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Spatial analysis of female intentional homicides*

Análise espacial dos homicídios intencionais de mulheres

Análisis espacial de los homicidios intencionales de mujeres

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ABSTRACT

Objective: To analyze the characteristics and spatial distribution of female intentional homicides, according to the regional health offices, in a state in the Northeast Region of Brazil. **Method:** This is an ecological study that had the municipality and regional health offices as units of analysis and used data from the Brazilian Mortality Information System. Mortality rates were calculated and smoothed by the local empirical Bayesian method. To identify the existence of spatial autocorrelation, the Moran's index was used. **Results:** A total of 1,144 homicides were reported, with an average rate of 6.2/100,000 women. For all regional health offices, the 10-39 age group, black race/skin color, and single marital status prevailed. The homicides took place in public spaces. The days of the week with the highest records were Saturday and Sunday and the months of the year December, January, February, and June. The global Moran's index was 0.6 (p = 0.01). Clusters of municipalities with high homicide rates were identified in regional health offices III and IV. Conclusions: The homicide victims were young, black, and single. The spatial analysis found critical areas of homicide occurrence, which are a priority for actions to prevent violence against women.

DESCRIPTORS

Homicide; Violence Against Women; Information Systems; Vital Statistics; Spatial Analysis.

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INTRODUCTION

Violence has been recognized as one of the main global public health problems. About 1.4 million people die annually from violence and homicide is the most extreme form of violence[1-2]. Intentional homicide is defined as "the unlawful death purposely inflicted on a person by another"[1]. In 2012, intentional homicide caused around half a million deaths worldwide. Men commit approximately 95% of homicides and make up 79% of victims; however, when homicide is associated with domestic or intra-family violence, it disproportionately affects more women[3-4].

Every year, intimate partners or family members commit almost 64,000 intentional homicides. Of the total number of women murdered, 47% are victims of intimate partners or family members, while only 6% of men, victims of homicide, have their intimate partner or family member as the perpetrator of[1] violence. Female homicides for gender reasons are considered femicides[5].

Violence against women is a phenomenon that still persists in the current societies and is manifested in different ways (physical, sexual, and psychological) and levels of severity. Most of the time, it occurs within the family context, more specifically by an intimate partner, being manifested within an abusive relationship, with significant economic, social, and familiar impact, and serious consequences for the victims' physical and mental health. The end point of violence against women is often[4] the homicide.

In Brazil, women exposed to violence have a mortality risk eight times greater than that of the general population of women and it is estimated that 100 women die weekly as a direct or indirect consequence of exposure to violence[6]. There were more than 100,000 female homicides between 1980 and 2014, with a rate of 5.13 deaths per 100,000 women[7]. In the state of Pernambuco, between 2006 and 2016, the average homicide rate in the female population was 5.7/100,000 women[8].

High female homicide rates in the country and in the world show the magnitude of gender violence in its most extreme form. The victims' and deaths' characteristics are information that can be used to formulate public policies to prevent violence and reduce deaths. Another tool that can be used by the health care area to study violence is spatial analysis, which allows the observation of patterns of distribution and the identification of areas of risk for mortality from homicides[9]. The aim of this study was to analyze the characteristics and spatial distribution of female intentional homicides, according to the regional health offices, in a state in the Northeast Region of Brazil.

METHOD

Design of study

This is an ecological study that considered the municipalities of the state of Pernambuco and the regional health offices as a spatial unit of analysis. The state is divided into 184 municipalities and one district (Archipelago of Fernando de Noronha), spread over five mesoregions and 12 regional health offices (RS). The district of Fernando de Noronha was not included in the spatial analysis due to the lack of neighboring municipalities, but there was no record of female intentional homicides in that district.

Population

The study included all intentional homicides of women living in the state who were 10 years old or older, coded as "external causes of morbidity and mortality" (codes X85 to Y09 - Aggressions) in the International Statistical Classification of Diseases and Related Problems to Health (ICD-10), registered in the Mortality Information System (SIM) in the period from 2012 to 2016.

Data collection

In November 2018, the SIM database related to female intentional homicides was obtained from the State Department of Health of Pernambuco. The population projections of the Brazilian Institute of Geography and Statistics (IBGE) were used; the digital base also comes from IBGE, with the reference system Sirgas 2000 and a geographic coordinate system.

Data analysis and treatment

To characterize female homicides, the following variables were studied: age group (10 to 39 years, 40 and over); race/skin color (not black = white, black = black + brown); marital status (single, married/common-law marriage, widow, divorced); place of occurrence of death (hospital/health service, home, public spaces, others); month and day of the week of death; and basic cause of death (firearm firing; sharp or penetrating object; blunt object; hanging, strangulation, suffocation; and other means).

The average mortality rates per 100 thousand were calculated, dividing the average number of female homicides by the average of the population of women living in the state of Pernambuco, with 10 years of age or older, in the period studied. The average rate was used to avoid bias due to small numbers.

The average mortality rates were adjusted using the local empirical Bayesian method, to minimize the effects of fluctuations resulting from the small number of deaths in any of the territorial units. The global Moran's index was used to check the rates spatial autocorrelation. This index ranges from -1 to +1, where zero indicates the absence of autocorrelation and values closer to 1 indicate the existence of positive or negative autocorrelation. The closer to 1, the greater the similarity between neighboring municipalities in relation to mortality.

For the delimitation of critical and transition areas, as well as the identification of clusters, the local Moran's index (Local Indicators of Spatial Association - LISA) was used. The Box Map and Moran Map of mortality rates were constructed. The clusters were classified into four quadrants: Q1 (positive values, positive means) and Q2 (negative values, negative means); Q3 (positive values, negative means), and Q4 (negative values, positive means).

In the Box Map, the clusters are presented regardless of statistical significance; and in the Moran Map, the clusters remain significant (p-value < 0.05). High-risk areas corresponded to those in which the municipality has a high mortality rate and its neighbors also have high rates, classified in Q1. The geographical distribution of the Human Development Index (HDI) by municipality was carried out, in the state of Pernambuco, which is based on some dimensions (education, health, and income) to measure the development of a location[10]. The software TerraView (version 4.2) was used to calculate and analyze the spatial autocorrelation indicators and the software QGIS (version 2.18) for graphical presentation.

Ethical aspects

The research respected the standards and ethical guidelines of Resolution No. 466/2012, of the National Health Council, and was approved by the Research Ethics Committee of the Federal University of Pernambuco (Universidade Federal de Pernambuco) under Opinion No. 2.986.711, dated October 29, 2018. The Health Department of the State of Pernambuco approved the concession of SIM's database.

RESULTS

In the period studied, 1,144 female intentional homicides were recorded. Of these, 503 (43.9%) were concentrated in RS I. The victims' ages ranged from 10 to 97, with a mean of 24 years (standard deviation = 15.3 years). For all regional health offices, the 10-39 age group, black race/skin color, and single marital status prevailed. Regarding the place of occurrence, in six RS and in the state of Pernambuco, homicides occurred predominantly on public spaces. Most homicides occurred on the weekend (Saturday and Sunday) in five RS and in Pernambuco. The months of the year with the highest homicide records were December (9.1%), January (8.8%), February (8.8%), and June (8.8%) (Table 1).

Firearm firing was the main cause of death in seven RS and in the state of Pernambuco. It is worth mentioning that in RS I, 332 (66.0%) homicides were caused by firearms. For RS VII, VIII and IX, a sharp or penetrating object was the most frequently used (Table 2).

The average mortality rate was 6.2, ranging from 1.2 to 17.0 (Figure 1A). Between RS VII and VI, the rate varied from 2.3 to 7.0, respectively. The municipality with the lowest rate (1.2/100,000 women) was Santa Maria da Boa Vista, located in the RS VIII. The municipality with the highest rate (17.1/100,000 women) was Camutanga, located in RS XII.

Figure 1B shows the rates smoothed by the local empirical Bayesian estimator and 25% are distributed over RS I, II, III, IV, V, VI, IX and XII, with the highest concentration in RS IV.

The global Moran's index of smoothed rates was 0.6 (p = 0.01). In the Moran scattering plot (Box Map), the Q1 municipalities were located mainly in RS III, IV, V, VI and XII (Figure 1C). The Moran Map was used to identify clusters of municipalities with a statistically significant spatial autocorrelation of 5%. Four conglomerates and a critical municipality (Q1), four low-level conglomerates (Q2), and a municipality in transition (Q3) were identified. The clusters (Q1 areas) are located in the RS: I (two municipalities), III (eight municipalities), IV (eight municipalities), XII (two municipalities), and VI (three municipalities, one conglomerate and one isolated municipality) (Figure 1D). Municipalities in Q1 areas have low and medium HDI rates (Figure 1E).

Table 1 - Characterization of female homicides, according to the regional health offices - Pernambuco, Brazil, 2012-2016.

Regional Health Office	I		II		III		IV		V		VI		VII		VIII		IX		X		XI		XII		PE	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age range																										
10 to 39	394	78.3	45	71.4	70	83.3	132	72.5	45	70.3	36	61.0	4	57.1	38	74.5	32	76.2	14	82.4	22	84.6	34	73.9	866	75.7
40 and older	109	21.7	18	28.6	14	16.7	50	27.5	19	29.7	23	39.0	3	42.9	13	25.5	10	23.8	3	17.6	4	15.4	12	26.1	278	24.3
Race/skin color																										
Not black	69	13.9	9	14.8	10	12.2	20	11.0	5	8.2	5	8.5	-	-	4	8.0	4	9.8	3	17.6	1	3.8	4	8.9	134	11.9
Black	427	86.1	52	85.2	72	87.8	162	89.0	56	91.8	54	91.5	7	100.0	46	92.0	37	90.2	14	82.4	25	96.2	41	91.1	994	88.1
Marital status																										
Single	417	90.3	50	80.6	65	85.5	108	78.3	32	74.4	27	67.5	6	85.7	38	76.0	29	74.4	8	61.5	14	66.7	37	86.0	832	82.1
Married/common-law marriage	45	9.7	10	16.1	6	7.9	20	14.5	10	23.3	10	25.0	1	14.3	10	20.0	6	15.4	1	7.7	4	19.0	2	4.7	125	12.3
Widow	-	-	1	1.6	3	3.9	7	5.1	1	2.3	2	5.0	-	-	-	-	2	5.1	-	-	2	9.5	2	4.7	31	3.1
Divorced	-	-	1	1.6	2	2.6	3	2.2	-	-	1	2.5	-	-	2	4.0	2	5.1	4	30.8	1	4.8	2	4.7	26	2.6

continue...

…continuation

Regional Health Office	I		II		III		IV		V		VI		VII		VIII		IX		X		XI		XII		PE	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Place of occurrence																										
Hospital/Health Service	94	22.1	8	12.9	19	22.6	25	13.8	6	9.4	11	19.0	-	-	8	15.7	6	14.3	4	23.5	2	7.7	9	20.0	266	23.4
Residence	77	18.1	21	33.9	17	20.2	55	30.4	28	43.8	28	48.3	1	14.3	18	35.3	11	26.2	10	58.8	10	38.5	10	22.2	287	25.2
Public space	225	52.8	28	45.2	37	44.0	87	48.1	24	37.5	12	20.7	1	14.3	11	21.6	6	14.3	1	5.9	11	42.3	21	46.7	464	40.8
Others	30	7.0	5	8.1	11	13.1	14	7.7	6	9.4	7	12.1	5	71.4	14	27.5	19	45.2	2	11.8	3	11.5	5	11.1	121	10.6
Month of occurrence																										
January	46	9.1	3	4.8	9	10.7	10	5.5	5	7.8	7	11.9	1	14.3	6	11.8	5	11.9	4	23.5	2	7.7	3	6.5	101	8.8
February	43	8.5	5	7.9	8	9.5	14	7.7	9	14.1	5	8.5	-	-	5	9.8	3	7.1	-	0	1	3.8	8	17.4	101	8.8
March	41	8.2	10	15.9	7	8.3	13	7.1	7	10.9	2	3.4	-	-	3	5.9	4	9.5	3	17.6	3	11.5	7	15.2	100	8.7
April	53	10.5	2	3.2	4	4.8	10	5.5	8	12.5	6	10.2	1	14.3	2	3.9	3	7.1	-	0	1	3.8	5	10.9	95	8.3
May	39	7.8	5	7.9	8	9.5	14	7.7	4	6.2	7	11.9	-	-	4	7.8	4	9.5	1	5.9	4	15.4	4	8.7	94	8.2
June	51	10.1	6	9.5	9	10.7	17	9.3	3	4.7	4	6.8	1	14.3	4	7.8	3	7.1	2	11.8	-	0	1	2.2	101	8.8
July	37	7.4	5	7.9	6	7.1	16	8.8	1	1.6	2	3.4	-	-	4	7.8	3	7.1	1	5.9	2	7.7	4	8.7	81	7.1
August	43	8.5	9	14.3	7	8.3	9	4.9	8	12.5	4	6.8	-	-	6	11.8	1	2.4	1	5.9	1	3.8	1	2.2	90	7.9
September	31	6.2	3	4.8	4	4.8	21	11.5	2	3.1	8	13.6	1	14.3	7	13.7	5	11.9	3	17.6	2	7.7	5	10.9	92	8.0
October	40	8.0	2	3.2	5	6.0	21	11.5	6	9.4	7	11.9	-	-	2	3.9	2	4.8	-	0	2	7.7	4	8.7	91	8.0
November	39	7.8	5	7.9	7	8.3	12	6.6	7	10.9	2	3.4	3	42.9	2	3.9	5	11.9	2	11.8	6	23.1	4	8.7	94	8.2
December	40	8.0	8	12.7	10	11.9	25	13.7	4	6.2	5	8.5	-	-	6	11.8	4	9.5	-	0	2	7.7	-	0	104	9.1
Day of the week																										
Monday	78	15.5	10	15.9	12	14.3	33	18.1	7	10.9	10	16.9	-	-	7	13.7	5	11.9	4	23.5	4	15.4	5	10.9	175	15.3
Tuesday	56	11.1	17	27.0	4	4.8	28	15.4	9	14.1	10	16.9	1	14.3	3	5.9	5	11.9	1	5.9	5	19.2	4	8.7	143	12.5
Wednesday	65	12.9	9	14.3	9	10.7	17	9.3	8	12.5	6	10.2	0	0	6	11.8	8	19	2	11.8	5	19.2	8	17.4	143	12.5
Thursday	52	10.4	6	9.5	9	10.7	23	12.6	9	14.1	5	8.5	0	0	2	3.9	1	2.4	1	5.9	1	3.8	7	15.2	116	10.1
Friday	72	14.3	6	9.5	11	13.1	27	14.8	8	12.5	10	16.9	1	14.3	6	11.8	7	16.7	1	5.9	2	7.7	8	17.4	159	13.9
Saturday	88	17.5	6	9.5	18	21.4	27	14.8	11	17.2	5	8.5	2	28.6	15	29.4	3	7.1	4	23.5	5	19.2	4	8.7	188	16.4
Sunday	92	18.3	9	14.3	21	25.0	27	14.8	12	18.8	13	22	3	42.9	12	23.5	13	31	4	23.5	4	15.4	10	21.7	220	19.2

Grades: Ignored/blank: race /skin color - 16 (1.39%), marital status - 130 (11.36%), place of occurrence - 06 (0.52%)

Table 2 - Characterization of female homicides, according to the regional health offices - Pernambuco, Brazil, 2012-2016.

Regional Health Office	I		II		III		IV		V		VI		VII		VIII		IX		X		XI		XII		PE	
	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Basic cause of death																										
Firearm firing	332	66.0	33	52.4	55	65.5	101	55.5	25	39.1	25	42.4	3	42.9	17	33.3	15	35.7	7	41.2	15	57.7	25	54.3	654	57.2
Sharp or penetrating object	98	19.5	22	34.9	20	23.8	51	28.0	22	34.4	22	37.3	4	57.1	22	43.1	17	40.5	7	41.2	6	23.1	16	34.8	307	26.8
Blunt object	50	9.9	4	6.3	6	7.1	21	11.5	8	12.5	9	15.3	-	-	8	15.7	8	19.0	2	11.8	4	15.4	3	6.5	123	10.8
Hanging, strangulation, suffocation	20	4.0	3	4.8	3	3.6	5	2.7	6	9.4	2	3.4	-	-	3	5.9	-	-	1	5.9	-	-	2	4.3	45	3.9
Other means	3	0.6	1	1.6	0	0.0	4	2.2	3	4.7	1	1.7	-	-	1	2.0	2	4.8	-	-	1	3.8	-	-	15	1.3

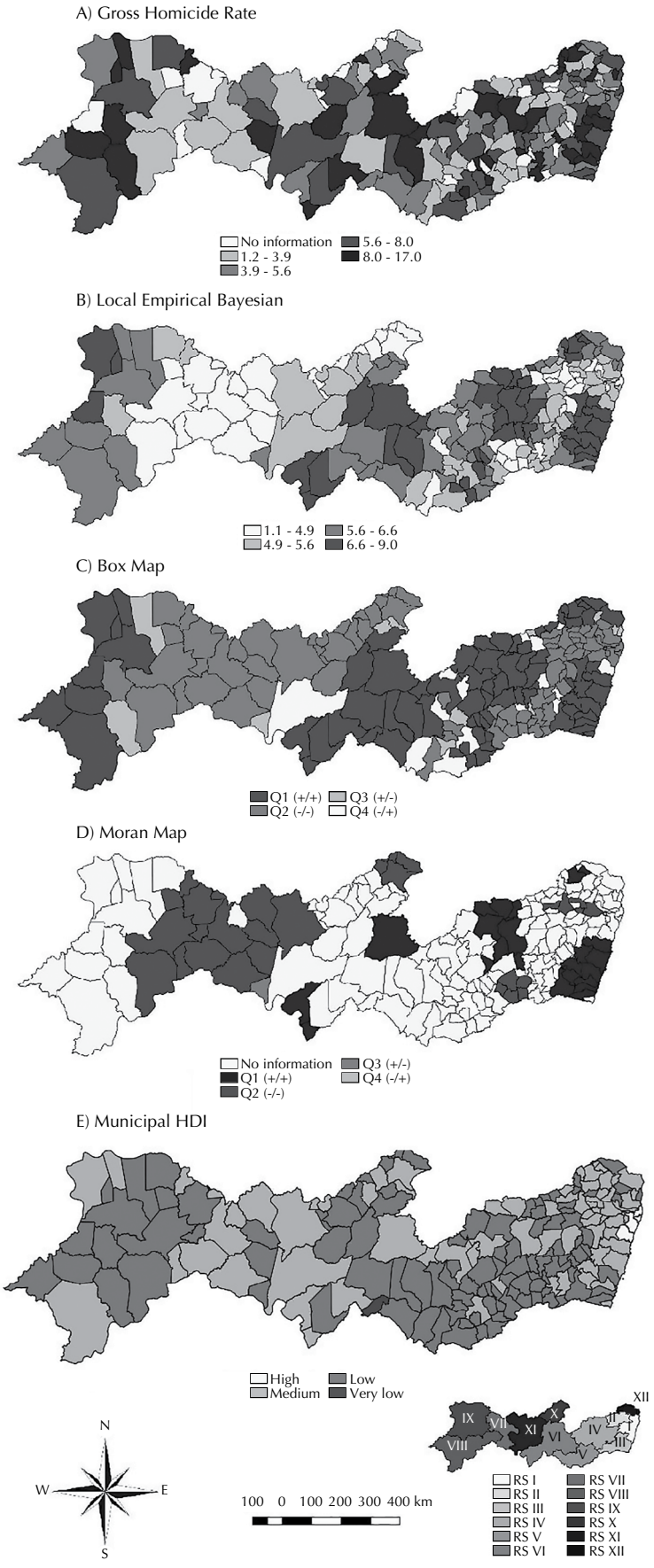

Figure 1 – Gross average rate (A), average rate estimated by the local empirical Bayesian method (B), spatial distribution of mean homicide rates – Box Map (C), critical areas for homicides, according to Moran's scattering – Moran Map (D) of female homicides (E), Human Development Index by municipality - Pernambuco, Brazil, 2012-2016.

DISCUSSION

The results of this study are similar to others found in the literature, with most victims at childbearing age, of black race/skin color, with a place of occurrence on public spaces and with the use of a firearm. Generally, women do not appear to be the target of homicide, unless when they are threatened by someone with whom they have a relationship or, at least, some kind of previous relationship[11].

Female intentional homicides were more frequent in the 10 to 39 age group. A study analyzing female homicides in the Brazilian regions found that women in the second and third decades of life showed higher risk of death. In Italy, Germany, and the United States, female intentional homicides were more common in the age group from 15 to 29 and 30 to 44[12]. Globally, these groups represent the majority of homicides and women aged 30 or over may be at higher risk of exposure to violence by an intimate partner or family member than other age groups[1].

Regarding race/skin color, it was observed that more than 80% of women victims of intentional homicides, in all RS, were black. Studies have shown that the frequency of female homicide varies according to race/skin color and, in general, black women are the main victims. In the United States, the comparison of racial and ethnic differences in homicides of adult women showed that black women were more likely to be killed by acquaintances (29.0%)[13]. Other authors have shown that homicide mortality was significantly higher for black women (OR = 2.1), when compared to white women (OR = 1.0). In addition, evidence indicated that the type of violence that caused the death of black women may have been more serious, such as the use of more lethal weapons or injuries to areas of the body that are more vulnerable [14].

In this study, most women were single, differently from what was observed in other studies, in which the main victims were married or in a common-law marriage, and, in general, the aggressor is the intimate partner [13,15]. The victim's marital status in the Death Certificate is single; however, there is no way to know, only based on the SIM data, if these women had partners/boyfriends, to be consistent with the literature, which shows that they are mostly victims of intimate partners. The SIM data analysis does not allow saying that female homicides are gender-related crimes. However, 70% of these deaths are estimated to be[16] femicides.

Worldwide, 13.5% of female homicides are committed by an intimate partner[3]. Hierarchical relations of gender power and disorders resulting from the use of alcohol and other drugs may be related to violent behavior[17]. The increase in gender equality is associated with low levels of violence, as it provides women with the necessary resources to end an unhealthy relationship[12].

A study on factors associated with homicide by an intimate partner showed that, in cases where the perpetrator had a history of aggression, victims were 2.4 times more likely to suffer the fatal injury at home. Likewise, in cases where the perpetrator was the victim's current partner, there was twice as much chance of the injury causing the death to occur at the victim's residence[18]. Most of the time, the victims were involved in an episode of physical or verbal aggression with an intimate partner when the homicide occurred[18].

The weekend was the period when there were more homicides. This fact may be related to the increased consumption of alcoholic beverages in this period. A study carried out with victims of domestic and family violence, seen in urgent and emergency services, found that 46.1% of the cases occurred in the weekend[19]. The months with the highest occurrence of homicides were months of vacations and parties (carnival, Brazilian June fests, and the end of the year). A study carried out in Brazil identified the months of September, October, and December as those of highest occurrence of physical violence against women[20].

There was a predominance of homicides by firearms, and in three RS homicides using sharp or penetrating objects prevailed. Some studies show that firearms, of different types, are the most involved in female homicides[13,21]. The use of sharp or blunt instruments is related to the fact that the homicide was committed in a situation where knives, or similar objects, could be easily found. Other authors understand that sharp instruments, blunt weapons, and other methods, such as strangulation or drowning, can represent a means to attack the victim during a conflict, while the firearm indicates the intention to murder the victim[22].

A recent meta-analysis study on the risk factors for female homicides by intimate partners found that one of the main factor is the aggressor having direct access to a[23] weapon. Intimate partners who are violent and have access to a firearm are the authors of the most serious assaults. Thus, laws prohibiting people under restraining orders due to domestic violence from having access to these weapons are associated with reductions in the number of homicides by an intimate partner. Nevertheless, some provisions of these laws and their application may affect their efficiency[24].

Regarding the homicide place of occurrence, public spaces stand out. These places being the ones of highest occurrence shows the intentionality and seriousness of the violence, which happens mainly with the use of a firearm, which threatens the likelihood of survival[25].

The highest mortality rates and critical conglomerates for female homicides were concentrated in distant municipalities in the metropolitan region, located mainly in the Zona da Mata (RS III) and in the Agreste of Pernambuco (RS IV). Cultural factors may influence this result, such as the still strong presence of cultural patterns of gender hierarchies. It is still common, in municipalities located in less urban regions, for women not to report domestic violence or rape, especially in family settings[26]. Usually due to fear of judgment, which can be practiced by the local society, fear of retaliations, and greater difficulty accessing protection services for victims of violence, such as the specialized women's police stations[26].

The spatial analysis carried out in this study allowed both the identification of areas with city agglomerations with high-risk for female homicide and areas of epidemiological transition, that is, those surrounded by neighboring low-risk municipalities. Transition areas can be considered an

intermediate priority for public policies to prevent violence against women[9]. A study spatially analyzing the distribution of sexual violence rates practiced by an intimate partner against women showed that this type of analysis can contribute to the identification of vulnerable areas and to the development of prevention strategies and strengthening of public policies[27]. In fact, the spatial analysis of homicides is yet another important tool to be used in actions to prevent violence against women.

Almost all municipalities in the state of Pernambuco had an HDI between medium and low, including critical areas for the occurrence of female homicides. Issues such as education, health, and income can interfere with the violence of a place.

In many cases, female homicides are the result of a cycle of aggressions. Health services have a fundamental role in identifying and responding to different situations of violence, as they are often the first place where victims seek assistance[21,28]. Such services are responsible for embracing and implementing preventive and assistance measures and not just for medicalization of the symptoms and signs of physical illness[29]. Health professionals, including nurses, shall be able to recognize situations of violence against women. It is also necessary to articulate the notification of violence against women with counseling and the possibility of referral to the network of other care and protection services, aiming to end the cycle of violence[30].

This study can contribute to expand the knowledge about female homicides in the health area, allowing greater visibility of violence against women. In addition, it allowed the understanding of the characteristics of women who suffered violence and died because of it. Understanding the characteristics of victims and crimes can assist the Nursing team in decision-making in preventive and assistance activities in situations of violence. The spatial analysis allowed the identification of critical areas for the occurrence of female homicides and these can be priority areas for interventions in the area of public health.

This study has the following limitations: (a) quality of the data used, although important improvement in the SIM was observed; (b) difficulties in accessing public security data, which contain information about the circumstances, the victim's relationship with the aggressor, and the use of psychoactive substances, as this information would allow a structured methodological approach; and (c) a significant portion of female homicides are possibly femicides; however, the SIM does not contain this information. Future epidemiological studies should be based on a methodological analysis including multiple databases (Notifiable Diseases Information System – Sinan; Emergency Ambulance Service – Samu; public security) and factors associated with homicides, as well as considering the contextualization of behaviors and conduct that could predict homicides.

CONCLUSION

Reducing lethal violence against women requires comprehensive measures addressing individual, social, economic, cultural, and situational factors. This study shows that young, black, and single women were the most common victims. Homicides occurred on public spaces and with the use of firearms. Deaths occurred on the weekend and in the months of holidays and traditional festivals in Brazil (carnival, Brazilian June fests, and New Year celebrations). The highest mortality coefficients and critical areas are concentrated in distant municipalities in the metropolitan region, located mainly in the Zona da Mata and in the Agreste of Pernambuco.

The characterization of female homicides can contribute to the expansion of knowledge about violence against women in the field of nursing and public health and can be used to conduct measures aimed at reducing homicides. The spatial analysis allowed the identification of critical areas for the occurrence of homicides and these can be priority areas for interventions in the health area.

RESUMO

Objetivo: Analisar as características e a distribuição espacial dos homicídios intencionais de mulheres, de acordo com as regionais de saúde, em um estado da Região Nordeste do Brasil. **Método:** Estudo ecológico que teve o município e as regiões de saúde como unidades de análise e usou dados do Sistema de Informações sobre Mortalidade. Calcularam-se as taxas de mortalidade, que foram suavizadas pelo método bayesiano empírico local. Para identificação da existência de autocorrelação espacial, utilizou-se o índice de Moran. **Resultados:** Registraram-se 1.144 homicídios, com taxa média de 6,2/100.000 mulheres. Para todas as regiões de saúde prevaleceram a faixa etária de 10 a 39 anos, a raça/cor negra e a situação conjugal solteira. Os homicídios ocorreram em via pública. Os dias da semana com maiores registros foram sábado e domingo e os meses do ano dezembro, janeiro, fevereiro e junho. O índice de Moran global foi de 0,6 (p = 0,01). Identificaram-se *clusters* de municípios com altas taxas de homicídios nas III e IV regiões de saúde. Conclusões: As vítimas de homicídios eram jovens, negras e solteiras. A análise espacial localizou áreas críticas de ocorrência de homicídios, que são prioritárias para as ações de prevenção da violência contra as mulheres.

DESCRITORES

Homicídio; Violência contra a Mulher; Sistemas de Informação; Estatísticas Vitais; Análise Espacial.

RESUMEN

Objetivo: Analizar las características y la distribución espacial de los homicidios intencionales de mujeres, de acuerdo con las regionales de salud, en una provincia de la Región Noreste de Brasil. **Método:** Estudio ecológico que utilizó el municipio y las regiones de salud como unidades de análisis y empleó datos del Sistema de Informaciones sobre Mortalidad. Se calcularon las tasas de mortalidad que fueron mitigadas por el método bayesiano empírico local. Se utilizó el índice de Moran para identificación de la existencia de autocorrelación espacial. **Resultados:** Fueron registrados 1.144 homicidios con un promedio de 6,2/100.000 mujeres. En todas las regiones de salud predominaron mujeres con edades entre 10 y 39 años, de raza/color negro y solteras. Los homicidios ocurrieran en vía pública. Los días en los que más ocurrieron fueron sábado y domingo y los meses diciembre, enero, febrero y junio. El índice

de Moran global fue 0,6 (p = 0,01). Se identificaron *clusters* de municipios con altas tasas de homicidios en las III y IV regiones de salud. Consideraciones Finales: Las victimas de homicidios eran jóvenes, negras y solteras. El análisis espacial localizó áreas críticas de ocurrencia de homicidios, que son prioritarias para las acciones preventivas de la violencia contra las mujeres.

DESCRIPTORES

Homicidio; Violencia contra la Mujer; :Sistemas de Información; Estadísticas Vitales; Análisis Espacial.

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