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The *PCSVDF*^{Mulher} Study: New Data, Prevalence and Correlates of Domestic Violence in Brazil*

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Abstract

Even though Domestic Violence (DV) is most prevalent in developing areas (OECD, 2018) and represents a significant socioeconomic and public health issue, several countries still lack helpful information to understand the causes and consequences of DV to address better public policies that target women well-being. This is the case of Brazil (the fifth most prevalent country concerning DV worldwide) where the best statistics on domestic violence are scarce and dates back to the 2005 World Health Organization Multi-Country Study (WHO, 2005). We present a unique longitudinal data set on domestic violence in Brazil: the PCSVDF^{Mulher} (Pesquisa de Condições Socioeconômicas e de Violência Doméstica e Familiar contra a Mulher - Survey of Socioeconomic Conditions and Domestic and Family Violence against Women), an interdisciplinary effort to build empirical evidence that enables the study of DV, the allocation of resources in the household, women and children's health, and child development, and the interrelationships among them through an interdisciplinary approach. The project gathered information from more than 10,000 women aged 15-49 who lived in the capitals of Northeast Brazil, in two waves: 2016 and 2017. Besides information on violence against women, the project provides data about women's health, bargaining power and intra-household resource allocation, cultural and social norms, knowledge about civil rights and use of protective judicial measures against domestic violence, as well as information on couples (e.g. education, health risk behavior, anthropometrics, skin color, labor market status etc.), women's subjective expectations and beliefs relative to welfare and to partner's abuse, and many others. Indeed, our figures show that about 30% of women have experienced domestic violence (i.e., emotional, physical or sexual violence) over their life course, 14% reported that such scourge did happen in the last 12 months. We also show that women's education is a crucial preventive factor in DV, while the risk of suffering partner's abuse is increasing among younger and non-white women in Brazil. We are confident we built an unprecedented and high-quality dataset that will reward interdisciplinary efforts about DV.

Keywords: PCSVDF^{Mulher}, Longitudinal Dataset, Domestic Violence.

JEL: I15, J12, J16.

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1. Introduction

Domestic violence (DV) is one of the most persistent social scourges in societies. It is a significant public health issue, as well as a violation of human rights. The World Health Organization (WHO), see (WHO, 2013), asserts that more than one-third women globally experience violence perpetrated by their partners or ex-partners, say, intimate partner violence (IPV). DV[1] negatively affects women's health in all its dimensions, jeopardizing their physical (Campbell, 2002; Campbell et al., 2002), mental (Meekers et al. 2013; White and Satyen, 2015) and reproductive health (Sarkar, 2008; Akyüz et al., 2012; Fanslow, 2017). Besides, it leads women to substance abuse (Kaysen et al. 2007) and suicidal attempt (Devries et al., 2011), or even it can result in femicide (Campbell et al., 2003).

DV not only impact on women's health but also their socioeconomic status. Empirical evidence shows that abused women exhibit low labor market productivity, are more likely to leave their job and experience unemployment (Lloyd, 1997; Farmer and Thiefenthaler, 2004; Tolman and Hui-Chen Wang, 2005; Canavire-Bacarreza and Avila, 2010). Sabia et al. (2013) show that non-partner sexual violence is associated with a 6.6 percent decline in female labor force participation and a 5.1 percent decline in wages in the US. Also, DV can be used as an instrument to undermine women's autonomy and ensure an allocation of resources that is more aligned with male's preferences (Eswaran and Malhotra, 2011).

The economic costs of domestic violence against women reached 5% of the GDP of industrialized economies, and 14% of low-income countries (Waters et al., 2004). This cost is about 3.3% in the US at the beginning of the 2000s and reaches 5.1% in Peru, 10% in Brazil, 12.3% in Mexico, and 24.7% in Colombia at the end of the 1990s (Waters, 2005). It is worth noting that women's well-being is a central issue in the research agenda of development economists, to ensure human development and foster economic progress, and its link with DV is a central issue of public health concern.

Despite these deleterious impacts, several countries still lack helpful information to understand the causes and consequences of DV and to better address public policies that target women well-being, even though the quantity and quality of the statistics on DV has improved

[1] Due to pragmatism, we employ the terms gender violence, domestic violence and domestic and family violence against women with the same meaning. In other words, such terms are operationalized by means of the theoretical perspective defined in Article 5 of Law N. 11.340 (Maria da Penha Law) which defines domestic and family violence against women as "any action or omission based on gender which causes death, injury, physical, sexual or psychological suffering and moral or patrimonial damage to the victim". Therefore, other victims of domestic violence (such as children or seniors) are not necessarily part of the study, unless their episodes of domestic violence fit in the mentioned Law. However, we keep intimate partner violence (violence perpetrated by an actual or ex-partner against a woman) separately defined.

since the 2000s (e.g. Demographic and Health Surveys, Reproductive Health Surveys, Violence Against Women Surveys and the World Health Organization Multi-Country Study).

This is the case of Brazil where the most recent statistics on domestic violence dates back to the 2005 World Health Organization Multi-Country Study, despite the commendable effort made by the Bureau of Policy for Women (Secretaria de Políticas para Mulheres - SPM), the Bureau of National Public Security (Secretaria Nacional de Segurança Pública - SENASP) and the Ministry of Health (Ministério da Saúde - MS) in compiling administrative data on violence against women in the country.[2]

In addition to the lack of updated information on DV, there is an unfortunate true worldwide deficit in good longitudinal data. This lack of empirical evidence is so despite the fact the benefits of longitudinal studies for violence, crime, social and economic research as reported by Rose (2002). As to domestic and family violence against women, the importance of collecting and analyzing longitudinal data is already clearly evidenced. A longitudinal survey on domestic violence can help researchers and policymakers: i) to trace the trajectory of the development of violent behavior against women (Staff, Crowell, and Burgess, 1996); ii) to understand causal relationships and inter-generational effects of domestic violence (Kishor, 2005); iii) to rule out competing risk factors that potentially lead a woman to be abused by her partner (Capaldi, Knoble, Shortt, and Kim, 2012). Moreover, India, another developing country with similar socioeconomic problems to Brazil, has been demonstrated the advantages of longitudinal surveys to understand the predictors of domestic violence and its consequences for women well-being (Kalokhe et al., 2017).

In Brazil, there is an urgent need not only for prevalence statistics but also for information that can subsidize public policies that target women's empowerment and protection against gender violence. A major thrust for that is the deep and complex interface between empowerment and resource allocation and distribution of bargaining power within households (Hindin and Adair, 2002; Doss, 2013; Browning et al., 2014), the formation of women's expectations about socioeconomic events (Delavande et al., 2011), and the potential consequences of domestic violence to children (Aizer, 2011; Rawlings and Siddique, 2014; Jofre-Bonet et al., 2016).

In an attempt to fulfill this gap, we present new empirical evidence on domestic violence in Brazil. The Survey of Socioeconomic Conditions and Domestic and Family Violence against Women (Pesquisa de Condições Socioeconômicas e Violência Doméstica e Familiar contra a Mulher- PCSVDF^{Mulher}), carried out in 2016 and 2017, makes available a detailed and unique

[2] For instance, femicide rate reached 4.4 per 100,000 women in 2010 (Waiselfisz, 2012), jumping to 4.8 per 100,000 women in 2013 which is the fifth largest femicide rate among 83 countries (Waiselfisz, 2015).

longitudinal household survey based on an interdisciplinary background (Economics, Sociology, Public Health, Criminology, Anthropology, Statistics, and others) designed to be an empirical benchmark on domestic violence in Brazil. It gathers information from more than 10,000 women, being a representative sample from the nine capitals of Northeast Brazil[3]. We present findings on the prevalence of physical, emotional and sexual intimate partner violence against women from the first and second wave of the survey, as well as correlations with women's socioeconomic and demographic characteristics that can work as potential preventive and risk factors.

The paper has the following sections: section 1 is the introduction, already presented; section 2 provides a brief review of the economic literature on domestic violence; section 3 brings details about the data source; section 4 presents prevalence rate and results from logistic regressions, and section 5 concludes.

2. A Brief Review of the Economic Literature on Domestic Violence

The feminist theory claims that domestic violence is a consequence of man's need to control woman, especially in patriarchal societies (Ali and Naylor, 2013). The evolutionary theory argues that natural selection contributed to male's sexual proprietariness behavior and violent inclinations with regard their mates because violence and threat work to deter sexual rivals and limit female autonomy (Buss and Duntley, 2011).

In economic theory, violence or the threat of violence can be regarded as an aspect of the "threat point" in a cooperative bargaining model or as part of "punishment strategy" in a non-cooperative game, which favors male's control over resource allocation within household (Tauchen and Witte, 1995; Lundberg and Pollak, 1993;1994;1996; Eswaran and Malhotra, 2011). Thus, a wife's employment status or potential earnings, or the attractiveness of her alternatives outside marriage can determine the incidence of marital violence.

Aligned with this framework, several studies have shown that better economic status of women (e.g. employment status, wages, dowries, etc.) inhibits partners' abusive behavior, at least in the medium or long run (Farmer and Thiefenthaler, 1997; Zhang and Chan, 1999; Srinivasan and Bedi, 2007; Aizer, 2010; Bhattacharyya et al., 2011). On the same line of reasoning, women benefited from additional resources from cash, vouchers and food transfers are less likely to be victims of controlling behavior, emotional, physical and/or sexual abuse from their partners (Bobonis et al., 2013; Hidrobo and Fernald, 2013; Hidrobo et al., 2016).

[3] Northeast Brazil is comprised of nine states and has an area of 1,554,291.74 km² (18.27% of the Brazilian territory and larger than the territories of Portugal, Spain, France, and Italy together) and an estimated population of 56,560,081 inhabitants (equivalent to the population of France or Italy, for instance).

Nevertheless, misalignment of spousal preferences regarding the intrahousehold allocation of time can trigger the husband's sabotage in the form of economic abuse, especially when wife's wage is relatively larger than husband's wage (Anderberg and Rainer, 2013). Alternatively, even the time-inconsistent preferences of women in dropping a violent relationship can induce more spousal violence (Aizer and Dal Bó, 2009).[4]

In patriarchal societies, however, the better economic status of women may induce more spousal violence because men feel their traditional gender role threatened (Koenig et al., 2003; Eswaran and Malhotra, 2011; Heath, 2014; Cools and Kotsadam, 2017). Aizer (2010) criticizes studies that aim to test the male backlash hypothesis because they ignore women's rationality constraint, i.e., the possibility of ending the relationship. In some contexts, nonetheless, divorce or separation is a non-credible outside option for women due to conservative social norms, and then an increase in women's economic status can result in more partners' abuse (Koenig et al., 2003).

In rural India, for instance, "dowry" violence does not refer directly to marriage-related payments made at the time of the wedding, but to additional payments demanded after the marriage by the groom's family where the husband systematically abuses the wife to extract larger transfers (Block and Rao, 2002).

Another subject of inquiry is the likely impacts public transfers might have on women empowerment and domestic violence. In Mexico, while small transfers decrease violence by 37% for all households that participate of the programme Oportunidades, large transfers increase the aggressive behavior of husbands with traditional views of gender roles, probably because their wife's entitlement to a significant transfer threatens their identity (Agelucci, 2008). In Brazil, the Bolsa Familia programme increases partners' violence against women (Moreira et al., 2016).

Domestic violence can also be sensitive to macroeconomic changes in the labor market. Aizer (2010) finds that the decline in the gender wage gap in California (US) over the past 13 years can explain nine percent of the reduction in violence against women (i.e., women hospitalization for assault), suggesting that policies which serve to narrow the male-female wage gap also reduce violence and the costs associated with such social phenomenon. However, economic crises in the UK exposed women to more partners' violence, especially for those women who faced a higher risk of unemployment than men (Anderberg et al., 2015).

[4] Women are also at risk of the unexpected violent behavior of their partners. Card and Dahl (2011) show that an unexpected loss when the home football team, when is considered the favorite, is associated with an increase in the rate of intimate partner violence.

Not only labor market status and household efficiency may interact with domestic violence, but also the marriage market. Pollack (2004) predicts that the level of domestic violence is sensitive to the probability of violent husbands marry women who are more likely to remain in violent marriages, especially when they witnessed domestic violence during their childhood. Bowlus and Seitz (2006) show that abused women are 1.7-5.7 times more likely to divorce in Canada, and witnessing violence as a child is a strong predictor of men's abusive behavior. Moreover, changes in the law of divorce, allowing unilateral divorce and reducing costs, contribute to a reduction from 27% to 36% in the spousal conflicts comparing married to unmarried couples in Spain (Brassiolo, 2016).

The PCSVDF^{Mulher} has a great potential to further contribute with the economic literature on domestic violence, as it gathers information on women's health, bargaining power within household, cultural and social norms, knowledge about civil rights and use of protective judicial measures against domestic violence, and information on couples (e.g., education, health risk behavior, anthropometrics, skin color, labor market status). Besides, the survey provides information about subjective expectations and beliefs (a la Manski, 2004) from women relative to welfare (i.e., standard or living, satisfaction with the relationship, job opportunities, economic security, friends, and even health) and to the probability of being a victim of partner's abuse.

3. Data Source

The objective of PCSVDF^{Mulher} (Survey of Socioeconomic Conditions and Domestic and Family Violence against Women) is to build a unique dataset that enables the study of domestic violence, the allocation of resources in the household, women and children's health, and child development, and the interrelationships among them through an interdisciplinary approach (Doss, 2013; Browning, Chiappori, and Weiss, 2014).

The initial phase (Waves 1 and 2) of the project developed as an international collaboration between researchers from the Universidade Federal do Ceará (UFC), Institute for Advanced in Toulouse, France (IAST), University of Oxford, the World Bank and a non-governmental organization (NGO) with broad expertise in providing services and support to victims of gender violence, Instituto Maria da Penha, Brazil (IMP).[5]

[5] The following research group worked in the ***PCSVDF***^{Mulher}: José Raimundo Carvalho (CAEN/UFC and LECO/CAEN, Brazil – Principal Investigator & Project Manager), Heidi Colleran (Max-Planck-Institut fur Menschheitsgeschichte, Germain), Thierry Magnac (University of Toulouse, France), Miriam Muller (World Bank, USA), Elizaveta Perova (World Bank, USA), Victor Hugo de Oliveira (IPECE and LECO/CAEN, Brazil), Climent Quintana-Domeque (University of Oxford, UK), Eva Raiber (University of Toulouse, France), Paul Seabright (Institute for Advanced Study in Toulouse, France), Jonathan Stieglitz (Institute for Advanced Study in Toulouse, France).

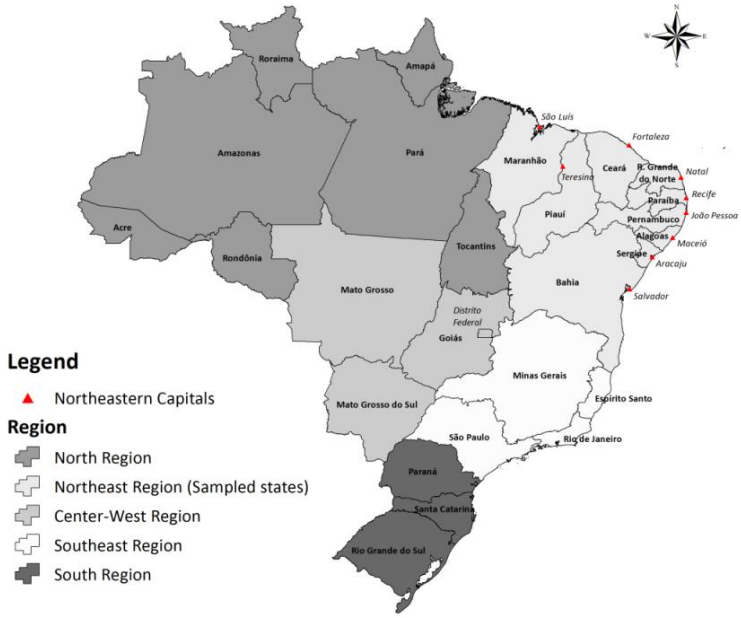
We established a technical partnership between our research group and a survey research firm with experience in household and victimization data sets, DataInfo, a company with considerable experience in victimization surveys. The survey's first two waves have been collected between March 30th and June 3rd of 2016 (Wave 1), and between March 13rd and July 31st of 2017 (Wave 2), respectively.

Ethical and safety guidelines for the conduct of this research were developed and were adhered to. These emphasized individual informed consent and the importance of ensuring confidentiality and privacy, both as a means to protect the safety of respondents and field staff, and to improve the quality of the data. Ethics permission for the study was obtained from the Brazilian Scientific Ethical Committee (Approval Number 53690816.5.0000.5054).

3.1 Sample Design

The study's sample is quantitative, probabilistic and representative of women (with age on the interval 15-49) who live in the States' capitals of the Brazilian Northeast. The Northeast Region of Brazil is one of the five official and administrative regions of the country. Figure 1 shows the geographical coverage of the PCSVDFMulher survey.[6]

Figure 1: Geographical coverage of the PCSVDF[Mulher] Survey



Source: Elaborated by the authors.

[6] Brazil has twenty-six states and one federal capital (Brasilia). The Northeast region comprises nine states (capitals are shown in parenthesis): Maranhão (São Luis), Piauí (Teresina), Ceará (Fortaleza), Rio Grande do Norte (Natal), Paraíba (João Pessoa), Pernambuco (Recife), Alagoas (Maceió), Sergipe (Aracaju) and Bahia (Salvador).

The Northeast represents 18% of Brazilian territory 1,558,196 km^2 (601,623 sq mi), has a population of 53.6 million people, 27.8% of the total population of the country, and contributes 13.4% (2011) of Brazil's GDP. It is an impoverished region, though: 58% of the population lives in poverty, defined as less than $2/day.

Interviewers utilized CAPI software in face-to-face interviews. The sampling unit is a woman who is a resident of the household selected for the research. The sampling plan was drawn up by stratifying the population of households in three stages. The first stage consists of a random selection of census tracts in each state capital. To preserve the income distribution, the census tracts were stratified into three strata based on the average income of the household head (at the level of the census tracts). In the second stage, there was a random selection of a sample of households at each of the census tract selected at the previous step. Finally, in the third stage and to ensure the safety and confidentiality of respondents, only a woman aged 15-49 was randomly selected per household.

The survey used carefully selected female interviewers and supervisors trained using a standardized full week training, covering issues of gender, violence, ethical and safety issues, as well as interview techniques.[7] The WHO ethics guidelines required that all interviews take place in complete privacy except for infants younger than two years. Interviewers were trained in several strategies to ensure such privacy, including the use of dummy questions in case someone entered the room, and use of decoy interviewers to ask questions of mothers-in-law or husbands if this was the only way to ensure privacy with the respondent.

As an ethical requirement strictly advised by the World Health Organization, all interviews proceeded in the local language. Information about available local services was provided to all respondents at the end of the interview if the interviewer judged it necessary.

Building on top of the world best literature in the area of domestic violence (WHO, 2005; Ellsberg and Heise, 2005; Bender, 2016), the PCSVDF^{Mulher} proposes to push forward the analysis of the causes and consequences of domestic violence. First, by constructing an innovative questionnaire concerning its interdisciplinary content. Second, by applying the survey instrument to a representative and a longitudinal sample of women.[8]

[7] 40-hour training at each one of the nine states provided to roughly 25 - 35 interviewers per site (256 interviewers in total) and composed of three modules. The first module (24 hours duration) explored concepts of gender, gender norms, equality, gender-based violence, and stigma. Instructors addressed how these topics interact at the moment of data collection and how to act during and after interviews. The Instituto Maria da Penha was in charge of that initial training phase. The second module (12 hours duration) presented the technical aspects of the tools used during the fieldwork, such as field and equipment operation, as well as sampling issues, and technical details about all sections of the questionnaire, handling of the tablet and the use of Survey Solutions from the World Bank. DataInfo delivered the second phase of training. Finally, the third module dealt with incentives and motivations, and some specific aspects of the questionnaire (4 hours duration).

[8] Except for the British Study Millennium Cohort Study (Hansen, 2012), which has an issue exclusively related to domestic violence, we believe that PCSVDF^{Mulher} is the first world initiative to simultaneously present

In order to accomplish these two goals, PCSVDF^{Mulher} combines the use of a rigorous methodology based on the best international studies on gender violence and victimization such as the 2005 Multi-country Study on Women's Health and Domestic Violence against Women (WHO, 2005), International Violence Against Women Survey (Johnson et al., 2008), World Studies of Abuse in the Family Environment (Sadowski et al., 2004) with the design of existing longitudinal household surveys such as European Community Household Panel (Peracchi, 2002), German Socio-economic Panel Study (Gert et al., 2007), National Longitudinal Surveys of Youth (BLS, 2012), British Household Panel Survey (Taylor et al., 2010), and Understanding Society (Knies, 2016).

3.2 Structure of the Questionnaire

The questionnaire of the PCSVDF^{Mulher} spread into twelve sections (see Table A1 in Appendix A). The first two sections (I and II) describe households and their members, especially eligible women. Section III provides demographic and socioeconomic characteristics of household members. Sections IV to X collects information from women about general and reproductive health, norms and perception about violence against women, partner/ex-partner characteristics, bargaining power, the experience of violence perpetrated by partner or ex-partner, match valuation and expectations. The last two sections (XI and XII) relate to the quality evaluation of the survey. Also, we have developed an instrument that collected data on interviewer's characteristics, experience in surveying people, socioeconomic details, norms, and others. Our interviewer's data set allows us to use meta and para-data to enhance our analysis (Kreuter , 2013).

As to the choice of questions related to domestic violence, we closely followed the 2005 Multi-country Study on Women's Health and Domestic Violence against Women (WHO, 2005) study.[9] The PCSVDF^{Mulher} adhered to the ethical and methodological guidelines from the WHO-multicounty study (WHO, 2005) which includes the use of female interviewers only, training of interviewers, learning on tactics to manage conflict situations and ensure privacy, among others. The PCSVDF^{Mulher} emphasized the use of individual informed consent letters and the importance of ensuring confidentiality and privacy, both as a means to protect the safety of respondents and interviewers, and to improve the quality of the data. The fieldwork comprised the following five stages:

interdisciplinary characteristics, focusing on domestic violence, statistical representativeness, and longitudinal design.

[9] We are thankful to the World Health Organization and its Brazilian staff of the project for providing the questionnaire in Portuguese.

i. Two focus groups: Fortaleza (CE) and João Pessoa (PB);
ii. A 40 hours training for UFC and DataInfo staffs on Survey Solutions (CAPI) software, held in Fortaleza (CE);
iii. Two pre-tests of the questionnaire applied in Fortaleza (CE) and Natal (RN)
iv. A series of 9 on-site sets of training, with 40 hours each, for 256 interviewers (25-35 people for each state);
v. Application of the final questionnaire.

3.3 Success and Response Rates

In the design of the PCSVDF^{Mulher} sampling plan, we calculated the minimum sample to guarantee pre-specified significance, as described in Table 1. All data was entered with Survey Solutions – CAPI software from the World Bank, version 5.10.0 using data entry screens with extensive interactive error, range, consistency checking and tools for managing field operations and data validation in real time.

In general, our study achieved a high response rate in Wave 1 at each site as documented in Table 1. Across the nine different sites, 10,094 (out of 11,411) women completed interviews which gives us an overall success rate of 88.46%, varying from Fortaleza, CE (96.98%), with the highest response rate, to Natal, RN (83.18%), with the lowest.

Table 1: Sample Size of the PCSVDF^{Mulher} – Wave 1

	Women Population 15-49*	Applied Questionnaires	Valid Questionnaires	Success Rate (%)
State capital		(A)	(B)	(B)/(A)
Aracaju, SE	182,932	1,105	1,007	91.13
Fortaleza, CE	763,145	1,259	1,221	96.98
Joao Pessoa, PB	230,831	1,230	1,117	90.81
Maceió, AL	295,015	1,195	1,018	85.19
Natal, RN	251,401	1,296	1,078	83.18
Recife, PE	471,612	1,472	1,308	88.86
Salvador, BA	905,401	1,397	1,202	86.04
São Luís, MA	342,191	1,283	1,143	89.09
Teresina, PI	248,746	1,174	1,000	85.18
Total	3,691,274	11,411	10,094	88.46

Source: Elaborated by the authors. *Estimates from the Pesquisa Nacional de Amostra por Domicílios Contínua/IBGE, 1st Quarter/2016.

To evaluate the quality and representativeness of the data, Quintana-Domeque et al. (2018) compare the distribution of age and educational attainment in the PCSVDF^{Mulher} data (Wave 1) with data from the Pesquisa Nacional por Amostra de Domicílios Contínua (PNADC) carried out by the Instituto Brasileiro de Geografia e Estatística (IBGE). The PCSVDF^{Mulher} shows similar sample size and sociodemographic characteristics (i.e., women's age, education

attainment, and self-reported race/color) for women aged 15-49 in the nine state capitals (see Table A2 in Appendix A).

Besides the overall success rate, an additional natural step to assess data quality is to implement an analysis of missing response rates. A critical issue on missing response analyses is to determine the population "eligible" to answer that section of the questionnaire. Since PCSVDF^{Mulher} questionnaire has its logical idiosyncrasies (which gives rise to its peculiar flow of responses), there is an implicit level of "missingness" at each section of the questionnaire which means that interviewees can answer a few or all sections, depending on their characteristics, history and/or choices. Table 2 shows the figures relative to the success rate of each section.

Table 2: Success Rates at each Section

	"Eligible" to Answer	**Answer the Section**	**Success Rate (%)**
Sections of the questionnaire	(A)	(B)	(B)/(A)
IV. Woman's questionnaire	10,094	10,094	100.00
V. Norms and awareness/knowledge about violence against women and Maria da Penha Law	10,094	9,493	94.05
VI. Respondent and her partner	10,094	8,987	89.03
VII. Bargaining power	4,381	3,984	90.94
VIII. Experience of violence from partner or ex-partner	7,411	5,766	77,80
IX. Experience of violence not related to partner	10,094	6,869	68,05
X. Match valuation, subjective expectations and counterfactuals	10,094	7,847	77.74
XI. Supplementary section	10,094	8,410	83.32

Source: Elaborated by the authors.

Column A of Table 2 gives the number of women who are "eligible" (again, given their characteristics, history and/or choices) to answer that section of the questionnaire, and column B gives the number of women that ended up answering at least partially the questions from that specific section.

Overall, the success rate per section is about 85%. The response rate of Section VIII regarding the experience of partners or ex-partners is 79%. In the 2005 Multi-country Study on Women's Health and Domestic Violence against Women, the overall response rate for Brazil (Recife and São Paulo) was 89.9%, but it varies from 60% in Japanese city to 97.8% in Ethiopia province (Garcia-Moreno et al., 2006). In countries surveyed by the Demography and Health Survey (DHS) in the 2000s, the response rate varies from 90% to 99%. In the International Violence Against Women Survey (IVAWS) the response rate varies from 39% in Australia to 99% in the Philippines (Devries et al., 2010).

The National Intimate Partner and Sexual Violence Survey carried out by the Centers of Disease Control and Prevention (CDC) in the US exhibit a success rate of about 82% using phone survey between 2010 and 2012 (Smith et al., 2017). The European Union survey on

violence against women (Violence against women: an EU-wide survey) finds an overall response rate of 77%, varying from 44.7% in Denmark to 99.9% in Finland (FRA, 2013).

Thus, PCSVDFMulher exhibits a comparable response rate (specific for the experience of violence of partners or ex-partners) with international surveys on domestic violence against women. The lowest response rate popped up at Section IX relative to the experience of violence (not related to partner), with a success rate of less than 65%.[10]

3.4 Attrition in the PCSVDF^{Mulher}

One of the aspects that most impacts on the quality of longitudinal surveys is the loss of its original panel members (unit non-response) due to the process of sample friction (attrition). Our initial aims require that our project collects around five waves of data. Therefore, knowledge of the determinants of sample attrition becomes an essential condition for the maintenance of quality in the study.

The methodological and operational benefits resulting from the understanding of the attrition process implicitly in the PCSVDF^{Mulher} and the likely potential redesign will only affect the quality of the data collection activities from its third wave on and will affect other remaining waves of the study. In this sense, all improvements resulting from the understanding of the sample friction processes will add to the study, maintaining the quality level not only for the third wave but also for all other future waves of data.

Technically, there is attrition when a sample unit ceases to participate in a longitudinal data collection study (Lynn, 2009). Such cessation may be voluntary or involuntary. It is important to investigate other similar surveys that presented significant rates of attrition to understand the friction issue in the PCSVDF^{Mulher}. We will go over the strategies used in our study to handle and minimize attrition before looking at similar longitudinal studies, however.

The PCSVDF^{Mulher} has taken some critical steps to minimize sample attrition. First, it adhered faithfully to the methodological protocol of the World Health Organization study on global domestic violence (WHO, 2005), as well as to expand it through a longitudinal approach protocol. Second, we employed CAPI data collection technology that automatically geo-referenced all household addresses. Third, we conducted two randomized experiments (at Fortaleza, CE, and Salvador, BA) offering financial incentive to try to recover women who have suffered attrition (refusals or non-approaches) or to minimize potential friction for those

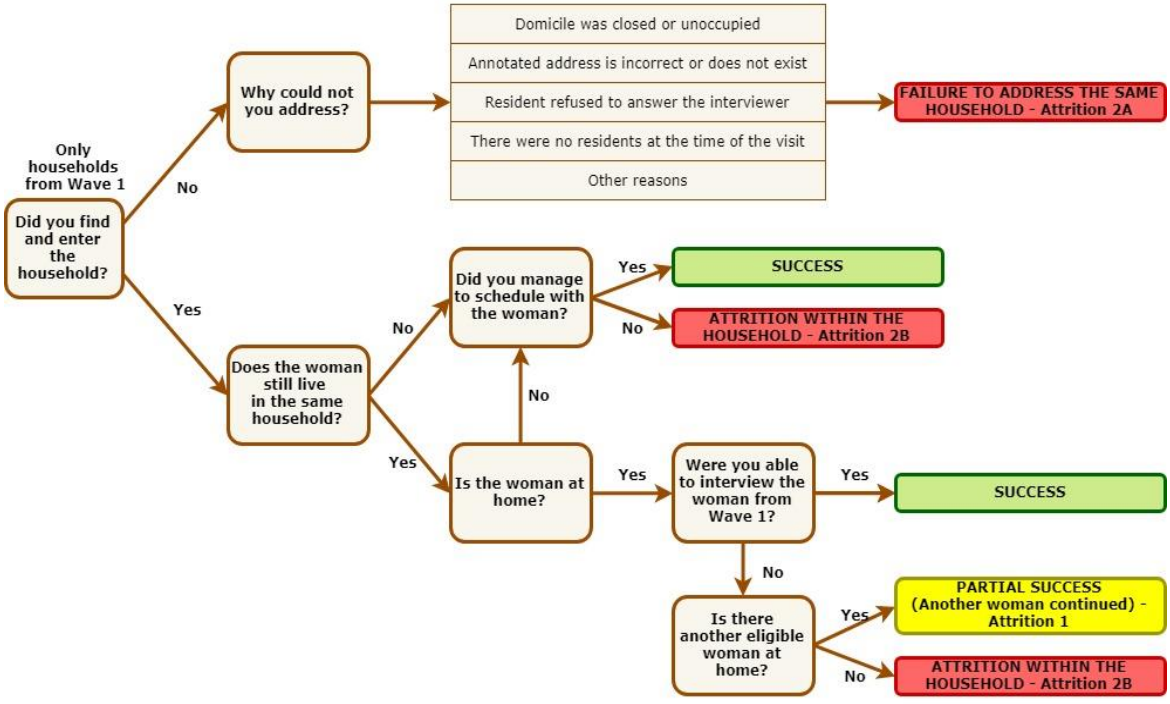
[10] As we mentioned before, we collected important socioeconomic, norms/cultural traits, and experience through an interviewers' questionnaire answered by all who worked in the project. Interviewers' questionnaires add an essential layer of information that has proven to be crucial for quality assurance and improvements in large surveys. This finding is informative for at least one reason: we can try to increase the response rate in future waves by either training or dispensing those interviewers with high "missing rates."

women yet to participate in the survey. Fourth, PCSVDF[Mulher] collected a replacement sample in 2017 (Wave 2), independent and representative of the population under analysis. This last measure is much more a preventive strategy of attrition. Notwithstanding that, we did have attrition.

It is important to take a closer look at the protocol of the sequence of actions taken during Wave 2 to start understanding what happened,. Figure 2 depicts the sequence of actions taken while re-applying questionnaires. We see a detailed view of the flow of the questionnaire and possible field situations that led to attrition. Four interview profiles are identified:

- SUCCESS: when the same woman who participated before (Wave 1) is successfully re-interviewed;
- PARTIAL SUCCESS (Another woman continued), "Attrition 1": when a woman who participated in Wave 1 did not participate, for any reason, again and another woman from the same household responded the questionnaire;
- FAILURE TO ADDRESS THE SAME HOUSEHOLD, "Attrition 2A": when an interviewer did not find or get access to a household visited at Wave 1;
- ATTRITION WITHIN THE HOUSEHOLD, "Attrition 2B": an interviewer had access to the household visited at Wave 1 but for whatever motive she could not interview the original woman nor any other eligible woman if any.

Figure 2: Questionnaire Application Protocol in Wave 2



Source: DataInfo (2018).

Table 3 presents the data to analyze attrition in our data set. Out of 10,094 initially interviewed women, we were able to re-interview 4,665, resulting in an attrition rate of 54% (or, if we consider the category "partial success" – a different interviewed women at the same household, this will decrease to 44%). Such attrition figures were quite encouraging, compared to similar studies and considering the length of our questionnaire (with an average duration[11] of 48.37 min (s.d. 29.01) for Wave 1 and 49.47 min (s.d. 29.78) for Wave 2, see, Figures 3A) and 3B) and the fact that there was no financial incentive for women to participate in the study.[12]

Table 3: Attrition in the PCSVDF^{Mulher}

Observation Type	**2016 (A)**	**Observation Type**	**2017**	**Proportion** $(\boldsymbol{A})/(\boldsymbol{B})$
Matched	4,665	Matched	4,665	0.46
Attrition 1	1,031	Reposition – original household	1,031	0.10
Attrition 2A or 2B	4,398	Reposition – another household	4,822	-
Total – Wave 1	10,094 **(B)**	Total – Wave 2	10,518	

Source: Elaborated by the authors.

Figure 3: Questionnaire Response Duration in the *PCSVDF^{Mulher}*

Figure 3A: Response Duration – Wave 1, 2016 (n = 10,094)

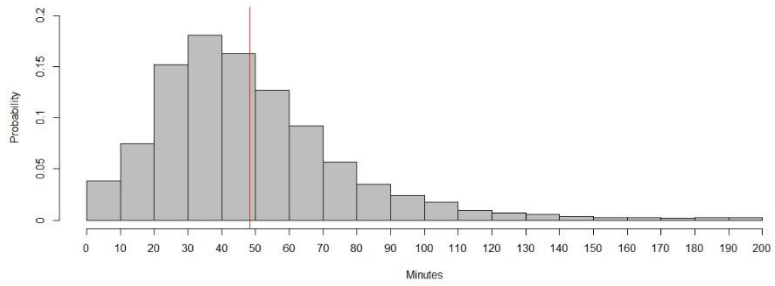
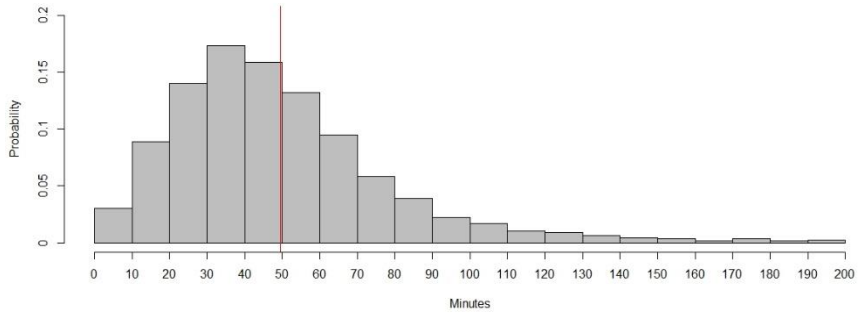


Figure 3B: Response Duration – Wave 2, 2017 (n = 10,518)



Source: Elaborated by the authors. Vertical red lines flag average duration.

[11] Average completed duration. We truncated distributions at 200 minutes, as we confirmed that these cases did not represent true duration but a failure of interviewees to turn-off the CAPI clock at the end of the interview.

[12] It is interesting to note that one of the survey firms (Budget Proposal Elaborated on 10/2015) that disputed the bidding process to execute the PCSVDF^{Mulher} (by the way, it did not win) stated in its proposal that *"... we estimate an approximate loss of 40% of the sample in the second interview of refusal, change of respondent, etc.) "*, not so different number of 54% (or, 44%) that occurred.

In order to replace the 5,429 women who left the sample, we interviewed 1,031 women in their respective households (Attrition 1) and 4,822 out of the households (this more than compensated the 4,398 women regarding Attrition 2A or 2B), totaling a sample of 10,518 women in 2017, where 5,853 new women served as "Replacement Sample".

As already pointed out, there is a shortage of longitudinal studies about domestic violence which makes difficult any comparison of levels of friction calculated in our database *vis a vis* other studies. The first necessary step would be to seek similar studies to PCSVDF^{Mulher} and to establish a framework of comparative studies. However, compiling a set of examples of scientific projects that have collected longitudinal data on domestic and family violence against women is difficult. There is a shortage of international studies in this area, and a lack of national studies. Table 4 presents an attempt to develop a brief compilation of studies with the characteristics mentioned above.

Table 4: Survey of Attrition Rates in Longitudinal Domestic Violence

Study	Short Description	Sample Size	Sampling Interval	Attrition (%)
Domestic Violence Intervention Education Project (DVIEP) - Davis and Taylor (1997)	This is an RCT-type study that assigned families who reported domestic incidents in New York to receive police patrol follow-up visits after the incident. Participation in domestic violence education programs was also randomized.	436	6 months	28.0
Women, Co-occurring Disorders, and Violence Study (WCDVS) - Mchugo et al. (2005)	Cooperative study to evaluate new service models for women with mental health and substance use disorders and a history of physical and/or sexual abuse	2.729	6 months	26.5
Study of Posttraumatic Stress Disorder, Anxiety, and Depression in Australian Victims of Domestic Violence - Merti and Mohr (2001)	The study evaluates recovery from post-traumatic stress disorder (PTSD), anxiety and depression consequences of domestic violence.	100	12 months	41.0
The Broward County Evaluation – Gondolf (2001)	An RCT-type study where male perpetrators of domestic violence were randomized into two groups: i) experimental, where they were sentenced to 1-year probation and 26 weeks of group counseling sessions; and ii) control, where they were sentenced to only one year of probation. The study followed both men and their female victims.	404	12 months	79.0

Source: Elaborated by the authors.

In general, there is a peculiarity in longitudinal studies: the high rate of friction. This high rate of non-response is a consequence of factors such as duration of the questionnaire,

inappropriate methodology, and interviewer training errors, low geo-referencing technology, among others.

Hence, given the complexity of the study, the theme, the size of the questionnaire and the sample size of the PCSVDF^{Mulher}, we believe that a rate of friction of 54% is still satisfactory. Of course, our study requires some improvements in such a way that turns our attrition at a minimum in future waves.

4. Results

Despite considerable advances brought by the World Health Organization study (WHO, 2005), data on the prevalence of domestic violence in Brazil is still incomplete and out of date and not representative. The WHO's study covered only the city of São Paulo and the "Zona da Mata" of Pernambuco (d'Oliveira et al., 2009). Therefore, there is a need to follow up the research agenda that seeks to analyze the prevalence and incidence of domestic violence in Brazil, considering the profound social and economic changes that occurred in the last decade.

However, estimating the prevalence of domestic violence is a challenge, especially in developing countries such as Brazil because of the notorious underreporting. The literature on violence against women repeatedly emphasizes that the vast majority of victims do not seek help, and those who do not seek support tend to resort to informal networks of friends, neighbors, relatives, religious institutions, or community organizations (Ellsberg and Heise, 2005; Ruiz-Perez et al., 2007; United-Nations, 2014).

4.1 Measuring Prevalence of Domestic Violence in PCSVDF^{Mulher}

We collected three types of information about domestic violence: emotional violence[13], physical violence and sexual violence. The PCSVDF^{Mulher} adopted the same definitions of domestic violence as those employed by 2005 WHO Multi-country Study on Women's Health and Domestic Violence against Women.

The theoretical effort to maintain the PCSVDF^{Mulher} as faithful as possible to the WHO's study is essential because of comparability between them (see, Table A3 in Appendix A). At the same time, the PCSVDF^{Mulher} study carefully constructed definitions of violence against

[13]This terminology, used by the World Health Organization (WHO) at the time (Garcia-Moreno, Jansen, Ellsberg, Heise, and Watts, 2005), is not accepted evenly. Especially in legal literature, emotional violence can be framed, and so-called, as psychological violence or moral violence. See, Lei Maria da Penha, available at http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/lei/l11340.htm. The intellectual effort of researchers was to remain faithful to the original study of WHO with the fundamental objective of making comparability between studies possible. However, the new conceptual and classification perspective contained in the legal framework of the Maria da Penha Law permeates all research and will be gradually adopted in the next waves of data collection.

women in such a way to align them with Maria da Penha Law, which is the main instrument of legislation that can punish and prevent domestic and family violence against women in Brazil. According to Maria da Penha Law, it is considered domestic and family violence against women any action or omission based on gender that causes death, injury, physical, sexual and/or psychological suffering to a woman, beyond moral and patrimonial damage.[14] In that sense, the PCSVDF^{Mulher} can be used for monitoring and evaluating public policies targeted to protect women against domestic violence.

Besides, we need to examine with detail the concept of intimate partner violence, how to operationalize it and how to calculate it within the PCSVDF^{Mulher}. We follow as close as possible Breiding et al. (2015) who put forward the following basic definitions:

- Intimate Partner Violence (IPV): Intimate partner violence includes physical violence, sexual violence, stalking and psychological aggression (including coercive tactics) by a current or former intimate partner (i.e., spouse, boyfriend/girlfriend, dating partner, or ongoing sexual partner)
- Intimate Partner: An intimate partner is a person with whom one has a close personal relationship that may be characterized by the partner's emotional connectedness, regular contact, ongoing physical contact and sexual behavior, identity as a couple, and familiarity and knowledge about each other lives. The relationship need not involve all of these dimensions. Intimate partner relationships include current or former: spouses (married spouses, common-law spouses, civil union spouses, domestic partners), boyfriends/girlfriends, dating partners, or ongoing sexual partners. Intimate partners may or may not be cohabiting. Intimate partners can be opposite or same sex.

Based on this information, our research group developed a protocol for computing domestic violence measures using the PCSVDF^{Mulher} (see Appendix B), which allows us to calculate lifetime prevalence rates of emotional, physical, and sexual violence against women, as well as prevalence rates in the last 12 months.

4.2 Prevalence of Domestic Violence in the Northeast of Brazil

Table 5 reports the prevalence of domestic violence ($V_{emotional}$, $V_{physical}$, V_{sexual}, $and\ IPV$) "Lifetime" and "Last 12 months", and its asymptotic confidence interval for five different sub-samples from PCSVDFMulher:

[14] The Maria da Penha Law also typifies two other forms of violence against women – patrimonial violence and moral violence. Patrimonial violence is understood as any conduct that entails retention, subtraction, partial or total destruction of objects, instruments of work, personal documents, assets, values, and economic rights or resources, including those designed to meet woman's needs. On the other hand, moral violence is any conduct that characterizes slander, defamation or injury.

- Full 2016: all 10,094 women from Wave 1
- Full 2017: all 10,518 women from Wave 2
- Matched 2016: all 4,665 women interviewed in both wave - DV data calculated at 2016
- Matched 2017: all 4,665 women interviewed in both wave - DV data calculated at 2017
- Replacement 2017: all 5,853 women interviewed for the first time in 2017 as a replacement for attrition (note that $Full\ 2017 = Matched\ 2017 \cup Replacement\ 2017$)

Table 5: Prevalence of Emotional, Physical and Sexual Violence in the Northeast Region, Brazil – 2016/2017

	Prevalence rate				
	Full 2016	**Full 2017**	**Matched 2016**	**Matched 2017**	**Replacement 2017**
Full sample	10,094	10,518	4,665	4,665	5,853
Lifetime					
$V_{emotional}$	29.30	30.55	28.89	28.96	32.01
	(28.07 - 30.56)	(29.4 - 31.73)	(27.14 - 30.71)	(27.32 - 30.65)	(30.39 - 33.67)
	5,195	6,075	2,530	2,904	3,171
$V_{physical}$	19.04	17.47	18.80	16.01	18.82
	(17.97 - 20.15)	(16.52 - 18.46)	(17.29 - 20.4)	(14.69 - 17.42)	(17.47 - 20.26)
	5,085	5,953	2,479	2,861	3,092
V_{sexual}	7.75	7.28	7.38	6.91	7.62
	(7.04 - 8.53)	(6.64 - 7.97)	(6.4 - 8.5)	(6.02 - 7.91)	(6.73 - 8.62)
	5,133	6,030	2,492	2,895	3,135
IPV	35.22	34.51	34.84	33.17	35.75
	(33.91 - 36.56)	(33.31 - 35.74)	(32.96 - 36.76)	(31.45 - 34.93)	(34.06 - 37.46)
	5,045	5,969	2,463	2,861	3,108
Last 12 Months					
$V_{emotional}$	13.18	14.00	12.33	13.41	14.53
	(12.28 - 14.15)	(13.13 - 14.91)	(11.08 - 13.71)	(12.2 - 14.73)	(13.32 - 15.83)
	5,112	5,980	2,481	2,863	3,117
$V_{physical}$	6.06	5.22	5.71	4.22	6.15
	(5.43 - 6.77)	(4.67 - 5.83)	(4.83 - 6.72)	(3.52 - 5.04)	(5.34 - 7.08)
	4,997	5,863	2,463	2,823	3,040
V_{sexual}	2.62	2.37	2.21	2.15	2.56
	(2.21 - 3.1)	(2 - 2.79)	(1.69 - 2.89)	(1.67 - 2.77)	(2.05 - 3.2)
	5,115	6,002	2,484	2,881	3,121
IPV	15.54	15.77	14.62	15.06	16.42
	(14.54 - 16.59)	(14.84 - 16.74)	(13.23 - 16.12)	(13.76 - 16.46)	(15.12 - 17.8)
	4,866	5,791	2,374	2,782	3,009

Source: Elaborated by the authors. Asymptotic Confidence Interval of 95% appears below, inside parenthesis. Subsample used to compute the prevalence rate is displayed below confidence interval.

It is worth stressing again that we seek to measure Intimate Partner Violence. Since not all women who answered violence questions, the sample reduces. We restrict the sample to women who effectively has a partner or had an ex-partner. In this case, single women who never engaged in a relationship are not part of the sample. Thus, the sample includes women who are:

formally married, living in cohabitation, divorced, separated or who had a broken relationship, widowed women and women who reported to have had an ex-partner but did not inform their current marital status. Also, we restrict the sample to women who accepted to answer questions from section VIII (regarding the experience of partner/ex-partner domestic violence) in Wave 1.

Due to the Conflict Tactic Scale nature that PCSVDF^{Mulher} employs to measure domestic violence, unless a woman did not provide an answer to all the three types of domestic violence (physical, emotional or sexual), she belongs to our sample[15]. Finally, to help understanding Table 5, for each type of violence we show the prevalence, its 95% confidence interval, and the effective sample size employed, respectively.

Results from Table 5 show that, in 2016, about 29.3% of all women aged 15 - 49 years old report having been victims of domestic emotional violence throughout their lives in Northeast Brazil.[16] The figures on physical and sexual violence are disturbing too: 19% of women from the Northeast reported assaults at least once throughout their lives, and the prevalence of sexual violence throughout their lives is 7.8%.

Based on population estimates from the PNADC/IBGE in Table 1, absolute numbers indicate that almost 1 million women were victims of emotional violence, 639 thousand suffered physical abuse, and 262 thousand became sexually victimized throughout their lives in the Northeastern capitals of Brazil. These numbers, however, are upper bound guesses as we know victimization of IPV concentrates in a small number of women, a phenomenon known as multiple-victimization.

Furthermore, prevalence rates in the last twelve months (see, Table 5, *Last 12 Months*), despite being logically lower, highlight the social relevance of domestic violence in the Northeast region. The prevalence of self-reported emotional violence in the last 12 months is 13.2%, whereas physical and sexual violence in the same period amounts to 6.1% and 2.6% of sampled women.

We proceed now to analyze prevalence in 2017, more specifically through the "Full 2017" sample and compare it with the preceding "Full 2016" sample. A word of caution is essential now. In epidemiological studies, two fundamental measures support the quantitative understanding of epidemics: prevalence and incidence. According to Jewell (2004), prevalence

[15] We also have worked with a slightly more restrictive (and smaller) sample, i.e., keeping only those women with valid measures on all three types of violence (emotional, physical and sexual), and get very similar results.

[16] Unless otherwise stated, all analysis at this section is concerned with prevalence of $V_{emotional}$, $V_{physical}$, V_{sexual}, *and IPV* "Lifetime".

(interval prevalence) is the proportion of the population at risk at any point belonging to a time interval.

Also, the same author defines incidence ratio as the proportion of a population where all its members are at risk of "contracting" the disease at the beginning of a time interval that becomes new cases before the end of the said interval. While prevalence describes a metric to characterize the volume or size of the epidemic, the incidence better characterizes its initiation and therefore is indicated for causal studies. However, prevalence is a more complex mechanism whose dynamics depends on the incidence, death, and recovery of individuals.

Said that we look at prevalence at the “Full 2017” sample and compare it with the “Full 2016” sample. A quick glimpse at Table 5 reveals almost no difference, except for V_emotional, as all prevalence values and corresponding confidence intervals indicate. However, given the attrition rate observed in our data and the likely selection inherent to collecting IPV data, if someone wants to draw a picture of the dynamic features of domestic violence in our sample he or she would better compare the “Full 2016” sample with the “Replacement” sample, and not with the “Full 2017”.

The reason is simple: although all three samples (“Full 2016”, “Full 2017” and “Replacement”) are large enough, only the “Full 2016” and “Replacement” data sets are independent samples from their underlying population. It is important to stress that the “Full 2017” is very important and useful for many scientific investigations, but concerning the aggregate comparison between prevalence rates, it is not the best choice, given the high and likely selected attrition. Table 6 depicts value for a test of differences of prevalence rates between the “Full 2016” and “Replacement” samples (Newcombe, 1998).

Table 6: P-values for the Difference between Prevalence in the PCVSVDF[Mulher]

Violence	**P-value** **Full 2016 x Replacement 2017**
Lifetime	
$V_{emotional}$	0,0095*
$V_{physical}$	0,8338
V_{sexual}	0,8628
IPV	0,6483
Last 12 Months	
$V_{emotional}$	0,0905*
$V_{physical}$	0,9114
V_{sexual}	0,9324
IPV	0,3135

Source: Elaborated by the authors. Test for the difference between independent proportions. An * indicates a statistically significant difference.

Table 6 depicts an essential set of tests. Overall, we can only claim that emotional violence has changed in the Northeast of Brazil. That change consistently happened for both window frames of measurement, say, "Lifetime" and "Last 12 Months" and it reflects an increase of 8.5% and 10.2%, respectively. These figures are not negligible at all, especially when one considers the fact that the change occurred in a year. Higher IPV values are just a specific dimension of a broader and deeper new wave of crime and violence in Brazil that started at this century.

Indeed, this is a Latin America's issue. There are two main challenges that Latin America currently faces concerning violence: i) an increase in interpersonal violence; and ii) a "new" type of violence linked to organized crime, especially in areas that are relevant for drug-related markets (cultivation, distribution, and consumption). Both issues appeared at the onset of the 21st century.

The systematic escalation of crime in Brazil, especially in the last 20 years, and the recent homicide waves in northeastern states (notably Ceará, Rio Grande do Norte, Maranhão, and Pernambuco) (see, de Segurança Pública, 2015) are social phenomena that have attracted the attention of scholars and of society as a whole. These new social challenges demand shifts on old social, economic and criminological paradigms that in vain have been trying to address such complexity utilizing solutions often devoid of due methodological rigor and empirical.

In this context, a pertinent question arises (Sapori, 2012): why, despite the socio-economic advance in the country in the last two decades, has there been a setback in public security? In fact, there is an urgent need to understand and criticize the relationship between policies related to the social improvements implemented in recent years in the country (such as Bolsa Familia, microcredit programs, poverty reduction and inequality and the Maria da Penha Law) and high levels of violence in Brazil, both general violence and DV.[17]

4.3 Prevalence of Domestic Violence in States of the Northeast of Brazil

We proceed to the analysis of IPV at a more disaggregated geographic level. Table 7 reports the prevalence of domestic violence (IPV) "Lifetime," and its asymptotic confidence interval for the same five samples, and for each one of the cities sampled. Table 8 brings p-values for testing differences between the statistics for the "Full 2016" and "Replacement 2017" samples.

[17] The evolution in time, and the strategies and tactics of recent geopolitical consolidation of the national and international drug factions certainly play a relevant role in understanding the explosion of violence in the Brazilian Northeast that has been occurring in the last decade.

Table 7: Prevalence of *IPV* (Lifetime) in the Capitals of the Northeast Region

City	Full 2016	Full 2017	Matched 2016	Matched 2017	Replacement 2017
Aracaju. SE	32.88	35.59	35.84	32.73	38.26
	(28.89 - 37.13)	(31.7 - 39.67)	(29.66 - 42.51)	(27.32 - 38.64)	(32.76 - 44.06)
	520	576	226	278	298
Fortaleza. CE	34.21	36.46	32.27	35.53	37.68
	(30.77 - 37.82)	(33.42 - 39.6)	(27.94 - 36.9)	(31.54 - 39.73)	(33.03 - 42.56)
	722	960	437	546	414
João Pessoa. PB	39.97	36.28	41.86	36.01	36.47
	(36.34 - 43.71)	(32.79 - 39.91)	(36.26 - 47.67)	(30.72 - 41.65)	(31.86 - 41.34)
	703	725	301	311	414
Maceió. AL	40.47	34.30	42.68	34.58	34.12
	(36.2 - 44.89)	(30.38 - 38.44)	(36.46 - 49.13)	(28.31 - 41.41)	(29.14 - 39.46)
	509	554	246	214	340
Natal. RN	44.16	34.14	42.97	32.16	35.45
	(38.92 - 49.53)	(30.01 - 38.51)	(34.35 - 52.01)	(25.83 - 39.19)	(30.09 - 41.2)
	351	498	128	199	299
Recife. PE	37.25	37.60	38.26	35.93	39.92
	(32.81 - 41.92)	(33.79 - 41.57)	(32.42 - 44.44)	(31.01 - 41.16)	(33.95 - 46.2)
	451	617	264	359	258
Salvador. BA	32.20	38.13	32.43	33.41	42.56
	(29.05 - 35.53)	(34.87 - 41.51)	(27.95 - 37.25)	(28.9 - 38.24)	(37.9 - 47.36)
	826	847	407	410	437
São Luís. MA	27.89	28.50	29.81	30.68	26.93
	(24.26 - 31.82)	(24.95 - 32.33)	(24.45 - 35.77)	(25.11 - 36.84)	(22.42 - 31.97)
	563	600	265	251	349
Teresina. PI	31.50	26.35	20.11	24.23	28.43
	(27.02 - 36.34)	(22.88 - 30.13)	(14.78 - 26.68)	(19.52 - 29.63)	(23.46 - 33.96)
	400	592	189	293	299

Source: Elaborated by the authors. Asymptotic Confidence Interval of 95% appears below, inside parenthesis. Subsample used to compute the prevalence rate is displayed below confidence interval.

Table 8: P-values for the Difference between Prevalence (Lifetime), Capitals

City	P-value Full 2016 x Replacement 2017
Aracaju, SE	0,1402
Fortaleza, CE	0,2475
João Pessoa, PB	0,2660
Maceió, AL	0,4876
Natal, RN	0,2731
Recife, PE	0,2410
Salvador, BA	0,0723*
São Luís, MA	0,0087*
Teresina, PI	0,0295*

Source: Elaborated by the authors. Test for the difference between independent proportions. An * indicates a statistically significant difference.

We make comments about only the three cities with significant effects on its lifetime IPV prevalence, say, Salvador, São Luis e Teresina. The considerable increase of 32.2% for Salvador (from a prevalence of 32.20 up to 42.56) is an indeed a motive for concern.

Such dynamics finds support at another independent source: accordingly to the Brazilian Public Security Yearbook (FBSP, 2017), while the number of violent deaths of women in the country increased by 6.4% between 2006 and 2016, this increase was 81.5% in Bahia. A similar, although broader, pattern of homicide "feminization" has been documented for Ceará: *"In Fortaleza [capital of Ceará], the 340% increase in the number of young women murdered in the first half of 2018 shows an unprecedented profile of victimization with a strong gender bias and shows dysfunctions in the mechanisms of social protection and public security. There is a need for a change in the conduct of public policies to deal with these crimes."* (see, IMP, 2018)

There is some good news, however. Both São Luis and Teresina show a fall of 3.4% and 9.7%, respectively. We still do not have any clue about how these cities managed to decrease their IPV. Admittedly, this deserves more investigation.

Table 9 depicts the prevalence of domestic violence for IPV (Last 12 Months). We do not develop further comments, except an interesting point that relates to the increase in prevalence (Last 12 Months) in São Luis of 17.8% (from 10.58 up to 12.46). How is it possible to decrease 3.4% (Lifetime) and increase by 17.8% (Last 12 Months)? Is it a contradiction or just a puzzle? Indeed, the conjunction of an increase in lifetime prevalence with a decrease in 12 months-prevalence is entirely possible due to the specific way of prevalence measurement, for instance, if we have an increment on the incidence (new cases of IPV) between 2016 and 2017.

Table 9: Prevalence of *IPV* (Last 12 Months) in the Capitals of the Northeast Region

City	Full 2016	Full 2017	Matched 2016	Matched 2017	Replacement 2017
Aracaju, SE	15,98	18,61	17,04	18,28	18,93
	(12.98 - 19.51)	(15.49 - 22.18)	(12.48 - 22.77)	(13.95 - 23.55)	(14.61 - 24.12)
	513	548	223	268	280
Fortaleza, CE	15,27	17,00	12,06	15,92	18,43
	(12.72 - 18.22)	(14.69 - 19.59)	(9.19 - 15.64)	(12.97 - 19.36)	(14.85 - 22.61)
	694	941	423	534	407
João Pessoa, PB	17,63	16,62	15,85	16,39	16,79
	(14.87 - 20.76)	(13.98 - 19.64)	(11.9 - 20.74)	(12.48 - 21.19)	(13.33 - 20.91)
	675	698	284	299	399
Maceió, AL	19,46	15,51	19,13	16,43	14,94
	(16.06 - 23.35)	(12.61 - 18.93)	(14.38 - 24.94)	(11.79 - 22.34)	(11.35 - 19.37)
	478	535	230	207	328
Natal, RN	22,52	15,20	21,77	15,38	15,07
	(18.23 - 27.47)	(12.19 - 18.77)	(15.07 - 30.26)	(10.78 - 21.4)	(11.27 - 19.81)
	333	487	124	195	292
Recife, PE	16,78	17,11	18,55	15,85	18,82
	(13.44 - 20.74)	(14.24 - 20.41)	(14.03 - 24.07)	(12.26 - 20.22)	(14.33 - 24.28)
	429	602	248	347	255
Salvador, BA	11,74	15,14	12,97	12,75	17,45
	(9.65 - 14.21)	(12.81 - 17.8)	(9.92 - 16.75)	(9.74 - 16.47)	(14.03 - 21.48)
	809	832	401	408	424
São Luís, MA	10,58	13,49	11,11	14,94	12,46
	(8.17 - 13.56)	(10.87 - 16.62)	(7.63 - 15.81)	(10.81 - 20.22)	(9.22 - 16.58)
	539	578	252	241	337
Teresina, PI	14,39	12,46	8,47	10,25	14,63
	(11.17 - 18.33)	(9.91 - 15.52)	(5.07 - 13.62)	(7.08 - 14.53)	(10.86 - 19.38)
	396	570	189	283	287

Source: Elaborated by the authors. Asymptotic Confidence Interval of 95% appears below, inside parenthesis. Subsample used to compute the prevalence rate is displayed below confidence interval.

Our findings also reveal a complex picture of prevalence at a disaggregated geographical level in the Northeast of Brazil. Besides, we can track the source of a significant increase in emotional IPV. To finish this subsection, we offer a quick glimpse of global measures of prevalence based on published studies so that we can compare to our national findings.

Garcia-Moreno et al (2006) report that lifetime prevalence of physical and sexual violence reached 27.2% (95% CI= 23.9-30.6) and 10.1% (95% CI= 8.0-12.2) in two Brazilian state capitals (Recife and São Paulo), and 8.3% (95% CI= 6.4-10.2) and 2.4% (95% CI= 1.6-3.9) for the exposure in the last 12 months. The estimates displayed in Tables 5 are smaller than reported by Garcia-Moreno et al. (2006), except for the prevalence of sexual violence in the last 12 months.

Global prevalence shows that women exposed to physical or sexual violence over their life cycle (aged 15 or older) varies 24.6% (Western Pacific) to 37.7% (South-east Asia) among

low- and middle-income regions (WHO, 2013), reaching 65.6% in Central Sub-Saharan Africa. In the Americas, the lifetime prevalence of physical or sexual violence is 29.8% (WHO, 2013), and 23.7% in South America (Devries et al., 2013). High-income countries exhibit a prevalence of 23.2% (WHO, 2013), about 21.3% in North America and 19.3% in Western Europe.

Computing the same prevalence using the PCSVDF^{Mulher}, we find 21% (95% CI= 19.9-22.1) for physical or sexual violence over their life cycle. Thus, the prevalence of domestic violence from the PCSVDF^{Mulher} shows that Brazil exhibits a level of exposure compared with high-income countries, being below regional levels of exposure.

In 2005, the lifetime prevalence of physical or sexual violence reached 28.9% in Brazil (WHO, 2005; Garcia-Moreno et al. 2006). The evidence from the PCSVDF^{Mulher} suggests the existence of a decreasing path of domestic violence in the last fifteen years in Brazil.

The Maria da Penha Law (enacted in August 2006) appears as a significant contributing factor. Also, socioeconomic improvements in the country seemed to have contributed to the decrease in DV, as well. The Law modified the way authorities used to treat domestic violence in at least four ways: i) it increased costs to offenders; ii) it enlarged women's empowerment; iii) it created safer conditions for victims to report domestic violence to authorities; and iv) it improved jurisdictional mechanisms that made the criminal justice system to be more effective in addressing cases of domestic violence (see, Cerqueira et al., 2015).

Empirical evidence has shown that the Maria da Penha Law has effectively contributed to reducing female homicide in Brazil (Cerqueira et al., 2015; Azuaga and Sampaio, 2017). Besides, the spread of women's police stations in Brazil as support to Maria da Penha Law also contributed to the reduction of female homicide rates among young women (Perova and Reynolds, 2017).

4.4 Results from Logistic Regression

In this subsection, we estimate the partial correlations of domestic violence with women's sociodemographic characteristics (per capita household income, age, education, race/color, occupation, marital status, and children). We use logistic regression and focus on the odds ratio regarding lifetime exposure to domestic violence for Wave 1 (n = 5,045) and Wave 2 (n = 5,969) of the PCSVDFMulher. To avoid unnecessary reduction of the sample size, we add indicators of missing information for some explanatory variables.

Table 10 provides the mean and standard deviation of some women's characteristics for both waves 1 and 2. The average women's age is 33 in wave 1 and 34 in wave 2. About 19% of women are illiterate or have incomplete primary education in both waves, and approximately 21% have completed primary education.

Table 10: Descriptive statistics of women's characteristics

	Full 2016	**Full 2017**
Age	32.856	34.030
	(9.526)	(9.605)
Illiterate or incomplete primary	0.190	0.190
	(0.392)	(0.393)
Primary education	0.214	0.207
	(0.410)	(0.405)
High-school education	0.492	0.498
	(0.500)	(0.500)
College education	0.102	0.104
	(0.303)	(0.305)
Missing education	0.002	-
	(0.042)	-
Black	0.242	0.223
	(0.429)	(0.416)
Brown	0.527	0.551
	(0.499)	(0.497)
White	0.216	0.216
	(0.411)	(0.411)
Other	0.014	0.010
	(0.119)	(0.100)
Married	0.352	0.381
	(0.478)	(0.486)
Cohabiting	0.214	0.214
	(0.410)	(0.410)
Engaged in a relationship	0.175	0.168
	(0.380)	(0.373)
Divorced or separated	0.226	0.200
	(0.418)	(0.400)
Widow	0.019	0.022
	(0.137)	(0.147)
Single	0.013	0.015
	(0.114)	(0.122)
Occupied	0.408	0.429
	(0.492)	(0.495)
Missing occupation	0.007	0.004
	(0.081)	(0.065)
Poor	0.315	0.386
	(0.465)	(0.487)
Fortaleza	0.143	0.161
	(0.350)	(0.367)
João Pessoa	0.139	0.121
	(0.346)	(0.327)
Maceió	0.101	0.093
	(0.301)	(0.290)
Natal	0.070	0.083
	(0.254)	(0.277)
Recife	0.089	0.103
	(0.285)	(0.304)
Salvador	0.164	0.142
	(0.370)	(0.349)
São Luís	0.112	0.101
	(0.315)	(0.301)
Teresina	0.079	0.099
	(0.270)	(0.299)
Effective sample size	5,045	5,969

Note. Standard deviation in parentheses.

About 49% are high-schooled in wave 1, and 50% in wave 2, and near 10% have a college degree in both waves of the PCSVDF^{Mulher}. Besides, 53% of women reported brown color (or "pardo") in wave 1 and 55% in wave 2. About 24% are black in Wave 1, and 22% in Wave 2. White women are 22% of the sample, and another color/race account only for 1% in both waves of the survey.

Moreover, 35% of women are married in wave 1, and 38% in wave 2. About 21% of women are cohabiting, and 17% are engaged in a relationship in both waves. Divorced or separated women are 23% in Wave 1, and 20% in Wave 2. Widows are near 2%, and single women are about 1% of the sample. Occupied women are 41% in wave 1, and 43% in wave 2. About 31% live in a poor household in wave 1, and 39% in wave 2.[18]

Results in Table 11 shows that the risk of reporting lifetime domestic violence increases with women's age (OR = 1.137 and p–value<0.01 in wave 1, and OR = 1.139 and p–value<0.01 in wave 2), but decreases when age becomes larger (OR = 0.998 and p–value<0.01 in wave 1 and 2). According to public health studies, young women are at particular risk of domestic violence worldwide (Jewkes, 2002a; Abramski et al., 2011). It seems to be the case in Northeast Brazil, once the results for both waves of the survey suggest that domestic violence increases among younger women and decreases among older women.

Women's education appears as an important protective factor for domestic violence in Brazil. For both waves of the survey, the risk of reporting lifetime domestic violence is decreasing with women's educational attainment. Comparing with women who have incomplete primary education or without schooling, women with a college education exhibit odds ratio of 0.516 (p-value<0.01) and 0.571 (p-value<0.01), respectively for the wave 1 and wave 2. Women with high-school education show odds ratio of 0.727 (p-value<0,01) in the wave 1, and 0.655 (p-value<0.01) for the wave 2. In wave 2, notice that women with complete primary education are less likely to report lifetime domestic violence than women with incomplete primary education or without schooling (OR = 0.815, p-value<0.05).

In general, the literature predicts that women's education is negatively associated with exposure to domestic violence (Jewkes, 2002a; 2002b; Abramski et al., 2011; Capaldi et al., 2012; Heise and Kotsadam, 2015). Silva et al. (2010) find that low-educated women (0 – 8 years of schooling) have an odds ratio of 2.34 in comparison with high-educated women in Recife, Brazil. However, Kiss et al. (2012) do not find a significant association between years of schooling and domestic violence in São Paulo, Brazil.

[18] The proportion of women living in poor households is defined as the fraction of women that belongs to household with total income per household member smaller than ¼ of minimum wave of 2017 (R$ 976,00). Income values are deflated using the IPCA/IBGE.

Table 11: Estimations from Logistic regressions

	Full 2016	**Full 2017**
Age	1.137***	1.139***
	(0.029)	(0.027)
Age^2	0.998***	0.998***
	(0.000)	(0.000)
Primary education	0.879	0.815**
	(0.084)	(0.072)
High-school education	0.727***	0.655***
	(0.061)	(0.051)
College education	0.516***	0.571***
	(0.066)	(0.066)
Missing education	1.250	
	(0.871)	
Black	1.168	1.329***
	(0.112)	(0.119)
Brown	1.139	1.183**
	(0.090)	(0.088)
Other	1.105	1.757**
	(0.285)	(0.482)
Cohabiting	1.846***	1.694***
	(0.161)	(0.132)
Engaged in a relationship	1.860***	1.914***
	(0.176)	(0.168)
Divorced or separated	2.741***	3.127***
	(0.228)	(0.244)
Widow	1.577**	1.173
	(0.352)	(0.236)
Single	1.552	1.423
	(0.422)	(0.350)
Occupied	1.048	0.850***
	(0.070)	(0.052)
Missing occupation	0.709	0.851
	(0.287)	(0.390)
Poor	1.136*	0.961
	(0.079)	(0.059)
Fortaleza	1.051	1.040
	(0.133)	(0.118)
João Pessoa	1.428***	1.072
	(0.179)	(0.129)
Maceió	1.548***	1.060
	(0.208)	(0.137)
Natal	1.770***	0.995
	(0.261)	(0.133)
Recife	1.261*	1.109
	(0.175)	(0.138)
Salvador	0.883	1.018
	(0.111)	(0.119)
São Luís	0.821	0.734**
	(0.112)	(0.095)
Teresina	0.962	0.679***
	(0.141)	(0.089)
Log likelihood	-3134.7	-3676.9
Observations	5,045	5,969

Exponentiated coefficients. Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

These last two studies produced their results using data from 2005 WHO Multi-Country Study on Women's Health and Domestic Violence. In the US, Aizer (2011) reported that less educated women are more likely to be admitted to the hospital for an assault while pregnant.

By analyzing self-reported race/color, we find no systematic differences in the risk of lifetime domestic violence between races in wave 1. In Wave 2, these differences are marked. Black women exhibit a more significant risk of suffering domestic violence than white women (OR=1.329, p-value<0.01). The odds ratio is slightly smaller for brown women (OR=1.183, p-value<0.05), but they are still more likely to suffer domestic violence than white women. A significant odds ratio is also observed for other race/color women (OR=1.757, p-value<0.05), suggesting a more substantial risk of suffering domestic violence in comparison with white women.

This last evidence suggests that self-reported race/color is an essential predictor for domestic violence in Northeastern Brazil. Silva et al. (2010) show that black women are the most exposed race group to domestic violence in Recife, Brazil. In the US, the specialized literature provides strong evidence that black women are highly exposed to domestic violence (Cho, 2012; Capaldi et al., 2012). However, other studies do not find significant black-white differences or show that such differences vanish after accounting for socioeconomic characteristics (Grossman and Lundy, 2007).

Regarding marital status, divorced or separated women exhibit a high risk of reporting lifetime domestic violence than formally married women (OR=2.741, p-value<0.01 in wave 1, and OR=3.127, p-value<0.01 in Wave 2). The literature shows that formally married women are less exposed to domestic violence than separated or divorced women (Abramsky et al., 2011; Capaldi et al., 2012). Perhaps, results in Table 11 reflect that abused women are more likely to divorce (Bowlus and Seitz, 2006). Notice also that cohabiting women are more likely to report lifetime domestic violence than formally married women (OR=1.846, p-value<0.01 in Wave 1, and OR=1.694, p-value<0.01 in Wave 2). Selection out of marriage and cohabitation or differences in social supports and institutional characteristics may explain this last evidence (Kenney and McLanahan, 2006). The longitudinal design of the PCSVDF^{Mulher} can help us to shed light on such issue in future research. Besides, widows and single women do not exhibit significant odds ratios, except widowed women in wave 1 (OR=1.577, p-value<0.05).

The estimated odds ratio for occupied women is not statistically significant in Wave 1, but the risk of reporting lifetime domestic violence is decreasing with occupation status of women in Wave 2 (OR=0.850, p-value<0.05). This result should be taken with caution; once reverse causation is latent in the model (Bhattacharyya et al., 2011; Eswaran and Malhotra, 2011; Chin, 2012). Abramsky et al. (2011) found no consistent relationship between women's employment

status and domestic violence using the 2005 WHO Multi-Country Study on Women's Health and Domestic Violence.

Last but not least, we observe that poor women (deflated per capita household income smaller than the ¼ minimum wage of 2017) are more likely to report domestic violence than non-poor women in wave 1 (OR=1.136, p-value<0.10), but this estimate is significant only at 10%. However, we observe no difference in the risk of suffering domestic violence between poor and non-poor women Wave 2. Although some evidence in public health literature have shown a negative association between domestic violence and women's socioeconomic status (Jewkes, 2002a; Koening et al., 2003; Abramsky et al., 2011; Wilson, 2015), it seems that domestic violence is not a social phenomenon restricted only to poor households in Brazil.

5. Conclusion

The current paper aimed to present a new and innovative household survey focused on the socioeconomic conditions and domestic violence against women in Brazil. We design the Pesquisa de Condições Socioeconômicas e Violência Doméstica e Familiar contra a Mulher ($PCSVDF^{Mulher}$) as a longitudinal survey in order to provide information on socioeconomic and demographic characteristics of household members, women's health and reproductive behavior, women's decision making and household expenditure, social norms, knowledge about domestic violence and Maria da Penha Law, experience of violence perpetrated by the partner or ex-partner, experience of violence not related to partners, matching valuation, subjective expectations and counterfactuals.

All this information can help to analyze the causes and consequences of domestic violence from an economic, sociological and public health perspective, and can effectively help to establish the linkages between individuals' behavior and policy.

The $PCSVDF^{Mulher}$ can contribute to understand the relationship between domestic violence and participation in the labor market and women's productivity (Lloyd, 1997; Farmer and Thiefenthaler, 2004; Tolman and Hui-Chen Wang, 2005; Sabia et al., 2013), as well as their implications for intra-household resource allocation (Bourguignon et al 2009; Browning et al., 2014; Attanasion and Lechene, 2014), marriage market (Browning et al., 2014; Chiappori et al., 2012; 2016; 2017) and interactions with social norms (Alesina, 2016). We can also investigate how the use of protective judicial measures can help women to increase their bargaining power and reduce domestic violence (Lundberg and Pollak, 1993; 1994; 1996).

The $PCSVDF^{Mulher}$ also allows the investigation of the consequences of domestic violence during pregnancy for life in utero (Aizer, 2011; Rawlings and Siddique, 2014; Jofre-Bonet et al., 2016).

Our paper's main contributions are i) to present the strengths of the PCSVDF^{Mulher}, and ii) to show an updated and detailed view of domestic violence in Brazil. Indeed, DV in Brazil is at the same level of high-income countries and have decreased over time when compared to 2005 WHO Multi-Country Study on Women's Health and Domestic Violence against Women (WHO, 2005). Our study also shows that women's education is a crucial preventive factor in domestic violence, while the risk of suffering partner's abuse is increasing among younger and non-white women in Brazil. This evidence corroborates the existing literature (Jewkes, 2002; Silva et al., 2010; Abramsky et al., 2011; Capaldi et al., 2012; Kiss et al., 2012; Wilson, 2015; Heise and Kotsadam, 2015).

Like any other research project with this level of complexity, PCSVDF^{Mulher} presents some limitations, although we worked hard to reduce them drastically by following strictly the methodology advocated by the World Health Organization (WHO, 2005). We understand that, despite the fact that our sampling effort could be comparable to those employed in multi-countries studies, due to the fact that both geographic and population dimensions of the Brazilian Northeast are comparable to European countries, our study needs to increase its spatial coverage to (at least) cities in the countryside in future waves.

The results and analyses highlighted so far by PCSVDF^{Mulher}, we believe, have the potential to launch a research agenda in the area of domestic violence, empowerment, household bargaining and child development where economics and other disciplines could get along and make exciting new scientific discoveries by a judicious use of an interdisciplinary and/or multidisciplinary approach.

Finally, we point out some future priorities of PCSVDF^{Mulher}: i) to include validated measures to assess the phenomenon of Economic Violence (Patrimonial Violence); ii) to expand the research to the collection of Biomarkers (saliva samples); iii) to understand the process of transmission of domestic violence between generations and its implications for child development; and iv) to evaluate the role of social networks as a causal and simultaneous mechanism of domestic violence, among others.

Appendix A – Additional Tables

Table A1: Structure of the Questionnaire

Section	Description
I. Household Selection Form	It collects household address and uniquely identifies each respondent.
II. Administration Form (Random Numbers)	It captures automatically geographic coordinates of the household address, creates random numbers, as well as gets more information about household composition.
III. Woman's Selection Form (WSF)	It enables interviewers to build a list of all household members and to gather necessary demographic and socioeconomic information, and participation of household members in social programs. It also flags the beginning of a specific set of questions related to selected women.
IV. Woman's Questionnaire	It marks the point where interviewers establish a (partial) success in the interview process, i.e., achieving that point during the survey process is a necessary condition to make the survey firm pay an interviewer for that specific questionnaire. It collects information on fear of crime, general and reproductive health, contraceptive choice, history of pregnancies (including miscarriages and stillbirths), and children outcomes.
V. Norms, Awareness/Knowledge about Violence against Women and the Maria da Penha Law[19]	It discusses women's perceptions about what constitutes to domestic violence, the occurrence of such violence in their neighborhood, their attitudes about gender relations and the Maria da Penha Law.
VI. Respondent and her Partner	It collects information about any relationship with her current/most recent husband/partner. Besides, it contains more information on partner/ex-partner characteristics.
VII. Bargaining Power	it deals with a description of all aspects regarding the development of the bargaining processes within the household. Questions about income generation, asset ownership, household members' time allocation (information on gender inequality in time allocation between "domestic production", work and leisure activities), preferences and decision-making structure are collected.
VIII. Experiences of Violence (partner and ex-partner)	It contains full victimization episodes of domestic, gender and familiar violence against women. Violence victimization episodes split into physical, psychological, and sexual. Not only data on the prevalence of violence are collected, but also information on coping strategies, evaluation of institutions dealing with women's violence, and women's history of relationships.
IX. Experiences of Violence not Related to Partner	It collects data on experiences of different forms of violence from relatives, from acquaintances, and/or from strangers.
X. Match Valuation, Subjective Expectations and Counterfactuals	It gathers information to calculate the marriage match value using a set of subjective evaluation questions coupled with an experimental set of "factual" questions. We include a subsection entirely devoted to knowledge about marriage's aspects and counter- and pre-factuals. Also, we collect information about overall happiness.
XI. Supplementary Section	It is a short section with interviewee's evaluation of the duration of the interview process and assessment of interviewee's skin color performed by the interviewer.
XII. Results	The closing section collects information to aid in the process of evaluation of data quality.

Source: Elaborated by the authors from the PCSVDF^{Mulher}.

[19] Federal Law 11.340, de 7 de agosto de 2006. See Maria da Penha Law, available at http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/lei/l11340.htm.

Table A2: Sociodemographic characteristics PCSVDF[Mulher] vs. PNADC/IBGE

	PCSVDF[Mulher]		PNADC/IBGE	
	N	**%**	**N**	**%**
Age				
15-19	1,269	12.57	1,577	14.35
20-24	1,521	15.07	1,581	14.39
25-29	1,574	15.59	1,579	14.37
30-34	1,530	15.16	1,674	15.23
35-39	1,423	14.10	1,626	14.80
40-45	1,261	12.49	1,541	14.02
45-49	1,516	15.02	1,410	12.83
Education				
No education	101	1.00	443	4.03
Some fundamental school	1,638	16.23	1,671	15.21
Fundamental school	674	6.68	1,060	9.65
Some high school	1,536	15.22	1,086	9.88
High school or technical formation	4,100	40.62	4,107	37.38
Some college	990	9.81	906	8.25
College or graduate studies	1,034	10.24	1,715	15.61
Missing	21	0.21	-	-
Self-reported Race/Color				
White	2,414	23.92	2,818	25.65
Black	2,270	22.49	1,216	11.07
Brown	5,268	52.19	6,898	62.78
Asian	8	0.08	30	0.27
Indigenous	41	0.41	26	0.24
Missing	93	0.92	-	-
Observations	10,094		10,988	

Source: Quintana-Domeque et al. (2018) using PCSVDF[Mulher] (wave 1) and PNAD Contínua/IBGE (1st Quarter 2016).

Table A3: Types of violence against women and related questions in the PCSVDF[Mulher]

Type of Violence	Multi-country study on women's health and domestic violence against women	Questions in the PCSVDF[Mulher]	Maria da Penha Law
Emotional Violence	Was insulted or made to feel bad about oneself; Was humiliated or belittled in front of others; Was intimidated or scared on purpose (for example by a partner yelling and smashing things) Was threatened with harm (directly or indirectly in the form of a threat to hurt someone the respondent cared about)	- Insulted you or made you feel bad about yourself? - Belittled or humiliated you in front of your parents or other family members? - Belittled or humiliated you in front of other people? - Done things to scare or intimidate you on purpose (e.g., by the way he looked at you, by yelling and smashing things) - Threatened to hurt you or someone that you care about?	Psychological violence is understood as any conduct that causes emotional damage and diminishes self-esteem or that harms and disrupts full development or that seeks to degrade or control their actions, behaviors, beliefs and decisions, through threat, embarrassment, humiliation, manipulation, isolation, constant vigilance, persistent persecution, insult, blackmail, ridicule, exploitation and limitation of the right to come and go or any other means that causes harm to psychological health and self-determination.
Physical Violence	Was slapped or had something thrown at her that could hurt her Was pushed or shoved Was hit with fist or something else that could hurt Was kicked, dragged, or beaten up Was choked or burnt on purpose Perpetrator threatened to use or actually used a gun, knife, or another weapon against her	- Slapped you or thrown something at you that could hurt you? - Pushed you or shoved you or pulled your hair? - Hit you with his fist or something else that could hurt you? - Kicked you, dragged you or beat you up? - Choked you? - Burnt you on purpose? - Threatened to use a gun, knife, wood, iron, axe or another weapon against you? - Actually used a gun, knife, wood, iron, axe or another weapon against you?	Physical violence is understood as any conduct that offends integrity or bodily health.
Sexual Violence	Was physically forced to have sexual intercourse when she did not want to Had sexual intercourse when she did not want to because she was afraid of what partner might do Was forced to do something sexual that she found degrading or humiliating	Force you to have sexual intercourse when you did not want to? Had a sexual relationship with you, without using physical violence, just because you were afraid of his reaction if you said no? Force you to do something sexual that you found degrading or humiliating?	Sexual violence is understood as any conduct that constrains her to witness, maintain or participate in unwanted sexual intercourse, through intimidation, threat, coercion or use of force; that induces her to commercialize or use, anyway, her sexuality; that prevents her from using any method of contraception or to force her into marriage, pregnancy, abortion or prostitution through coercion, blackmail, bribery or manipulation; or that limits or nullifies the exercise of their sexual and reproductive right.

Source: Elaborated by the authors from WHO (2005) and Maria da Penha law.

Appendix B – Calculating Prevalence of IPV (Intimate Partner Violence) in the PCSVDF^{Mulher}

To make operational the concept of IPV, the first challenge is to define who has or have ever had an intimate partner. Only after that, we can proceed to calculate the IPV's prevalence. First, we invite the reader to inspect Figure B1 which reveals a summary of essential questions necessary to define precisely IPV, be it either emotional, physical or sexual.

Figure B1: Questions Related to "Ever Partnered" and IPV Definitions in the PCSVDF^{Mulher}

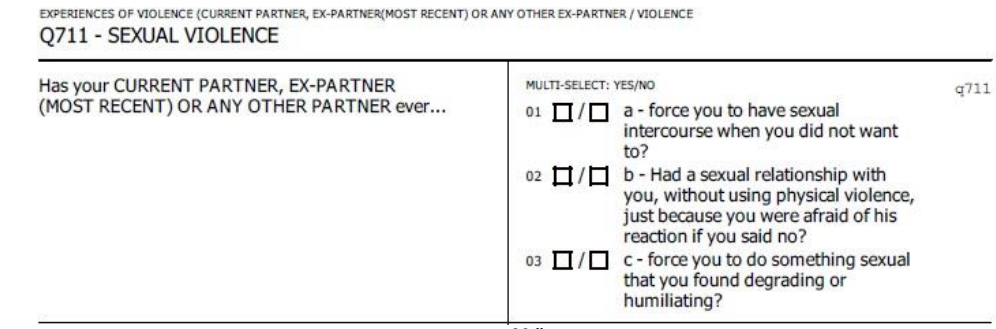
Number	Question	Wording
1	Q501	"Do you currently have a partner?"
2	Q502	"Have you ever had a partner?"
3	continuar2	"May we continue?"
4	q708	Group of emotional violence questions
5	$q708_b$	Group of "Last 12 Months" emotional violence questions
6	$q708_c$	Group of frequency of emotional violence questions
7	q709	Group of physical violence questions
8	$q709_b$	Group of "Last 12 Months" physical violence questions
9	$q709_c$	Group of frequency of physical violence questions
10	q711	Group of sexual violence questions
11	$q711_b$	Group of "Last 12 Months" sexual violence questions
12	$q711_c$	Group of frequency of sexual violence questions

Source: Elaborated by the authors from the PCSVDF^{Mulher}.

The definition of partnership (be it 'actual partner" or "ever partnered") comes out from Q501 and Q502. The subtleties arise when we proceed to calculate prevalence. Now, we proceed to IPV's definition. Indeed, we can (and do) calculate four types of IPV's prevalence, say, physical, emotional, sexual and (overall) prevalence. The PCSVDFMulher, as well as the WHO study, employ a CTS (Conflict Tactics Scale) to define and measure IPV.

To understand our definitions for prevalence we have to have a closer look at the questionnaire, more specifically at the point where interviewees respond to violence questions. As the three basic types of violence (physical, emotional, and sexual) have a similar set of questions, we present two Figures to help understand our points. Figure B2 provides an indicator of the occurrence of sexual violence ever in the interviewer's life, and Figure B3 shows a "Last 12 months" indicator of sexual violence and its frequency.

Figure B2: Sexual Violence (Ever) Indicator in the PCSVDF[Mulher]


EXPERIENCES OF VIOLENCE (CURRENT PARTNER, EX-PARTNER(MOST RECENT) OR ANY OTHER EX-PARTNER / VIOLENCE

Q711 - SEXUAL VIOLENCE

Has your CURRENT PARTNER, EX-PARTNER (MOST RECENT) OR ANY OTHER PARTNER ever...

MULTI-SELECT: YES/NO — q711

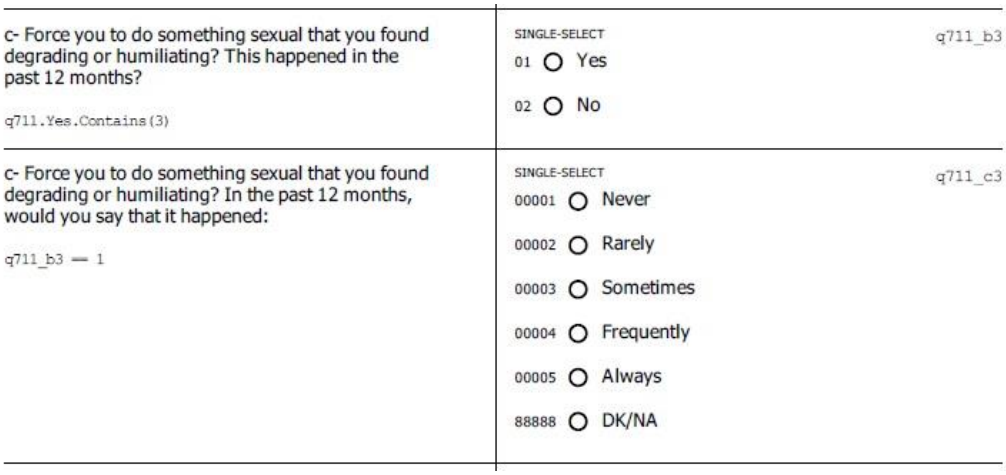
01 ☐/☐ a - force you to have sexual intercourse when you did not want to?

02 ☐/☐ b - Had a sexual relationship with you, without using physical violence, just because you were afraid of his reaction if you said no?

03 ☐/☐ c - force you to do something sexual that you found degrading or humiliating?

Source: Elaborated by the authors from the PCSVDF[Mulher].

Figure B3: Sexual Violence (Last 12 Months) and Frequency Indicators in the PCSVDF[Mulher]


c- Force you to do something sexual that you found degrading or humiliating? This happened in the past 12 months?

E q711.Yes.Contains(3)

SINGLE-SELECT — q711_b3

01 ○ Yes

02 ○ No

c- Force you to do something sexual that you found degrading or humiliating? In the past 12 months, would you say that it happened:

E q711_b3 = 1

SINGLE-SELECT — q711_c3

00001 ○ Never

00002 ○ Rarely

00003 ○ Sometimes

00004 ○ Frequently

00005 ○ Always

88888 ○ DK/NA

Source: Elaborated by the authors from the PCSVDF[Mulher].

The group of questions related to the frequency of violence has six possible answers: (never, rarely, sometimes, frequently, always, DK/NA). As each of the 16 items (5 emotional, 8 physical, and 3 sexual violence) assume either a "yes" = 1, a "no" = 0, or a "NA" (not available, due to either a voluntary non-response or an actual missing) we define the following criteria for the existence of violence in women's lifetime (we restricted our example for emotional IPV only):

1. There are five emotional violence questions ($q708^j$) indexed by $j = a, b, \dots, e$;
2. We say a woman suffered emotional violence ($V_{emotional} = 1$) $if\ \exists\ j: q708^j = 1$;
3. We say a woman did not suffer emotional violence ($V_{emotional} = 0$) $if\ \forall\ j: q708^j = 0$;
4. Otherwise, we cannot say a woman suffered, or she did not suffer emotional violence, so ($V_{emotional} = NA$).

This protocol applies to both physical and sexual violence and defines all three types of violence ("Lifetime"), say, $V_{emotional},\ V_{physical}, and\ V_{sexual}$ (emotional, physical and sexual violence, respectively) where each one of these variables assumes values on the set {0,1,NA}. In order to define Domestic Violence in general ("overall" IPV), we apply recursively the same protocol:

1. There are three emotional violence questions ($V_{emotional},\ V_{physical}, and\ V_{sexual}$) indexed by $k = emotional, physical, sexual$;
2. We say a woman suffered IPV (IPV = 1, "Ever Happened") $if\ \exists\ k: V_k\ = 1$;
3. We say a woman did not suffer IPV (IPV = 0, "Ever Happened") $if\ \forall\ k: V_k = 0$;
4. Otherwise, we cannot say a woman suffered, or she did not suffer IPV (IPV = NA, "Ever Happened").

These two protocols define four types of violence that happened ever in life: emotional, physical, sexual and IPV. However, it is important to define violence for a "Last 12 months" time interval. We can define another similar protocol by noting that right after each of the 16 items (5 emotional, eight physical, and three sexual) there is a question that asks if the episode of violence happened during the last 12 months, see Figure B3. The calculations follow analogously, and so we refrain from doing this here.

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Even though Domestic Violence (DV) is most prevalent in developing areas (OECD, 2018) and represents a significant socioeconomic and public health issue, several countries still lack helpful information to understand the causes and consequences of DV to address better public policies that target women well-being. This is the case of Brazil (the fifth most prevalent country concerning DV worldwide) where the best statistics on domestic violence are scarce and dates back to the 2005 World Health Organization Multi-Country Study (WHO, 2005). We present a unique longitudinal data set on domestic violence in Brazil: the PCSVDFMulher (Pesquisa de Condições Socioeconômicas e de Violência Doméstica e Familiar contra a Mulher - Survey of Socioeconomic Conditions and Domestic and Family Violence against Women), an interdisciplinary effort to build empirical evidence that enables the study of DV, the allocation of resources in the household, women and children's health, and child development, and the interrelationships among them through an interdisciplinary approach. The project gathered information from more than 10,000 women aged 15-49 who lived in the capitals of Northeast Brazil, in two waves: 2016 and 2017. Besides information on violence against women, the project provides data about women's health, bargaining power and intra-household resource allocation, cultural and social norms, knowledge about civil rights and use of protective judicial measures against domestic violence, as well as information on couples (e.g. education, health risk behavior, anthropometrics, skin color, labor market status etc.), women's subjective expectations and beliefs relative to welfare and to partner's abuse, and many others. Indeed, our figures show that about 30% of women have experienced domestic violence (i.e., emotional, physical or sexual violence) over their life course, 14% reported that such scourge did happen in the last 12 months. We also show that women's education is a crucial preventive factor in DV, while the risk of suffering partner's abuse is increasing among younger and non-white women in Brazil. We are confident we built an unprecedented and high-quality dataset that will reward interdisciplinary efforts about DV

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