

## INVESTIGACIÓN ORIGINAL

DOI: <http://dx.doi.org/10.15446/revfacmed.v67n3.73245>

# Sociodemographic, criminal and forensic characteristics of a sample of female children and adolescents murdered in Brazil. 2010-2016

*Características sociodemográficas, criminales y médico-legales de una muestra de niñas y adolescentes víctimas de homicidio en Brasil. 2010-2016*

Received: 30/06/2018. Accepted: 13/11/2018.

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## | Abstract |

**Introduction:** In Brazil, violence, regardless of the type, is the leading cause of death in adolescents and young adults.

**Objective:** To describe the characteristics of the homicides in which female children and adolescents were the victims based on the autopsy reports recorded in the morgue of the city of Porto Alegre, Brazil.

**Materials and methods:** Cross-sectional study in which 70 autopsy reports of girls and female adolescents who were killed between January 2010 and December 2016 were analyzed. The cases were evaluated according to the homicide motive or the homicide perpetrator, and five categories were established: drug trafficking related death, femicide, homicide perpetrated by a family member, death preceded by sexual violence, and death related to other transgressions.

**Results:** There was a significant increase in the number of girls and female adolescents who were murdered between 2010 (n=7) and 2016 (n=19). Most of the homicides (64.2%) were related to drug, while femicide occurred in 15.7% of the cases. Homicides perpetrated by a family member, or preceded by sexual violence or related with other transgressions were less frequent as they occurred in 10%, 5.7% and 4.2% of the cases, respectively.

**Conclusion:** Greater attention must be paid to the increase in the number of drug trafficking related homicides among female adolescents when creating and implementing relevant public policies.

**Keywords:** Violence; Homicide; Gender-Based Violence; Adolescents (MeSH).

## | Resumen |

**Introducción.** En Brasil, la violencia, en sus diferentes manifestaciones, es la primera causa de muerte entre adolescentes y adultos jóvenes de ambos sexos.

**Objetivo.** Describir las características de los homicidios de niñas y adolescentes registrados en la morgue de Porto Alegre, Brasil.

**Materiales y métodos.** Estudio transversal que analizó 70 pericias de necropsia de jóvenes víctimas de homicidio entre enero de 2010 y diciembre de 2016. Los casos fueron evaluados según los motivos de los crímenes, identificando 5 categorías: muertes causadas por tráfico de drogas, feminicidios, homicidios familiares, muertes por violencia sexual y homicidios relacionados con otras infracciones legales.

**Resultados.** Hubo un aumento significativo en el número de niñas y mujeres adolescentes víctimas de homicidio entre 2010 (n=7) y 2016 (n=19). La mayoría de casos estuvieron relacionados con el tráfico de estupefacientes (64.2%), mientras que los casos de feminicidio representaron 15.7% de la muestra. Los homicidios cometidos por un familiar, los precedidos de violencia sexual y aquellos relacionados con otras actividades ilegales fueron menos frecuentes con un 10%, 5.7% y 4.2%, respectivamente.

**Conclusiones.** Es necesario prestar más atención al aumento de los homicidios en esta población relacionados con el tráfico de estupefacientes a la hora de crear e implementar políticas públicas al respecto.

**Palabras clave:** Violencia; Homicidio; Violencia de género; Adolescente (DeCS).

Rios AM, Martini M, Crespo KC, Morales AF, Magalhães PVS, Telles LEB. Sociodemographic, criminal and forensic characteristics of a sample of female children and adolescents murdered in Brazil. 2010-2016. Rev. Fac. Med. 2019;67(3):389-96. English. doi: <http://dx.doi.org/10.15446/revfacmed.v67n3.73245>.

Rios AM, Martini M, Crespo KC, Morales AF, Magalhães PVS, Telles LEB. [Características sociodemográficas, criminales y médico-legales de una muestra de niñas y adolescentes víctimas de homicidio en Brasil. 2010-2016]. Rev. Fac. Med. 2019;67(3):389-96. English. doi: <http://dx.doi.org/10.15446/revfacmed.v67n3.73245>.

## Introducción

Violence against children and adolescents is a serious global problem that affects cognitive, affective and social development in this population group. (1) Each year, approximately eight million children and adolescents (aged 0-19 years) die worldwide, and the leading death causes include poor health conditions, involvement in armed conflict situations, any type of violence against this population, child marriage, adolescent pregnancy, malnutrition, and child labor. (2-4) In Latin America, the existing high unemployment rates and the fact that there are not many activities in which young people may engage in make them more prone to be involved in criminal activities and, therefore, to have access to firearms, which undoubtedly represents higher children and adolescents' mortality rates due to the occurrence of intentional homicides in this context. (1,5-7)

The number of homicides is considered the best international indicator of violence. (8) In developed countries, violent deaths are mainly caused unintentionally (traffic and similar accidents), while in the case of intentional violent deaths, suicide is the most common form of violent death. (8) In Brazil, violent deaths are the most common cause of death in adolescents and young adults, both in men and women. Homicidal violence has soared since the 1980s, and it mainly affects black or dark skinned adolescents from economically disadvantaged households. Since then, the number of violent deaths in Brazilian adolescents has been constantly increasing. (6,9,10)

As mentioned above, the increase in children and adolescents' mortality rates has been associated with the use, possession and distribution of firearms. (1,6,11) According to Crossen *et al.* (12), each year 2 960 children and adolescents aged 0-19 years were victims of homicide between 2008 and 2010 in the United States of America. (12) In several Latin American countries, including Brazil, homicides by firearm exceed 70% of the total homicide rates, and rank first in terms of youth homicide. (13) Likewise, the consumption of alcohol and other psychoactive substances in this population makes them more vulnerable to be involved in violent situations that lead to this final outcome. (6,13)

According to Peres *et al.* (1), in Latin America, people aged 15-17 years have the highest risk of being a homicide victim, followed by the youngest children group (0-1 years old). According to this study, the younger the child, the more likely the murder is perpetrated by a family member (50% to 75%), including one or both parents, being the involvement of the mother more frequent. On the contrary, as they grow, children are more exposed to community violence, for when they are 15 years or older in only 5% of the cases the homicide perpetrator is a family member of the victim. (1)

In several countries it has been reported that in terms of sex, young males have a higher risk of being murdered than young girls (roughly seven times), but also, that the main homicide perpetrators are in fact young males. (14-17) Agranonil & Eurnstenu, in a study on child and adolescent mortality in Rio Grande do Sul / Brazil between 2000 and 2014, reported that in all age groups, males had a higher risk of being murdered than females, particularly in the 15-19 years age group, in which the probability of being a homicide victim was 10 times higher in males. (18) In general, male children and adolescents (0-17 years) are murdered by a stranger as a result of their involvement in criminal activities or interpersonal conflicts in public spaces.

Regarding female children and adolescents victims of homicide, usually the murderer is a family member or her partner, the latter being the final stage of a continuous and increasing process of victimization. (19,20) It is important to note that the increase in the number of women who were victims of homicide due to urban violence is related

to assassination attempts against their partners, (21,22) or their direct involvement in criminal activities. (19)

The aim of the present study was to describe the sociodemographic, criminal and forensic characteristics of the female children and adolescents who were victims of homicide based on the autopsy reports filed in the morgue of Porto Alegre, Brazil, between January 2010 and December 2016, for there are not many forensic studies analyzing homicides in this population, as well as the reasons behind violent death in female children and adolescents exposed to different types of violence. (16)

## Materials and methods

This is a cross-sectional and retrospective study in which the autopsy reports of female children and adolescents victims of homicide made in the Legal Medicine Department of Porto Alegre between January 2010 and December 2016 were analyzed. Considering the estimated population of the capital city (Porto Alegre) and the other eight cities located in the Metropolitan area of Porto Alegre (Greater Porto Alegre), the population coverage of the morgue during the study period was 2.216.975 inhabitants. Likewise, the autopsies performed in the central morgue account for nearly 50% of all autopsies carried out in the State of Rio Grande do Sul, with an estimate population of 11.000.000 inhabitants.

All autopsy reports of female subjects who, at the time of their death, were 17 years old or younger, and who, at the place of their death, were classified as homicide victims, were included. On the other hand, autopsy reports in which a different cause of violent death was informed (accidents, suicides, undetermined) were excluded.

In order to study homicide characteristics in this specific population, autopsy reports were analyzed on the basis of the motives leading to the murder or the homicide perpetrator; this way five categories were identified: drug trafficking related death, femicide (perpetrated by their partners in the context of intimate partner violence), homicides in which the perpetrator was a family member, death related to being involved in other illegal activities, and death preceded by sexual violence. For each category, the following variables were evaluated: socio-demographic information (the victim's age and ethnicity, as well as the city where the murder occurred), criminal data (the victim's history and frequency of victimization) and the information provided by the forensic pathologist (how was the death caused, the number and location of lesions in the body, and if there were traces of alcohol or other psychotropic substances).

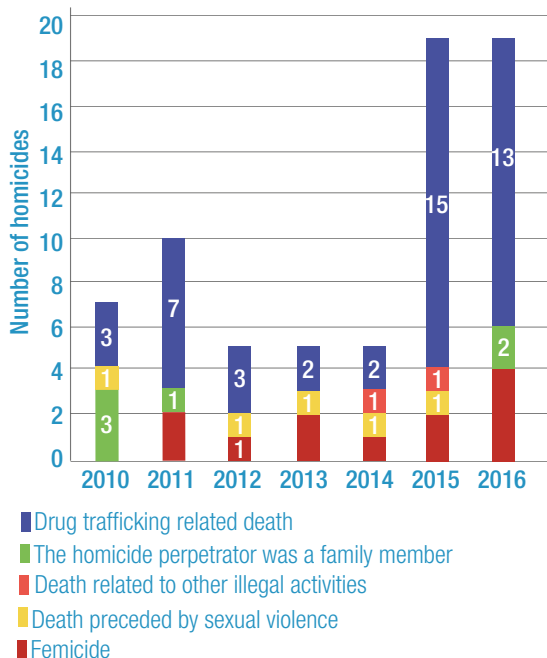
Socio-demographic and criminal information was obtained from the Crime Scene Investigation General Protocol of *Instituto Geral de Perícias* (Crime Scene Investigation General Institute), police reports and the records made at the crime scene by the team responsible for the removal of the body. Medico-legal information was obtained from autopsy reports and forensic laboratory test results. Likewise, according to the information provided by the institution, blood alcohol levels were measured by using Gas Chromatography – Flame Ionization Detector and Headspace GC sampling techniques, and urine immunoassay screening for cannabinoids, amphetamines and benzodiazepines was used for toxicological evaluation.

The study was authorized by the Department of Education and Research of the Legal Medicine Department of Porto Alegre and was granted ethical approval by the Ethics and Research Committee of *Hospital de Clínicas* of Porto Alegre (project No. 899 062, September 2017).

## Results

From January 2010 and December 2016 there were 70 girls and female adolescents who were classified as victims of homicide. When

these figures are analyzed by year (Figure 1) the number of homicides were similar between 2010 and 2014 (4 to 10 homicides), somehow a dramatic increase was observed in 2015 and 2016, with 19 and 17 cases respectively; it is important to note that in 2015 and 2016 most of the deaths were classified as drug trafficking related deaths, with 15 and 13 cases respectively. Figure 1 shows the distribution of homicides in this population according to the year of occurrence and the motives leading to the murder or the homicide perpetrator.



**Figure 1.** Distribution by year of occurrence and motive-based categories of girls and female adolescents who were victims of homicide in the Metropolitan Region of Porto Alegre between 2010 and 2016 according to the Autopsy Reports of the Legal Medicine Department of Porto Alegre. Source: Own elaboration based on the data obtained in the study.

### Sociodemographic variables

Most of the victims were adolescents (n=57), and there was a high number of deaths in all the categories that were established, with

the exception of the homicide perpetrated by a family member category (Table 1). In the case of girls (aged 0-12 years), there were 13 homicides (18.4%), while the lowest number of occurrence in this group corresponded to the age group between 7 and 12 years old, as only one case was reported. In terms of ethnicity, most of the victims were Caucasian (n=48), and most of the homicides took place in the capital city (n=44).

### Criminal variables

Figure 2 shows a significant increase in the number of homicides in 2015 and 2016, as the cases reported in this period account for 54.2% of the total reports made between 2010 and 2016. Likewise, an increase in the number of homicides in the 12-17 years age group was also observed during the study period, while in children younger than 12 years old the trend remained stable.

March and August were the months in which most cases were reported (34.2%), with 19 homicides in total for each of these months during the study period. In addition, most of the autopsies (54.2%) were performed on the weekends (from Friday evening to Sunday night), and bodies arrival at the morgue took place mainly in the night-time (7:00 pm - 6:00 am) (62.8%).

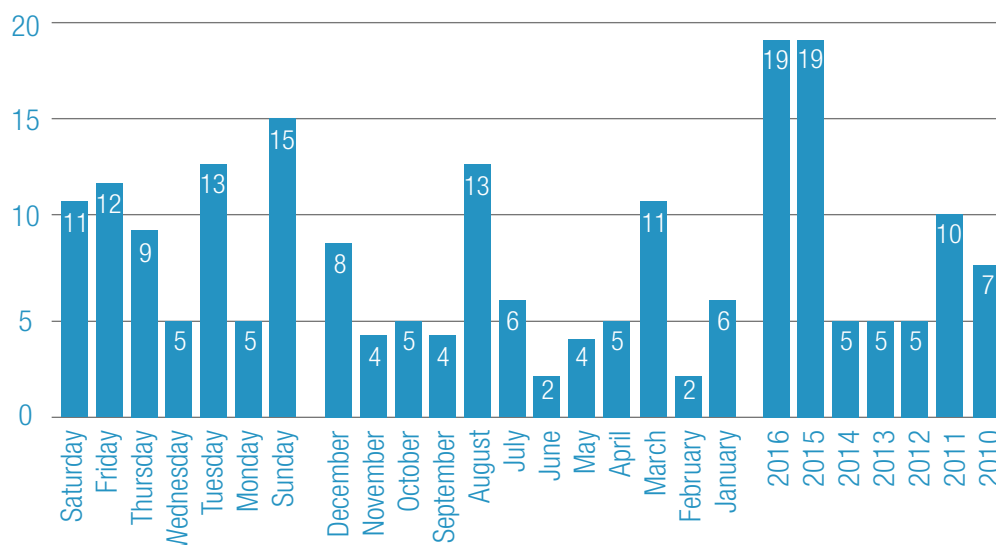
Regarding the place of death, 47 (67.1%) homicides took place on public places such as public roads (whether the victim was just walking or riding a personal use or public transportation vehicle) and bars, while the other 23 (32.9%) occurred in the victim's home or in the house of a friend or a relative. In those cases where the victim did not die at the place of the attack, but instead died in a hospital while receiving medical care, the place of death was determined based on the information provided by the police report (Table 2). In 29 cases (41.4%) there were reports of two or more victims of homicide at the crime scene, especially in homicide cases related to drug trafficking and those perpetrated by family members (familicide).

In order to know if the victims had been previously subjected to any type of violence, i.e. prior victimization, police reports involving them were also analyzed (Table 2). Based on these reports, prior to their violent death, exposure to any type of stressor was observed in 43 cases (61.4%): all of them had been subjected to any form of psychological violence, 31 to physical violence (44.2%), and 9 to sexual abuse (12.8%).

**Table 1.** Distribution of girls and female adolescent who were victims of homicide in the Porto Alegre Metropolitan Area according to their sociodemographic variables. 2010-2016.

Motive of homicide/ Homicide perpetrator (n=70)		Drug Trafficking related death n (%)	Perpetrated by intimate partner n (%)	Perpetrated by a family member n (%)	Preceded by sexual violence n (%)	Related to other illegal activities n (%)	Total n (%)
Age group	0-1 years	2 (33.3)	0 (0.0)	4 (66.6)	0 (0.0)	0 (0.0)	6 (100.0)
	2-6 years	4 (66.6)	0 (0.0)	1 (16.6)	1 (16.6)	0 (0.0)	6 (100.0)
	7-12 years	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
	13-17 years	38 (66.6)	11 (19.2)	2 (3.5)	3 (5.2)	3 (5.2)	57 (100.0)
Ethnicity	Caucasian	33 (68.7)	6 (12.5)	6 (12.5)	2 (4.1)	1 (4.1)	48 (100.0)
	Mestizo	7 (53.8)	3 (23.0)	1 (7.6)	1 (7.6)	1 (7.6)	13 (100.0)
	Black people	5 (62.5)	2 (25.0)	0 (0.0)	1 (12.5)	0 (0.0)	8 (100.0)
	Other	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)
Site location	Capital City	32 (72.7)	6 (13.6)	2 (4.5)	2 (4.5)	2 (4.5)	44 (100.0)
	Metropolitan Area	13 (50.0)	5 (19.2)	5 (19.2)	2 (7.6)	1 (3.8)	26 (100.0)
	Total	45 (64.2)	11 (15.7)	7 (10.0)	4 (5.7)	3 (4.2)	70 (100.0)

Source: own elaboration based on the data obtained in the study.



**Figure 2.** Distribution of cases in which girls and female adolescents were victims of homicide between 2010 and 2016 according to their occurrence by day of the week, month and year.

Source: own elaboration based on the data obtained in the study.

**Table 2.** Distribution of homicides based on the criminal variables.

Motive of homicide/ Homicide perpetrator (n=70)		Drug Trafficking related death n (%)	Perpetrated by intimate partner n (%)	Perpetrated by a family member n (%)	Preceded by sexual violence n (%)	Related to other illegal activities n (%)	Total n (%)
Place of death	Residence	7 (30.4)	8 (34.7)	7 (30.4)	0 (0.0)	1 (4.3)	23 (100.0)
	Public spaces/other	38 (80.8)	3 (6.3)	0 (0.0)	4 (8.5)	2 (4.2)	47 (100.0)
Had they been subjected to any form of violence?	Yes	29 (67.4)	6 (13.9)	3 (6.9)	2 (4.6)	3 (6.9)	43 (100.0)
	No	16 (59.2)	5 (18.5)	4 (14.8)	2 (7.4)	0 (0.0)	27 (100.0)
Had they been subjected to physical violence?	Yes	23 (74.1)	3 (9.6)	1 (3.2)	1 (3.2)	3 (9.6)	31 (44.2)
	No	22 (56.4)	8 (20.5)	6 (15.3)	3 (7.5)	0 (0.0)	39 (100.0)
Had they been subjected to psychological violence?	Yes	29 (67.4)	6 (13.9)	3 (6.9)	2 (4.6)	3 (6.9)	43 (100.0)
	No	16 (59.2)	5 (18.5)	4 (14.8)	2 (7.4)	0 (0.0)	27 (100.0)
Had they been subjected to sexual violence?	Yes	3 (33.3)	2 (22.2)	0 (0.0)	2 (22.2)	2 (22.2)	9 (100.0)
	No	42 (68.8)	9 (14.7)	7 (11.4)	2 (3.2)	1 (1.6)	61 (100.0)
Total		45 (64.2)	11 (15.7)	7 (10.0)	4 (5.7)	3 (4.2)	70 (100.0)

Source: own elaboration based on the data obtained in the study.

## Forensic variables

According to the information shown in Table 3, fatal head injuries were observed in 42 cases (60%), which makes it the body area most frequently affected, regardless of whether other anatomical regions were affected or not. In addition, most facial and cranial injuries were caused by firearms (n=38). On the contrary, the cases in which the victims were stabbed to death were less frequent (n=10), and only in one homicide a blunt weapon was used; besides, most of the injuries in body areas different from the head were stab wounds (over 20).

Firearms were used in most of the homicides related to drug trafficking and other illegal activities (46 out of 48 cases), while in the case of victims who were murdered by their intimate partners

(femicides), death by stabbing was predominant. Finally, in the case of homicides preceded by sexual violence, in most of the victims, death was caused by asphyxiation (3 out of 4 cases).

Making blood and urine analyses in victims of violent death is a standard forensic procedure. According to the autopsy reports included in this study, presence of alcohol in the bloodstream was only observed in less than 10% of the bodies in which blood tests were performed (n=63). Concerning urine tests, psychotropic substances traces were identified in 22 bodies (31.4%). In the case of bodies found in an advanced stage of decomposition or when the victims underwent surgical procedures after they were assaulted, no blood or urine tests were performed (n=5). Finally, there was not information regarding blood and urine tests in 3 cases (4.2%).

**Table 3.** Distribution of homicides based on the medico-legal variables.

Motive of homicide/ Homicide perpetrator (n=70)	Drug Trafficking related death n (%)	Perpetrated by intimate partner n (%)	Perpetrated by a family member n (%)	Preceded by sexual violence n (%)	Related to other illegal activities n (%)	Total n (%)	
Site of Injury	Head	23 (76.6)	4 (13.3)	2 (6.6)	0 (0.0)	1 (3.3)	30 (100.0)
	Head and other region	9 (75.0)	1 (8.3)	0 (0.0)	1 (8.3)	1 (8.3)	12 (100.0)
	Cervical region	2 (20.0)	4 (40.0)	1 (10.0)	3 (30.0)	0 (0.0)	10 (100.0)
	Thorax/abdomen	10 (62.5)	2 (12.5)	3 (18.7)	0 (0.0)	1 (6.2)	16 (100.0)
	Death by asphyxiation	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	2 (100.0)
Murder weapon	Firearms	43 (82.6)	4 (7.6)	2 (3.8)	0 (0.0)	3 (5.7)	52 (100.0)
	Bladed weapon (death by stabbing)	1 (10.0)	5 (50.0)	3 (30.0)	1 (10.0)	0 (0.0)	10 (100.0)
	Blunt weapons	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
	Asphyxiation	1 (14.2)	1 (14.2)	2 (28.5)	3 (42.8)	0 (0.0)	7 (100.0)
Alcohol presence in blood	Yes	2 (40.0)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)
	No	36 (63.1)	7 (12.2)	7 (12.2)	4 (7.0)	3 (5.2)	57 (100.0)
	There was not blood test	4 (80.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)
	There is no information	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)
Psychotropic substances presence in blood	Yes	18 (81.8)	3 (13.6)	0 (0.0)	1 (4.5)	0 (0.0)	22 (100.0)
	No	22 (55.0)	6 (15.0)	7 (17.5)	3 (7.5)	2 (5.0)	40 (100.0)
	There was not urine test	4 (80.0)	1 (20.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)
	There is no information	1 (33.3)	1 (33.3)	0 (0.0)	0 (0.0)	1 (33.3)	3 (100.0)
Total	45 (64.2)	11 (15.7)	7 (10.0)	4 (5.7)	3 (4.2)	70(100.0)	

Source: own elaboration based on the data obtained in the study.

## Discussion

The increase in mortality rates among boys 15 years old or older is a worldwide phenomenon (23), however few studies have addressed childhood and adolescence death in girls. (23) In the present study, an increase in the number of female adolescents who were victims of homicide in the capital city (Porto Alegre) from 2010 to 2016 was observed, in particular in Caucasian population. These findings are in agreement with the data described by Waiselfisz in 2015 (24), where he reports a significant increase in the homicide rates among female adolescents aged 13 or older, and that the state of Rio Grande do Sul ranks eighth among the Brazilian states with the highest rates of Caucasian women victims of homicide per 100 000 inhabitants.

Firearms were used as murder weapons in 52 (74.28%) of 70 the homicides, where the head was the anatomical region most commonly affected; in addition, most of these deaths were related to drug trafficking. In this regard, different international studies have also described that the use of firearms is the main means for murdering women. (25-30) On the contrary, death by stabbing or caused by a bladed weapon was less frequent (14.28%), and it was predominant in homicides perpetrated by the victims' intimate partners or their relatives (mainly their biological father). Other studies that have also analyzed the use of firearms and bladed weapons (mainly knives) in homicides in Brazil have reported a similar frequency, being Sunday the day more homicides occur (6,31); likewise, similar to the findings reported here, said studies concluded that the frequency of murders was higher on the weekends (Friday evening to Sunday night) and at night-time. (6,31)

In this study it was observed that most of the homicides were classified into the drug trafficking related deaths category (n=45). In addition, most of these victims were murdered in public areas such as bars and streets, whether they were just passing by or riding public transportation or personal use vehicles, and in some cases, they were not the target to be killed in the assault; in fact in 22 cases (48.8%), at least another person was also murdered at the crime scene. After studying the information available in the crime scene investigation reports of these homicides, it was found that in 43 cases (95.55%) the victims were shot with a firearm while doing their usual activities, describing a pattern of unidentifiable aggressors that used motorbikes or cars to approach their targets and fire at them and at other people who were present at the time of the assault and who were involved in this urban violence environment. Also, it was observed that in this scenario (drug trafficking), female adolescents were murdered together with their partners. These findings are in agreement with what other studies have reported regarding the murder of women in retaliation against their partners or relatives, and the violent death of women and children in areas affected by drug trafficking. (19,21,32)

The second category with the highest number of homicides was femicide, since 11 (15.7%) were perpetrated by the victim's intimate partner, besides in 8 cases (72.7%) the victims' age ranged between 13 and 15 years old at the time of their deaths, which reveals an early occurrence of this type of crime. In this sense, in 2013 the National Institute of Legal Medicine and Forensic Sciences of Colombia expressed its concerns regarding the increase in the number of femicides of minors. (11)



In the present study, the term femicide was used to classify only the homicides perpetrated by the victims' partners, ex-partners and anyone else with whom the victims might be in a sexual abuse or affective relationship and could be considered as their intimate partner. Few national surveys have addressed dating violence and intimate partner violence in adolescents and young people. (33-35) However, international organizations have described the problem that early marital unions and child marriages represent, for domestic violence, mainly against girls, may begin in the early stages of the relationship. (36,37) The cultural acceptance of dating violence and jealousy behaviors leads to the establishment of subordination relationships based on the use of violence. (33-36,38) Finally, three victims were pregnant at the time of their death, in two of them the presence of a fetus was reported, while the third one was killed due to her suspected pregnancy.

Regarding the category in which the homicide perpetrator was a family member of the victim, 11 cases were included. In the study period, 6 girls younger than 2 years old were murdered, of these, 4 (66.6%) were killed by their parents, while only 1 girl in the 2-6 years age group was murdered by one of her biological parents. When the homicide perpetrator is the biological father, the homicide can be classified under the familicide category, as, according to the cases included in this study, there were men who murdered their intimate partners and their daughters. In Brazil, effective public health policies have reduced infant mortality rates (22); however, Brazilian infants and young children are population groups that are still prone to be exposed to domestic violence scenarios due to their dependency on their caregivers and the fact they don't have many interactions outside their domestic environment. Also, it has been reported than in Latin America infants have a risk of death three times higher than children aged 1-4 years. (1,37)

With the exception of the death related to other illegal activities category, homicides were less frequent in the death preceded by sexual violence category. There were 4 four homicides in this category and they all shared a similar cause of death: strangling. The victims in this category were mainly adolescents aged 13-17 years (n=3) and based on the crime scene information available in the reports, the bodies were found in deserted areas, partially naked and with their personal belongings near them. Concerning the fourth victim, a preschooler, several anogenital injuries were observed, which confirmed sexual abuse. In the Brazilian context, sexual violence against prepubescent girls is characterized by its occurrence within the domestic environment (i.e. the household), the fact that it occurs more than once, and the absence of physical forensic evidence. (39)

Violence against children is a worldwide serious problem that can affect in different ways their psychological, cognitive and social development. The damage inflicted on children varies depending on the frequency and severity, and the form of violence they are exposed to, as well as their relationship with the perpetrator.(1,37,40) When analyzing if the victims included in this study had been subjected to any form of psychological or physical violence, it was found that violence episodes had been reported in 43 cases (61.42%). Likewise, previous sexual abuse was also reported, but it was less frequent, as only 2.8% of the adolescents included in the sample were being sexually exploited at the time of their death.

Another factor that was associated with a prior victimization was the use of abuse of psychotropic substances at the moment of death, which was observed in 31.42% of the adolescents. In the sample included here, the use of psychotropic substances was directly associated with drug trafficking and other illegal activities related homicides. In this regard, several studies have stated that the consumption of alcohol and other psychoactive substances disinhibits the perpetrator and makes the victim more vulnerable (41-45), as this

situation may lead them to adopt risky behaviors, such as getting into debt with drug dealers.

The study limitations included the lack of confirmation of the initial data through the police investigation reports or the judicial proceedings reports, and the difficulty to determine population annual percentage growth rates in the area where the sample was obtained, however based on the data provided by the Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics) there were not significant variations during the study period regarding the total number of inhabitants of the region, which suggests that the absolute numbers do not deviate too much from the annual growth rates. Taking this into account, the findings regarding drug trafficking related deaths affecting girls and female adolescents that are reported here cannot be extrapolated to other regions of the country and for the same period (2010-2016), so, further research is required to study this phenomenon in other Brazilian regions.

## Final considerations

Recently, infant mortality rates have experienced a general decrease in Brazil due to the efforts and actions that have been implemented by the government regarding public policies aiming at reducing infant deaths caused by infectious diseases and malnutrition; thus, children who used to die before they turned 1 year old are now reaching adolescence. Public safety and public health measures, as well as preventive actions, such as a better availability and accessibility to sports, leisure and cultural activities for young people are required to prevent early deaths in girls and female adolescents preceded by violent actions against them. Any attempt to keep children and adolescents away from illegal and crime related activities or to protect them from domestic violence must take into account the origin of the violent actions, which is often hidden by transgenerational behaviors.

Identifying the different factors directly related to the killing of female adolescents phenomenon will allow adopting policies aiming at interrupting the cycle of violence this population is exposed to, as well as proposing to stop trivializing the violent acts they are subjected to. Also, in order to avoid a fatal outcome it is necessary to properly and timely identify if a child or adolescent is at risk of being murdered based on any prior record reporting psychological or physical violence against him or her, for in this study, based on the available police reports, almost two thirds of the victims (64.14%) had been previously subjected to any form of violence, whether psychological, physical or sexual.

## Conflicts of interest

None stated by the authors.

## Funding

PVSM was supported by a National Council for Scientific and Technological Development - CNPq productivity fellowship.

## Acknowledgements

None stated by the authors.

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