

Trend of social inequities in reports of sexual violence in Brazil between 2010 and 2014

Tendência das iniquidades sociais nas notificações de violência sexual no Brasil entre 2010 e 2014

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ABSTRACT: *Introduction:* Sexual violence has emerged in the health field with changes in the epidemiological profiles of populations. *Methodology:* An ecological study with 5,565 Brazilian municipalities between 2010 and 2014. A descriptive analysis of the variables (Population rate of sexual violence reporting, household income *per capita* and HDI) and their stratification by quintile was performed. In order to explore the factors associated with changes in social inequalities regarding the rate of reporting of sexual violence, the Slope Index of Inequality and Relative Index of Inequality were adopted. An Ekiplot was constructed for the outcome on each independent variable. *Results:* The mean rate of reports of sexual violence in Brazil was 4.38 reports/100,000 inhabitants for the period. There was an increase in the rate of sexual violence and improvement in socioeconomic conditions. There was a higher rate of reporting in the quintile with better living conditions. An increase in the inequality of the rate of sexual violence as a function of household income and the HDI was observed. Several factors seem to influence the increase of reports of sexual violence in the country, among them the improvement in the living conditions of the population and greater moral sensitivity to violence. However, there is still a disparity in reporting among municipalities according to their socioeconomic status. *Conclusion:* The lack of public policies on social equity in health has interfered with reports of sexual violence in the country and has widened health inequities.

Keywords: Sexual Violence. Social Inequity. Mandatory Reporting. Brazil.

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RESUMO: Introdução: A violência sexual tem despontado no cenário da saúde com as mudanças nos perfis epidemiológicos das populações. **Metodologia:** Estudo ecológico com 5.565 municípios brasileiros entre 2010 e 2014. Realizou-se análise descritiva das variáveis (taxa populacional de notificação de violência sexual, renda domiciliar *per capita* e índice de desenvolvimento humano — IDH) e suas estratificações por quintil. Para explorar os fatores associados às mudanças nas desigualdades sociais na taxa de notificação de violência sexual, foram adotados o coeficiente angular de desigualdade e o índice relativo de desigualdade. Construiu-se *equiplot* para o desfecho em cada variável independente. **Resultados:** A taxa média de notificações de violência sexual no Brasil foi de 4,38 notificações/100 mil habitantes para o período. Houve incremento na taxa de violência e melhoria nas condições socioeconômicas. Observou-se maior taxa de notificações no quintil com melhores condições de vida, bem como aumento na desigualdade da taxa de notificações de violência sexual em função da renda domiciliar e do IDH. Diversos fatores parecem influenciar o aumento das notificações de violência sexual no país. Entre eles, destacam-se a melhoria nas condições de vida da população e a maior sensibilidade moral à violência, contudo ainda há disparidade de notificações entre os municípios de acordo com sua condição socioeconômica. **Conclusão:** A falta de políticas públicas de equidade social em saúde tem interferido nas notificações de violência sexual no país e ampliado as iniquidades em saúde.

Palavras-chave: Violência Sexual. Iniquidades Sociais. Notificação de Abuso. Brasil.

INTRODUCTION

With the recent changes in the epidemiological profiles of the world's populations, a new issue has emerged in the health field: violence. The World Health Organization (WHO) and the United Nations (UN), in the 1990s, declared sexual violence to be a social and health problem, and sought to work together with governments to create a political agenda that included actions to combat and prevent it^{1,2}.

In this context, Brazil, since 1996, with its Inter-American Convention to Prevent, Punish and Eradicate Violence against Women (*Convenção Interamericana para Prevenir, Punir e Erradicar a Violência contra a Mulher*), recognizes sexual violence as a violation of human rights³. Thus, it has searched for tools to combat sexual violence. As such, the Violence and Accident Surveillance System (*Sistema de Vigilância de Violências e Acidentes - VIVA*) was implemented in 2006, with the purpose of making it possible to obtain data and disseminate information on violence and accidents, which would make it possible to get to know the magnitude of these problems⁴. In conjunction with this, the Brazilian government enacted a series of laws to combat sexual violence^{5,6}.

However, these measures still seem to be insufficient to solve the problem, as there are a high number of cases of sexual violence in the country⁷. Minayo⁸ reveals that in order to combat violence, it is necessary to understand how it is structured, including the understanding of its determining context. Therefore, social conditions are an issue that must be considered when trying to understand this theme, because, despite being a worldwide phenomenon, sexual violence affects populations of different degrees of socioeconomic

development differently³. A WHO multi-country study⁹ provides a comprehensive view of patterns of sexual violence in low- and middle-income settings and highlights lower rates of sexual violence in middle-income countries than in low-income countries. In addition, another study¹⁰, in the United States, a high-income country, reveals even lower rates.

In this sense, we call on Dahlgren and Whitehead's model of social determination of health¹¹, which has sparked international discussions about the social macro determinants of health and their relationship with health inequities. The WHO¹ points out a multiplicity of risk factors related to sexual violence that have an additive effect. Such factors are present at different levels, ranging from the individual, such as age, education and use of alcohol and drugs, to the social, such as legislation to combat violence and local poverty level¹².

The Brazilian Federal Constitution¹³, still in 1988, declared the importance of health as a fundamental right and recognizes its social determination, however this understanding has not been reflected in the policies that deal with sexual violence in the country.

In the context of a developing country, with a national sexual violence information system that has been in place for over 10 years, it is essential to understand how the reporting of this condition has evolved over the years with the country's social development and its relationship with social differences. Therefore, this study aimed to assess the trend of notifications of sexual violence in Brazil from 2010 to 2014 and its relationship with the social inequities experienced by Brazilian municipalities.

METHODOLOGY

This is an ecological study that analyzes inequalities in reports of sexual violence in Brazil. Its unit of analysis was 5,565 Brazilian municipalities between the years 2010 and 2014.

The analyzed outcome was the population rate of reporting sexual violence in Brazilian municipalities, which was calculated using the ratio between the number of reports of sexual violence in the municipality and the number of inhabitants in the city multiplied by 100 thousand. The data were extracted from national databases. Reports of sexual violence were obtained from VIVA, while the population count was obtained from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE). The independent variables included are representative of the economic conditions (household income *per capita*) and social development (human development index - HDI) of Brazilian municipalities. These data were collected from the Human Development Atlas (United Nations Development Program - *Programa das Nações Unidas para o Desenvolvimento* (PNUD)/Institute of Applied Economic Research - (*Instituto de Pesquisa Econômica Aplicada* - IPEA/João Pinheiro Foundation - *Fundação João Pinheiro* - FJP).

Because Brazilian population censuses, like the release of UNDP data, occur only every 10 years, linear data from 2010 was extrapolated from 2010 to calculate estimates from 2011 to 2014, which was then used to calculate the independent variables. Then, an exploratory analysis was performed to verify the consistency of the data. The evaluation of outliers,

by means of the standardization of values and the Mahalanobis measure D^2 , did not detect atypical cases. No lost data were detected for the municipalities, and only the data from the five municipalities created in 2013 were not included in the analysis.

A descriptive analysis of the variables per year was performed. Then, the socioeconomic variables were stratified by quintile, the first quintile representing the lowest income and HDI conditions and, consequently, the last quintile representing the highest household income and HDI. A new descriptive analysis of the outcome was made based on the mean and standard deviation per quintile of the independent variables in the municipalities. Based on the syntax of the Stata program, an Equiplot was constructed for the outcome in each independent variable. Equiplot graphs were designed by the International Center for Equity in Health¹⁴, with the aim of analyzing social inequalities over the years.

To explore the factors associated with changes in social inequalities in the reporting rate of sexual violence, the Slope Index of Inequality (SII) was adopted, which calculates the decline or difference in the index (estimated at $-\beta_1$), and the relative index of inequality (RII), which can be interpreted as the global rate ratio between the lower and upper groups in the socioeconomic hierarchy. The SII represents a weighted linear regression to express the absolute difference in the reporting rate of sexual violence between the municipalities with the lowest and highest values on the socioeconomic indicator. For such statistical treatment, the independent variables were categorized into quintiles and transformed into the Redit score, which is based on the sample proportion in each category. In this analysis, the statistical significance of the trend was confirmed by the interaction variable when adjusting the year to the independent variables. The software used was Stata version 14 (Stata Corporation, College Station, TX, United States).

RESULTS

Only data from five Brazilian municipalities were excluded from this study, as these municipalities were created in 2013. Thus, the rate of sexual violence in 5,565 municipalities, from 2010 to 2014, was analyzed, making a total of 27,825 observations. For the period, the average rate of reports of sexual violence in Brazil was 4.38 reports/100 thousand inhabitants. Between 2010 and 2014, there was an increase in the rate of reports of sexual violence followed by an improvement in socioeconomic conditions (Table 1).

Through the analysis of the report rate of sexual violence by socioeconomic quintile, it was observed that there was a higher rate of reports in the last quintile. As previously described, the fifth quintile is formed by the municipalities with the best conditions: highest household income *per capita* and highest HDI. There was also a temporal evolution of all of the quintiles of socioeconomic indicators, demonstrated by the increase in the reporting rate of sexual violence over the years (Table 2).

In Figure 1, we can observe a widening of the distance between the quintiles of socioeconomic variables related to the reporting rate of sexual violence. Such behavior among

socioeconomic quintiles over the years points to an increase in the inequality in the rate of sexual violence reporting due to household income and the HDI.

Table 3 shows the annual absolute (SII) and relative (RII) inequality values. The slope measures the absolute difference in the reporting rate of sexual violence between the lowest and highest income and HDI conditions. The higher this value, the greater the inequality. In 2010, there was an absolute difference of 3.26 between the reporting rate of the highest

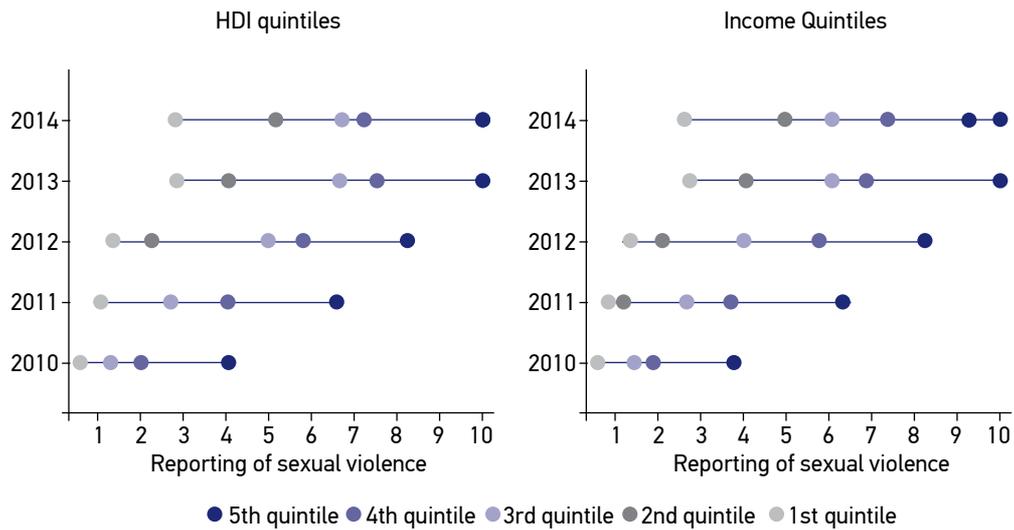
Table 1. Descriptive analysis of the population rate of sexual violence, income *per capita*, and the human development index (HDI) between the years 2010 to 2014.

	2010	2011	2012	2013	2014
	Mean (95%CI)				
Population rate of sexual violence	1.72 (1.54 – 1.90)	3.08 (2.81 – 3.35)	4.52 (4.20 – 4.85)	6.23 (5.82 – 6.64)	6.36 (5.92 – 6.80)
<i>Per capita</i> income (ln BRL)	494 (487 – 500)	509 (502 – 516)	525 (518 – 532)	540 (522 – 547)	556 (548 – 563)
HDI	0.660 (0.657 – 0.661)	0.673 (0.671 – 0.674)	0.686 (0.684 – 0.688)	0.700 (0.698 – 0.701)	0.713 (0.712 – 0.715)

CI95%: 95% Confidence Interval

Table 2. Population rate of sexual violence in Brazilian municipalities by income quintile *per capita* and the human development index (HDI) between the years 2010 to 2014.

Variable	Quintile	2010		2011		2012		2013		2014	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
<i>Per capita</i> income	Q5	3.92	9.44	6.63	13.32	8.67	15.97	10.56	19.89	9.79	16.77
	Q4	1.98	6.53	3.88	11.49	6.08	14.59	7.21	15.96	7.70	14.72
	Q3	1.51	6.95	2.81	12.38	4.23	12.71	6.32	14.35	6.36	15.04
	Q2	0.56	4.32	0.89	3.46	2.26	9.29	4.17	14.86	5.20	24.19
	Q1	0.60	4.26	1.21	6.40	1.38	5.30	2.89	10.24	2.76	8.00
HDI	Q5	4.06	9.52	6.49	13.15	8.23	15.68	10.05	18.62	9.99	17.39
	Q4	2.00	7.29	4.03	11.67	5.79	14.35	7.58	16.44	7.21	14.20
	Q3	1.33	5.94	2.71	12.11	4.97	13.55	6.68	15.90	6.69	14.91
	Q2	0.64	4.38	1.09	4.86	2.27	9.25	4.00	15.13	5.13	24.20
	Q1	0.56	4.31	1.09	6.12	1.36	5.21	2.84	9.22	2.81	7.84



*In 2010, because the population rate of sexual violence in the first and second quintiles of HDI and the *per capita* income are very close, the balls that represent these quintiles in the *equiplot* were superimposed.

Figure 1. Equiplots of the population rate of sexual violence in Brazilian municipalities by income quintile *per capita* and the human development index (HDI) between the years 2010 to 2014.

Table 3. The Slope Index of Inequality (SII) and the Relative Index of Inequality (RII) for the population rate of sexual violence in Brazilian municipalities*.

Variables	Slope Index of Inequality (95%CI)				
	2010	2011	2012	2013	2014
Income	-3.26 (-3.35;-3.16)	-5.66 (-5.79;-5.53)	-8.41 (-8.58;-8.25)	-8.81 (-9.02;-8.60)	-8.46 (-8.68; -8.23)
	<i>p</i> < 0.001				
HDI	-3.32 (-3.42;-3.22)	-5.76 (-5.89;-5.63)	-8.27 (-8.44;-8.11)	-8.84 (-9.06;-8.63)	-8.36 (-8.59; -8.14)
	<i>p</i> < 0.001				
	Relative Index of Inequality (95%CI)				
	2010	2011	2012	2013	2014
Income	0.07 (0.07; 0.08)	0.08 (0.08; 0.09)	0.11 (0.10; 0.12)	0.21 (0.21; 0.22)	0.26 (0.25; 0.27)
	<i>p</i> < 0.001				
HDI	0.07 (0.06; 0.07)	0.09 (0.08; 0.09)	0.13 (0.12; 0.14)	0.22 (0.21; 0.23)	0.26 (0.25; 0.27)
	<i>p</i> < 0.001				

*p indicates the statistical significance of the trend; 95%CI: 95% confidence interval.

and lowest income municipalities and that this difference has widened over the years. As such, in 2014 the absolute difference was 8.46. The same pattern of increase occurred for the HDI variable, whose absolute difference in 2010 was 3.32, changing to 8.36 in 2014. Thus, we found that there is an inequality in the reporting rates of sexual violence between the municipalities with the lowest and highest income and HDI.

We emphasize that the slope coefficients showed negative values due to the type of correlation between the reporting rate of sexual violence and socioeconomic variables. As the highest rates were observed in the best social contexts, the straight line of the regression equation has an opposite slope, hence the negative values. In summary, due to mathematics, where a larger number is subtracted from a smaller one, the value ended up being negative. Regarding the RII values, they express the reason for the reporting rate of sexual violence among the municipalities with the lowest and highest income and HDI conditions. It appears that in 2010 the reporting rate of sexual violence in the municipalities with the lowest income and HDI was 0.07 times higher than that of the municipalities with the highest HDI. This means that rates in municipalities with the worst social conditions have always been lower when compared to those with better living conditions. We also found that over the years, the ratio has increased, that is, the inequalities between municipalities with better and worse conditions have widened.

The temporal trend showed a significant increase in the rates of sexual violence reporting in relation to socioeconomic variables, observed by the increase in the coefficient values over the years. This means that in the period under study there was an increase in the reporting rate of sexual violence. There was also a simultaneous increase in the inequality of reporting, since the quintile of higher income and HDI presented an increase in reporting that was proportionally higher than the quintile representing the lowest social condition.

DISCUSSION

Most of the world's data on sexual violence comes from police records, health services, non-governmental organizations and research, yet such statistics on sexual violence are just the tip of the iceberg. The global magnitude of the problem is much greater than the official information points out, especially in cases resulting from socioeconomic vulnerability¹. In recent years, several countries have made progress in improving the quality of this information. In Brazil, since 2006, the government has systematically obtained data on violence from health care services, which has served as a basic tool to combat violence around the country⁴.

According to official information on violence from national health services, there has been a progressive increase in the reporting rates of sexual violence in the country over the years, accompanied by the development of socioeconomic conditions. Other Brazilian studies have also pointed to the phenomenon of the gradual increase in reports of sexual violence in the country over the years¹⁵⁻¹⁷. As, there is a question as to whether in fact there

was an increase in the prevalence of sexual violence in the country or whether other factors are influencing the increase in reporting.

According to Misse¹⁸, there has recently been an increase in moral sensitivity to violence, which could lead to a steady increase in the number of reports of sexual violence in Brazil. In addition, the advancement in general living conditions during this period of time may have reflected an improvement in the population's access to health services and health information^{19,20}. The expansion of access to health services in conjunction with greater awareness of the importance of reports of sexual abuse cases, both by the population and by health professionals, may also have boosted official statistics on sexual violence. In addition, the development of a legal apparatus in the country in recent years may have contributed to the progressive increase in reports of sexual violence.

Meanwhile, Law n° 10.778/2003⁵ stands out. It makes the reporting of sexual violence mandatory through Decree n° 4.388/2002²¹, which considers sexual violence as a crime against humanity, laws 11.304 / 2006⁶ and n° 12.015 / 2009²², which criminalize sexual violence, among others. Finally, the Brazilian Ministry of Health itself mentions that the progressive structuring of the registration of information on sexual violence and the collection of residues in the public health system has improved information on sexual violence⁷.

The analyzes according to categories of economic and social condition showed that the highest rates sexual violence reporting occurred in the places with the best social and economic indicators. This finding seems to go against current literature, which has revealed a higher prevalence of sexual violence in socioeconomically less favored contexts^{1,23}. We emphasize once again that the statistics used for this work are not the population prevalence of sexual violence, but the number of cases of people who have been seen in health services. As such, Pelisoli et al.²⁴ highlights the predominance of reports of sexual violence in more developed areas than in peripheral areas of the country. In contrast, Moreira et al.¹⁵ observed a higher rate of sexual violence in the North of the country, while Justino et al.¹⁶ and Santos et al.²⁵ pointed to a higher prevalence of cases of sexual violence in socioeconomically underprivileged areas.

Another important finding of this study was the increasing socioeconomic gradient of sexual violence reporting over the years. In all of the years studied, there was an increase in the rates of sexual violence between the income and HDI quintiles, with a concentration of reports in the wealthiest quintiles. If, on the one hand, the findings in the literature^{1,12,26} identify more cases of sexual violence in poorer contexts, on the other hand, our study saw a higher reporting of violence in more favored contexts.

Following this idea, Assis et al.²⁷ affirm that the most economically developed Brazilian federative units have a greater number of health services that report sexual violence. In addition, Sousa et al.²⁸ report that there is still difficulty in filling out the sexual violence report forms, especially in municipalities with lower economic conditions, where services are less structured. Thus, this set of studies, associated with our findings, points to the existence of an inversion in the reports of sexual violence structured by social inequity in Brazil, which makes the socially privileged group appear more often in the official statistics on sexual violence.

Dealing with the socioeconomic factors of health has been a premise of international health policy. According to WHO²⁹, it is a fundamental human right of anyone to enjoy the highest attainable standard of health regardless of economic or social condition. Therefore, health standards and, consequently, access to reporting services enjoyed by the richest must be achieved by all. Thus, measuring health inequalities is an indispensable pursuit in order to make advancements in improving the health situation of social aggregates, in which the analysis of average values is no longer sufficient. This type of analysis is an essential tool for actions that seek greater equity in health³⁰.

Based on the analysis of inequality between the quintiles of income and HDI, it was also noted that over the years this gradient has become even greater with the widening of the difference and the ratio between the reporting rates of sexual violence between the municipalities of extremely hierarchical strata. Currently, with the improvement of the general health conditions of the population, there is a tendency towards a polarization of health problems in socially disadvantaged groups, characterizing a progressive expansion of social inequities in health^{31,32}. This is because in the last few decades there has been an improvement in the living conditions of the population, bettering the social determinants of health, which has had a direct impact on general health conditions. However, the speed of improvement of health conditions in the poorest strata is much slower than in the richest. The health of socially privileged groups is much more sensitive to improvements in social determinants of health than less privileged groups. Therefore, this disparity between the health of the rich and the poor has widened.

Graham and Kelly³¹ point out that there is a conceptual difference between determinants of health and determinants of health inequities. The latter deals with the fundamental structures of the social hierarchy and the social distribution of living conditions. Policies committed to improving health standards and reducing health inequities should think about these concepts and focus both on the progress of social determinants of health and on the determinants of health inequities. Policies focused only on improving the social determinants of health, without also focusing on their distribution among social strata, can lead to a polarization of the problem, increasing health inequities. Roncalli et al.³² mention that in order to reduce health inequities, it is necessary to make the rate of health improvement of the poorest higher than that of the richest groups and so progressively improving among the social strata.

Based on everything that has been presented, there is a polarization of notifications of sexual violence in higher social categories that may not correspond to the reality of the Brazilian population's prevalence of sexual violence. As such, in order to tackle sexual violence in Brazil, more public social policies focused on improving the social conditions of populations are urgent and essential. Additionally, policies focused on improving reports of sexual violence in socially less favored groups are needed to reduce the inequity of reporting, and thus consequently improve this problem in the country. As long as we have low levels of reporting in the least socially favored contexts, we will not be able to develop effective policies to combat and prevent sexual violence. Therefore, this is the great challenge for policy

makers to combat and prevent sexual violence in Brazil: to reduce inequities in reporting so that we can have more realistic statistics.

Sexual violence is a complex condition characterized by multiple causes^{1,8,33}. As such, we do not intend to cover all of the discussions about sexual violence in Brazil with this study. We seek only to understand the social inequities in the reporting of sexual violence based on two classic variables for the study of social determination of health: income and the HDI. However, a range of other social, economic, political and cultural elements can lead to social differentiations of populations with interference in sexual violence statistics which have not been taken into account here.

In addition, unlike traditional studies on the subject that use data from epidemiological surveys, our study was based on statistics from health services, which may have led to an inversion in the interpretation of data. In any case, we believe that the findings of this work, if considered by policy makers, can help to combat sexual violence in Brazil.

CONCLUSION

In Brazil, reports of sexual violence have been increasing steadily over the years. During this period, municipalities with different social and economic realities have demonstrated different statistics regarding the reporting of sexual violence with a concentration of reports in the most socioeconomically privileged groups. It was noted that the disparity in reporting between social groups has widened, pointing to an inequity in health, and indicating the insufficiency of social equity public policies in the context of sexual violence. As such, studies are still needed to broaden the understanding of this social disparity of reporting, and policies focused on improving the reporting sexual violence in the poorest groups are needed, in order to reduce the socioeconomic gradient of the reports.

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