

## Intimate partner violence, breastfeeding, breastmilk substitutes and baby bottle use in the first year of life

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**Abstract** *This article aims to investigate the relationship between intimate partner physical violence (IPPV) and breastfeeding (BF), use of breastmilk substitutes (BMS) and bottle-feeding among children aged 12 to 15 months. This is a cross-sectional study with mothers in primary care facilities of the city of Rio de Janeiro. IPPV was identified by the Brazilian version of the Conflict Tactics Scales 1-Form R and feeding practices were identified by a 24-hour Dietary Recall. Associations were verified by logistic regression with odds ratio (OR) estimates and 95% confidence intervals. BF was offered to 58.5% of the children and BMS to 88.5%. Also, 70.5% of the children used a baby bottle. Physical violence was observed in 26.7% of couples. Households where couples physically abuse each other are more likely to not breastfeed (OR=2.14, p-value=0.030), to use breastmilk substitutes (OR=5.15, p-value=0.03) and bottle-feed (OR=2.71; p-value=0.01), when compared to households without physical violence. The results highlight the need to investigate intrafamily relationships in cases where inadequate breastfeeding practices are identified, and to enable health professionals to support families in conflict situations.*

**Key words** *Breastfeeding, Domestic violence, Bottle-feeding*

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## Introduction

Breastfeeding has been proven as the ideal feeding practice to promote child growth and development, and is recommended exclusively for the first six months of life and should be continued up to two years of age - or older - while complemented with healthy foods<sup>1</sup>. Nonetheless, data from national studies reveals that, in the first month of life, 18% of children already consumed water, teas and other types of milk, and, before the age of six months, salty food and fruits are already introduced. Similarly, the late introduction of food is also observed<sup>2-5</sup>.

Over the years, several studies have investigated the consequences of inadequate feeding practices on children's health during the first thousand days of life<sup>6-8</sup>. For example, malnutrition is linked to the world's leading causes of death and is directly associated with inadequate food intake, especially early interruption of exclusive breastfeeding and inadequate complementary feeding practices<sup>9-11</sup>. In parallel, the literature from the last decades, has highlighted the increasing rates of overweight and obesity in childhood<sup>12-14</sup>. According to global data, in 2016, almost 40.6 million children under five were overweight or obese<sup>15</sup>.

Appropriate breastfeeding and complementary feeding practices play a significant role in improving children's health and nutrition. Some authors estimate that adequate and opportune complementary feeding, along with continued breastfeeding for up to two years, could save the lives of millions of children under the age of five per year<sup>16,17</sup>. Also, they can provide significant benefits during adolescence and adulthood<sup>7</sup>.

Besides that, devices such as nipples, bottles, and mini baby bottles are sources of contamination, therefore unsafe for children, and are harmful to speech and chewing development, as well as to breast acceptance<sup>18-20</sup>.

Some factors related to inadequate breastfeeding practices include: lower maternal age; low schooling level; negative previous experience with breastfeeding; lack of knowledge about the management of breastfeeding, its advantages, and negative consequences of the use of baby bottles, nipples, pacifiers and infant formulas; return to work in the immediate postpartum period; mother-child separation in the first months of life; lack of family support, depression and family violence<sup>2,4,21-27</sup>.

Research on the relationship between intimate partner violence (IPV) and breastfeeding

practices shows an association with interruption of exclusive breastfeeding in the first months of a child's life, and more recently, with the introduction of fluids and solid foods before the fourth month of life<sup>28,29</sup>.

Results from a recent systematic review point to a lower likelihood to initiate breastfeeding and breastfeed, and a higher likelihood of discontinuing exclusive breastfeeding among women victims of violence. Also, IPV is associated with the introduction of breastmilk substitutes, mixed feeding practices, and early introduction of liquids and solid foods<sup>30</sup>. It is also noteworthy that the age range included in the investigations is limited to the first six months of life.

The role of family environment in children's growth and feeding practices has been investigated in recent research<sup>27,29,30</sup>. However, the relationship between intimate partner violence and breastfeeding practices in the first year of life should be further explored.

From this perspective, this study aimed to investigate the association of intimate partner physical violence and breastfeeding, use of breast milk substitutes and bottle feeding in the first year of life of children attended at primary care facilities of the city of Rio de Janeiro.

## Methods

### Study design and population

This is a cross-sectional study with information derived from a prospective cohort study that followed the first year of life of newborns attended at four primary care facilities of Rio de Janeiro from June 2005 to December 2009. The interviews with the mothers were held in the first, second, third, fifth, seventh, and thirteenth months of the child's life.

In order to minimize loss to follow up, only the children who participated in the first two interviews made up the cohort baseline and were followed for subsequent months. Also, the interviews were scheduled to coincide with mothers' return visits to the pediatrician or for child's vaccination, according to the Ministry of Health's vaccination schedule.

### Inclusion criteria

The sample consisted of 217 mothers and their children who participated in the baseline and thirteenth-month interviews, that provided

information about the outcome (feeding practices within the 24 hours before the interview) and about the exposure (intimate partner violence). This study included children up to 15 months of life who were single fetuses of biological mothers.

### Data measurement and collection

The information used in this study was collected through interviews with pre-tested questionnaires conducted by previously trained researchers (nutritionists).

### Outcomes: breastfeeding practices

Breastfeeding practices in the 24 hours before the interview were investigated in the thirteenth-month interview using a closed-ended question instrument adapted from those used in surveys on national multi-vaccination campaign days, which included questions on the consumption of breastmilk, other types of milk and other foods, including water, teas and other fluids.

The outcomes, Breastmilk (BM) and Breast Milk Substitutes (BMS) – infant formula and/or cow's milk -, were categorized dichotomously: received = 0, did not receive = 1. BMS. Besides these variables, we investigated baby bottle use, also categorized dichotomously.

### Central exposure: intimate partner physical violence

Data regarding intimate partner violence were obtained by asking mothers about strategies used by them and their partners to resolve possible disagreements. The Portuguese version of CTS-1 (Conflict Tactics Scales - Form R)<sup>31</sup>, applied on the thirteenth-month of the child's life, was used to collect this information.

The CTS-1 instrument contains 18 items and aims to measure the strategies used to resolve possible disagreements occurred twelve months before the interview and, indirectly, to identify a situation of violence. The form covers three tactics for dealing with conflict: "argumentation" (use of rational discussion - items a-c); "verbal violence" (verbal and nonverbal use for the purpose of threatening, injuring or hurting - items d-f, h-j); and "physical violence" (use of physical force to deal with conflict - items k-s). Overall Physical Abuse, in which explicit physical force is used, was subdivided into Minor Physical Abuse (items k-m; throwing things at one another; pushing or grabbing; slapping or smacking); and Severe Physical

Abuse (items n-s; kicking, biting or punching; (attempting) hitting with objects; beating; strangling or suffocating; threatening with weapon/knife; or using them against each other).

Four answer options were available for each item on the scale: "Sometimes reacted this way"; "Often reacted this way"; "Already reacted this way, but not in the last 12 months"; "Never reacted this way"<sup>32</sup>.

The relationships appreciated were that of the partner concerning the mother and vice versa. Intimate partner physical violence (IPPV) was rated positively when women responded (1) or (2) to at least one of the items on the physical violence scale (items k-s), either as victim or perpetrator. This classification was also used for minor physical violence (items k-m) and severe violence (items n-s). The categories of violence: overall physical, minor physical, and severe physical were dichotomized as proposed by Straus<sup>33</sup>.

### Measuring covariates

The covariates investigated in this study were collected at baseline: possession of household items, social network, maternal schooling, maternal age, common mental disorders, and mother current working status.

The possession of household items was evaluated from the following items: stereo, washing machine, tumble dryer, steam iron, electric oven, freezer, multiprocessor, vacuum cleaner, microwave oven, computer, and DVD player. Considering the median distribution, the cutoff point >3 was considered to be the higher possession of household items.

The social network was measured through questions regarding the number of friends and relatives with whom the woman could rely on in the last 12 months<sup>34</sup>. This variable was dichotomously analyzed (0-2 and three or more relatives or friends).

Common mental disorders (CMD) were assessed using a 12-item instrument, namely, the General Health Questionnaire (GHQ-12)<sup>35</sup>, with twelve items reflecting feelings of depression, anxiety, lack of confidence and inability to cope with typical situations. Each item had four answer options, and the first two were classified as lack of symptoms (0 points) and the last two as the presence of symptoms (1 point). After adding up scores, we obtained a scale from 0 to 12 and, from this scale, the mental disorders variable was classified into three categories: common mental disorders ( $\geq 3$  positive responses), severe mental

disorders ( $\geq 5$  positive responses), and depressive symptoms ( $\geq 9$  positive answers)<sup>36</sup>.

### Data processing and analysis

The questionnaires were checked, coded, and 100% of entries were reviewed, and a small percentage of errors was found and corrected. The software Epi Info 6.04<sup>37</sup> was used for data storage, and the analyses were performed using the R-Project version 2.11.1 statistical package<sup>38</sup> and Stata 11<sup>39</sup>.

Initially, the prevalence of the dependent variables, central exposure, and covariates were estimated. Associations between covariates and breastfeeding practices were verified through the odds ratio (OR) estimates and respective 95% confidence intervals (95% CI).

For the multivariate analyses, a logistic regression model adjusted by the covariates cited in the literature as relevant for this relationship was performed: possession of household items, mother current working status, maternal age, social network and CMD (suspected depression)<sup>4,25,26,40</sup>. A power of 80% to detect as significant ( $p < 0.05$ ) an odds ratio of 1.6 was considered, taking into account the prevalence of non-breastfeeding among unexposed of 38%.

### Ethical issues

The Ethics Committee of the Institute of Social Medicine of the State University of Rio de Janeiro approved the project.

### Results

Of the 217 children, 50,9% were male and had a mean age at the time of interview of 12,8 months  $\pm 1,08$ . The prevalence of breastmilk consumption and its substitutes were 58,5% and 88,5%, respectively. Besides, it is noteworthy that more than 75% of the children used baby bottles. Concerning intimate partner physical violence, the prevalence of overall, minor, and severe physical violence was 26,7%, 25,8%, and 11,1%, respectively (Table 1).

Significant associations were observed in the bivariate analyses between overall physical violence and non-breastfeeding, as well as the supply of breastmilk substitutes and bottle feeding (Table 2).

In multivariate analyses, the associations remained significant even after adjusting for co-

variates (possession of household items, mother current working status, maternal age, social network, and suspected depression). Couples mutually physical abuse each other are 2,14 times more likely not to offer breastmilk (CI 1,06-4,31), 5,15 times more likely to provide breastmilk substitutes (CI 1,13-23.4) and 2,71 times more likely to use a baby bottle (CI 1,19-6,16), compared to couples who do not physically abuse each other (Table 2).

### Discussion

This study pioneered the evaluation of the relationship between IPPV and breastfeeding practices of children in the first year of life. The results show that physically abusive couples are twice as likely not to offer breastmilk, five times as likely to offer breastmilk substitutes, and twice as likely to bottle-feed their children, compared to couples who do not physically abuse each other.

In general, previous studies investigating intimate partner violence as a risk factor for improper child feeding practices have focused on breastfeeding practices in the first months of life, such as the lower intention to breastfeed<sup>41</sup>, early discontinuation of exclusive breastfeeding<sup>28,29,42</sup>, lower likelihood of initiating breastfeeding<sup>42,43</sup> and shorter duration of breastfeeding<sup>44</sup>.

In a literature review on the consequences of domestic violence on child growth, Yount *et al.*<sup>45</sup> observed that maternal physical, nutritional, and mental health mediated this effect. The authors pointed out that from risk behaviors, such as inadequate prenatal and childcare, they led to unfavorable outcomes for child nutritional status.

Also, other authors suggest that abused women may have low self-esteem, lack of autonomy and physical and mental disabilities to perform their daily activities, such as choosing and preparing food, eventually offering formulas, and they further point out that depression and maternal anxiety can result in reduced social support and breastfeeding care<sup>46-51</sup>. Thus, it is possible to point out women's mental health as an intervening variable in the relationship between IPPV and suboptimal breastfeeding practices.

Concerning feeding with breastmilk substitutes, besides the mother/child-related risks, feeding with infant formula increases the consumption of dwindling resources and accumulation of non-biodegradable waste, repercussions in the household's budget, as well as consequences concerning changes in the mother-baby bond<sup>52-54</sup>.

**Table 1.** General characteristics of the population of four UBS in the city of Rio de Janeiro, 2005/2009.

Characteristics	n	(%)	Total
Possession of household items			
Three or more	129	59.4	215
Less than three	86	39.6	
Maternal schooling			
Full elementary school and over	136	68.7	198
Incomplete elementary school	62	31.3	
Mother currently working			
Yes	74	34.3	216
No	142	65.4	
Maternal age			
< 20	30	15.1	
20-34	146	73.4	199
≥ 35	23	11.6	
Suspected depression			
Yes	11	94.9	214
No	203	5.1	
Support network			
None	8	4.0	
1	31	15.7	198
2	25	12.6	
3 and over	134	67.7	
Breastmilk			217
Yes	127	58.5	
No	90	41.5	
Breastmilk substitutes			217
Yes	192	88.5	
No	25	11.7	
Baby bottle			217
Yes	153	70.5	
No	64	29.5	
Overall IPPV			
Yes	58	26.7	217
No	159	73.3	
Minor IPPV			
Yes	56	25.8	217
No	161	74.2	
Severe IPPV			
Yes	24	11.1	217
No	193	88.9	

Source: The authors.

Although the current recommendation by the competent bodies is that children between 6 months and 2 years of age should receive family food and breastmilk<sup>3,52,53</sup>, according to WHO, less than one in five children are breastfed for 12 months in high-income countries, and only two out of three children between 6 months and 2

years of age receive breastmilk in low- and middle-income countries<sup>54</sup>.

Breastmilk is the ideal food for infants as a source of nutrients, although alone may not meet nutrient and energy needs from the sixth month of life. Also, the benefits of continued breastfeeding are established for both mother and child, such as a lower risk of breast cancer among women and a lower likelihood of childhood obesity<sup>55,56</sup>.

Concerning partner violence, in the population studied, 26,7% of couples physically abused each other, and about 11% severely did so. Research on the magnitude of intimate partner violence has intensified over the years. For example, a population-based, cross-sectional study in the urban area of Florianópolis revealed the prevalence of experiencing any physical violence (17%), moderate physical violence (16,6%) and severe physical violence (7,3%) between men and women. The authors observed that the more severe the act of violence, the higher the occurrence of violence against women<sup>57</sup>. Also, most physical abuse victims are subjected to various violent acts over long periods<sup>58,59</sup>.

It is worth mentioning that the studied populations are diverse, that these studies investigated different types of violence and used different instruments in their measurements, thus hindering comparison of their findings. Despite these discrepancies, this is a high-scale event, and efforts must be made in order to improve this situation. The construction of strategies that encourage dialogue and promote the exercise of a peace culture seems to be the path to achieving this aim<sup>60</sup>.

This study has some significant limitations. While cross-sectional, one could identify that the time of exposure to violence, 12 months before the interview, was associated with breastfeeding practices, observed from the 24-hour recall, ensuring a cause-effect temporality.

The outcomes measuring also deserves comments. This process used a 24-hour recall, which has pre-defined foods and closed-ended response options. Carvalhaes<sup>61</sup> found that the use of current data on infant feeding minimizes errors related to the informant's memory. Also, poor diet variety of children under one year of age makes the 24-hour recall a useful tool for assessing the food intake of this age group, mainly when it already contains the list of the main foods consumed by infants, which leads to reducing data collection errors when using this method. The advantage of using this method is the lower probability of change in eating habits since information is collected after consumption<sup>62</sup>.

**Table 2.** (Crude and Adjusted) Odds Ratios, 95% Confidence Intervals (95% CI) and significance level (p), between exposure variables and outcomes. Rio de Janeiro, 2005/2009.

Endpoints	Intimate partner physical violence (overall)			
	Crude		Adjusted*	
	OR	95% CI p-value	OR	95% CI p-value
No breastfeeding	1	1,01 3,74	2,14	1,06 4,31
	1,94	0,031		0,03
Breastmilk substitutes	4,71	1,1 42,6	5,15	1,13 23,4
	1	0,02		0,033
Use of baby bottle	1,86	0,88 4,19	2,71	1,19 6,16
	1	0,08		0,01

\*Covariate-adjusted analyses: Possession of household items, mother currently working, maternal age, social network and suspected depression.

Source: The authors.

Also, noteworthy is that this study uses a scale to measure IPPV adapted to the Brazilian population and whose psychometric properties are adequate, which is fundamental for the success of these investigations on violence.

In light of these considerations, the findings of this research point to the relevance of IPPV in determining the practices of breastfeeding children between 12 and 15 months of age. Although several factors have been pointed out in the literature as determinants of these practices, so far, no other study has studied this relationship with IPPV in this age group and national contexts.

The identification of intimate partner violence is essential for the implementation of victim support strategies, and these findings contribute to the elaboration of promotion and prevention actions, both concerning the eating habits of children in the first years of life and intimate partner violence. These strategies must incorporate family violence as another factor related to the inadequate introduction of food, interruption of continued breastfeeding, family food choices and, consequently, as another target for intervention.

It is also highlighted that violence is a complex phenomenon that involves not only one individual but all members of the family<sup>3,63,64</sup>. Health facilities are strategic places of action,

since women and children, in general, are those who most seek health services due to physical, mental, or emotional damage. Also, the complex context surrounding the victim and its relationship with the perpetrator makes coping with violence extrapolate health services, requiring the involvement of different sectors such as public safety, justice, and labor, as well as the involvement of organized civil society, setting up integrated service networks.

## Conclusion

This study pioneered the investigation of the relationship of IPPV and practices of breastfeeding children in the first year of life. Physical violence between couples is associated with not breastfeeding and using bottles. Violence affects not only the victim but all family members, especially women, who are primarily responsible for the care of their children and family feeding practices.

A closer perspective of health professionals on aspects related to these events may assist the decisions of violence victims to address the conflict situation, stimulate their autonomy, and improve their relationship with feeding practices.

## Collaborations

RS Mezzavilla and MH Hasselmann were responsible for the conception and design of the study, performed the analysis and interpretation of the data, prepared, revised and approved the final version of the manuscript. GVB Vianna and AC Lindsay prepared, revised and approved the final version of the manuscript.

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