

Physical violence against women by their intimate partner during pregnancy and its relationship with breastfeeding

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Abstract

Objectives: to estimate the association between physical violence against women by their intimate partner during pregnancy and breastfeeding.

Methods: the data source is the 2010 National Demographic and Health Survey (DHS) conducted in Colombia, and 11,416 mother-child dyads were analysed. The relationship between physical violence against women by their partner during pregnancy and breastfeeding indicators was carried out using the weighted propensity score from the Inverse Probability of Treatment Weighting (IPTW). Variables for adjustment were selected through the Directed Acyclic Diagram (DAG) and performed a sensitivity analysis to identify the strength of hidden bias.

Results: according to the data, 6.4% (730) of the women suffered physical violence by their partner during their pregnancy. The median time of exclusive breastfeeding was 1.0 month. No statistically significant relationship was observed with any of the breastfeeding indicators analysed: exclusive breastfeeding (OR=1.17; CI95%=0.82-1.67); breastfeeding at any time (OR=1.61; CI95%=0.58-2.60); and initiation of breastfeeding (OR=1.07; CI95%=0.74-1.2).

Conclusion: although the association between violence against women committed during pregnancy and breastfeeding indicators was not found, the suboptimal breastfeeding practices and high prevalence of violence against women by the partner are two major public health issues in Colombia. Prenatal care professionals can change this scenario by identifying women exposed to intimate partner violence and offering tailored support for breastfeeding practices.

Key words Intimate partner violence, Pregnancy, Breastfeeding, Propensity score



Introduction

During the first few months of life, breastfeeding is the best feeding method for a newborn and has positive effects for both mother and child. It favours the establishment of mother-child attachment and better social adaptation and psychomotor development of the child compared to babies fed with another type of food.¹

Despite its numerous benefits, many mothers do not breastfeed their children; if they do, it is for a short time. In Colombia, the duration of exclusive breastfeeding (1.8 months) and complementary breastfeeding (14.9 months)² are far from the goals set by World Health Organization (WHO), which recommend exclusive breastfeeding for up to six months and complementary breastfeeding up to two years or more.³

Several factors influence the decision of women to breastfeed their children. These include socio-demographic, economic, and behavioural factors. Additionally, the mother's social context can play an important role in breastfeeding practice. Among social context factors, the physical violence suffered by women at the hands of their intimate partners during pregnancy, have been pointed out as risk factors for low breastfeeding rates.⁴ Globally, a third of women have been victims of gender-based violence, with a higher risk of exposure during and after pregnancy.⁵

Literature suggests that pregnancy may be a risk factor for acts of violence against women. Situations where it already exists may exacerbate or modify the pattern of behaviour and the frequency and severity of the episodes of violence. As a result of this violence, there is an increased risk of prematurity, low birth weight, neonatal death, congenital malformations, lack of mother-child attachment and breastfeeding difficulties.⁶ In addition, intimate partner violence (IPV) against women involves physical, sexual and emotional coercion. This coercion can generate stress and alter the hormonal behaviour responsible for the breast milk let-down reflex, and consequently, breastfeeding practices.⁷

Overall, evidences across countries suggests that mothers who experience IPV are less likely to breastfeed optimally,⁸⁻¹⁰ However, systematic reviews presently available show inconsistent results.^{6,11}

Even though it is very relevant to understand the phenomenon of violence against women on a global scale, and particularly that suffered from an intimate partner and its impact on the health of women and newborns, there is a lack of research on the effect of violence during pregnancy on breastfeeding.

This study aims to answer whether there is a relationship between physical violence inflicted by a woman's intimate partner against her during pregnancy and the practice of breastfeeding in Colombia.

Methods

The data source for this article was the National Demographic and Health Survey (DHS) carried out in 2010, in Colombia, provided by the Colombian Ministry of Health and Social Protection through its institutional repository.

The National Demographic and Health Survey (DHS) has been conducted in Colombia every five years since 1990. It collects information on demographic and populational health aspects related to public policy objectives on sexual and reproductive health. It is a survey with national coverage and urban and rural representation for six regions (Caribbean, Eastern, Central, Bogota, Pacific and Amazonia-Orinoquia) and 16 subregions, and for each Colombian region.

The DHS 2010 is a probabilistic, clustered, stratified, and multi-stage sample, including 51,447 households in 258 municipalities. The survey selected women aged between 13 and 69 years (n=67,408) and all individuals aged 59 years and over (n=17,574) living in the selected households. The survey also assessed children under 5 years old, corresponding to all births occurring in the five years prior to the survey (n=15,204).

DHS 2010 used five questionnaires that collected the following information:

1. Household data regarding the infrastructure, composition, and specific characteristics of each of the residents;
2. Complete information of women of childbearing age (15-49 years old), their husband/partner, and each child under 5;
3. Information on cervical uterine cytology among women aged between 18 and 69 years who have had sexual activity, and mammography among women aged between 40 and 69 years;
4. Health information of individuals 59 years old and over;
5. Anthropometric measurements (weight and height) of all children under five years of age and of their mothers.

The present study included women aged between 15 and 49 years, interviewed during the development of DHS 2010, who answered the questions included in the module on violence, and who had a single livebirth from 2004 until the application of the survey. It was necessary to make this restriction because the survey does not identify in which pregnancy the woman was a victim of violence.

The exposure variable was the physical violence by the intimate partner against the women during pregnancy. The analysis did not include sexual or psychological violence because DHS 2010 had only one question regarding

physical violence during pregnancy. This referred to whether “*Someone hit, slapped, kicked, or injured you during pregnancy (or any of the pregnancies)*” and, in this case, the instances in which the husband, ex-husband, boyfriend, and ex-boyfriend committed the violence. Hence, this defined the variable ‘physical violence against women by the intimate partner during pregnancy’.

The outcome variable was breastfeeding, with three indicators for analysis. ‘Exclusive breastfeeding’ was defined as breastfeeding in which the child, during the first 6 months of life, had received only breast milk and may or may not have had oral rehydration or drops of vitamins, minerals or medications.³ ‘Breastfeeding at any time’ was defined as the baby having been breastfed at some point in life, irrespective of whether or not this was the sole method of feeding. Finally, ‘initiation of breastfeeding’ was defined as the moment the child was placed on the mother’s breast. This indicator was further subdivided into two categories: up to the first hour of life and after the first hour of life.

Regarding the covariates of the study, a directed acyclic graph (DAG) was built from the literature review on the study theme, which shows the complex relationship between the different risk factors (Figure 1). DAG is a visual and qualitative tool for selecting confounding variables identified from a theoretical causal model. The arrowheads inform a causal path between two variables, and it is possible, through pre-established rules, to identify a minimum set of variables for adjustment.¹² Twenty variables were initially included, which were either related to exposure, outcome or both (pregnancy planning; women’s age, schooling, occupation and race; marital status; parity; alcohol and drugs consumption by parent; partner’s age and schooling; type of family, wealth index; prematurity; prenatal care; depression and anxiety during pregnancy; social support; birth weight; alcohol and drugs consumption by women and history of women’s violence). After application of DAG’s rules, the minimum adjustment set of variables for analysis of association between physical violence against women by their intimate partner during pregnancy and breastfeeding were: related to the women (pregnancy planning, age, schooling, occupation, marital status, race, and parity), related to the partner (alcohol and drugs consumption, age, schooling), and related to the family context (type of family and wealth index). The wealth index is a composite measure of a household’s cumulative living standard and was calculated using easy-to-collect data on a household’s ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities. The type of family was defined according to its configuration: complete nuclear (formed by a father, a mother, and their children); incomplete

nuclear (a nuclear family where one of the members is missing); expanded (made up of grandparents, uncles, cousins and other blood or related relatives). The analysis did not include the variable “occupation of the woman” because it was not available in the database.

The preliminary data analysis identified the lack of data on variables related to breastfeeding and some covariates, with percentages ranging from 3.1% for women’s education to 35.7% for the baby’s age when first receiving fluids. Multiple imputation was the method of choice for dealing with missing data using the Miss Forest method. It is a nonparametric method for mixed-type data (continuous and categorical variables) based on imputation by prediction of random search data (Random Forest). It consists of realizing multiple decision trees on a data sample, thus predicting the missing values by using a smaller number of variables and then estimating an average value.¹³

To analyze the relationship between physical intimate partner violence against women during pregnancy and breastfeeding, a weighted by propensity score was used from the Inverse Probability of Treatment Weighting (IPTW). This study used the propensity score as a way to correct the imbalance in the distribution of predictors (covariate) that occur in observational studies, thus making the groups comparable and avoiding biased estimates of the effect of intimate partner violence against women during pregnancy and breastfeeding.¹⁴

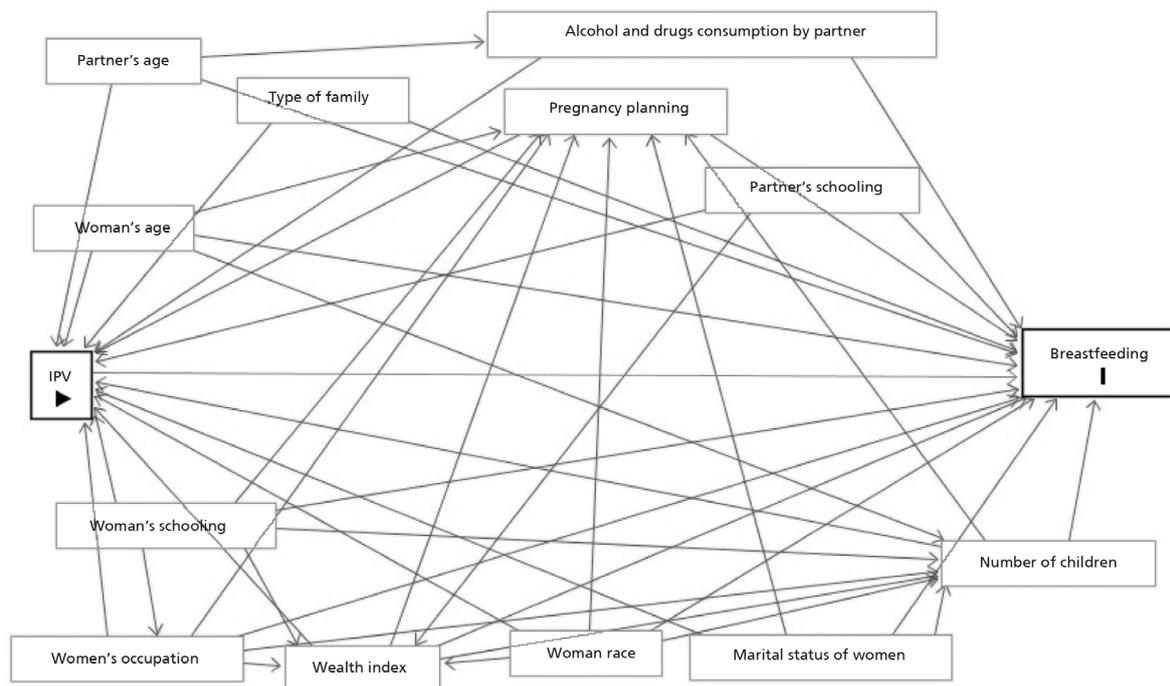
The propensity score calculation was performed using the GBM (Generalized Boosted Modeling) method, a multivariate nonparametric regression technique. Through iterative estimation procedures, this technique attempts to find the propensity score that provides the best balance between the exposed and non-exposed groups, making both groups similar in relation to pre-exposure covariates.¹⁴

The application of GBM allowed the estimation of the probability of a woman suffering from violence committed by her intimate partner during pregnancy, conditional on the values of covariates identified in the DAG (Figure 1).

Checking the common support area and balancing the groups verified adequate propensity score estimation. Visual inspection (box plot) evaluated the common support area, showing a good common support area with an almost parallel box plot. A balance in the distribution of observed covariates was achieved, obtaining standardized differences between means and proportions less than 0.1 and for variances between 0.18-1.2. The mean effect of physical violence by the intimate partner against women during pregnancy was calculated using the odds ratio (OR) with 95% confidence intervals (CI95%) for each breastfeeding indicator considered in the analysis.

Figure 1

Directed acyclic graph (DAG) – Minimum adjustment set for analysis of association between physical violence against women by their intimate partner during pregnancy and breastfeeding.



IPV = Intimate partner violence.

Sensitivity analysis was performed to determine the presence of unobserved confounding variables (hidden bias). To define the sensitivity of the present study, we considered the Rosebaum criterion, which establishes a study sensitive to hidden bias if Gamma values are close to 1.¹⁵

All analyzes were performed using the program R, version 3.4.2 (The R Foundation for Statistical Computing), using the twang and rbounds libraries for propensity score estimation and sensitivity calculation, respectively. All estimates considered the complex sampling design.

Results

There were 11,416 mother-child dyads analyzed. The prevalence of physical violence by an intimate partner during pregnancy was 6.4%. The median duration of exclusive breastfeeding was 1.0 month, and the total time of breastfeeding was 12.0 months. Only 18.2% of babies received exclusive breastfeeding up to six months, but almost all (96.4%) were breastfed at some time. Most babies started breastfeeding until the first hour of life (75.4%), and some did after the first hour of life (26.5%).

The average age of women was 27.9 years, and most of these women lived in an urban area (69.0%). 71.9% were currently married, and 53.5% had a high school education. Native Colombian and Black/Mulato/Afro-Colombian/

Afro-descendants represented, respectively, 11.5% and 10.6% of the studied population. Notably, 77.8% of the women reported another race different from those included in the survey. More than half of the women (56.7%) belonged to the poorest quintiles of the wealth index. Approximately 50% of pregnancies were unplanned, 11% of the deliveries were premature, and 34.2% were cesarean births. Regarding partner characteristics, the average age was 33.2 years, one third of partners were service workers (33.9%), and more than a half had secondary education (55.1%). Regarding behavioural characteristics, 67.7% drank alcohol and 22.1% frequently got drunk (Table 1).

Regarding the estimation of the effect of physical violence by the intimate partner against women during pregnancy on breastfeeding practices, no statistically significant relationship was observed for any of the indicators analyzed, with odds ratios (OR) close to 1 (Table 2). Sensitivity analysis revealed the possibility of omitted or non-measured variables modifying these estimates, as this study was very sensitive to hidden bias, given the Gamma value of 1.1.

Discussion

The present article analyzed the relationship between women's exposure to physical violence from the intimate partner during pregnancy and three breastfeeding indicators (exclusive breastfeeding, initiation of breastfeeding, and

Table 1

Description of the study population. National Demographic and Health Survey. Colombia, 2010.		
Variable	Median	Standard deviation
Total breastfeeding (months)	12.0	9.03
Exclusive breastfeeding time (months)	1.0	2.28
	Mean	Standard deviation
Woman's age	27.9	7.2
Partner's age	33.2	7.6
	N	%
Physical intimate partner violence during pregnancy		
No	10686	93.6
Yes	730	6.4
Exclusive breastfeeding		
Yes	2079	18.2
No	9337	81.8
Breastfeed an any time		
Never breastfed	406	3.6
Breastfeed an any time	11010	96.4
Initiation of breastfeeding		
Up to the first hour of life	8612	75.4
After the first hour of life	2804	24.5
Woman's race		
Native Colombian	1318	11.5
Black/Mulato/Afro-Colombian/Afro-descendent	113	10.6
Other	8885	77.8
Marital status		
Never married	1407	12.3
Currently married	8209	71.9
Formerly married	1800	15.8
Women's schooling		
No education	200	1.7
Primary	2917	25.5
Secondary	6111	53.5
Higher	2188	19.2
Pregnancy planning		
Then	5675	49.7
Later	3140	27.5
No more	2601	22.8
Cesarean birth		
No	7520	65.8
Yes	3896	34.1
Preterm birth		
No	10279	90.0
Yes	1137	10.96
Partner's schooling		
No education	311	2.7
Primary	3158	27.6
Secondary	6288	55.1
Higher	1515	13.3
Don't know	144	1.2
Partner's occupation		
Professional, technical (similar employment)	718	6.29
Director, public employee (high rank positions)	117	1.0
Administrative personnel (similar employment)	548	4.8
Merchant, vendors	1298	11.4
Service workers	3877	33.9
Agricultural work (forester, fisher, animal hunter)	2342	20.5
Machinery operator, transportation (similar employment)	1850	16.2
Other, including army	601	5.3
Don't know	65	0.6
Alcohol consumptions by partner		
Never	1873	16.4
Often	2526	22.1
Sometimes	11416	61.4
Wealth index		
Poorest	3356	29.4
Poorer	3142	27.5
Middle	2363	20.7
Richer	1578	13.8
Richest	977	8.6
Type of family		
Complete nuclear	5034	44.1
Incomplete nuclear	788	7.9
Expanded	4881	42.7
Other	713	6.3

Table 2

Effect of physical violence by the intimate partner against women during pregnancy on breastfeeding. Demographic and Health Survey. Colombia 2010.				
Breastfeeding	OR*	CI95%	OR**	CI95%
Exclusive Breastfeeding				
Yes	1	-	1	-
No	1.27	0.98 - 1.71	1.16	0.79 - 1.72
Breastfeed at any time				
Breastfeed an any time	1	-	1	-
Never breastfed	1.04	0.98 - 1.83	1.06	0.46 - 2.44
Initiation of breastfeeding				
Up to the first hour of life	1	-	1	-
After the first hour of life	1.07	0.75 - 1.24	1.07	0.73 - 1.26

*OR unadjusted odds ratio; **OR adjusted odds ratio (weighted by Inverse Probability of Treatment Weighting - IPTW).

breastfeeding at any time). There was no statistically significant association between the two variables, based on the data obtained from the DHS 2010 for Colombia.

This result is similar to that found in the Pregnancy Risk Assessment Monitoring System (PRAMS). In this research carried out in 47 USA states from 2004 to 2014, the authors did not find a significant association between physical violence during pregnancy and breastfeeding practices.¹⁶

A recent systematic review about the theme showed that among 16 studies, four out of seven studies found that IPV exposure shortened breastfeeding duration; only half of the studies (5 out of 10) found that IPV led to early termination of exclusive breastfeeding, and two out of six studies found that IPV significantly reduced breastfeeding initiation.⁶

A study in Brazil showed similar results with the present study, examining recurrent violence and intimate partner violence and its relationship with breastfeeding. The results did not observe differences in exclusive breastfeeding duration in mothers exposed or not to any kind of violence.¹⁷

Also, studies in Zambia, Malawi e Tanzania; Bangladesh; Africa (including eight countries), Nigeria and India^{8,18,19} presented diverging results. All of these studies used, as a data source, the Demographic and Health Survey to estimate the effect of domestic violence against women during pregnancy on breastfeeding.

Of the three studies conducted in India, two found that experiencing any type of violence (psychological, physical, sexual) increased the risk of non-exclusive breastfeeding within the first 24 hours after birth.^{19,20} Contrary to the two previous studies, in the third study, emotional violence was not associated with a higher likelihood of short duration breastfeeding (less than 1 month or early breastfeeding).²¹

With the same statistically significant results, the Bangladeshi study showed that women who experienced physical or psychological violence from their partner after childbirth were more likely to abandon exclusive breastfeeding early.¹⁸

The study in Zambia, Malawi and Tanzania showed that maternal experience of various types of IPV was associated with suboptimal breastfeeding practices in all three countries.⁸

A study conducted in eight African countries (Ghana, Kenya, Liberia, Malawi, Nigeria, Tanzania and Zambia) showed that violence by an intimate partner had a tendency to be associated with suboptimal breastfeeding practices, and sexual violence was more frequently associated with inappropriate breastfeeding practices.²²

Finally, the study conducted in Nigeria found that the experience of intimate partner violence is also related to improper practices of exclusive breastfeeding.⁹

Although all of these studies analyzed DHS data, they used different types of violence by the intimate partner against women and breastfeeding indicators for analysis. Some focused exclusively on emotional violence, others analyzed the three types of violence, and others only studied physical violence. Regarding the parameters of describing breastfeeding practices, some studies included breastfeeding initiation in the first hour of life, 24 hours after birth and until the first month of life. Other studies evaluated for mixed feeding or early abandonment of breastfeeding. These situations could therefore limit the comparability of the studies and their results. Studies with population samples derived from public health systems (and not DHS, as in previous studies) showed results that are more homogeneous. A study in Bihar, India, found that women who experienced violence, compared with those who had never experienced physical or sexual violence from their partners at any time in their lives, had lower odds of early breastfeeding (OR=0.81; CI95%=0.71-0.93) and exclusive breastfeeding (OR=0.83; CI95%=0.7-0.96).²³

In line with previous studies, a survey of 17,564 women in Australia found that women who reported a history of violence from their intimate partners were significantly more likely to discontinue early exclusive breastfeeding in the postnatal period (OR=1.4; CI95%=1.0-2.0).²⁴

A cross-sectional study conducted in Brazil involving 811 women with children up to 5 months of age who

were users of primary health care units showed that severe physical violence by an intimate partner during pregnancy is an independent risk factor for breastfeeding abandonment. After controlling for maternal age, socioeconomic status, and alcohol consumption, women exposed to physical violence had a 31% higher incidence of abandoning exclusive breastfeeding compared to women not exposed to physical violence (HR=1.30, CI95%=1.01, 1.69).²⁵

Likewise, another study conducted in Brazil with a cohort of 564 women with children who were an average age of 30 days old showed, in the first assessment, that children of women who experienced severe physical violence by their partner in the 12 months prior to the interview, were at a higher risk of early interruption to exclusive breastfeeding in the second month of life and in the following month. Even after controlling for possible confounding factors (gender, age, birth weight, age, maternal education and household goods), this trend was observed.¹⁰

A common issue in the studies described above is that all study subjects were required to assess the history of violence at some point in their lives. Differences in the period in which women experience violence (before and/or during pregnancy), may have influenced the outcomes. It seems that chronic violence suffered for most of the woman's life has a greater impact on breastfeeding. Physical violence is generally associated with psychological violence, which is a factor related to depression and anxiety. This could interfere with early interruption of exclusive breastfeeding and could be associated with the mothers' perception of lack of breast milk.²⁶

It is worthwhile that the existing literature is characterised by various outcome measures for both IPV and breastfeeding. The divergent results among the studies may limit the comparability, including the present one, since there are some methodological differences such as various breastfeeding outcomes (initiation, duration, and exclusive breastfeeding) and stages (lifetime, one year before pregnancy, during or after pregnancy); different methods of assessing and types of violence (physical, psychological or sexual); differences in sample sizes, and factors for adjustment in multiple models.

All aspects mentioned above are possible causes of differences across studies. The relationship between partner violence against women and breastfeeding is a complex issue beyond the methodological problems described in the previous paragraph. To explain this behaviour, some researchers suggest two conceptual hypotheses. The first is the 'deficit hypothesis', which refers to the fact that mothers exposed to violence from their partner (mainly physical or sexual) may present behavioural or physiological difficulties in relation to

breastfeeding.²⁷ A mother exposed to such violence may relate distressing sexual experiences to breastfeeding and breasts, which may be associated with early termination of breastfeeding. She may also be physically injured, anxious, or depressed, which may then affect her ability to breastfeed the baby.²⁷

The second, a 'compensatory hypothesis', suggests that women exposed to violence from their partner may be more sensitive to their children's needs and show some more positive care and parenting behaviour, including better infant feeding practices. Some studies have shown that compensatory behaviour may lead the mother to be more loving, emotional and receptive, due to her exposure to violence. However, both hypotheses necessitate further investigations that examine other variables to understand the conditions, situations and feelings faced by women who suffer intimate violence from their partners during pregnancy.²⁸

Some methodological issues need to take in account before considering the implications of the results of this study. Regarding our findings, Colombia's DHS 2010 has some limitations. First, a cross-sectional design has some limitation to estimate the effect of an exposition on the outcome. Notwithstanding that the reverse causality in this survey is unlikely, longitudinal and prospective studies are more suitable to assess the causal effect of physical violence against women during pregnancy and breastfeeding. A single question about physical violence committed by the intimate partner during pregnancy has less possibility of capturing the complexity of the violence and the different episodes of violence that a woman can experience in the different stages of her life, which would underestimate the results. All these factors may be a possible explanation for the lack of association with breastfeeding.

Other relevant factors interfering in this relationship could be the contextual and individual circumstances that determine a woman's awareness regarding her perception of violence, which may be conditioned to each woman's own experiences and culture. DHS uses WHO ethical and safety protocols for research on IPV,²⁹ but despite these protocols, a proportion of women may not feel confident reporting IPV due to fear related to the consequences of disclosure or stigma, and IPV may be subject to underreporting. Besides, the survey did not consider the severity of violence nor the chronicity of episodes of abuse during pregnancy. This data could clarify the results, since more severe and chronic abuse would be a greater predictor of women's behavior in relation to childcare practices such as breastfeeding.

Among the positive aspects, we highlight the use of the DAG for selecting the adjustment variables and data analysis with a propensity score. The construction of a conceptual theoretical model with the implementation

of a Directed Acyclic Diagram (DAG) allowed a visual representation and a mean, through arrows, to identify the causal relationships among partner violence against women during pregnancy, breastfeeding, and the different covariates. The construction of the DAG allowed the identification of possible confounding factors and mediating and colliding variables, reducing the likelihood of confounding or selection bias.

The propensity score as a method of analysis can be considered another positive aspect of the study. It allowed a balance in the covariates observed between exposed and unexposed groups, in an attempt to approximate an observational research to an experimental one.

Although this study did not present statistical association between physical violence against women by their intimate partner during pregnancy and breastfeeding, the analysis broadens the evidence base in different ways. First, it is a study conducted in Colombia, where there is no such study that analyzes this relationship. Second, a large and representative national sample was considered for the study, such as the National Demographic and Health Survey. Third, different breastfeeding indicators were analyzed (exclusive breastfeeding, initiation of breastfeeding, and breastfeeding at any time).

In the view of the importance of the theme, it is necessary to ensure researches that enable in-depth investigation of all kinds of violence against the women during the pregnancy. Prospective studies should be carried out, clearly defining pregnancy as a critical moment for the occurrence or exacerbation of violence against women, addressing the different forms of violence in a standardised way and using breastfeeding indicators recommended by the WHO.

In view of the high prevalence of IPV and suboptimal breastfeeding practice in Colombia, an active investigation by health professionals is strongly recommended for women at risk or victims of IPV. Pregnancy is the time when a woman maintains contact with health services, and health professionals can help change this scenario, identifying women exposed to violence and offering individualised support for the practice of breastfeeding.

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Authors' contribution

Aristizábal LYG conceived of the presented idea, developed the theory, performed the analysis and prepared a first draft of the manuscript. Theme-Filha MM discussed the methodological approach to data analysis. The two authors discussed the results and contributed to the final version of the manuscript.

The authors declare no conflicts of interest.

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