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Lethal and intentional violent crimes against women in Alagoas, Northeast Brazil: a comparative study before and during the Covid-19 pandemic

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Abstract

Background The death of women as a result of violent crime has become a major social and health problem worldwide. Most of these crimes are committed by their partners. The Covid-19 pandemic seems to have amplified the problem, given that measures to contain the spread of the disease have exposed women to more prolonged contact with their aggressors.

Objective To describe the epidemiological profile of lethal and intentional violent crimes committed against women in the state of Alagoas, Brazil, from March 2018 to February 2020 (before the pandemic) and from March 2020 to December 2021 (during the first two years of the Covid-19 pandemic).

Methods This is an observational study involving all deaths of women due to lethal and intentional violent crimes. The data was obtained from the Alagoas State Secretariat for Public Security. The variables age, type of crime, means used, day of the week and time of the crime were analyzed. The specific mortality rate was calculated for the entire study period. Population data was obtained from the Brazilian Institute of Geography and Statistics (IBGE). Descriptive statistics were used to analyze the data.

Results There were 316 deaths during the study period. The mortality rate in 2020 (5.33/100,000) was higher than in the years prior to the pandemic (3.88/100,000 in 2018 and 4.84/100,000 in 2019). There was a predominance of the 18–29 (31.31%) and 30–39 (27.95%) age groups in both periods. The proportion of female homicides was 55.19% in the pre-pandemic period and 64.20% in the pandemic period. The proportion of beating deaths was 1.7 times higher in the pandemic period than in the non-pandemic period (15.23% vs. 8.97%). There was also an increase in beatings on Saturdays, with a proportion 1.60 times higher than in the pre-pandemic period (19.75% vs. 12.34%).

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Conclusion The victims were predominantly young women, the crimes classified as homicides and with the use of firearms. The study emphasizes that the context of the Covid-19 pandemic may have contributed to the increase in violent crimes against women in Alagoas, highlighting the urgency of preventive measures and support for victims.

Keywords Violence against women, Domestic violence, Social isolation, Covid-19, Homicide

Introduction

Violence against women is currently one of the most devastating phenomena in society. Considered a serious social problem in Brazil and throughout the world, this violence has innumerable harmful consequences for the dignity of the victims, as well as for their physical and mental integrity, often leading to death [1, 2].

Lethal and intentional violence against women can be considered the final and extreme result of a series of abuses suffered. This includes cases of femicide, which refers to circumstances in which women are victimized because of their gender, as a result of domestic or family violence, or when there is contempt or discrimination because of their status as women [1, 2]. It also includes dynamics derived from urban violence, such as robberies followed by death and other conflicts [1, 3, 4].

It is important to conceptualize femicide and female homicide. The female homicide refers to the murder of women in a broad sense, including causes related to gender issues (femicide) and those related to delinquency in general. Femicide therefore appears as a subtype of female homicide. Furthermore, the term female homicide reinforces the need to give visibility to crimes committed against women [4]. In addition to these, there are also bodily injuries resulting in death, characterized when the aggressor had no direct intention of causing death, but death ends up occurring as a result of the intended aggression, and robbery aggravated by death, characterized by robbery followed by the death of the victim (1–4).

This phenomenon has been present in society since the emergence of patriarchal culture, which has not only contributed to the increase of violence, but also to its naturalization by society [5]. Violence manifests itself in different forms and in different sectors of society throughout the world, without restriction to specific environments, age, social status or ethnicity [2, 5, 6]. It is estimated that one in three women will experience physical or sexual violence at the hands of a partner or non-partner during her lifetime, highlighting the magnitude of violence against women in the current situation [7].

According to Brazilian Law No. 10.778/2003, violence against women is recognized by the Secretariat of Epidemiological Surveillance as a social and a public health problem that must be studied and reported [8]. Since 2009, information on domestic sexual violence and other abuses has been included in the database of the Notifiable Diseases Information System (SINAN) [8].

In December 2019, the first cases of an infectious disease caused by the new coronavirus SARS-CoV-2, later named Covid-19, were reported in the Chinese city of Wuhan [9]. The virus spread rapidly to other countries, and on March 11, 2020, the World Health Organization declared a pandemic [10]. In Brazil, the first case of the disease was identified in February 2020 [11] and quickly spread throughout the country [12, 13].

To contain the spread of the virus, the Brazilian government has implemented social distancing measures, including closing schools and universities, banning large events and gatherings, restricting travel and public transportation, and conducting awareness campaigns to get people to stay home and only go out to buy food and medicine or seek medical care [14, 15]. While important, these restrictions have increased the likelihood of violence against women [16–20].

In Alagoas, Decree No. 69530 of March 18, 2020, establishes a series of measures to deal with the public health emergency of international importance resulting from COVID-19 (21). In this measure, the government suspended, for a period of 15 days, all events with an audience of more than 500 (five hundred) people for open events and 100 (one hundred) people for closed events, visits to libraries, museums, theaters and public parks, matches with an audience of the Alagoas State Soccer Championship, collective cinema activities and sports academies of any kind [21]. These activities continued for months until vaccination was introduced. In addition to the existing reporting channels (Dial 180, 100, 181, 197, 129, 190 and 192), the only additional fact observed in Alagoas in the fight against violence against women was the use of “WhatsApp”: Women’s Protection Service, Civil Police, Public Defender’s Office” [19].

This occurred because women spent more time with their potential aggressors while being cut off from their support networks, resulting in a lack of information and support. In addition, access to support services for women in situations of violence, whether specialized or not, was also hampered [19]. As a result, the evidence points to a scenario in which, due to limited access to reporting channels and protection services, there has been a decrease in the recording of crimes related to violence against women, followed by a decrease in the distribution and granting of protection measures and an increase in lethal violence [21].

In 2021, the state of Alagoas recorded the highest number of femicides per 100,000 inhabitants in the Northeast

region and the fifth highest in the country [22]. Despite this, data and analysis on this problem in the state are still limited and not widely known by the population, highlighting the need for more qualitative and quantitative studies on this issue.

Therefore, this study aims to describe the epidemiological profile of lethal and intentional violent crimes against women in the state of Alagoas, Brazil, from March 2018 to February 2020 (before the pandemic) and from March 2020 to December 2021 (during the first two years of the Covid-19 pandemic).

Methods

This is an observational study using secondary data available on the platform of the Secretariat of Public Security of the State of Alagoas (SSP AL) [23]. All records of lethal and intentional violent crimes involving women before (March 2018 to February 2020) and during the first two years of the Covid-19 pandemic (March 2020 to December 2021) were included.

Alagoas, located in the Northeast region of Brazil, has an area of 27,848.140 km², 102 municipalities and borders Pernambuco, Sergipe, Bahia and the Atlantic Ocean. The estimated population of the state is 3,364,895 people, of which 52.11% are women, with a Human Development Index (HDI) of 0.631 in the last census in 2010 [24, 25] (Fig. 1).

The following variables were analyzed: age group (< 18; 18 to 29; 30 to 39; 40 to 49; 50 or more), type of crime (femicide, homicide, bodily injury resulting in death,

robbery aggravated by death) and means used (melee weapon, mechanical asphyxiation, beating, and firearm injury). The day and time of the event were also taken into account.

To calculate the specific mortality rate, we considered: number of deaths of women victims of lethal and intentional violent crimes in the place and period / number of women living in the place and period x 100,000 women. The population data needed to calculate the mortality rate was obtained from the Brazilian Institute of Geography and Statistics (IBGE).

Data were collected from the website of the SSP of Alagoas [23], based on the monthly reports made available. Public domain data is made available by the Center for Statistics and Criminal Analysis through reports. From these reports, only records relating to female deaths were extracted. The study included homicides of women of all ages, classified as femicide or not, in the territory of Alagoas and available in the public database of the SSP website. Data collection took place between September 2021 and February 2022. From the data collected, a database was created for later analysis.

Once collected, the data were consolidated and standardized in Excel for Windows® spreadsheets. To avoid typing errors, a double-entry procedure was used, with checks and corrections made at the end of each collection shift. Descriptive analysis was then performed. The chi-square test was used to compare categorical variables between periods. The t-test was used to compare average

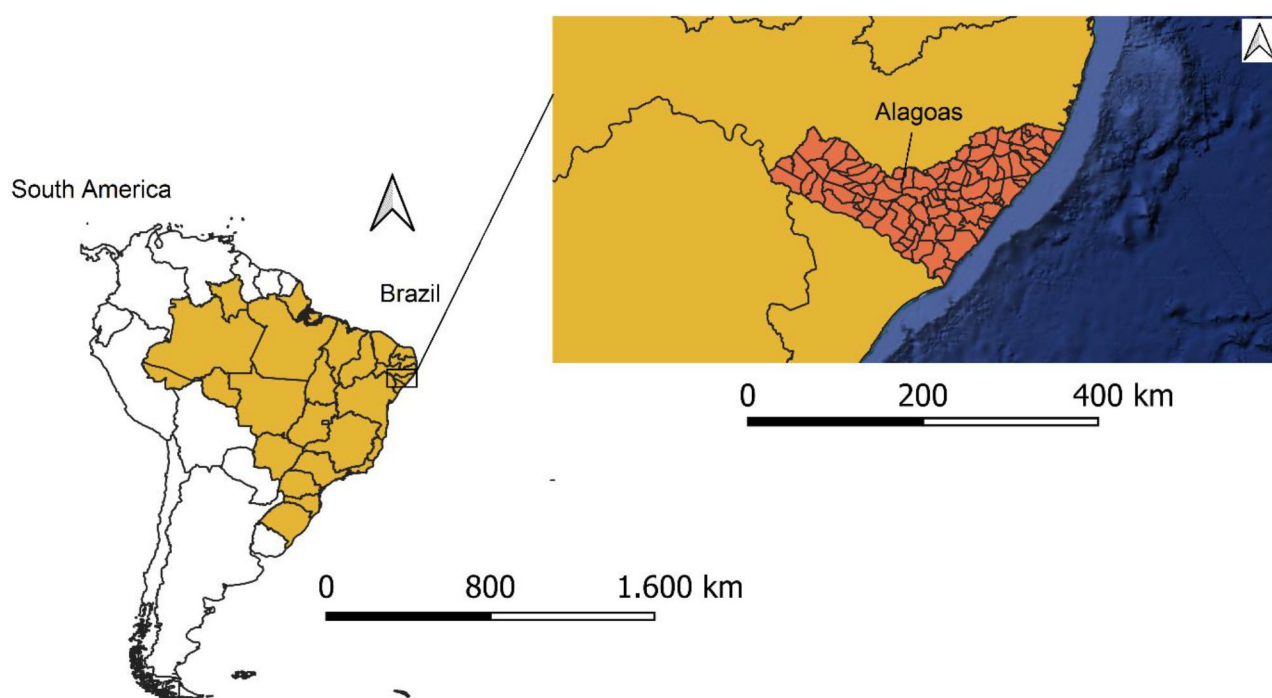


Fig. 1 Study area. Alagoas, Brazil

rates between periods. A significance level of 5% was adopted.

All ethical and legal considerations related to research involving human subjects were respected, in accordance with Resolution 466/2012. It was not necessary to submit the study to an ethics committee, since the study used secondary data available and publicly accessible on the website of the competent body. All methods were carried out in accordance with relevant guidelines and regulations.

Results

Between January 2018 and December 2021, 316 cases of lethal and intentional violent crimes against women were recorded in Alagoas, resulting in a mortality rate of 4.54 per 100,000 women. In the first year of the Covid-19 pandemic, 2020, both the number of cases ($n=93$) and the mortality rate (5.33 per 100,000 women) were higher than that observed in the pre-pandemic years (3.88/100,000 in 2018 and 4.84/100,000 in 2019). In 2021, the mortality rate decreased again to 4.13 per 100,000 women (Fig. 2). When comparing the average rates for the pre-pandemic period (4.36/100,000) and the pandemic period (4.73), no significant difference was observed (t student; $p=0.667$).

In March 2020, there was a decrease compared to the same month of the previous year. However, April (0.69 per 100,000), May (0.52 per 100,000), June (0.52 per 100,000), August (0.52 per 100,000), September (0.46 per 100,000) and December (0.40 per 100,000) recorded the highest rates compared to the same months of the pre-pandemic years (Fig. 3).

Of the total number of records, 51.26% (162 cases) occurred during the pandemic period, considering March 3, 2020, the date of the first confirmed case of Covid-19 in the state of Alagoas, as the time limit. In general, there were no significant differences in the variables

age, type of crime and means used. However, some descriptive insights should be highlighted. Considering the total number of deaths (pre-pandemic+pandemic), the most affected age groups were 18–29 years and 30–39 years, although there was a decrease in the percentage of women in the 30–39 years age group during the pandemic (pre-pandemic: 31.01% ($n=45$ cases); pandemic: 25.00% ($n=38$ cases)). During the pandemic, there has been an increase in the proportion of women aged 40 and over (Table 1).

Regarding the type of crime, female homicide was predominant in both periods, with a higher occurrence during the pandemic (55.19%; 85 cases in the pre-pandemic period and 64.20%; 104 cases in the pandemic period). On the other hand, crimes classified as femicide ranked second, although with a lower proportion during the pandemic (40.91%; 63 cases in the pre-pandemic period and 31.48%; 51 cases in the pandemic period) (Table 1).

Firearms and melee weapons were the main methods used, accounting for 85.51% of deaths in the pre-pandemic period and 77.49% in the pandemic period. On the other hand, the proportion of deaths caused by beating was 1.7 times higher during the pandemic period than during the non-pandemic period (15.23% vs. 8.97%, respectively) (Table 1).

As for the time of day when the crimes occurred, there was an increase in incidents on Saturdays, with a proportion 1.60 times higher than in the pre-pandemic period (19.75% vs. 12.34%, respectively). Mondays were in second place, but with a difference of 3.56% points (Fig. 4A). With regard to the time of day, there was a decrease during the afternoon shift (12:00–17:59) and an increase during the rest of the day (Fig. 4B).

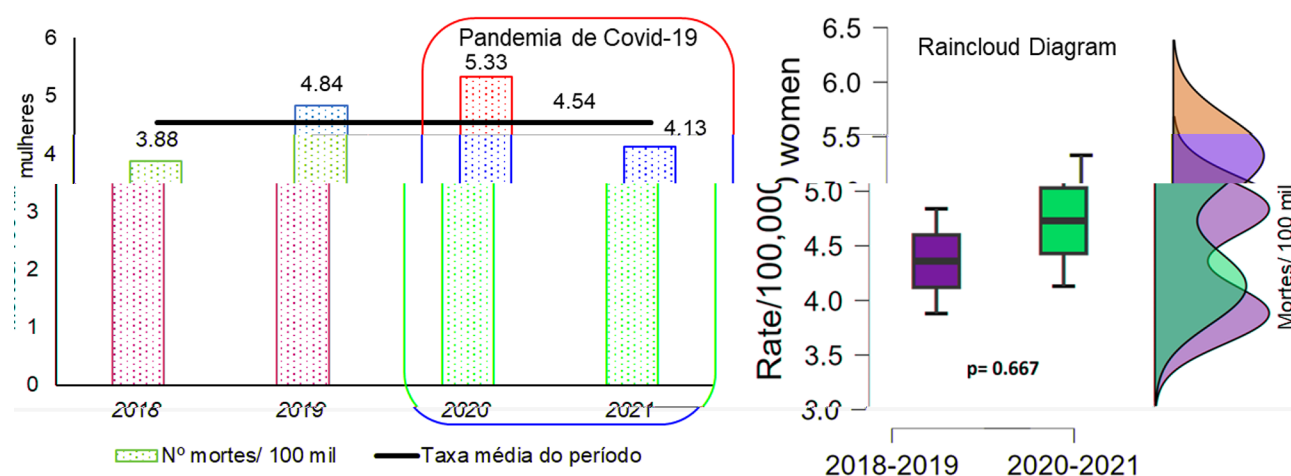


Fig. 2 Female mortality due to lethal and intentional violent crimes. Alagoas, Brazil, 2018–2021. Legend: Comparison of pre-pandemic (2018 and 2019) and pandemic (2020 and 2021) rates (t student; $p=0.667$)

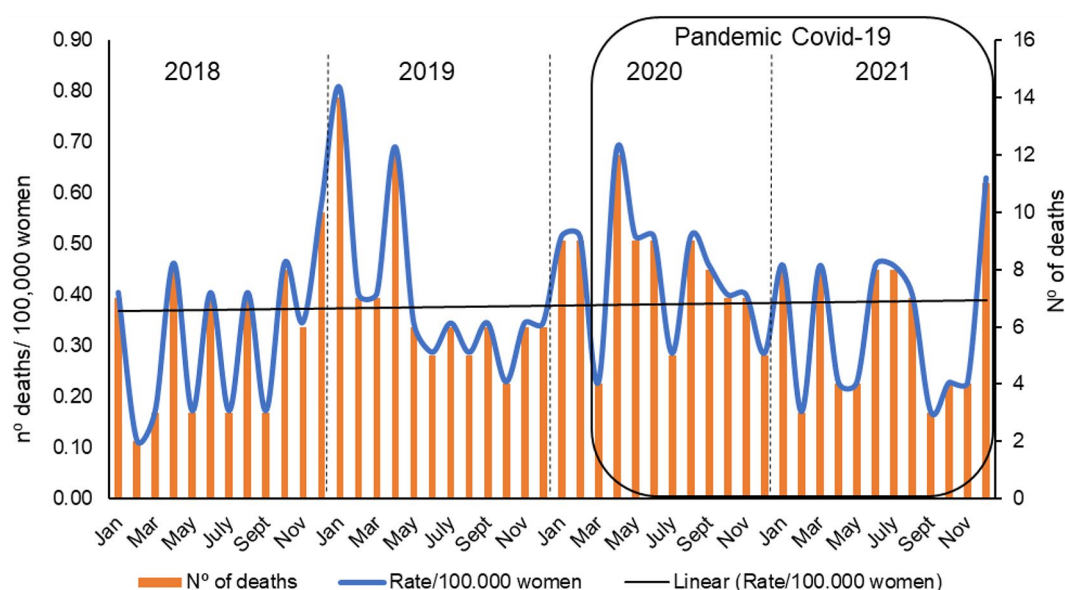


Fig. 3 Monthly evolution of female mortality due to lethal and intentional violent crimes. Alagoas, Brazil, 2018–2021

Table 1 Comparison of the socio-demographic profile of lethal and intentional violent crimes committed against women before and during the first two years of the COVID-19 pandemic. Alagoas, Brazil, 2018–2021

Variables	Pre-pandemic January 2018 to February 2020	Pandemic March 2020 to December 2021	Total	P value x ² test
Age range (Years)¹	N=145	N=152	N=297	
<18	19 (13.10%)	22 (14.47%)	41 (13.80%)	0.818
18 to 29	45 (31.01%)	48 (31.58%)	93 (31.31%)	
30 to 39	45 (31.01%)	38 (25.00%)	83 (27.95%)	
40 to 49	20 (13.79%)	24 (15.79%)	44 (14.82%)	
50 or more	16 (11.03%)	20 (13.16%)	36 (12.12%)	
Type of crime	N=154	N=162	N=316	
Femicide	63 (40.91%)	51 (31.48%)	114 (36.08%)	0.379
Female Homicide	85 (55.19%)	104 (64.20%)	189 (59.80%)	
Bodily injury resulting in death	2 (1.30%)	2 (1.23%)	4 (1.27%)	
Robbery ag- gravated by death	4 (2.60%)	5 (3.09%)	9 (2.85%)	
Means²	N=145	N=151	N=296	
Melee weapon	42 (28.96%)	47 (31.13%)	89 (30.07%)	0.225
Mechanical asphyxiation	8 (5.52%)	11 (7.28%)	19 (6.42%)	
Beating	13 (8.97%)	23 (15.23%)	36 (12.16%)	
Firearm	82 (56.55%)	70 (46.36%)	152 (51.35%)	

Legend: ¹ 19 deaths with no age recorded; ² 20 unreported deaths/other means

Source: Prepared by the authors based on data provided by SSP-AL (2022)

Discussion

This study describes the epidemiological profile of lethal and intentional violent crimes against women in the state of Alagoas, before (March 2018 to February 2020) and during the first two years of the Covid-19 pandemic (March 2020 to December 2021). Violence against women worsened in the first year of the pandemic and was higher than that observed in the other years analyzed, although without a significant difference, probably due to the reduction in mortality in 2021 as a result of mass vaccination, reduced transmission and the resumption of economic activity. Female homicides predominated in both periods, but were more frequent during the pandemic. Deaths from beatings increased during the first pandemic year.

During the pandemic, especially in the first pandemic year (2020), the social isolation increased women's vulnerability and insecurity due to increased time spent with aggressors at home, combined with uncertainty about the functioning of public institutions and support networks for victims of domestic violence [14, 16–19, 24]. Support from social and family networks is critical in helping women cope with intimate partner violence [24–27]. In addition, factors such as the socioeconomic vulnerability of families and the emotional stress caused by the pandemic are factors that increase the risk of violence.

The increase in violence against women during the lockdown was observed in many countries. The global press reported on the phenomenon even before the first scientific studies on the subject were published. In France, for example, the number of reports increased by 30% during the lockdown [28]. In the United Kingdom alone, between March 12 and April 23, 2020, the number

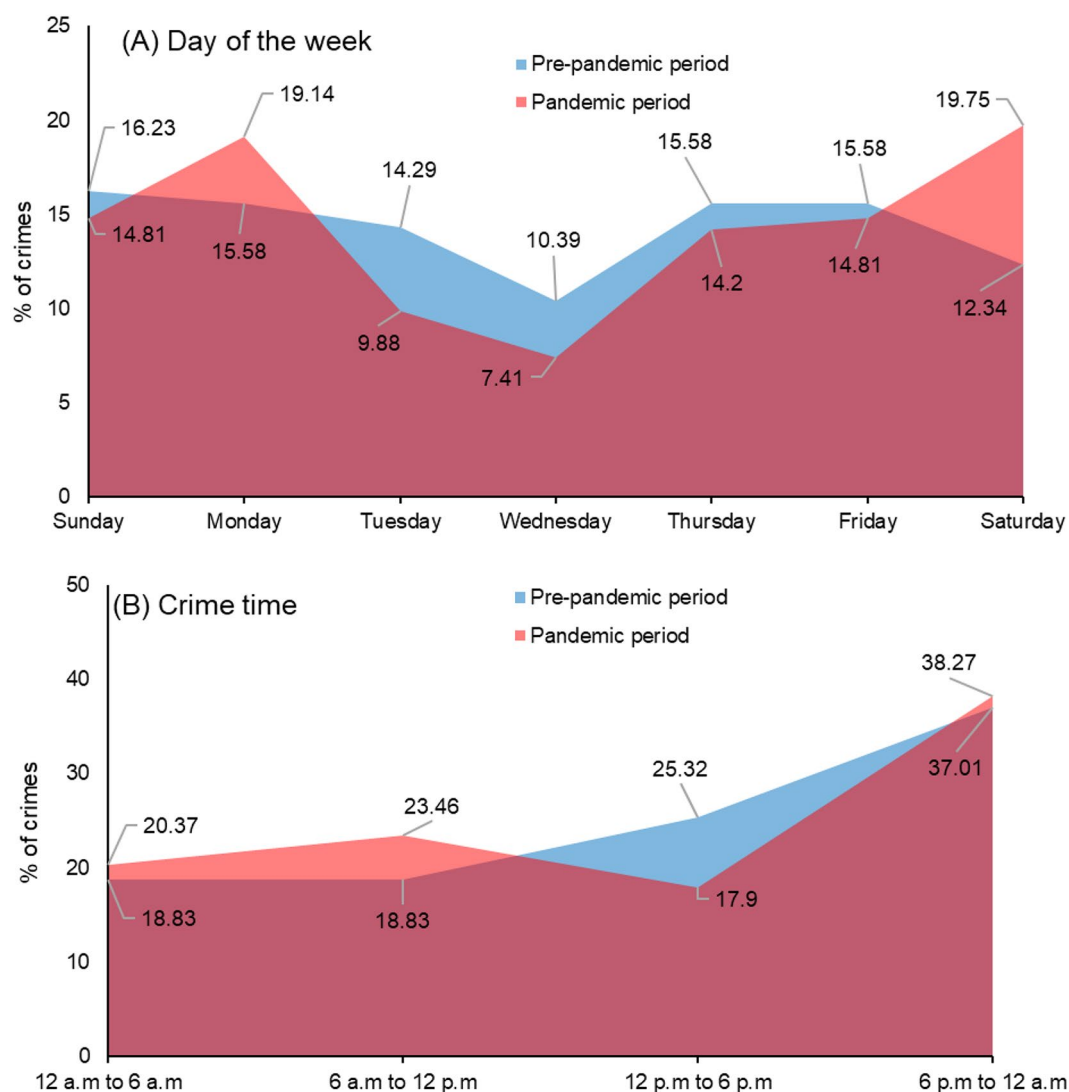


Fig. 4 Temporal aspects of lethal and intentional violent crimes committed against women before and during the first two years of the COVID-19 pandemic. Alagoas, Brazil, 2018–2021

of female deaths doubled compared to the average of the previous ten years [29].

As for the mortality rate of women due to lethal and intentional violent crimes, an immediate decrease was observed in March 2020, when social isolation measures were implemented in Alagoas (Decrees No. 69.501 and No. 60.502) [1]. This decrease coincides with the overall decrease in intentional homicides recorded in Alagoas in 2020, which decreased during the first month of the pandemic [32]. This immediate reduction in violence rates is probably the result of fewer people on the streets, at parties, concerts and other gatherings, which are often associated with greater physical vulnerability, excessive alcohol consumption and episodes of aggression [16].

In the following months, however, the rates for female homicides diverged from those for total homicides. While the latter continued to decrease, the female mortality rate

increased [30]. In May 2020, a month with a high number of Covid-19 cases and strict social isolation measures in Alagoas, there was an increase in deaths, confirming hypotheses about the consequences of social isolation on lethal and intentional violent crimes against women, especially those related to domestic violence. As we will see below, this context is contradictory, given that the processes implemented to tackle the Covid-19 pandemic have exposed women to gender-based violence and therefore to femicide. Another important observation is the decrease in the number of cases classified as femicide during the pandemic. In contrast, there was an increase in homicides from April 2020 compared to the pre-pandemic period.

It is likely that this difference is related to the way the crime was recorded by the police authority. The way in which the deaths are recorded raises doubts about the

real scenario of female deaths in the State of Alagoas. In comparison with other Brazilian scenarios where there has been an increase in femicides [4], it is suggested that a part of the female homicides could be femicides. A second argument suggesting this is the fact that the context of social isolation due to the pandemic has increased the risk of domestic violence. In this case, the outcome is gender-related death (femicide).

This scenario reflects weaknesses in mortality records that can jeopardize the process of addressing gender-based violence. Qualifying police records should therefore be an urgent measure to be implemented in order to produce and make available reliable and timely information for the decision-making process of public managers.

Regarding the means of aggression used in crimes against women, the study found that firearms were the main instrument, confirming the literature. In a study conducted in the state of Ceará, 78.5% of women killed in the year in which social isolation began due to Covid-19 were victims of firearms [33]. The type of weapon used is a useful variable for distinguishing between homicides of women that occur inside and outside the home. In Brazil, firearms are predominantly used in homicides of women outside the home, accounting for 54.2% of cases, while inside the home this proportion is much lower, at 37.5% [22].

It is also common for melee weapons and other types of weapons to be used more often in crimes committed in the context of family and domestic violence. This is because the fatalities usually result from interpersonal conflicts that intensify, leading the aggressor to grab the nearest object to attack the victim [34]. In our study, we observed an increase in the proportion of crimes committed with a melee weapon, beating or mechanical suffocation during the pandemic. This suggests a greater proximity between victim and aggressor, a dynamic that intensified during the pandemic.

Despite the closure of many businesses and the promotion of home offices, many people continued to work during business hours, making it difficult for crime to occur during this period [19, 24, 25]. The increase in crime on Saturdays and Mondays may be the result of the accumulation of friction, aggression, and violence that occurred over the weekend, when the victim typically spends more time with the aggressor. With regard to the time of day, there was a decrease during the afternoon shift (12:00–17:59) and an increase during the rest of the day.

Many strategies have been adopted in Brazil to combat violence against women. Between March 11 and April 30, 2020, Fornari et al. [3] mapped 77 strategies in print journalism, 93 in social networks, 45 in government websites and another 40 in third sector organizations. Although they were fundamental, they were not able to prevent violence on their own. This shows that tackling the problem

is complex and polysemic, requiring the involvement of different actors (governmental and non-governmental).

Despite all the methodological care taken, this study has limitations, mainly related to the characteristics of the data source used, which has limited variables, making it impossible to provide a more detailed characterization of the epidemiological profile of the sample studied. In addition, it is likely that femicides were classified as homicides. In addition, data on possible authorship could provide more clarity in interpreting the phenomenon. However, this investigative process is often time-consuming. It is necessary to stress the urgency of introducing more detailed recording of crimes against women in official systems. This will allow a more in-depth analysis of the context and facilitate the development of plans and public policies aimed at reducing or eliminating this alarming problem.

Conclusions

We conclude that the context imposed by the Covid-19 pandemic has worsened the situation of violence against women in the State of Alagoas, especially in the first year of the pandemic, with an increase in both the number and the mortality rate compared to the average for the period analyzed. The increase in deaths by melee weapon, beating or mechanical asphyxiation during the pandemic is evidence of the probable proximity of the victim to the perpetrator.

Public policies aimed at protecting women must be implemented to prevent these crimes. Interventions are needed in the various social determinants that expose the female population to violence.

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Author contributions

DNN, PCRF, CDF, TAV, GKRS and CMLA: Conceived and designed the paper, collected the data, reviewed the data, wrote the paper, and approved the final version of the manuscript. TSM, DUSM, RFC: Conceived and designed the paper, collected the data, reviewed the data, wrote the paper, and approved the final version of the manuscript. RFC and CDFS: Conceived and designed the paper, collected the data, reviewed the data, wrote the paper, and approved the final version of the manuscript.

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Data availability

A statement to confirm that all methods were carried out in accordance with relevant guidelines and regulations. The data used in the study are not available for access from other countries. To obtain the bank used, contact the author: Carlos DF Souza, Federal University of Vale do São Francisco (UNIVASF), Av José Maniçoba, s/n, Centro, Petrolina, Pernambuco, Brazil 56.304-205. E-mail: carlos.dornels@univasf.edu.br; Phone: +55 87 99622 0698 Access in Brazil is free (<http://seguranca.al.gov.br/estatisticas/>).

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

- Beyer KMM, Layde PM, Hamberger LK, Laud PW. Does neighborhood environment differentiate intimate partner femicides from other femicides? *Violence Against Women*. 2015;21(1):49–64. <https://doi.org/10.1177/1077801214564075>
- COE. Council of Europe). COVID-19 crisis: Secretary General concerned about increased risk of domestic violence. Council Of Europe; 2020.
- Marques ES, Moraes CLD, Hasselmann MH, Deslandes SF, Reichenheim ME. A violência contra mulheres, crianças e adolescentes em tempos de pandemia pela COVID-19: panorama, motivações e formas de enfrentamento. 2020. *Cad. Saúde Pública*, 36(4), e00074420. <https://doi.org/10.1590/0102-311X00074420>
- Caicedo-Roa M, Bandeira LM, Cordeiro RC. Femicídio e Feminicídio: discutindo e ampliando os conceitos. *Rev Estud Fem* [Internet]. 2022;30(3):e83829. <https://doi.org/10.1590/1806-9584-2022v30n383829>
- Fórum. Brasileiro de Segurança Pública. Violência doméstica durante a pandemia de covid-19. Nota Técnica. São Paulo; 2020. <https://forumseguranca.org.br/wp-content/uploads/2018/05/violencia-domestica-covid-19-v3.pdf>
- PAHO, Pan American Health Organization. Violence against women. Washington: Pan American Health Organization (PAHO); 2024. <https://www.paho.org/en/topics/violence-against-women>
- WHO (World Health Organization). Violence against women. Geneva. 2021. <https://www.who.int/news-room/fact-sheets/detail/violence-against-women>
- Brasil. Lei nº 10.778, de 24 de novembro de 2003. Estabelece a notificação compulsória, no território nacional, do caso de violência contra a mulher que for atendida em serviços de saúde públicos ou privados. *Diário Oficial* [da] República Federativa do Brasil, Brasília, DF, 24. nov. 2003. http://www.planalto.gov.br/ccivil_03/leis/2003/11/0778.htm
- Zhu N, Zhang D, Wang W, Li X, Yang B, Song J et al. A novel Coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727–33. available from: <https://doi.org/10.1056/NEJMoa2001017>
- WHO (World Health Organization). Coronavirus disease (COVID-19) pandemic. 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-s-2019>
- Ministério da Saúde do Brasil. Secretaria de Vigilância em Saúde. Doença pelo Coronavírus 2019. *Bol Epidemiol*. 2020. <https://portalarquivos.saude.gov.br/images/pdf/2020/Abril/12/2020-04-11-BE9-Boletim-do-COE.pdf>
- Carmo RF, Nunes BEBR, Machado MF, Armstrong AC, Souza CDF. Expansion of COVID-19 within Brazil: The importance of highways. *J Travel Med*. 2020;27:Taaa106. <https://doi.org/10.1093/jtm/taaa106>
- Carmo RF, Nunes BEBR, Machado MF, Armstrong AC, Souza CDF, De Souza CDF, Machado MF, Silva Junior AG, Nunes BEBR, Carmo RF. De Souza CDF, Machado MF, Silva Junior AG, Nunes BEBR, Carmo RF. Airports, highways and COVID-19: An analysis of spatial dynamics in Brazil. *J Transp Health*. 2021;21:101067. <https://doi.org/10.1016/j.jth.2021.101067>
- Aquino EML, Silveira IH, Pescarini JM, Aquino R, Souza-Filho JÁ, Rocha AS et al. Medidas de distanciamento social no controle da pandemia de COVID-19: potenciais impactos e desafios no Brasil. *Ciênc saúde coletiva* [Internet]. 2020Jun;25:2423–46. <https://doi.org/10.1590/1413-81232020256.1.10502020>
- Brasil. Lei nº 13.979, de 6 de fevereiro de 2020. Dispõe sobre as medidas para enfrentamento da emergência de saúde pública de importância internacional decorrente do coronavírus responsável pelo surto de 2019. *Diário Oficial* [da] República Federativa do Brasil, Brasília, DF, 6 fev. 2020. https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2020/lei/l13979.htm#view
- Malta DC, Szwarcwald CL, Barros MBA, Gomes CS, Machado IE, Souza Júnior PRB et al. A pandemia da COVID-19 e as mudanças no estilo de vida dos brasileiros adultos: um estudo transversal, 2020. *Epidemiol. Serv. Saúde*, Brasília, 29 (4), e2020407, set. 2020. <https://doi.org/10.1590/S1679-4974202000400026>
- Maranhão RA. A violência doméstica durante a quarentena da COVID-19: entre romances, feminicídios e prevenção. *Brazilian Journal of Health Review*. 2020;3(2):3197–3211. <https://doi.org/10.34119/bjhrv3n2-161>
- World Health Organization (WHO). WHO Director-General's opening remarks at the media briefing on COVID-19. Geneva: WHO. 2020. <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
- Fornari LF, Lourenço RG, de Oliveira RNG, Santos DLA, Menegatti MS, Fonseca RMGS. Domestic violence against women amidst the pandemic: coping strategies disseminated by digital media. *Rev Bras Enferm* [Internet]. 2021;74:e20200631. <https://doi.org/10.1590/0034-7167-2020-0631>
- Vieira PR, Garcia LP, Maciel ELN. Isolamento social e o aumento da violência doméstica: o que isso nos revela? *Rev bras epidemiol* [Internet]. 2020;23:e200033. <https://doi.org/10.1590/1980-549720200033>
- Governo do Estado de Alagoas. Decreto nº 69530 de 18/03/2020, que dispõe sobre as medidas para enfrentamento da emergência de saúde pública de importância internacional decorrente do COVID – 19 (Coronavírus), e dá outras providências. <https://www.legisweb.com.br/legislacao/?id=390824>
- Fórum. Brasileiro de Segurança Pública. Anuário Brasileiro de Segurança Pública, 14 ed. São Paulo: 2021. <https://forumseguranca.org.br/anuario-14/>
- Secretaria de Estado da Segurança Pública de Alagoas. Boletim mensal da estatística criminal. Núcleo de Estatística e Análise Criminal. 2020. <http://seguranca.al.gov.br/estatisticas>
- Instituto Brasileiro de Geografia e Estatísticas (IBGE). Alagoas. Cidades e estados. Rio de Janeiro: IBGE, 2022. <https://www.ibge.gov.br/cidades-e-estados/al.html>
- Sunde RM, Sunde LMC, Esteves LF. Femicídio durante a pandemia da COVID-19. *Oikos*. 2021;32(1):55–73. <https://doi.org/10.31423/oikos.v32i1.11081>
- Lucena K, Deininger LSCm Coelho HFC, Monteiro ACC, Vianna RPT, Nascimento JA. Analysis of the cycle of domestic violence against women. *J. Hum. Growth Dev.*, São Paulo. 2016;26(2):139–146. <https://doi.org/10.7322/jhgd.119238>
- Bezerra CFM, Vidal ECF, Kerntopf MR, Lima Junior CM, Alves MNT, Carvalho MG. Violência contra as mulheres na pandemia do COVID-19: Um estudo sobre casos durante o período de quarentena no Brasil. *Id on Line Rev. Mult. Psic*. 2020;14(51):475–485. <https://doi.org/10.14295/online.v14i51.2613>
- Bezerra CFM, Vidal ECF, Kerntopf MR, Lima Junior CM, Alves MNT, Carvalho MG, Euronews. Euronews Domestic violence cases jump 30% during lockdown in France. *Euronews* [Internet]. 2020. <https://www.euronews.com/2020/03/28/domestic-violence-cases-jump-30-during-lockdown-in-france>
- Grierson J. Domestic abuse killings 'more than double' amid covid-19 lockdown. *Guardian*. 2020 Apr 15. <https://www.theguardian.com/society/2020/apr/15/domestic-abuse-killings-more-than-double-amid-covid-19-lockdown>
- Governo do Estado de Alagoas. Decreto nº 69.501. Dispõe sobre as medidas para enfrentamento da emergência de saúde pública de importância internacional decorrente do COVID-19 (coronavírus), e dá outras providências. <https://www.legisweb.com.br/legislacao/?id=390838>
- Governo do Estado de Alagoas. Decreto nº 60.502. Institui medidas temporárias de enfrentamento da emergência de saúde pública de importância internacional decorrente do COVID-19 (coronavírus), no âmbito dos órgãos e entidades da administração direta e indireta do poder executivo estado dá outras providências. <https://www.lexml.gov.br/urn/urn:lex:br:federal:decreto:1967-03-14;60502>
- Fórum. Brasileiro de Segurança Pública. Anuário Brasileiro de Segurança Pública, 15 ed. São Paulo; 2022. <https://forumseguranca.org.br/anuario-15/>
- Chagas ER, Oliveira FVA, Macena RHM. Mortalidade por violência contra mulheres antes e durante a pandemia de Covid-19. *Ceará*, 2014 a 2020. *Saúde Debate*, 46(132), 63–75, 2022. <https://doi.org/10.1590/0103-1104202213204>

34. Gomes IS. Feminicídios e possíveis respostas penais: dialogando com o feminismo e o direito penal., *Gênero, Direito. João Pessoa*. 2015;(1):188–218. Available from: <https://doi.org/10.18351/2179-7137/ged.2015n1p188-218>.

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