



ORIGINAL RESEARCH PAPER

Epidemiology

DRUG INTOXICATION IN BRAZIL: AN ANALYSIS OF THE CASES REGISTERED FROM 2007 TO 2017

KEY WORDS: Intoxication, Drug-Related Side Effects and Adverse Reactions, Chemically-Induced Disorders

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ABSTRACT

The objective of this study was to analyze the epidemiological profile of drug intoxication cases in Brazil according to sociodemographic variables. This was a descriptive study. Drug poisoning rates occurred in Brazil between 2007 and 2017 were considered the outcomes. The exploratory variables were: region of residence, sex, and age group. Results: Between 2007 and 2017 approximately 43.3% of exogenous poisonings occurred in Brazil and registered in SINAN were caused by drug intoxications. The rate of drug intoxications registered increased 5 times during the study period, being higher in females. All regions showed an upward trend of intoxications by drugs in both sexes. Conclusion: The increase in drug intoxication rates and the upward tendency for both sexes in Brazil serve as an alert both to health professional and the population regarding the need to ensure a rational and safe use of medicines.

INTRODUCTION

Drug poisoning (DP) are defined as the nocive response due to administration, intentional or not, of drugs in higher than usual doses (Anvisa, 2009). DP represent a serious public health problem in the world, making it necessary interventions in prevention and health promotion to reduce damage due to this incident (Matos *et al.*, 2002). According to the United States National Poison Data System report, in 2015 medicines accounted for approximately 53.0% of all cases of intoxication in adults over 20 years of age; 35.1% in children under three and 80% in fatalities in poisoning. It was also observed a predominance of females in cases involving youngsters and adults (Mowry *et al.*, 2016).

In Brazil, according to oficial data, 78.56% of the drug poisoning cases registered between 2007 and 2013 were observed among individuals over 15 years of age and 12.42% in children under four years old. In this age group, the drugs accounted for 34.82% of the registered intoxication cases. Because of significant consumption of drugs and high number of DP in Brazil, studies on the subject are fundamental to creation of policies and actions that ensure greater security in consumption of drugs in the country. In this context, the aim of this study is describe and analyze trends in DP recorded in Brazilian National System of Notification (*Sistema Nacional de Agravos de Notificação – SINAN*) between 2007 and 2017, observing distribution of cases by sex, age bracket, region of residence and main conditions of poisoning.

METHODS

It is a descriptive, ecological, time series study about DP rates in Brazil recorded in *SINAN* between 2007 and 2017. The cases were analyzed by sex, age bracket, region of residence and main conditions of poisoning. Data about population were from Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística – IBGE*) and DP cases considered in the study were those recorded in *SINAN* as exogenous poisoning by drugs with final classification as poisoning confirmed. The analysis observed distribution in males and females; 0 to 4, 5 to 19, 20 to 59 and 60 or more years old individuals; residing in North, Northeast, Midwest, Southeast and South of Brazil; and with conditions of poisoning related to suicide attempt, accidental condition and self medication. Raw rates are influenced by age structure and distribution by sex of different regions populations in different years. Thereat, calculated rates were standardized by sex and age bracket, using the world standard population suggested by World Health Organization (Ahmad *et al.*, 2001). The analysis of trends in the historical series used Prais-Winsten generalized linear regression with correction for first order autocorrelation effect, using the software Stata 13. Trends were considered stationary when $p > 0.05$; declining when $p < 0.05$ and negative regression coefficient; or ascending when $p < 0.05$ and positive regression coefficient.

RESULTS AND DISCUSSION

Between 2007 and 2017, about 43.3% of exogenous poisoning recorded in *SINAN* were caused by consumption of drugs. DP rate increased 5.2 times during the study period, going from 3.7 cases per 100,000 population in 2007 to 19.4 cases per 100,000 population in 2017. Different studies on the subject in Brazil (Bortoletto & Bochner, 1999; Matos *et al.*, 2002; Gandalfi & Andrade, 2006; Lessa & Bochner, 2008; Teles *et al.*, 2013) and in the world (McCaig & Burt, 1999; Lall *et al.*, 2003; Afshari *et al.*, 2004; Akkose *et al.*, 2005; Fathelrahman *et al.*, 2005; Schotland *et al.*, 2016) attempt to the fact that drugs are one of main agents responsible for DP cases, since along with the increase of therapeutic resources to face different diseases there is increment in adverse events related to their consumption (Cano & Rozenfeld, 2009).

The DP average rates were higher in females during the study period, both in Brazil (14.8 vs. 6.4 cases per 100,000 population) and its regions (on average, rates were 2.3 times higher in females) (Table 1). The same difference was founded by Bortoletto & Bochner (1999); Gandalfi & Andrade (2006); Margonato *et al.* (2009); Hoshino *et al.* (2009); Bertasso *et al.*, (2010); Fonseca & Pardal (2010); Teles *et al.* (2013); and Feuser (2013) in their studies. Studies about consumption of drugs in Brazil (Costa *et al.*, 2011; Francisco *et al.*, 2014; Galvão *et al.*, 2014) show that women are the biggest consumers, besides being also the group that tries the most against life through the consumption of drugs (Bochner & Souza, 2008).

Table 1 – Drug poisoning average rates (per 100,000 population) recorded in Brazilian National System of Notification, by sex, Brazil and regions, 2007-2017.

Sex	Brazil	North	Northeast	Midwest	Southeast	South
Male	6.37	1.40	4.57	5.40	7.44	10.50
Female	14.85	2.95	8.99	12.42	17.84	26.43
Both	10.64	2.16	6.82	8.92	12.67	18.48

Sources: Brazilian Institute of Geography and Statistics (*IBGE*) and Brazilian National System of Notification (*SINAN*).

The higher DP average rates recorded occurred in the South of Brazil, followed by Southeast, Midwest, Northeast, and North. The first two were very close to or above the national average (Figure 1).

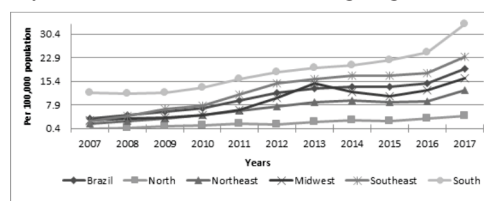


Figure 1 – Historical series of drug poisoning rates recorded

in Brazilian National System of Notification, Brazil and regions, 2007-2017.

The trends analysis show ascendent trends both in Brazil and its regions and in both sexes (Table 2). Factors as differences in *per capita* income, organization of health services and distribution of drugstores in the regions of Brazil can explain biggest occurrences in the South-Central, where are the regions with higher income and thereafter with better organization of health services and biggest number of drugstores (Bertoldi *et al.*, 2014; Santos & Boing, 2018).

Table 2 – Drug poisoning recorded in Brazilian National System of Notification, regression coefficient and trends, by sex, Brazil, 2007-2017.

Sex	Cases	Coefficient	CI (95%)		p	Tends
			Lower	Upper		
Male	68,292	2.07	1.70	2.44	0.000	Ascendent
Female	165,219	0.87	0.73	1.00	0.000	Ascendent
Both	233,511	1.47	1.21	1.72	0.000	Ascendent

Sources: Brazilian Institute of Geography and Statistics (IBGE) and Brazilian National System of Notification (SINAN).

The analysis by age bracket were used DP raw average coefficients, which showed that lowest DP rates recorded occurred in the age grupe of 60 years old or more, while biggest rates are founded in children of 0 to 4 years old (on average 5.5 times higher than the age group of 60 years old or more) (Figure 2).

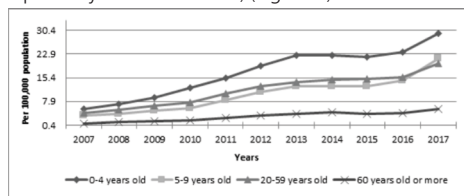


Figure 2 – Historical series of drug poisoning rates recorded in Brazilian National System of Notification, by age bracket, Brazil, 2007-2017.

The females presented more casees in all the age groups. Different studies (Matos *et al.*, 2002; Gandalfi & Andrade, 2006; Matos & Nascimento, 2008; Bochner & Souza, 2008; Maior & Oliveira, 2012) evidenced predominance of children under 5 years old in DP cases. Factors which results in DP in children are discussed by some authors, which relate the events to the orality phase in children under 4 years old, period in which they tend to take to the mouth the objects that are within reach, and colored packaging, with drawings, attractive shapes and sweet flavors are facilitating factors (Matos *et al.*, 2002; Maior & Oliveira, 2012). In her study, Bochner (2005) considers, beyond the factors inherent to childhood, which reflect the curiosity of children, factors related to safety of packaging and self-medication practice, reflecting the lack of legislation to ensure stricter monitoring of drug control. There is in Brazil, since 1994, a bill to creation of the Special Protective Packaging for Children (*Embalagem Especial de Proteção à Criança – EPPC*) which must contain a security seal to prevent children under 5 years old from opening them easily. The bill n. 4,841/1994 currently awaiting vote in Brazilian Plenay (Brasil, 2019).

The analysis of main conditions of poisoning recorded showed suicide attempt in first place (64.3%), followed by accidental conditions (13.4%) and self-medication (5.3%) during the study period, and the three conditions presented ascendent trends (Figure 3).

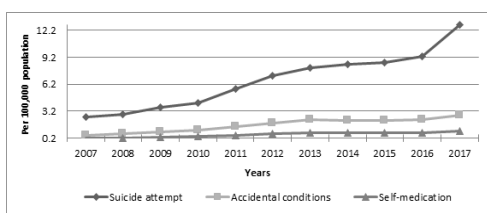


Figure 3 – Historical series of drug poisoning rates recorded in Brazilian National System of Notification, by condition, Brazil, 2007-2017.

in Brazilian National System of Notification, by condition of poisoning, Brazil, 2007-2017.

The analysis of conditions by age bracket showed children of 0 to 4 years old having accidental conditions as main condition of poisoning (on average 12.9 cases per 100,000 population); and in the groups of age from 5 to 19, 20 to 59 and 60 years old or more, the suicide attempt was the main condition of poisoning recorded (on average em 6.5; 8.8 and 1.4 cases per 100,000 population, respectively). Similar situation was observed by Matos *et al.* (2002), which founded in their study 76.8% of poisoning cases occurring in children under 4 years old and having as condition of poisoning the individual accident, and by Teles *et al.* (2013), which evidenced the suicide attempt as the main cause of DP in the Brazilian state of Bahia, being responsible for 81.0% of cases, and also with ascendent trends. Bernardes *et al.* (2010) in study performed in the Brazilian state of Paraná also founded the suicide attempt as main cause of DP, being more usual in the age group from 20 to 30 years old and in females. Besides these, others studies about DP presented as main condition of poisoning the suicide attempt (Bertasso-Borges *et al.*, 2010; Teles *et al.*, 2013; Feuser, 2013). The self-medication had lowest expression between conditions analyzed, presenting biggest number of cases in the age group from 20 to 59 years old (62.5%). Gandalfi & Andrade (2006) considered self-medication as a risk factor related to toxicological events, since many drugs do not need medical prescription for purchase, besides self-medication can be related to others conditions of poisoning as suicide attempt and accidental conditions.

It should be noted that there may be limitations regarding the data source used in this analysis, since even the IM being of compulsory notification in Brazil, there are possibilities of underreporting and typing or registration errors.

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