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How to police intimate partner violence against women? New lessons from women's police stations in Brazil

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ABSTRACT

This study investigates how geographic access to specialized Women's Police Station (WPS) relates to whether episodes of violence against women are classified as intimate partner violence (IPV) in Brazil's health system records. Using national administrative notifications (2010–2019) geocoded to health facilities and linked to WPS locations, we analyze 227,172 women aged 18–59 who identified a male perpetrator. Logistic regressions assess IPV correlates, with results presented as descriptive associations. Three sets of findings stand out. First, and most importantly, distance from a WPS and IPV are related and the association between distance to the nearest WPS and IPV classification varies by region: in the South and Midwest, the odds of IPV classification decline with distance, while in parts of the North and Northeast they rise with distance. Our uncovering that national averages conceal substantial geographic variation in access and reporting is a novel finding that has policy-relevant implications. Second, situational markers strongly predict IPV classification: episodes at the victim's residence, recurrent cases, and incidents involving an intoxicated perpetrator are much more likely to be classified as IPV, whereas weekday and daylight reports show lower odds. Third, violence concentrates among younger, Black, and less-educated women, while state capital cases are less likely classified as IPV, reflecting different urban service pathways. These findings indicate that specialized policing infrastructure correlates with health reporting patterns in complex ways. Aligning health services with policing infrastructure, particularly addressing alcohol-related cases and regional coverage gaps, may contribute to reducing violence against women.

Key words: Intimate Partner Violence; Women Police Station; Aggression; Women; Brazil

INTRODUCTION

Intimate partner or ex-partner violence (IPV) is one of the most prevalent forms of violence against women in the world. According to the World Health Organization (WHO, 2019), more than 25% of women aged 15–49 will experience physical or sexual violence from an intimate partner at least once in their lifetime. Worldwide, IPV perpetrated by men against women is considerably more prevalent than violence perpetrated by women against men, which may indicate ties between IPV against women and elements of patriarchy (Sukhtankar et al., 2022, Sikweyiya et al., 2020; Lelaurain et al., 2021). Countries, especially countries with high IPV rates, often struggle to effectively address gender-based violence. Various policy interventions and law enforcement reforms have been tried, but their success is limited. This limited success could be caused by biases displayed by men working in law enforcement: some may have the same biases against women (such as patriarchal beliefs) that help explain male violence against women. Research results may also be biased if data are collected by mostly masculine police forces and women hesitate to report violence to them, which leads to underestimates of the true extent of IPV and other forms of violence against women.

To address some of these biases in law enforcement, in recent years many countries have tried to feminize their police forces. The research summarized in Table 1 reports on the impact of such feminization on violence against women. When more female police officers were added it was found that women reported more cases of violence perpetrated against them. In India women police officers were added either in the form of adding Women's Police Stations (WPS), i.e. stations entirely staffed by female officers, or by adding female officers to women's desks in regular police stations. Both Amaral et al.'s (2021) study of the impact of WPS and Sukhtankar et al.'s (2022) study of the addition of Women's desks found that adding female police officers led to a significant increase in reports of crimes against women, and in particular of domestic violence crimes.

Brazil is another country that introduced WPSs¹ relatively early (in 1985, it is the first country to have done so in Latin America), and this article adds to the existing literature on the impact of such stations in Brazil. Lima and Souza (2009) showed that in WPSs gender-based violence tends to be perceived as a more serious crime than in regular police stations in the

¹ Note that in Portuguese the acronym for WPS is DEAM, which stands for *Delegacia Especializada de Atendimento à Mulher* (Specialized Police Station for Women).

same area (Rio de Janeiro, Brazil). Using data from a large sample of Brazil's urban population, Cordova and Kras (2021) showed that in municipalities with long-established WPSs men are more likely to oppose violence against women.

Most importantly, the feminization of police forces has been shown to lead to reductions in violence against women: in Brazil, Perova and Reynolds (2017) report that compared to areas without WPSs, in areas with WPS female homicides were 17% lower. Gender-based violence also dropped in Peru after the introduction of Women's Justice Centers. In Ecuador the establishment of WPSs led to some reduction in violence against women reported to the police (Ordenana 1998).

A finding from India also indicates that adding more female police officers had beneficial effects for women: the presence of more women police officers in India seems to have led to improved case resolutions (see Sukhtankar et al., 2022).

Previous studies analyzing IPV in Brazil have primarily relied on police records (e.g; Jong et al., 2000; Dossi, 2008; Lima and Souza, 2009; Oliveira et al., 2019; Machado et al., 2020) or national household surveys (Perova and Reynolds, 2017). While Amaral et al. (2021) similarly utilize police reports, their analysis focuses on India. Bhalotra et al. (2025) also use Brazilian data obtained from judicial cases and health units but their goal is to examine how domestic violence varies with job losses rather than how they vary with the presence of WPSs. However, relying solely on police data may underestimate the true prevalence of IPV, as many victims choose not to report abuse to the police, regardless of the officers' gender (Silva, 2003). For example, García-Moreno et al. (2005) found that less than twenty percent of ever physically abused women had reported IPV to the police. The first contribution of this paper is to address this limitation by drawing on data on violence against women collected from health facilities, which are likely to provide a more accurate reflection of IPV's incidence. Veloso et al. (2013) emphasize that municipal health departments provide the data feeding the Notifiable Diseases Information System (SINAN). This system receives notifications and investigations of cases of diseases and conditions included in the national list of compulsorily notifiable diseases. Regarding violence against women, notifications are mandatory, as a result of Law No. 10.778/2003, and serve as a basis for guiding public policy actions across the three levels of management of the Unified Health System (SUS): federal, state, and municipal. Through these notifications, it is possible to outline the profile of the victims, as well as identify

the types and nature of the violence suffered. Furthermore, we use the distance between a health facility and the nearest WPS as a proxy for the distance between a woman's residence and the nearest WPS, offering a novel approach to measuring access to law enforcement. The better measures of IPV allow us to obtain more accurate measures of the degree to which WPSs have helped reduce IPV against women in Brazil.

We hope that the present study will be useful to policy-makers considering the most effective ways of lowering violence against women in Brazil. This study may also contribute to the growing body of literature on the effectiveness of adding female police officers as a means of reducing IPV anywhere, as IPV is a global problem and many countries aim at reducing this kind of suffering. Evaluating the impact of interventions aimed at fighting IPV is challenging due to the high costs and logistical difficulties associated with implementing experimental reforms in national or state police forces. Therefore, policymakers often rely on cross-country comparisons of different strategies, such as comparing the outcomes of Policy A in one country with Policy B in another country. By providing estimates of the impact of women's police stations in Brazil on IPV against women based on novel health clinic data and summarizing other similar Brazilian studies this paper offers more potential comparability with studies assessing the effectiveness of increases in the female police staff in other countries or states than previous papers based on Brazilian data.

In this study we use data on characteristics of violence cases reported to health services, particularly the share classified as IPV, including the epidemiological profile of victims and injuries, conditional on seeking care and across gradients of spatial accessibility to WPSs. Results do not identify causal effects of WPS proximity on IPV reports.

This article is organized as follows. The next section contains a literature review on IPV and the importance of women's police stations. Subsequently, section 3 presents the data and econometric model. The fourth section presents and discusses the results. The last section presents conclusions and discusses final considerations.

2. LITERATURE REVIEW

According to the World Health Organization (WHO, 2017, 2019), understanding the factors associated with IPV and assessing the impact of interventions help address this significant public health issue. IPV encompasses physical, sexual, and psychological abuse, and neglect that

individuals exhibit towards current or previous partners; these different forms often coexist within the same relationship (Krug et al., 2002). According to WHO (2021) globally one in three women experienced IPV in their lifetime. This violence usually does not involve isolated episodes but rather a sequence of physical and non-physical behaviors that worsen over time (Johnson, 1995; Barsted and Hermann, 1999; Heise et al., 1994; Krug et al., 2002). Such prolonged exposure to violence can gradually undermine the victim's confidence and ability to leave the relationship, creating a pattern of behavior that violates women's rights by limiting their participation in society and harming their health and well-being (García-Moreno et al., 2013; Ribeiro, 2017). The study of violence against women does not just belong to the domestic sphere. It became a matter of public health in view of the important policy implications of the problem (Grossi et al., 2008; Krug et al., 2002).

The literature has shown that domestic violence is associated with alcohol consumption (Stuart et al., 2006; Dossi et al., 2008; d'Oliveira et al., 2009; Vieira et al., 2011; de Holanda et al., 2018; Silva et al., 2022). Leonard (2001) and Graham et al. (2011) found that alcohol use is related to severe IPV levels. Other factors associated with IPV are education (Ahinkorah et al., 2018; Henke and Hsu, 2018; Karlsson et al., 2022; Kawuki et al., 2021), age (Kawuki et al., 2021), pregnancy status (Gürkan et al., 2020), low birth weight (Aizer, 2011), race (Stockman et al., 2015; Reynolds, 2022), and income of both men and women (Angelucci, 2008; Aizer, 2010, 2011; Hidrobo and Fernald, 2013; Heath, 2014; Anderberg et al., 2016; Erten and Keskin, 2018; Henke and Hsu, 2020; Bhalotra et al., 2025). In addition, a woman's likelihood of experiencing IPV rises with prior exposure to other forms of abuse such as sexual abuse during childhood, degree of willingness to accept violence, and exposure to violence between parents (WHO, 2012). Most studies examine the role played by individual characteristics of the women who are victims of violence (Rodrigues et al., 2012; Garcia et al., 2015; Barufaldi et al., 2017), by the men who victimize them, and by other factors linked to this violence (Vieira et al., 2011; de Holanda et al., 2018; Silva et al., 2022).

Most studies on violence against women are based on data from police reports (Amaral, 2001; Jong, 2000). However, since many women who were or still are victims do not report to the police these studies may underestimate the magnitude of the problem (Silva, 2003). Women exposed to violence seek the help of health facilities because of threats to their physical, mental, and reproductive health (Heise et al., 1994). In fact, health emergency services are often the first

place where women break their silence after a severe episode of violence (Ribeiro, 2017). That she walks into a health unit can be considered as a warning sign that a woman has been the victim of violence, given how difficult it is for such victims to seek help. Health workers have difficulty identifying injuries or health disorders in abused women (Stark et al., 1979; Sugg and Inui, 1992; Flitcraft, 1993; Heise et al., 1994; Tilden et al., 1994; Silva, 2003; Garbin et al., 2006). Nevertheless, health workers often recognize and support abused women before more serious incidents occur. Sometimes, health units are the only places where these women seek help (WHO, 2000; Schraiber et al., 2002). Screening for IPV within health services can effectively identify affected women and lead to interventions that enhance safety and improve health outcomes (Feltner et al., 2018; Hegarty et al., 2013; McCloskey et al., 2006; Miller et al., 2011, 2021).

According to Tauchen et al. (1991), two conditions are necessary for women to decide to report aggression: i) outside interventions are effective in combating violence; and ii) the victim is able to support herself financially, and thus does not depend on her aggressor for her livelihood. Emotional support from family and friends is also essential for women to make the decision to leave an abusive relationship (Sagot (2000); Locke and Bunge (2000); Campbell (1998); Short et al. (2000), and safer outside options can discourage the use of violence within the marriage (Aizer, 2010). Adams et al. (2024) find that when women's outside options increase, there is a significant rise in breakup rates among couples with abused women, with no comparable effect observed among couples without abuse. Trust in law enforcement plays a crucial role in victims' decision to report, and perceived costs of reporting are closely tied to this trust (Boateng, 2018; Goodmark, 2018). Victims may hesitate to reach out if calling a helpline involves police involvement that limits their control over the legal process (Perez-Vincent and Carreras, 2022). In regions like Latin America, where trust in the police is low according to Gallup (2018), victims may be further discouraged from using formal reporting channels (Perez-Vincent and Carreras, 2022). Past experiences with law enforcement and perceptions of police effectiveness also influence victims' reporting decisions, with many seeking police assistance only in urgent cases where immediate safety is at risk (Lee et al., 2010).

In Brazil, in recent decades two legal reforms have been implemented to combat violence against women: the Maria da Penha law² and the Femicide Law³. These statutes mark a significant

² Law 11.340/2006

³ Law 13.103/2015

advance for women's rights and a crucial step in addressing domestic and family violence against women. These reforms were introduced after the introduction of specialized police units staffed by women, namely the WPSs who are the focus of this paper. These WPSs were established within the state-level Civil Police, part of Brazil's Public Security System. WPSs focus on prevention, investigation, and legal response, operating under human-rights and rule-of-law principles. Their creation provided many women with a clear "first door" to seek help when confronting violence. Consistent with Farmer and Tiefenthaler (1996), access to institutional supports, such as shelters, WPSs, social-assistance centers like CREAS⁴, and one-stop service hubs such as Womens Justice Centers ⁵, can strengthen a woman's credible threat of exit, as it signals to the aggressor that she may be capable and willing to leave the relationship. Therefore, the use of these services may act as a sign of women's unwillingness to tolerate any further domestic violence.

However, those police stations face significant constraints: they rarely provide specific services such as psychological counselling or legal assistance to victims (Sardenberg et al., 2012) and have limited hours of operation. According to Sardenberg et al., (2012) and Perova and Reynolds (2017), they also have fewer officers than recommended (BRASIL, 2010). In addition, police inspectors from the North and Northeast regions point out that there is a lack of exclusive training for WPS professionals, and the low level of training and lack of recognition for the work of these employees result in low motivation among professionals (Birol, 2013). However, in order to function effectively and in an integrated manner the police stations need to offer qualified care that prevents revictimization of women seeking help from WPSs (Brandão, 2004). Pasinato (2006) highlighted that the first assistance given to the victim is extremely important, as well as the role that this moment plays in further decisions she may make regarding whether to stay in a violent relationship or seek new ways out to escape from victimization.

The establishment of a WPS tends to reduce IPV for it raises the cost of violence to aggressors who are more likely to be prosecuted (Perova and Reynolds, 2017). Furthermore, WPSs' existence can facilitate the dissolution of abusive relationships and reduce conflicts in the remaining relationships (Manser and Brown, 1980). This is because restraining orders are issued that assist court procedures. Thus, WPSs may be contributing to creating safe outside options for abused women, and if they decide to leave the marriage, they are less likely to become victims of

⁴ Portuguese acronym Centro de Referência Especializado da Assistência Social

⁵ Portuguese acronym Casa da Mulher Brasileira

retaliation by the abuser (Perova and Reynolds, 2017). Women's police stations have proven effective in improving access to justice, empowering survivors to leave abusive relationships, and challenging patriarchal norms that perpetuate gender-based violence (Creagh, 2020). However, overcoming geographical barriers and ensuring accessible support services remain critical (Stulz et al., 2024). Greater access to justice - whether through proximity to law enforcement or institutional support - correlates with lower domestic violence rates, particularly among low-income women (Adler, 1996; CEPIA, 2013; Benavides et al., 2017; Kavanaugh et al., 2019). Yet, expanding women's police stations faces challenges such as budget constraints and a shortage of female officers. Research examining their impact on violence is therefore essential. In Brazil, ensuring physical access to justice remains a challenge. In 2019, the country had just 418 women's police stations for 5,570 municipalities - an average of one per twelve municipalities. Their effectiveness is further limited by their uneven distribution: 26% are concentrated in the state of São Paulo and another 12.5% in the state of Minas Gerais, highlighting significant regional disparities.

Despite the introduction of policies and laws to combat violence against women such violence remains widespread in Brazil. UN (2010) revealed that approximately 34% of Brazilian women reported having been a victim of IPV. The rate of women's homicide in the 2004-2014 period in Brazil increased by 11.6% (Cerqueira et al., 2016). It is encouraging, however, that in 2019, 3,737 women were murdered, well below the 4,519 female homicides recorded in 2018. The regions with the highest rate of female homicide in 2019 were the North, Midwest, and Northeast (Cerqueira et al., 2024). Such regional differences may be the result of variation in the cultural acceptance of violence against women. It may also be the result of state variation in funding for police and the legal system. Perova and Reynolds (2017) found that having a women's police station in a capital or metropolitan area reduces the average female homicide rate by 17%.

In Brazil, a woman is more likely to suffer violence if she is young, black, and less educated (Rodrigues et al., 2012; Garcia et al., 2015; Barufaldi et al., 2017; Reynolds, 2022). Meneghel et al. (2017) found an increase in female homicides in capitals and large Brazilian municipalities between the years 2007-2009 and 2011-2013, particularly among young, poor, Black, single, and low-education women.

In addition, in Brazil, most women suffer more aggression within their own homes than in public spaces (FBSP, 2019, 2017). Dossi et al. (2008) evaluated a municipality in São Paulo

between 2001 and 2005 using police reports, and identified that most aggressions occurred on weekends at home, between 12:00 am and 12:00 pm. Garcia et al. (2016) found that domestic violence against women mainly occurs on weekends and at night. These studies reinforce the need to adapt WPSs' hours and days of operation so they can better respond at times when aggressions are suffered by women. Rodrigues et al. (2016) have proposed that public administration should implement effective programs and services to care for victims of gender-based violence and their families to consolidate an articulated intersectoral network caring for abused women.

3. EMPIRICAL STRATEGY

3.1 Data

We used data from SINAN collected by the Brazilian Ministry of Health for the period 2010 to 2019 to analyze how the likelihood of domestic violence is associated with the distance between a WPS and the health unit where a woman reported domestic violence (used as a proxy for a woman's residence). Our study does not face complications arising from post-COVID-19 disruptions, as our analysis is based exclusively on data from before the pandemic.⁶

Since 2009⁷, Brazil's SINAN has tracked interpersonal and self-inflicted violence, which records incidents treated in health services—profiling victims, incident type and location, and, when available, the likely perpetrator. All public and private health facilities must file a DV notification in SINAN whenever victimization is suspected or confirmed. Because reporting is compulsory, initiated by health professionals (i.e., third parties), and not contingent on police or judicial involvement, these data capture both minor and severe cases and mitigate underreporting linked to fear of retaliation (e.g., García-Moreno et al., 2005; Johnson & Kishor, 2005; Rodriguez et al., 1996; see also Aizer, 2010; Bhalotra et al., 2025).

The violence notifications are extracted from the Interpersonal/Self-Inflicted Violence Notification Form and follow ICD-10 Chapter XX (External Causes). In our analysis, we focus on cases coded as assault (Y09). A caveat is that the database covers women who seek care, which

⁶ A number of studies have shown that domestic violence rose because of COVID (e.g. Henke and Hsu, 2020; Bullinger et al., 2021). This was due in part to COVID forcing couples to spend more time together as working from home or leaving the labor force became more common. Spending more time at home due to unemployment may also lead to more intimate domestic violence (see Bhalotra et al., forthcoming).

⁷ Because 2009 was SINAN's first year of DV notification and reporting was not mandatory, only a small share of municipalities reported. We thus drop 2009 (it represented 1.74% of the sample), and start from 2010.

may tilt the sample toward more severe assaults (Ferraz & Schiavon, 2022). Milder cases are also eligible for notification, but women subjected to more severe violence are more likely to seek help.

Because victims' residential addresses are confidential, we use the address of the health facility where care was sought as a proxy for home location. In Brazil, service delivery under the Unified Health System (SUS) is territorially organized into catchment areas and regional health networks; as a result, women are ordinarily directed to primary or urgent-care units located near their residence. Hospital care follows a different referral logic: when admission or specialized beds are required, patients may be referred to the nearest hospital with capacity, which can be located outside the patient's municipality and farther from home. This institutional distinction is crucial for our measurement strategy: SINAN domestic-violence notifications are completed at the point of first contact in primary or urgent care within the patient's catchment area, not during inpatient admissions. Hence, our proxy is not confounded by the longer-distance, inter-municipal referral patterns regulating location of hospitalizations.

Health facility addresses were obtained from the CNES (National Registry of Health Facilities) database and geocoded; observations without a valid CNES were dropped⁸. Data on WPS come from the Survey of Basic Municipal Information (MUNIC) collected by the Brazilian Institute of Geography and Statistics (IBGE) in its surveys (2009, 2012, 2014). For municipalities reporting a WPS, we collected the unit's official address from state government or Civil Police webpages, geocoded it, and computed the distance from each health facility to the nearest WPS. Figure 1 maps the distribution of WPSs in 2019 and the health facilities observed in our sample from 2010–2019. Figures 2 and 3 replicate Figure 1 for Brazil's five macro-regions - North, Northeast, Southeast, South, and Midwest.

We restrict the sample to female victims aged 18–59 years⁹ who identified a male as the likely perpetrator, accounting for 61.24% of records. We focus on women aged 18–59. For this group IPV is most prevalent and most likely to be subjected to the mechanism we study. In Brazil, girls under 18 are legal minors, and suspected or confirmed violence against them must be reported to the Child Protection Council under a separate protection track. Violence against people aged 60 and over is classified as elder abuse and must be reported to elderly rights councils and specialized

⁸ Observations with invalid CNES identifiers—typically due to facility deactivation (the establishment no longer exists) or data-entry errors by the reporting provider—were excluded (1.35% of the sample). We also dropped records missing a CNES code, which accounted for an additional 0.37% of the sample.

⁹ Excluding women under 18 reduced the sample by 25.78%; excluding women aged 60+ reduced it by 3.94%

police, as required by the Elderly Statute. We thus excluded very young and older women because SINAN treats¹⁰ these two groups through distinct procedures.

Observations with missing values on any analysis variable were removed. Missing values arise for several reasons: notification forms are frequently completed after the patient has left the facility, so the provider may lack some details; SINAN is designed for epidemiological surveillance rather than police reporting, which means certain fields are not prioritized for legal identification; and some victims seek care days after the incident and may be unable to recall all the relevant information. The dependent variable is a dummy equaling one when the women declared that they suffered any abuse and the aggressor was their spouse, ex-spouse, boyfriend, or ex-boyfriend; and zero otherwise¹¹. In general, different types of abuse coexist in the same relationship. The final sample comprises 227,172 women who were victims of violence perpetrated by men between 2010 and 2019.

Table 2 reports on characteristics of the victims and the violence episodes to which they were exposed in Brazil as a whole (col. 1) and in all five macro-regions (cols. 2-6). In terms of spatial access to a WPS, 54% of the respondents live within 10 km of a WPS, while 22% are more than 40 km away. Regionally, the Northeast has almost 30% of women living more than 40km away, while the Southeast has less than 20%. Since Brazil is diverse, we expected the average distance to vary across Brazil's macro-regions. In fact, women in the Midwest and North need to travel the farthest to reach a station (40.8 km and 32.4 km on average, respectively). In comparison, those in the Southeast face the shortest mean distance (21.3 km). When we examine the standard deviations, we note that they are large, especially in the North, indicating unequal access within regions.

Violence concentrates among younger women: For the whole country 68% of cases involve ages 18–39, which is the pattern within all regions as well. Self-identified race is 51.4% black and 47.7% white, implying an over-representation of black women relative to the 2010 Census (51.33% white; 48.31% black). When we examine race and region, the overrepresentation of blacks is even higher in the Northeast and the North, meaning that relatively more black women

¹⁰ Available at: https://bvsm.s.saude.gov.br/bvs/publicacoes/viva_instrutivo_violencia_interpessoal_autoprovocada_2ed.pdf

¹¹ Note that our analysis compares outcomes across perpetrator types, since all women in the SINAN records are victims of violence. Owing to SINAN's design, we cannot construct a comparable group of non-victimized women—an ideal counterfactual—so estimates should be interpreted as within-victim contrasts rather than victim vs. non-victim differences.

suffer violence against women. Marital status also differs from the Census: in our sample 49.8% of victims are married, compared with 39.2% who are single, whereas the Census reports 40.64% married and 43.50% single. These patterns also hold for the regions, except for the Northeast and the North, where the proportion of single women is higher. As for our sample's educational attainment, we see that it falls below national averages, with 35.9% not having completed elementary school (vs. 25.25% of women in the 2010 Census), and with just 5.1% having obtained a higher education.

Regarding characteristics of the violence episodes: 74% of incidents occurred in the victim's residence; 55% report prior episodes; and the aggressor had consumed alcohol in 54% of cases, which is consistent with prior evidence linking men's alcohol use to heightened risk of gender-based violence (Parry et al., 1996; Kyriacou et al., 1998; Moreno Martín, 1999; McCauley et al., 1995).

3.2 Methodology

A choice model was estimated in which the dependent variable is binary and captures whether the woman suffered IPV:

$$Pr(X) = G(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) = G(\beta_0 + X\beta) \quad (1)$$

where G is a cumulative distribution function:

$$G(z) = \frac{\exp(z)}{1 + \exp(z)} = \Lambda(z) \quad (2)$$

with $0 < G(z) < 1$ for any value of z. The leading binary models are logit and probit. Our preferred model is the logit model, in which G is the following logistic function:

$$G(z) = Pr(X) = G(X\beta) \quad (3)$$

This function lies between zero and one for all real z numbers (Wooldridge, 2023). It is the cumulative distribution function of a standard logistic random variable and can be derived from an underlying latent variable model:

$$Y_i^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_{ki} + \mu_i = X_i \beta + \mu_i \quad (4)$$

According to Cameron et al. (2010), the format of a basic binary model with the dependent variable defined by:

$$Y = \begin{cases} 1, & \text{with probability } p \\ 0, & \text{with probability } 1 - p \end{cases} \quad (5)$$

and where the probability function for the result y is given by $py(1 - p)^{(1-p)}$, with

$$E(y) = p \text{ and } var(y) = p(1 - p) \quad (6)$$

The regression model is formed by parameterizing p such that it depends on a function, F , with x being a vector of regressors and β being an unknown parameter vector. The conditional probability is defined by:

$$p_i = Pr(X) = F(X'\beta) \quad (7)$$

In a logit model, $F(\cdot) = \Lambda(\cdot)$, and the conditional probability function is defined by:

$$p_i = Pr(X) = \Lambda(\cdot) = \frac{e^{(X'\beta)}}{1 + e^{(X'\beta)}} \quad (8)$$

The logit model uses the maximum likelihood estimation method. For a sample of N independent observations, the maximum likelihood estimator maximizes the function associated with the log-likelihood:

$$Q(\beta) = \sum_{i=1}^n y_i \ln F(x'\beta) + (1 - y_i) \ln \{1 - F(x'\beta)\} \quad (9)$$

Our goal is to examine whether the probability of a IPV assault on a woman is conditioned by the distance from the nearest police station and characteristics of the woman and the violence episode. The dependent variable Y_{IPV} is a binary variable that captures the incidence of IP violence suffered by a woman, and the control group consists of victims of non-IPV violence perpetrated by men against women. This variable can be described as follows¹²:

$$\begin{aligned} Pr = (X) = \Lambda(\beta_0 + \beta_1 18 - 29years + \beta_2 30 - 39years + \beta_3 40 - \\ 49years + \beta_4 50 - 59years + \beta_5 white_asian + \beta_6 indigenou + \\ \beta_7 single + \beta_8 widow + \beta_9 divorced + \beta_{10} illiterate + \\ \beta_{11} incomplete_elementary_school + \beta_{12} elementary_school + \\ \beta_{13} high_school + \beta_{14} incomplete_higher_edu + \end{aligned} \quad (10)$$

¹² Dummies for years and regions were included.

$$\begin{aligned}
& \beta_{15}higher_education + \beta_{16}pregnant + \beta_{17}distance(2 - 5km) + \\
& \quad \beta_{18}distance(5 - 10km) + \beta_{19}distance(10 - 20km) + \\
& \beta_{20}distance(20 - 40km) + \beta_{21}distance(> 40km) + \beta_{22}urban + \\
& \quad \beta_{23}capital + \beta_{24}occured_again + \beta_{25}drunk + \beta_{26}residence + \\
& \quad \beta_{27}weekday + \beta_{28}daylight)
\end{aligned}$$

RESULTS

We estimate logit models in which the dependent variable equals one when the episode recorded at the health facility is classified as IPV. The results are presented as odd ratios (ORs) of the occurrence of a change in the dependent variable due to a one unit variation in the independent variable. The results can range from zero to plus infinity, where a value below (above) 1 means a lower (higher) likelihood of IPV occurrence. We report standard errors clustered at the municipality level and include year and state dummies in all specifications. It is important to highlight that these estimates are interpreted as descriptive correlations rather than causal effects.

Table 3 reveals that for Brazil as a whole (Col. 1) from 20 km onward, the odds of an episode being classified as IPV increase with distance from a WPS relative to the odds for women living close to a WPS. Table A1 (in the Appendix) confirms this finding in the case of continuous distance measures. One possible mechanism behind this finding is based on how distance affects women's reporting behavior: distance acts as an obstacle to reporting. Victims near a WPS feel protected coming forward, relative to those living farther away who face higher transaction costs (including time, risk of retaliation, and lack of accessible transport). The health service has a broader reach throughout the country than police stations; a weaker police presence may make women feel less secure when deciding whether to disclose violence. This aligns with Grossi et al. (2008), which ties presence of WPSs to increased visibility of violence due to more complaints. The presence of female officers likely amplifies this effect, as Sukhtankar et al. (2022) found that female officers are more likely to register cases of gender-based violence when they are working at the help desk of a police station in India.

Next, we examine results for each of the macro-regions. Brazil is vast and diverse, and the national averages may obscure the particularities of each region (columns 2 to 6 in Table 3). The coefficients of distance from a WPS vary across different regions. On the one hand, in the South and the Midwest, the odds of IPV decline with distance, suggesting that proximity facilitates reporting. Here, distance is primarily a logistical barrier; and we expect that reducing distance from a WPS would increase disclosure. In the Midwest, distance from a WPS ceases to matter after the first bin, possibly due to a thin institutional reach.

On the other hand, in the North and Northeast, the odds of IPV reports increase with distance from a WPS. This could be due to these areas' sparse WPS coverage, with only 8% of WPSs located in the North (RASEAM, 2025). Also, the North features illegal mining and other extractive industries that contribute to an intense dynamic of violence taking various forms. The North includes the Amazon region, which is characterized by high levels of violence, with many cases in remote areas, invisible to formal institutions. In these areas health services are more widespread than policing, so in both the North and Northeast the higher odds of IPV reporting in distant locations may reflect more opportunities to report violence in a health facility.

As for the Southeast, the region of residence of the most significant proportion of our sample, there the distance coefficients cluster near unity, which suggests that in densely served urban areas with multiple reporting options, proximity to a WPS is neither a binding constraint nor a strong signal. Other factors (employment, social norms, and alternative services) could be dominating women's reporting decisions.

The regional variation in the coefficients of the distance from a WPS dummies suggests that geography interacts with institutional capacity, patriarchal structures, and gender norms to shape gender-related violence and reporting practices. Figure 1 helps understand the spatial logic behind these regional differences. It shows that WPS density is highest in the South and Southeast, where reporting rates are also elevated, while the North's sparse WPS coverage corresponds to few recorded cases, consistent with our results. The reduced presence of WPSs in remote areas amplifies the effects of distance on women's feelings of being unprotected, while in regions with greater availability of WPSs, being far from a WPS may not be as problematic. It is possible that the marginal returns to additional WPS coverage diminish. National regressions average over effects of distance due to different mechanisms, obscuring the heterogeneity that matters most for policy design. The results highlight the importance of geographic heterogeneity in access to WPSs

that protect women and to health units where women can get treated for consequences of abuse and can report abuse cases. Policy recommendations may need to be tailored to the needs of women living in each region.

Table 3 also indicates that violent episodes reported on weekdays or during daylight hours are less likely to be classified as IPV. This could reflect an institutional barrier, as during the period our data were collected WPSs operated only during commercial hours on weekdays. Therefore, if the violence occurred at night or on the weekend, women were forced either to wait until the next business day to file a report at a WPS or to seek help at regular police stations, which are less sensitized to gender-based violence and less likely to register cases appropriately.

Since 74% of IPV occurs at home, where the victim and aggressor cohabit, nighttime and weekend exposure are intrinsic to the IPV abuse dynamic. In contrast, daytime weekday episodes may reflect non-IPV violence or less severe cases where the victim can more easily seek help without the aggressor's knowledge or control, especially in a densely populated region like the Southeast. The lower odds for weekday/daylight IPV cases are thus consistent with both the timing of IPV and the operational constraints of the institutions responsible for responding to it. We also observe that violent episodes in state capitals are less likely to be cases of IPV. This could be because large cities attract a broader range of violence episodes, other than IPV. It is also possible that in capital cities there are more institutions to which victims of IPV turn for help and they are less likely to report episodes at health clinics and to seek the help of female police officers for protection.

We observe three more situational factors that are strongly associated with IPV (Table 3). First, occurrences at the victim's residence are more likely to be IPV, consistent with the domestic nature of IPV (Schraiber et al., 2007). Second, recurrent episodes, i.e., the woman reported prior victimization, also show elevated IPV odds, which reinforces the argument that IPV is not an isolated event but an escalating pattern of control and violence (Johnson, 1995; Sales, 2019). Third, cases in which the aggressor consumed alcohol are significantly more likely to be due to IPV. This aligns with extensive evidence linking men's alcohol consumption to heightened risk of this form of gender-based violence (Zaleski et al., 2010; Vieira et al., 2014).

We also observe a clear life-cycle pattern of IPV. Relative to women aged 50–59, the odds of an episode being classified as IPV are higher for those aged 18–29 and 30–39, and moderately higher for those aged 40–49. These findings are consistent with the periods of more intense

formation of partnership and cohabitation. Educational dummies generally indicate lower odds of IPV among women with higher levels of education. The findings are consistent with education strengthening outside options and reducing tolerance for partner violence.

The association between distance and IPV is similar across subtypes of violence—physical, psychological, sexual, financial, and a residual “other” category. As shown in Table 4, greater distance is generally associated with higher odds of IPV in Brazil, with physical, sexual, and psychological violence more likely among women living more than 20 km from a WPS. In contrast, the odds of financial violence are highest for women living 2–5 km away, possibly because these areas have higher average income, which both increases financial conflict within couples and facilitates the establishment of WPSs. Estimates for the “other” category are noisier, given its low frequency, but the confidence intervals largely overlap the main effects.

As a robustness check, we trim observations for women living more than 100 km from a WPS. This cutoff is motivated by Figure 4 (Appendix), which shows that fewer than 5% of cases occur beyond this distance. We also present the distance histogram after applying this trimming (Figure 5 in the Appendix). The results presented in Table A2, which exclude women living more than 100 km from a WPS, confirm our main results for the distance variables, but they show higher associations between odds of IPV and residence, recurrence, and alcohol consumption.

CONCLUSION

This paper uses administrative records from health facilities in Brazil to examine which episodes are classified as IPV and how proximity to a WPS is associated with IPV reports, reports of different types of IPV, and the circumstances of the episodes. The analysis relies on logit models with odds ratios and standard errors clustered at the municipality level, and thus documents correlations rather than causal effects.

The findings reveal that distance from the nearest WPS matters for IPV reporting across Brazil, for policy however our analysis reveals substantial regional heterogeneity, which has important implications. In the South and Midwest, the odds of IPV decline as distance from a WPS increases, indicating that distance acts primarily as a logistical barrier to disclosure; reducing it would likely increase IPV reporting. In contrast, in the North and Northeast the likelihood of IPV rises with distance from a WPS. These are regions with remote and hard-to-reach areas, where there is illegal mining usually invisible to formal institutions, and where police stations are often

further away than health services. In these areas women may rely on health facilities as their most accessible reporting channel. The Southeast presents a different picture, with the distance coefficients clustering near unity. In these densely served urban areas women may have multiple options of reporting, and proximity to a WPS may be less of a constraint or a signal. Here other social norms could dominate reporting decisions. These regional patterns imply that national averages obscure the specific ways that women experience IPV and respond to it across Brazil.

Beyond geographic variation, three situational factors emerge as strongly associated with IPV. First, episodes occurring at the victim's residence are more likely to be IPV, consistent with its fundamentally domestic nature. Second, recurrent episodes, in which women report prior victimization, show elevated IPV odds, reinforcing that IPV is rarely an isolated incident but rather an escalating pattern of control and violence. Third, cases involving perpetrator alcohol consumption are substantially more likely to be classified as IPV. A clear life-cycle pattern also appears: relative to women aged 50–59, the odds of classification as IPV are higher among those aged 18–29 and 30–39, and moderately higher for those aged 40–49, with results being consistent across violence types.

This analysis faces some limitations. Distance to a WPS could be correlated with unobserved community characteristics that shape reporting, such as social norms, transportation networks or policing quality. Also, the data cover only women who reach health facilities, with no comparison group of non-victims, which does not allow us to compare victims and non-victims. Furthermore, heterogeneity in health facility practices and staff capacity for case assessment and documentation may bias IPV classification and introduce residual confounding. Despite these constraints, our findings have policy implications. By improving access to WPSs and coordination between WPSs and other frontline services, particularly health and social assistance, i.e. by expanding victims' access to institutions that support them, policy-makers could lower barriers to reporting. The country also needs to address the perpetrator alcohol use: investments in WPS should be complemented by public health and social policies targeting substance abuse and related risk factors.

More broadly, this study of the Brazilian experience demonstrates how WPS infrastructure can shape the visibility and handling of IPV in contexts with high violence and unequal service distribution. The marked regional heterogeneity cautions against relying on national averages to guide public policy decisions; misinterpreting average effects risks misplacing stations and

forgoing opportunities to reach women in high-need, low-access settings. For policymakers in Brazil and perhaps elsewhere, effective responses may require integrated public health and social policies that address alcohol abuse, strengthen the health-sector's capacity, and ensure that women have multiple, accessible pathways to safety and support.

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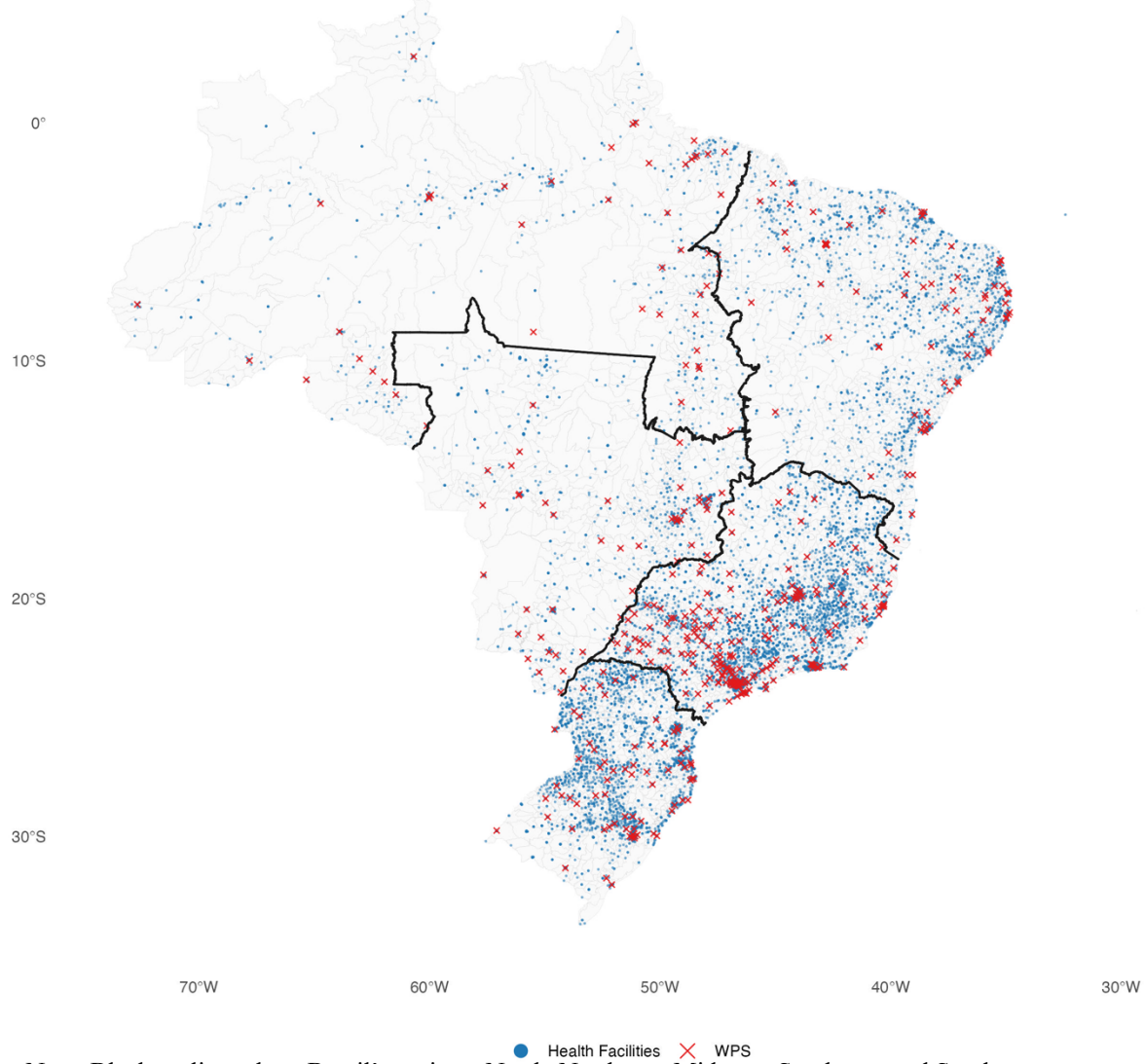
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TABLES AND FIGURES

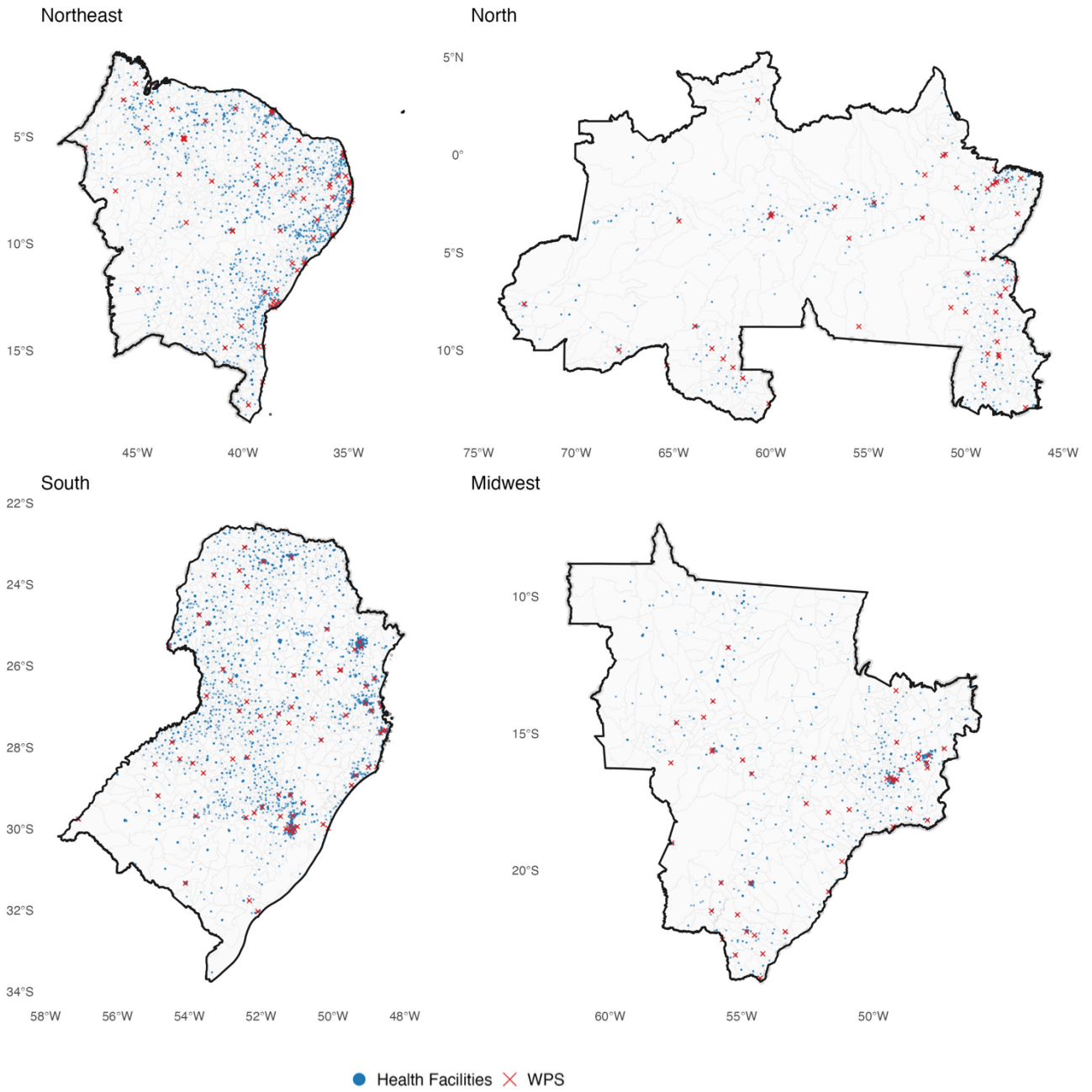
Figure 1: Location of WPSs (2019) and Health Facilities (2010-2019) in Brazil.



Note: Black outlines show Brazil's regions: North, Northeast, Midwest, Southeast, and South.

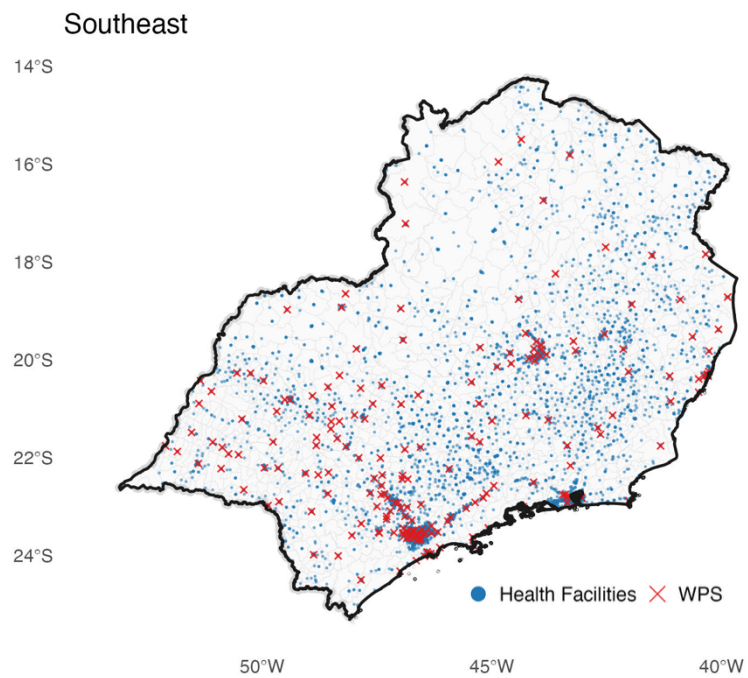
Source: Prepared by the authors using data from Brazilian Ministry of Health (CNES) and IBGE/MUNIC.

Figure 2: Location of WPSs (2019) and Health Facilities (2010-2019) for Region



Source: Prepared by the authors using data from Brazilian Ministry of Health (CNES) and IBGE/MU

Figure 3: Location of WPSs (2019) and Health Facilities (2010-2019) for Region



Source: Prepared by the authors using data from Brazilian Ministry of Health (CNES) and IBGE/MUNIC

Table 1: Research on Police Feminization¹³ and gender-based violence (incl. Intimate Partner Violence)¹⁴, by country, data type, years of data availability, & main findings

Study	Country	Data Type	Years Available	Main Findings
Ordenana (1998)	Ecuador	Police reports	1998	In four of the first five WPS, 52% of women reported that violence continued in their lives, although 59% said it had become less severe. In the other WPS, 76% of the women stated that the violence persisted after they filed complaints.
Jong et al. (2000)	Botucatu (Brazil)	Police reports	1995-1997	Most injuries were classified as minor, with only 0.7% of victims receiving medical attention due to the nature of the injuries. Most assaults were committed by spouses.
García-Moreno et al. (2005)	Bangladesh, Brazil, Ethiopia, Japan, Namibia, Peru, Samoa, Serbia/Montenegro, Thailand, and Tanzania	Standardized population-based household surveys	2000-2004	The majority of physically abused women (55%-95%) never sought help from formal services or authorities. Only in Namibia City and Peru did over 20% contact the police, and only in Namibia City and Tanzania City did over 20% seek health care services.
Dossi (2008)	Araçatuba (Brazil)	Police reports	2001-2005	The predominant aggressors were the current partner and spouse, with a higher frequency of assaults between couples on weekends. Most injuries were minor, occurring mainly on the head and upper limbs, with bruises and abrasions being the most common, and few victims sought medical attention.

¹³ Includes various means of increasing the proportion of women police officers: WPS or WJC

¹⁴ Intimate Partner Violence: against women.

Lima and Souza (2009)	Rio de Janeiro (Brazil)	Police reports	2005	In WPS gender-based violence is often perceived as a more serious crime (and consequently given less priority) than in regular police stations.
Devries et al. (2013) ¹⁵	81 countries	Health reports	2010	Many women using health services are likely experiencing or have histories of IPV. Health services have the potential to identify, support, and refer these women, as well as support children in households with IPV, following guidance from the WHO and other health bodies.
Veloso et al. (2013)	Belém (Brazil)	Health reports	2009-2011	From 2009 to 2011 IPV rose by 240%. 41.8% of all IPV was sexual violence, 26.3% psychological violence, and 24.0% physical violence.
Perova and Reynolds (2017)	Brazil	National Household Survey	2004-2009	In areas with WPSs, there was a 17% reduction in female homicides, especially in urban areas.
Oliveira et al. (2019)	João Pessoa, capital of Paraíba state (Brazil)	Police reports	2017	Domestic violence against women occurs across all areas of the city, in both affluent and marginalized communities.
Machado et al. (2020)	Brazil	Police reports	2013-2014	After-hours violence involves more severe assaults, highlighting the need for specialized services during these periods.
Mascarenhas et al. (2020)	Brazil	Health report	2011-2017	Most cases of violence against women recorded in health services are committed by intimate partners, involving physical, psychological, and sexual abuse. Factors associated with IPV include age, education, pregnancy, home occurrence, recurrence, and the aggressor's alcohol consumption.
Amaral et al. (2021)	India	Police reports	1998-2013	Establishment of Women's Police Stations (WPS) linked to a 29% increase in crimes against women

¹⁵ Data from 141 studies in 81 countries

Córdova and Kras (2021)	Brazil, national sample representative of the adult population in urban areas	Survey by Instituto Patricia Galvão	2013	In municipalities with long-established WPS men are more likely to oppose violence against women and to support bystander intervention
Sukhtankar et al. (2022)	India	Mixed (police & health)	2018-2020	Increase in deployment of more female officers across 180 police stations led to a significant increase in recorded violence against women
Sviatschi and Trako (2024)	Peru	Mixed (police & health)	2000-2014	Opening of Women's Justice Centers (WJC) ¹⁶ reduces gender-based violence

¹⁶ Women's Justice Centers are specialized institutions that provide police, medical and legal services to reduce gender-based violence.

Table 2: Descriptive statistics.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Brazil	North	Northeast	South	Southeast	Midwest
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
IPV	0.691 (0.462)	0.673 (0.469)	0.613 (0.487)	0.706 (0.456)	0.710 (0.454)	0.641 (0.480)
Distance from WPS($\leq 2km$)	0.246 (0.430)	0.217 (0.412)	0.325 (0.468)	0.278 (0.448)	0.219 (0.413)	0.238 (0.426)
Distance (2 – 5km)	0.191 (0.393)	0.346 (0.476)	0.188 (0.391)	0.142 (0.349)	0.185 (0.389)	0.237 (0.425)
Distance (5 – 10km)	0.112 (0.315)	0.189 (0.391)	0.059 (0.236)	0.131 (0.337)	0.108 (0.310)	0.090 (0.286)
Distance (10 – 20km)	0.091 (0.288)	0.033 (0.178)	0.052 (0.223)	0.071 (0.258)	0.120 (0.324)	0.064 (0.245)
Distance (20 – 40km)	0.141 (0.348)	0.017 (0.128)	0.093 (0.290)	0.156 (0.362)	0.173 (0.378)	0.047 (0.213)
Distance ($> 40km$)	0.220 (0.414)	0.199 (0.399)	0.283 (0.450)	0.222 (0.416)	0.196 (0.397)	0.220 (0.414)
Distance in km	24.795 (38.458)	32.347 (71.786)	30.195 (44.912)	23.129 (30.308)	21.316 (26.724)	40.771 (64.598)
Age:						
18 - 29 years	0.411 (0.492)	0.477 (0.499)	0.427 (0.495)	0.386 (0.487)	0.407 (0.491)	0.440 (0.496)
30 - 39 years	0.276 (0.447)	0.274 (0.446)	0.281 (0.450)	0.264 (0.441)	0.281 (0.450)	0.269 (0.443)
40 - 49 years	0.145 (0.353)	0.107 (0.310)	0.135 (0.341)	0.163 (0.369)	0.147 (0.354)	0.135 (0.342)
50 -59 years	0.067 (0.250)	0.051 (0.219)	0.066 (0.248)	0.071 (0.257)	0.065 (0.247)	0.069 (0.254)

<i>Ethnicity:</i>						
White ¹⁷	0.477 (0.499)	0.137 (0.344)	0.173 (0.378)	0.761 (0.427)	0.492 (0.5)	0.32 (0.466)
Black	0.514 (0.5)	0.835 (0.371)	0.821 (0.383)	0.231 (0.422)	0.506 (0.5)	0.637 (0.481)
Indigenous	0.008 (0.091)	0.028 (0.165)	0.006 (0.076)	0.008 (0.088)	0.02 (0.5)	0.043 (0.202)
<i>Marital Status:</i>						
Single	0.392 (0.488)	0.475 (0.499)	0.470 (0.499)	0.343 (0.475)	0.385 (0.487)	0.392 (0.488)
Married	0.498 (0.500)	0.462 (0.499)	0.446 (0.497)	0.522 (0.500)	0.504 (0.500)	0.505 (0.500)
Widow	0.013 (0.111)	0.008 (0.087)	0.013 (0.113)	0.014 (0.119)	0.013 (0.111)	0.010 (0.100)
Divorced	0.097 (0.296)	0.056 (0.230)	0.071 (0.257)	0.121 (0.326)	0.098 (0.298)	0.093 (0.291)
<i>Education:</i>						
Elementary school	0.116 (0.321)	0.086 (0.280)	0.090 (0.285)	0.157 (0.364)	0.112 (0.316)	0.094 (0.291)
Elementary school - not completed	0.359 (0.480)	0.350 (0.477)	0.425 (0.494)	0.382 (0.486)	0.329 (0.470)	0.411 (0.492)
High school	0.283 (0.451)	0.295 (0.456)	0.254 (0.435)	0.231 (0.422)	0.317 (0.465)	0.230 (0.421)
High school - not completed	0.142 (0.349)	0.161 (0.367)	0.131 (0.337)	0.136 (0.342)	0.143 (0.350)	0.158 (0.365)
Higher education - not completed	0.048 (0.215)	0.056 (0.230)	0.049 (0.216)	0.047 (0.212)	0.046 (0.210)	0.058 (0.235)
Higher education	0.051 (0.220)	0.053 (0.225)	0.052 (0.221)	0.046 (0.210)	0.053 (0.224)	0.049 (0.215)

¹⁷ Dummy equals to one if the person self-declared white or Asian

<i>Other variables:</i>						
Pregnant	0.069 (0.253)	0.084 (0.278)	0.085 (0.278)	0.063 (0.243)	0.064 (0.245)	0.083 (0.276)
The violence occurred in a capital municipality	0.181 (0.385)	0.373 (0.484)	0.358 (0.479)	0.090 (0.286)	0.137 (0.344)	0.316 (0.465)
Violence is recurrent	0.549 (0.498)	0.559 (0.497)	0.545 (0.498)	0.564 (0.496)	0.548 (0.498)	0.499 (0.500)
Agressor was drunk	0.536 (0.499)	0.550 (0.497)	0.545 (0.498)	0.544 (0.498)	0.519 (0.500)	0.623 (0.485)
Violence occurred at home	0.739 (0.439)	0.731 (0.443)	0.703 (0.457)	0.765 (0.424)	0.741 (0.438)	0.709 (0.454)
Violence occurred on a weekday	0.750 (0.433)	0.832 (0.374)	0.798 (0.402)	0.764 (0.425)	0.729 (0.444)	0.685 (0.464)
Violence occurred during daylight	0.389 (0.487)	0.408 (0.491)	0.436 (0.496)	0.380 (0.485)	0.383 (0.486)	0.358 (0.479)
<i>Type of violence:</i>						
Physical	0.855 (0.352)	0.772 (0.420)	0.798 (0.402)	0.829 (0.377)	0.889 (0.314)	0.863 (0.344)
Psychological	0.484 (0.500)	0.571 (0.495)	0.561 (0.496)	0.529 (0.499)	0.447 (0.497)	0.395 (0.489)
Sexual	0.101 (0.301)	0.136 (0.343)	0.161 (0.367)	0.105 (0.306)	0.075 (0.263)	0.157 (0.364)
Financial	0.024 (0.154)	0.024 (0.154)	0.058 (0.234)	0.026 (0.159)	0.017 (0.130)	0.013 (0.115)
Others	0.007 (0.082)	0.006 (0.078)	0.013 (0.115)	0.007 (0.083)	0.005 (0.072)	0.008 (0.089)
Observations	227,172	15,976	26,890	50,218	119,476	14,612

Source: Prepared by the authors using data from SINAN. Note: Standard errors, in parentheses.

Table 3: Odds Ratios of reporting Intimate Partner Violence – Brazil and Regions

Variables	(1) Brazil ¹⁸	(2) North	(3) Northeast	(4) South	(5) Southeast	(6) Midwest
Distance (2 – 5km)	1.017 (0.108)	1.295 (0.239)	1.416** (0.245)	0.605*** (0.0723)	1.156 (0.189)	0.641*** (0.092)
Distance (5 – 10km)	1.026 (0.0628)	1.729*** (0.329)	1.741*** (0.224)	0.869 (0.117)	0.895* (0.0598)	1.093 (0.143)
Distance (10 – 20km)	0.975 (0.0699)	1.319 (0.288)	1.455*** (0.178)	0.710* (0.134)	0.977 (0.0842)	1.107 (0.098)
Distance (20 – 40km)	1.170*** (0.0562)	0.949 (0.193)	2.205*** (0.340)	0.992 (0.113)	1.097* (0.0567)	0.975 (0.108)
Distance (> 40km)	1.162*** (0.0520)	1.374** (0.212)	1.642*** (0.172)	0.893 (0.0758)	1.138** (0.0718)	0.991 (0.101)
<i>Women's characteristics</i>						
18 to 29 years old	1.705*** (0.0353)	1.413*** (0.0582)	1.437*** (0.0646)	1.837*** (0.0820)	1.796*** (0.0459)	1.581*** (0.131)
30 to 39 years old	1.786*** (0.0358)	1.583*** (0.0914)	1.613*** (0.0877)	1.910*** (0.0991)	1.796*** (0.0430)	1.818*** (0.095)
40 to 49 years old	1.155*** (0.0220)	0.994 (0.0684)	1.228*** (0.0571)	1.184*** (0.0493)	1.140*** (0.0311)	1.217** (0.078)
White	0.989 (0.0172)	1.066 (0.0728)	0.977 (0.0390)	1.072* (0.0392)	0.973 (0.0217)	1.014 (0.0398)
Indigenous	0.665*** (0.0568)	0.511*** (0.0878)	0.741 (0.146)	0.825 (0.109)	0.726** (0.0930)	0.667*** (0.0621)
Single	0.370*** (0.00981)	0.489*** (0.0442)	0.387*** (0.0293)	0.365*** (0.0216)	0.350*** (0.0119)	0.349*** (0.0285)

¹⁸ The model include year and state dummies.

Widow	0.173*** (0.00848)	0.240*** (0.0552)	0.215*** (0.0315)	0.178*** (0.0194)	0.158*** (0.0100)	0.187*** (0.0291)
Divorced	0.888*** (0.0227)	1.286** (0.159)	1.127 (0.0853)	0.871** (0.0496)	0.831*** (0.0250)	0.868 (0.0775)
Elementary school -incomplete	0.898*** (0.0192)	1.064 (0.0870)	0.967 (0.0543)	0.870*** (0.0409)	0.873*** (0.0236)	0.933 (0.0531)
Elementary school	1.072** (0.0354)	1.405*** (0.174)	1.036 (0.0867)	1.014 (0.0622)	1.061 (0.0443)	0.997 (0.0891)
High school	0.930*** (0.0258)	1.132* (0.0835)	0.927 (0.0475)	0.905* (0.0503)	0.917** (0.0337)	0.834** (0.0586)
Higher education -incomplete	0.645*** (0.0293)	0.793** (0.0827)	0.827* (0.0827)	0.682*** (0.0827)	0.565*** (0.0827)	0.800** (0.0827)
Higher education	0.716 (0.0431)	1.119 (0.0915)	0.896 (0.125)	0.682*** (0.0507)	0.651*** (0.0553)	0.685*** (0.0677)
Pregnant	1.123*** (0.0363)	0.989 (0.108)	1.105 (0.0909)	1.213*** (0.0631)	1.113** (0.0597)	1.373*** (0.182)
<i>Other variables</i>						
Capital	0.692*** (0.0509)	0.702*** (0.0896)	0.730*** (0.0673)	0.550*** (0.0414)	0.788*** (0.0695)	0.569*** (0.0393)
Occurred again	3.723*** (0.107)	4.464*** (0.413)	4.190*** (0.450)	3.607*** (0.221)	3.501*** (0.115)	3.974*** (0.200)
Drunk	1.279*** (0.0294)	1.318*** (0.0838)	1.462*** (0.118)	1.259*** (0.0458)	1.233*** (0.0388)	1.353*** (0.101)
Residence	2.785*** (0.0726)	2.830*** (0.231)	2.862*** (0.221)	3.085*** (0.173)	2.606*** (0.0890)	3.087*** (0.273)
Violence occurred on a weekday	0.915*** (0.0205)	1.015 (0.0971)	0.853** (0.0623)	0.949 (0.0423)	0.900*** (0.0260)	0.899* (0.0556)
Violence occurred during daylight	0.847*** (0.0133)	0.988 (0.0373)	0.970 (0.0364)	0.820*** (0.0283)	0.792*** (0.0157)	0.925 (0.0495)
Constant	0.555*** (0.0837)	0.373*** (0.0961)	0.390*** (0.118)	0.747** (0.111)	0.645*** (0.0827)	0.702 (0.178)

Observations	227,172	15,976	26,890	50,218	119,476	14,612
Outcome mean	0.691	0.673	0.613	0.706	0.710	0.641

Source: Prepared by the authors using data from SINAN.

Note: Standard errors clustered at municipal level in parentheses. Dummies for years and states were included. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Logit results for different types of IPV.

Variables	(1) Physical	(2) Sexual	(3) Psychological	(4) Financial	(5) Others
Distance (2 – 5km)	1.070 (0.0929)	0.884 (0.121)	1.093 (0.133)	1.679** (0.396)	0.860 (0.247)
Distance (5 – 10km)	1.060 (0.0608)	1.061 (0.135)	0.996 (0.0805)	1.172 (0.266)	1.769** (0.482)
Distance (10 – 20km)	1.050 (0.0474)	1.120 (0.217)	0.933 (0.0845)	1.305 (0.313)	1.236 (0.434)
Distance (20 – 40km)	1.120*** (0.0481)	1.475*** (0.165)	1.136** (0.0706)	1.355* (0.216)	1.680* (0.469)
Distance (> 40km)	1.135*** (0.0498)	1.077 (0.143)	1.119** (0.0609)	1.340* (0.237)	1.256 (0.352)
<i>Women's characteristics</i>					
18 to 29 years old	1.779*** (0.0364)	0.899* (0.0534)	1.792*** (0.0564)	2.336*** (0.328)	1.854** (0.461)
30 to 39 years old	1.746*** (0.0337)	1.596*** (0.0957)	1.883*** (0.0646)	2.188*** (0.307)	2.385*** (0.567)

40 to 49 years old	1.093*** (0.0228)	1.507*** (0.107)	1.209*** (0.0315)	1.466*** (0.162)	1.739** (0.410)
White	0.996 (0.0164)	0.934 (0.0451)	1.017 (0.0218)	0.951 (0.0783)	0.782 (0.120)
Indigenous	0.662*** (0.0572)	1.206 (0.257)	0.579*** (0.0849)	0.789 (0.390)	0.308 (0.259)
Single	0.367*** (0.00770)	0.441*** (0.0257)	0.397*** (0.0155)	0.326*** (0.0321)	0.283*** (0.0491)
Widow	0.173*** (0.00868)	0.333*** (0.0580)	0.153*** (0.0105)	0.0820*** (0.0222)	0.0506*** (0.0299)
Divorced	0.857*** (0.0212)	1.213*** (0.0894)	0.896*** (0.0344)	0.860 (0.115)	0.544** (0.133)
Elementary school -incomplete	0.879*** (0.0184)	1.140* (0.0788)	0.916*** (0.0285)	0.825* (0.0951)	0.996 (0.208)
Elementary school	1.045 (0.0324)	1.069 (0.0944)	1.091* (0.0503)	0.934 (0.182)	1.229 (0.332)
High school	0.935** (0.0247)	0.983 (0.0670)	0.933** (0.0310)	0.800* (0.0981)	1.535* (0.338)
Higher education -incomplete	0.722*** (0.0313)	0.839* (0.0787)	0.699*** (0.0377)	1.041 (0.182)	1.775 (0.657)
Higher education	0.761*** (0.0372)	0.799** (0.0743)	0.734*** (0.0534)	0.969 (0.182)	2.129** (0.733)
Pregnant	1.257*** (0.0335)	1.117 (0.0907)	1.140*** (0.0409)	1.584** (0.292)	1.073 (0.249)
<i>Other variables</i>					
Capital	0.815*** (0.0518)	0.755*** (0.0616)	0.645*** (0.0612)	0.621*** (0.105)	0.439*** (0.101)
Occurred again	3.639*** (0.0812)	7.622*** (0.522)	3.529*** (0.160)	4.706*** (0.757)	4.340*** (0.718)
Drunk	1.316***	1.081	1.241***	1.266**	1.658***

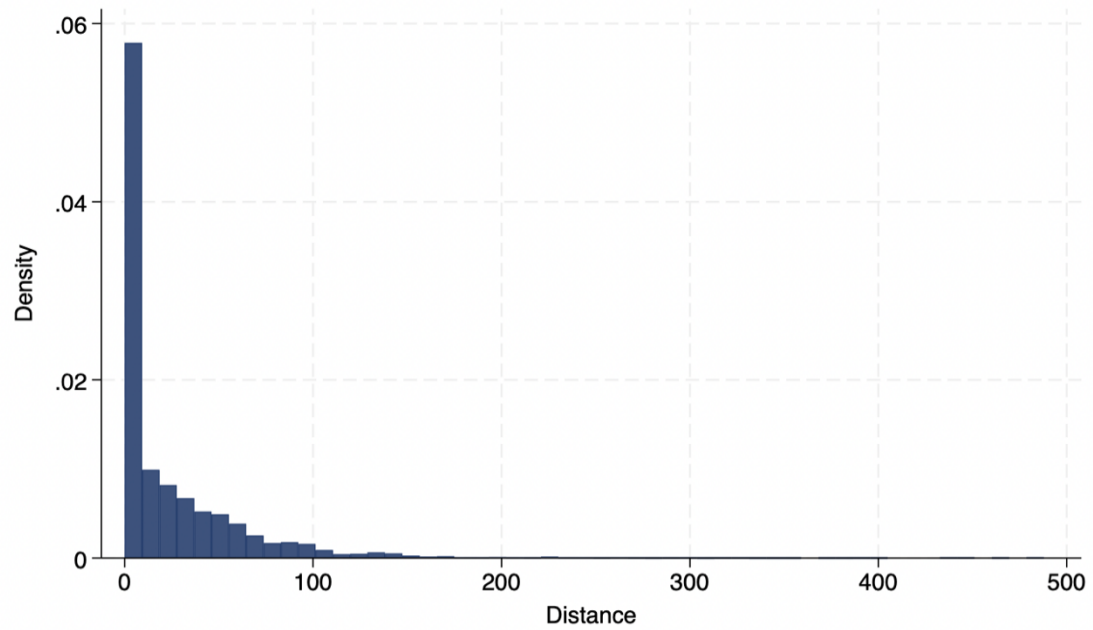
	(0.0247)	(0.0596)	(0.0390)	(0.122)	(0.263)
Residence	2.648***	6.924***	2.654***	3.262***	4.770***
	(0.0635)	(0.441)	(0.105)	(0.536)	(0.913)
The violence occurred on a weekday	0.929***	1.207***	0.943*	1.505***	0.833
	(0.0173)	(0.0862)	(0.0286)	(0.169)	(0.161)
The violence occurred during daylight	0.818***	0.993	0.821***	0.827	0.957
	(0.0123)	(0.0475)	(0.0183)	(0.0957)	(0.146)
Constant	0.661***	0.0213***	0.592**	0.167***	0.103***
	(0.0956)	(0.00724)	(0.151)	(0.0942)	(0.0771)
Observations	194,198	22,960	109,927	5,500	1,553
Outcome mean	0.720	0.219	0.752	0.758	0.717

Source: Prepared by the authors using data from SINAN.

Note: Standard errors clustered at municipal level in parentheses. Dummies for years and states were included. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

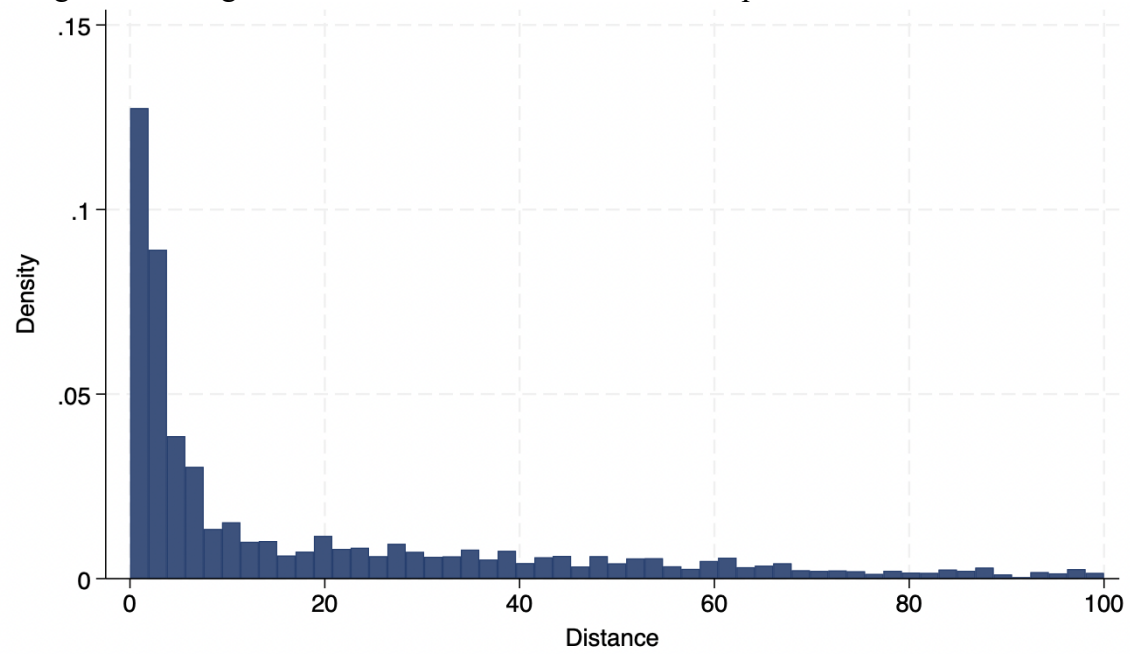
APPENDIX

Figure 4: Histogram of Distance



Source: Elaborated by the authors.

Figure 5: Histogram of Distance when trimmed the sample to distance <100km



Source: Elaborated by the authors.

Table A1: Logit results for discrete distance.

Variables	(1)
Distance	1.001*** (0.000350)
Constant	0.230*** (0.0201)
Observations	227,172
Outcome mean	0.691

Source: Prepared by the authors using data from SINAN.

Note: Standard errors, in parentheses, are clustered at the municipality level. The model include year and state dummies. All Table 4 covariates are included but suppressed from the display. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2: Logit results for trimmed sample (Distance <100km)

Variables	(1) Brazil	(2) North	(3) Northeast	(4) South	(5) Southeast	(6) Midwest
Distance (2 – 5km)	1.004 (0.108)	1.161 (0.205)	1.390* (0.243)	0.603*** (0.0720)	1.155 (0.189)	0.636*** (0.0919)
Distance (5 – 10km)	1.015 (0.0616)	1.524** (0.270)	1.715*** (0.220)	0.866 (0.116)	0.894* (0.0598)	1.085 (0.142)
Distance (10 – 20km)	0.967 (0.0691)	1.146 (0.231)	1.442*** (0.174)	0.708* (0.134)	0.976 (0.0842)	1.096 (0.0963)
Distance (20 – 40km)	1.162*** (0.0558)	0.884 (0.177)	2.171*** (0.325)	0.988 (0.114)	1.097* (0.0567)	0.977 (0.109)
Distance (> 40km)	1.156*** (0.0523)	1.342* (0.207)	1.695*** (0.179)	0.877 (0.0747)	1.137** (0.0725)	0.890 (0.101)
<i>Women's characteristics</i>						
18 to 29 years old	1.712*** (0.0365)	1.390*** (0.0613)	1.462*** (0.0716)	1.842*** (0.0829)	1.808*** (0.0466)	1.436*** (0.115)
30 to 39 years old	1.789*** (0.0369)	1.612*** (0.0996)	1.614*** (0.0925)	1.914*** (0.101)	1.805*** (0.0434)	1.677*** (0.0869)
40 to 49 years old	1.161*** (0.0223)	0.976 (0.0732)	1.240*** (0.0588)	1.193*** (0.0496)	1.151*** (0.0312)	1.147** (0.0707)
White	0.986 (0.0174)	1.088 (0.0804)	0.968 (0.0366)	1.070* (0.0400)	0.971 (0.0217)	1.003 (0.0408)
Indigenous	0.689*** (0.0666)	0.490*** (0.125)	0.771 (0.169)	0.819 (0.115)	0.770** (0.102)	0.685*** (0.0731)
Single	0.367*** (0.0102)	0.489*** (0.0503)	0.383*** (0.0305)	0.361*** (0.0219)	0.351*** (0.0121)	0.334*** (0.0305)
Widow	0.172***	0.238***	0.234***	0.177***	0.157***	0.186***

	(0.00861)	(0.0595)	(0.0353)	(0.0194)	(0.0100)	(0.0284)
Divorced	0.884***	1.278*	1.156*	0.868**	0.830***	0.837*
	(0.0231)	(0.170)	(0.0872)	(0.0498)	(0.0251)	(0.0801)
Elementary school -incomplete	0.902***	1.100	0.986	0.879***	0.875***	0.930
	(0.0199)	(0.0934)	(0.0593)	(0.0413)	(0.0240)	(0.0594)
Elementary school	1.071**	1.411**	1.022	1.024	1.062	0.989
	(0.0367)	(0.192)	(0.0890)	(0.0632)	(0.0448)	(0.0953)
High school	0.934**	1.142*	0.941	0.914	0.919**	0.827**
	(0.0269)	(0.0920)	(0.0502)	(0.0516)	(0.0342)	(0.0615)
Higher education -incomplete	0.634***	0.716***	0.825*	0.685***	0.563***	0.773**
	(0.0291)	(0.0729)	(0.0890)	(0.0633)	(0.0295)	(0.0890)
Higher education	0.712***	1.063	0.915	0.684***	0.649***	0.711***
	(0.0442)	(0.0896)	(0.132)	(0.0516)	(0.0556)	(0.0753)
Pregnant	1.125***	0.978	1.119	1.219***	1.110*	1.368**
	(0.0377)	(0.118)	(0.0983)	(0.0643)	(0.0600)	(0.201)
<i>Other variables</i>						
Capital	0.699***	0.795*	0.734***	0.549***	0.788***	0.565***
	(0.0503)	(0.0970)	(0.0659)	(0.0408)	(0.0693)	(0.0403)
Occurred again	3.702***	4.291***	4.228***	3.636***	3.483***	3.995***
	(0.110)	(0.440)	(0.492)	(0.228)	(0.116)	(0.222)
Drunk	1.284***	1.324***	1.484***	1.261***	1.236***	1.396***
	(0.0308)	(0.0932)	(0.131)	(0.0464)	(0.0395)	(0.117)
Residence	2.792***	2.815***	2.916***	3.099***	2.603***	3.158***
	(0.0754)	(0.256)	(0.239)	(0.175)	(0.0906)	(0.316)
The violence occurred on a weekday	0.914***	1.008	0.837**	0.943	0.903***	0.919
	(0.0213)	(0.116)	(0.0655)	(0.0427)	(0.0265)	(0.0630)
The violence occurred during daylight	0.852***	1.003	0.989	0.821***	0.795***	0.950
	(0.0138)	(0.0398)	(0.0376)	(0.0289)	(0.0159)	(0.0585)
Constant	0.556***	0.395***	0.365***	0.742**	0.640***	0.748***
	(0.0858)	(0.101)	(0.115)	(0.112)	(0.0825)	(0.193)
Observations	217,420	13,981	24,693	49,112	117,163	12,471

Outcome mean	0.690	0.673	0.607	0.705	0.710	0.625
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Source: Prepared by the authors using data from SINAN.

Note: Standard errors clustered at municipal level in parentheses. Dummies for years and states were included. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.