 8, 27} is also a necessary measure and would provide a complete and adequate analysis of the information collected, thus facilitating the planning and development of actions aimed at preventing risks and consequences of these drug intoxications.

Conclusão

The study revealed that, in the period from 2011 to 2017, there were 5,315 exogenous intoxications by drugs in the city of Brasília, with an average prevalence of 26.6 cases per hundred thousand inhabitants. It is noteworthy that the high number of cases is related to suicide attempts, in which poisoning by drugs and other toxic substances is the self-extermination method used, as well as the accidental exposure, usually related to children under five and the elderly.

Besides, it is interesting to highlight as a limitation the existence of a possible underreporting of the cases of intoxication

in the TabNet system in the years before 2011. Furthermore, during the systematic review, the articles found did not address the implementation and results of the measures presented to reduce the number of cases, also representing a limitation of this study.

In view of the research, it is possible to observe intervention measures aimed at mitigating these indices, such as Dial-Intoxication, although it is not yet widely known by the population. To meet the challenge, herein, it is essential to create and implement measures in order to prevent accidental circumstances, mainly concerning the child age group, and to develop strategies to promote quality of life, education, protection and health recovery and the prevention of damages related to suicide and other consequences of exogenous intoxication by drugs.

Referências

1. Magalhães APNd, Alves VdM, Comassetto I, Lima PC, Faro ACMe, Nardi AE. Atendimento a tentativas de suicídio por serviço de atenção pré-hospitalar. *J bras psiquiatr.* 2014;63(1):16-22.
2. Fundação Oswaldo Cruz/Centro de Informação Científica e Tecnológica/Sistema Nacional de Informações Tóxico-Farmacológicas. Casos, Óbitos e Letalidade de Intoxicação Humana por Agente e por Região. Brasil, 2017. Rio de Janeiro: MS/FIOCRUZ/SINITOX; 2020.
3. Klinger EI, Schmidt DC, Lemos DB, Pasa L, Possuelo LG, Valim ARM. Intoxicação exógena por medicamentos na população jovem do Rio Grande do Sul. *Revista de Epidemiologia e Controle de Infecção.* 2016;6 (suplemento): 42-52.
4. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Sistema de Informação de Agravos de Notificação – Sinan: normas e rotinas. 2 ed. Brasília: Editora do Ministério da Saúde; 2007.
5. Mota DM, Melo JRR, Freitas DRCd, Machado M. Perfil da mortalidade por intoxicação com medicamentos no Brasil, 1996-2005: retrato de uma década. *Ciênc saúde coletiva.* 2012;17(1):61-70.
6. Ministério da Saúde. Indicadores e Dados básicos – IDB/SUS. Brasília; 2012 [15 jun. 2019]. Available from: <http://tabnet.datasus.gov.br/cgi/idb2012/matriz.htm#demog>.
7. Instituto Brasileiro de Geografia e Estatística. O Brasil em síntese. Brasília; 2017 [15 jun. 2019]. Disponível em: <https://cidades.ibge.gov.br/brasil/df/brasil/panorama>.
8. Amorim MLP, Mello MJGd, Siqueira MTd. Poisoning in children and adolescents notified at a toxicology center in the Northeast of Brazil. *Rev Bras Saude Mater Infant.* 2017;17(4):765-72.

9. Brasil. Portal Agência Nacional de Vigilância Sanitária [online]. Disque-intoxicação: 2020. [17 jun. 2019]. Available from: <http://portal.anvisa.gov.br/disqueintoxicacao>.
10. Teles AdS, Oliveira RFdA, Coelho TCB, Ribeiro GV, Mendes WML, Santos PNP. Papel dos medicamentos nas intoxicações causadas por agentes químicos em município da Bahia, no período de 2007 a 2010. *Rev ciênc farm básica apl.* 2013;34(2).
11. Vieira LP, Santana VTPd, Suchara EA. Caracterização de tentativas de suicídios por substâncias exógenas. *Cad saúde colet.* 2015;23(2):118-23.
12. Domingos SM, Borghesan NBA, Merino MdFGL, Higarashi IH. Internações por intoxicação de crianças de zero a 14 anos em hospital de ensino no Sul do Brasil, 2006-2011. *Epidemiologia e Serviços de Saúde.* 2016;25(2):343-50.
13. Antunes F, Félix de Oliveira ML. Characteristics of patients hospitalized at an intensive care unit due to drug abuse. *Investigación y Educación en Enfermería.* 2013;31(2):201-9.
14. Carvalho ILdN, Lôbo APA, Aguiar CAdA, Campos AR. Suicidally motivated intoxication by psychoactive drugs: characterization among the elderly. *Rev bras geriatr gerontol.* 2017;20(1):129-37.
15. Moreira DL, Cavalcante Martins M, do Amaral Gubert F, Pereira de Sousa FS. Perfil de pacientes atendidos por tentativa de suicídio em um centro de assistência toxicológica. *Cienc enferm.* 2015;21(2):63-75.
16. Oliveira JdFMd. Internações hospitalares e mortalidade por intoxicação medicamentosa em São Paulo. 2017. p. 128-.
17. Carvalho IV. Incidência e caracterização de eventos adversos aos medicamentos (EAM) na unidade de emergência referenciada pediátrica do Hospital de Clínicas da UNICAMP. 2013. p. 95-.
18. Oliveira FFS, Suchara EA. Epidemiological profile of exogenous poisoning in children and adolescents from a municipality in the state of Mato Grosso. *Rev paul pediatri.* 2014;32(4):299-305.
19. Oliveira JdFMd, Wagner GA, Romano-Lieber NS, Antunes JLF. Tendência da mortalidade por intoxicação medicamentosa entre gêneros e faixas etárias no Estado de São Paulo, Brasil, 1996-2012. *Ciência & Saúde Coletiva.* 2017;22(10):3381-91.
20. Takahama CH, Turini CA, Giroto E. Perfil das exposições a medicamentos por mulheres em idade reprodutiva atendidas por um Centro de Informações Toxicológicas. *Ciência & Saúde Coletiva.* 2014;19(4):1191-9.
21. Maior MdCLS. Internações hospitalares de crianças menores de cinco anos por intoxicações medicamentosas no Brasil. 2015. p. 168-.
22. Tavares ÉO, Buriola AA, Santos JAT, Ballani TdSL, Oliveira MLFd. Fatores associados à intoxicação infantil. *Esc Anna Nery Rev Enferm.* 2013;17(1):31-7.
23. Sales CCF, Suguyama P, Guedes MRJ, Borghesan NBA, Higarashi IH, Oliveira MLFd. Intoxicação na primeira infância: socorros domiciliares realizados por adultos. *Rev baiana enferm.* 2017;31(4):e23766-e.
24. Paula TCd, Bochner R, Montilla DER. Análise clínica e epidemiológica das internações hospitalares de idosos decorrentes de intoxicações e efeitos adversos de medicamentos, Brasil, de 2004 a 2008. *Rev bras epidemiol.* 2012;15(4):828-44.
25. Toscano MM, Landim JTA, Rocha AB, Sousa-Muñoz RLd. Intoxicações exógenas agudas registradas em Centro de Assistência Toxicológica. *Saude e pesqui (Impr).* 2016;9(3):425-32.
26. Santos SA, Legay LF, Lovisi GM, Santos JFdC, Lima LA. Suicídios e tentativas de suicídios por intoxicação exógena no Rio de Janeiro: análise dos dados dos sistemas oficiais de informação em saúde, 2006-2008*. *Rev bras epidemiol.* 2013;16(2):376-87.

27. Mendes LA, Pereira BB. Intoxicações por medicamentos no Brasil registradas pelo SINITOX entre 2007 e 2011. *J Health Biol Sci (Online)*. 2017;5(2):165-70.
28. Santos SA, Legay LF, Lovisi GM. Substâncias tóxicas e tentativas e suicídios: considerações sobre acesso e medidas restritivas. *Cad saúde colet*. 2013;21(1):53-61.

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