



## Research article

# The association between intimate partner violence and breastfeeding practices in Cameroon: An analysis from demographic and health survey of 2018

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## ABSTRACT

Intimate partner violence is a major public health concern around the world. While its degrading effects on maternal health are well documented, it is not clear establishing a link with child health outcomes, especially on breastfeeding practices. Therefore, this paper aims to analyze the association between Intimate partner violence and breastfeeding practices in Cameroon using data from the 2018 demographic and health survey. Intimate partner violence is apprehended from its three dimensions (physical, emotional and sexual violence), and the two key breastfeeding practices are considered: early initiation to breastfeeding within an hour of delivery for children under 24 months of age, and exclusive breastfeeding during 24 h preceding the mother's interview for children under 6 months. The results of descriptive statistics suggest that 51.91 % (n = 1704) of mothers whose infants between 0 and 23 months of age who acquired early initiation to breastfeeding and 39.61 % (n = 484) of mothers whose infants between 0 and 5 months of age practiced exclusive breastfeeding. The estimated results of the logistic regression model suggest that emotional violence and sexual violence were significantly associated with low chances of early initiation to breastfeeding (OR: 0.675; 95 % CI: 0.528, 0.864;  $p < 0.05$ ; OR: 0.741; 95 % CI: 0.525, 1.046;  $p < 0.1$ ), which is not the case with physical violence which has no significant association. No dimension of Intimate partner violence was associated with exclusive breastfeeding, independently or with control for infant, maternal and household characteristics. We further performed robustness analysis, and the findings suggest that the associations are robust to consider another measure of Intimate partner violence and the duration of maternity leave. Thus, to improve breastfeeding practices, in particular early initiation to breastfeeding, public decision-makers should strengthen the fight against domestic violence by emphasizing sexual and emotional violence. This paper provides a benchmark for several future investigations that could discuss other breastfeeding practices and the policy challenges towards the length of maternity leave.

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## 1. Introduction

Breast milk is the first natural food for infants, and it is the best source of nutrition for new born babies. It is an important input which is very crucial or vital for healthy growth, necessary for development in infants [1]. Optimal Breastfeeding is undoubtedly essential for both the infant and the mother [2]. For infants, breastfeeding aids in lowering the incidence of childhood infections such as diarrhea, ear infections, and pneumonia [3]. Additionally, it mitigates the consequences linked to malnutrition and fosters cognitive and socio-emotional development [1,4–6]. For mothers, breastfeeding helps to reduce the risk of postpartum haemorrhage and depression, the risk of breast cancer, as well as the incidence of breast cancer and premature mortality resulting from various infectious diseases [1,7].

Conversely, the absence of breastfeeding and exposure to breast milk substitutes have serious repercussions on infants and mothers. Indeed, non-breastfeeding contributes to approximately 595,379 infant deaths annually worldwide, with 38 % attributed to diarrhea and 62 % to pneumonia [8]. Sub-Saharan Africa bears more than 56 % of global infant mortality, with 64 % occurring in lower-middle-income countries. For mothers, estimates show that non-breastfeeding leads to 2626 breast cancer-related deaths and 1471 ovarian cancer-related deaths in sub-Saharan Africa [8]. More so, the authors added that breastfeeding could avert up to 58,230 future maternal deaths annually from diabetes and diabetic related diseases, 2,27,069 future deaths from breast cancer and 13,644 future deaths from ovarian cancer.

In recent years, significant research focus has been directed towards early initiation and exclusive breastfeeding [2,5,9–11]. Early initiation is defined as the act of starting breastfeeding immediately or within an hour after giving birth, whereas exclusive breastfeeding is a situation in which an infant receives only breast milk from the mother or from a wet nurse for the first 6 months of life, and no other solid or liquid except drops or syrups containing vitamins, minerals, supplements or drugs [12]. Despite the multiple benefits associated with maternal breastfeeding, a substantial percentage of children worldwide do not adhere to the breastfeeding guidelines recommended by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) [8]. In 2015, global rates of early initiation to breastfeeding and exclusive breastfeeding were estimated at 45 % and 43 % respectively [13]. Using data from Demographic and Health Surveys (DHS) from 51 low- and middle-income countries, with 53 % in Africa, recent findings estimate that 54.2 % correspond to the prevalence of early initiation to breastfeeding while 44.4 % correspond to exclusive breastfeeding prevalence [5]. In Cameroon, according to statistics from the last two DHS, early initiation to breastfeeding increased between 2011 and 2018, from 39.9 % to 48 %, while in the same period exclusive breastfeeding also evolved, increasing from 31.4 % to 39.7 %.

Breastfeeding can be influenced by various factors including socioeconomic, cultural, biological and psychological factors, and even obstetric service delivery factors [12,14,15]. Nevertheless, several studies identify intimate partner violence (IPV), also called domestic violence, as a factor that may hinder breastfeeding in the first hours after childbirth or in the months that follow [16–19]. In fact, IPV can be defined as “the willful intimidation, physical assault, battery, sexual assault, and or other abusive behavior perpetrated by an intimate partner against another” [20]. IPV is associated with health damage in women. These involves physical damage, reproductive and mental health problems, neurological and chronic health problems, permanent disabilities, suicidal tendencies, and other cases that could lead to death [4,21–23]. Beyond these consequences on the health of the woman, IPV jeopardizes the well-being of her children and other members of the household, since they could develop high risks of post-traumatic stress and psychological depression, sexual dysfunction and anxiety [19,23].

According to WHO estimates of 2018 [24], one in three women (33 %) were reported to have been victims of IPV. The same report shows that the prevalence of IPV is estimated at 23.2 % in developed countries, 37 % in sub-Saharan Africa and 65.64 % in Central Africa. In Cameroon, over four women out of ten aged 15–49 who are either in union or who happen to have ended one (44 %) were said to have experienced violence at some point from a current or former partner. More so, 32 % of these cases occurred within the last 12 months [25].

There are three reasons why this paper focuses on IPV. Firstly, IPV is recognized as one of the most frequent violation of human rights [24], and constitutes a major social concern and public health problem concern in both developed and developing nations [5]. Secondly, domestic violence reduces a woman's ability to make choices and strategic decisions for herself and the children; thus hindering her autonomy [2]. Thirdly, during pregnancy, a period in which a woman is highly vulnerable, women continue to be abused by their intimate partners, which affects not only their own health but also that of the foetus. For many authors, pregnant women who experienced IPV are less likely to practice early breastfeeding and exclusive breastfeeding during the first 6 months after delivery [5, 10,18,26]. It's also argued that IPV is linked to increased risks of premature births and could lead to admission of the newborn baby to intensive health care units [27]. However, in Cameroon, questions remain unanswered about the relationship existing between IPV and breastfeeding. It is therefore essential to provide answers to these questions.

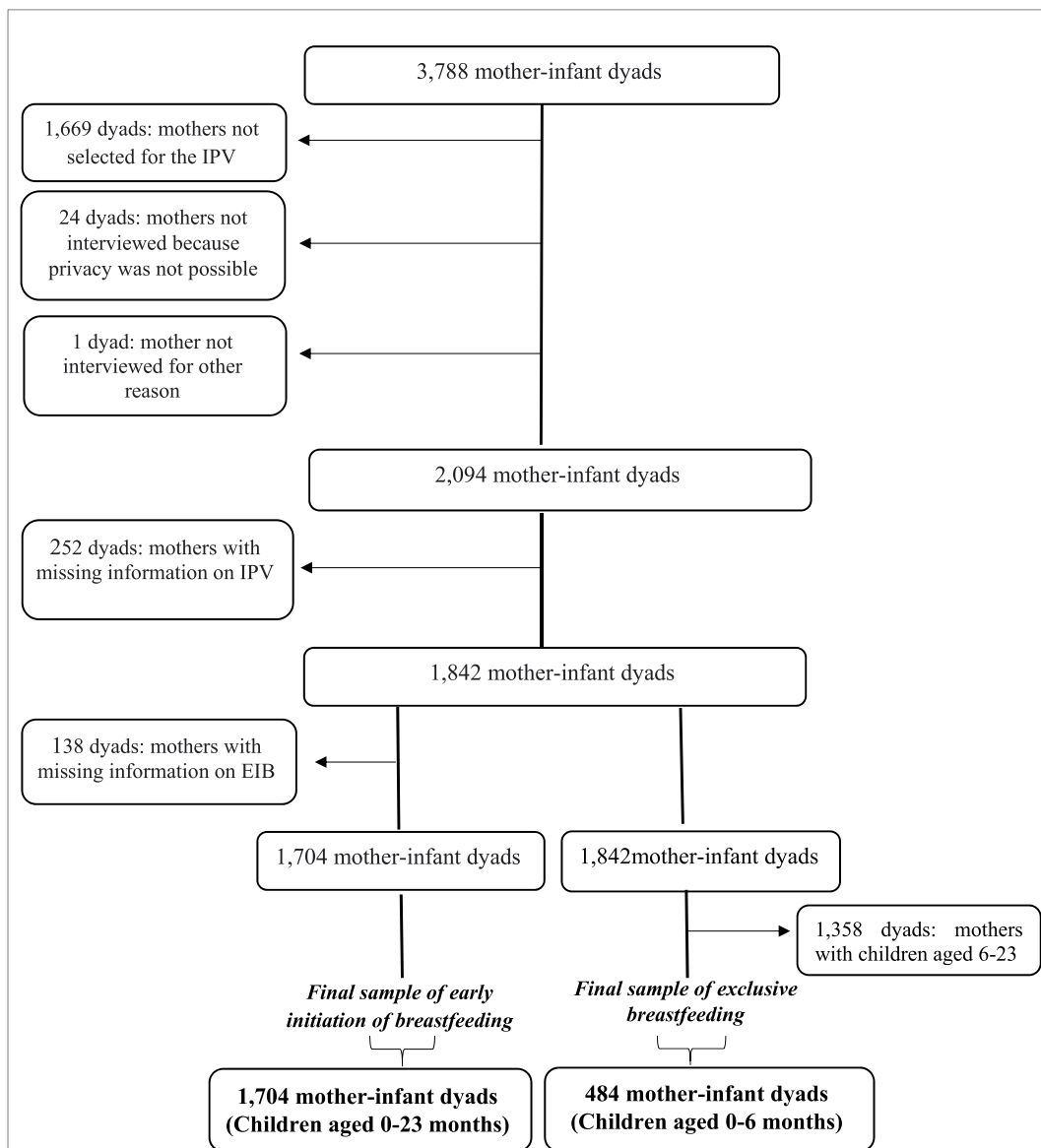
Thus, using data from the last Cameroon DHS of 2018, this paper aims to analyze the association of IPV dimensions with two breastfeeding practices: early initiation to breastfeeding and exclusive breastfeeding. Two hypotheses could be formulated from here: (i) a negative association between IPV dimensions and early initiation to breastfeeding and (ii) a negative association between IPV and exclusive breastfeeding. Addressing these objectives will shed more light on the challenges facing social policies aimed at combating domestic violence and improving the children's nutritional health, as indicated in the 2016–2027 health sector strategy document. The rest of the paper is subdivided into six sections: methods, results, discussion, robustness analysis, limitations, and conclusion.

## 2. Material and methods

### 2.1. Data and samples

The data used in this paper come from the fifth Cameroon Demographic and Health Survey (DHS) carried out in 2018. It was made by the National Institute of Statistics in collaboration with the Ministry of Public Health and financial support from the United Nations Agency for International Development (USAID), the United Nations Population Fund (UNFPA), the United Nations Children’s Fund (UNICEF) and the World Bank. As in other developing countries, this survey collected information on household characteristics, reproductive and sexual health, children’s health, women’s empowerment in the household, domestic violence and behavior towards STDs/AIDS [27].

The Cameroon DHS sample is a random and two-stage cluster sample. The primary survey unit is the enumeration area (EA) as defined by the Cameroon General Population and Housing Census in 2005 by the Central Bureau of Censuses and Population Studies. At the second stage, a sample of 28 households was selected per cluster with a systematic draw with equal probability. The sample is distributed in such a way as to guarantee an adequate representation of urban and rural areas among the 12 areas of study which were made up of the regions of Adamaoua, Center (without Yaoundé), East, Far-North, Littoral (without Douala), North, North-West, West,



**Fig. 1.** Flow chart showing construction of study samples, CDHS (2018). Source: Construction of authors.

South, South-West and the cities of Douala and Yaoundé [27]. Data collection, through interviews whose answers were directly recorded in tablets thanks to an application developed using CSPro software, started on June 16, 2018 in Yaoundé where each team covered at least 2 clusters before being deployed to the other 11 areas.

The 2018 DHS has a total of seven modules: woman, man, child, birth, household, household members and couple. In this paper, the woman module is used since the unit of analysis is the mother-infant dyad and it contains both questions about IPV and breastfeeding practices of children born in the preceding 5 years. This module has a total of 13,527 women aged 15–49 years and 3788 total mother-infant dyads. But to be included in the final sample, infants had to be 23 months or younger at the time of the mother's interview, and the mother had to be selected for and must have completed the IPV module, and all data on feeding practices and IPV had to be non-missing. Of these 3788 dyads, 1668 mothers were not selected for the IPV module, 24 mothers were not interviewed because privacy was not possible, 1 woman was not interviewed for other reasons and 252 mothers with missing information on IPV, yielding a total sample of 1842 mother-infant dyads. Excluding another 138 mothers with missing information on early initiation of breastfeeding resulted in a final sample of 1704 mother-infant dyads for the early initiation of breastfeeding analysis. The final sample of the exclusive breastfeeding analysis is comprised of 484 mother-infant dyads since only children aged 0–5 months are considered for this feeding practice (Ahmed et al., 2019). The flow chart of Fig. 1 summarizes the steps of the construction of the different samples.

## 2.2. Measurement of variables

### 2.2.1. The dependent variable

The dependent variable is breastfeeding practices. Two indicators of breastfeeding, recommended by WHO for the evaluation of breastfeeding practices [5], are considered: early initiation to breastfeeding and exclusive breastfeeding. In accordance with WHO/UNICEF definitions for assessing infant and young child feeding (IYCF), early initiation (which concerns children between 0 and 23 months) is measured by a binary variable which takes the value 1 if the child had been breastfed immediately or within an hour after birth, and 0 if not [28]. Exclusive breastfeeding (which concerns children between 0 and 5 months) is measured by a binary variable which takes the value 1 if two conditions were met: (i) the child was under breastfeeding, and (ii) no other liquid or food, not even water, was used to feed the child other than breast milk, and 0 if not. This based on the mother 24 h recall.

### 2.2.2. The explanatory variables

#### a) The variable of interest: IPV

The variable of interest is intimate partner violence. It is measured from its three key dimensions: physical violence, emotional violence and sexual violence. To assess the prevalence of intimate partner physical violence, seven questions were asked to recently married women and to women in union based on the common-law: (i) *Have you been pushed, shaken or knocked down by your husband?* (ii) *Have you been slapped by your husband/partner?* (iii) *Have you been punched or hit with anything dangerous object by your husband?* (iv) *Have you been kicked or dragged by your husband?* (v) *Have you been strangled or burnt by your husband?* (vi) *Have your hair been pulled or your arm twisted by your husband?* (vii) *Have you been threatened with a knife/gun or other weapon by your husband?* Thus, physical violence is measured by a binary variable which takes the value 1 if the mother had answered yes to any of the 7 questions above.

The prevalence of sexual violence was apprehended from the following two questions: (i) *Were you physically coerced by your husband in an unwanted sexual intercourse?* (ii) *Have you been forced into other type of unwanted sexual acts by your husband?* Sexual violence is measured by a binary variable which takes the value 1 if the mother answered yes to any of the 2 questions above.

Regarding emotional violence, three questions emerged during the investigation: (i) *Were you humiliated by your husband?* (ii) *Have you been threatened with prejudice by your husband?* (iii) *Were you insulted by your husband?* Emotional violence is measured by a binary variable which takes the value 1 if the mother answered yes to any of the 3 questions above.

#### a) Control variables

Control variables are selected based on prior research [5,11,16,29,30], and the sociocultural context of Cameroon. They are divided into three categories: child characteristics, characteristics of the mother and characteristics of the household. Child characteristics include sex (male; female), age (0–5 months; 6–11 months; 12–17 months; 18–23 months) and birth order (1; 2; 3; 4;  $\geq 5$ ). The characteristics of the mother include age (15–19 years; 20–24; 25–29; 30–34; 35–49), level of education (uneducated; primary; secondary; higher education), religion (Christian; Muslim; other), whether the woman worked in the last 12 months, the number of antenatal visits during the last pregnancy (0–3;  $\geq 4$ ), the person providing assistance during delivery (skilled provider -doctor, nurse/midwife, auxiliary nurse/midwife, other health worker; traditional birth attendant) and whether the mother received a post-natal check (PNC) during the first 2 days after delivery. The characteristics of the household include the sex of household head, the number of children aged 0–5 years living in the household, the area of residence (urban, rural) and the household wealth index (poorest; poorer; middle; richer; richest).

## 2.3. Empirical strategy of estimation

This paper combines the methods of descriptive statistics and econometrics. Descriptive statistics are conducted using percentage and means to explore the distributions of all variables (breastfeeding outcomes, IPV variables, and control variables). An econometric

model is used to evaluate the association of IPV with early initiation to breastfeeding and exclusive breastfeeding. Since these two outcomes are qualitative and dichotomous, a logistic regression model is used. The regression results were presented by the estimated odds ratio (OR) with 95 % confidence interval (CI). Moreover, sensitivity analyzes are performed (see section 5) to assess the robustness of the results. The logistic regression model is formalized as follows:

$$Y_{ij} = \log(p / 1 - p) = \alpha + \beta_1 * PV_i + \beta_2 * EV_i + \beta_3 * SV_i + \mathcal{E}_i \quad (1)$$

$$Y_{ij} = \log(p / 1 - p) = \alpha + \beta_1 * PV_i + \beta_2 * EV_i + \beta_3 * SV_i + X_i * \gamma + \mathcal{E}_i \quad (2)$$

Where  $p(1-p)$  represents the chances of a breastfeeding practice outcome (early initiation or exclusive breastfeeding) has been realized. Specifically, since  $j = 1, 2$ ,  $Y_{i1}$  represents the probability that the mother of the child  $i$  early initiate his child to breastfeeding, and  $Y_{i2}$  represents the probability that the mother of the child  $i$  has reported to practice exclusive breastfeeding.  $PV_i$ ,  $EV_i$  and  $SV_i$  refer respectively to physical violence, emotional and sexual violence experienced by the mother of the child  $i$ , and  $X_i$  is the matrix of control variables.  $\alpha$  and  $\beta_m$  ( $m : 1, 2, 3$ ) are the coefficients to estimate with the Maximum likelihood approach since the logistic regression model is non-linear.  $\alpha$  is the constant and  $\beta_j$  ( $1, 2, 3$ ) are the coefficients that allow us to evaluates the association of physical, emotional and sexual violence, respectively, with breastfeeding practices, while  $\gamma$  is a vector of coefficients which help to evaluate the association

**Table 1**  
Background characteristics of study participants in the CDHS 2018.

Variables	Mothers of children <24 months ( $n = 1704$ )		Mothers of children <6 months ( $n = 484$ )	
	n	%	n	%
Early initiation to breastfeeding	917	51.91	–	–
Exclusive breastfeeding	–	–	206	39.61
Any physical violence	570	33.5	156	32.2
Any emotional violence	454	26.6	133	27.5
Any sexual violence	169	9.9	44	9.1
Sex of child: female	829	48.7	221	45.7
Age of child (months)				
0–5	460	27	484	100
6–11	448	26.3	–	–
12–17	454	26.6	–	–
17–23	342	20.1	–	–
Birth order				
1	297	17.4	77	15.9
2	351	20.6	94	19.4
3	351	17.2	81	16.7
4	293	13	61	12.6
5+	222	31.7	171	35.3
Age of mother (years)				
15–19	192	11.3	56	11.6
20–24	406	23.8	103	21.3
25–29	469	27.5	130	26.9
30–34	380	22.3	116	24
35–39	202	11.9	62	12.8
40–49	55	3.2	17	3.5
Education of mother				
Uneducated	432	25.4	121	35.1
Primary	585	34.3	170	35.5
Secondary	609	35.7	172	4.3
Higher	78	4.6	21	65.9
Religion of mother				
Christian	1128	66.2	319	65.9
Moslem	519	30.5	148	30.6
Other religion	57	3.3	17	3.5
Worked last 12 months	1126	66.1	296	61.2
Received adequate ANC (4+ visits)	60	3.5	13	2.7
Delivery assisted by a skilled provider	1115	63.4	308	63.6
Received PNC during 2 days after delivery	986	57.86	262	54.13
Sex of household head: female	280	16.4	72	14.9
Place of residence: rural	957	56.2	279	57.6
Number of children under 5	1704	2.13	484	2.31
Wealth quintile				
Poorest	384	22.5	111	22.9
Poor	415	24.4	115	23.8
Middle	360	21.1	106	21.9
Rich	314	18.4	92	19
Richest	231	13.6	60	12.4

Source: Calculated from data provided by CDHS, 2018.

**Table 2**Association of IPV with early initiation to breastfeeding among mothers of children less than 24 months of age ( $n = 1704$ ).

Variables	Unadjusted model		Adjusted model	
	OR	95 % CI	OR	95 % CI
<i>IPV Indicators</i>				
Any physical violence	0.972 (0.117)	0.768–1.23	0.909 (0.115)	0.71–1.164
Any emotional violence	0.675*** (0.0849)	0.528–0.864	0.678*** (0.0874)	0.526–0.873
Any sexual violence	0.741* (0.131)	0.525–1.046	0.750 (0.135)	0.527–1.068
<i>Control variables</i>				
Sex of child: female			1.120 (0.113)	0.919–1.365
Age of child ( <i>ref</i> = 18–23)				
0–5			1.121 (0.166)	0.838–1.499
6–11			1.171 (0.176)	0.873–1.572
12–17			1.040 (0.154)	0.778–1.39
Birth order ( <i>ref</i> = 1)				
2			1.164 (0.206)	0.823–1.647
3			1.233 (0.247)	0.833–1.826
4			1.157 (0.257)	0.749–1.787
≥5			1.280 (0.289)	0.822–1.993
Age of mother ( <i>ref</i> = 15–19)				
20–24			0.656** (0.130)	0.446–0.967
25–29			0.900 (0.195)	0.589–1.375
30–34			0.902 (0.218)	0.562–1.448
35–39			0.724 (0.198)	0.424–1.237
40–49			0.834 (0.306)	0.406–1.712
Education of mother ( <i>ref</i> = uneducated)				
Primary			0.995 (0.147)	0.745–1.329
Secondary			0.765 (0.132)	0.545–1.072
Higher			0.976 (0.311)	0.523–1.821
<i>Religion of mother (ref = other religion)</i>				
Christian			0.872 (0.251)	0.496–1.533
Moslem			0.625 (0.185)	0.35–1.118
Worked last 12 months			0.959 (0.109)	0.767–1.198
Received adequate ANC: ≥4 visits ( <i>ref</i> = 0–3)			1.709* (0.497)	0.967–3.022
Delivery assisted by a skilled provider			1.043 (0.147)	0.792–1.375
Received PNC during 2 days after delivery			1.153 (0.134)	0.917–1.448
Sex of household head: female ( <i>ref</i> = male)			0.728** (0.100)	0.556–0.953
Place of residence: rural ( <i>ref</i> = urban)			0.697** (0.100)	0.526–0.924
Number of children under 5			1.008 (0.0466)	0.921–1.104
Wealth quintile ( <i>ref</i> = poorest)				
Poor			0.852 (0.133)	0.628–1.156

(continued on next page)

**Table 2** (continued)

Religion of mother (ref = other religion)		
Middle		0.750 (0.138)
Richer		0.787 (0.174)
Richest		0.960 (0.249)
Observations	1704	1704
Prob > chi2	0.000	0.000
McKelvey and Zavoina's R2	0.015	0.080
Akaike criteria (AIC)	2339.248	2344.069

Source: Calculated from data provided by CDHS, 2018.

with control variables. The significance of  $\beta_j$  and  $\gamma$  are evaluated by the test of student.  $\mathcal{E}_i$  is the error term. Eq. 1 is the unadjusted model that includes only IPV indicators as explanatory variables, while Eq. 2 corresponds to the adjusted model that takes into account, in addition to the dimensions of the IPV, the characteristics of the child, the mother and the household. All estimations are carried out with STATA 17.

### 3. Results

#### 3.1. Results of descriptive statistics

**Table 1** presents results of the descriptive statistics of the study variables. With regard to breastfeeding practices, these results show that 51.91 % (n = 1704) of mothers whose children were under 24 months old had practiced early initiation to breastfeeding, and 39.61 % (n = 484) of mothers whose children were less than 6 months old exclusively breastfed in the last 24 h. Regarding IPV, in both samples, approximately one in three women was a victim to physical violence ( $\leq 24$ : 33.5 %, n = 570;  $\leq 6$ : 32.2 %, n = 156), slightly more than one out of four was a victim to emotional violence ( $\leq 24$ : 26.6 %, n = 454;  $\leq 6$ : 27.5 %, n = 133), and approximately 9 % of women were victims to sexual violence by an intimate partner ( $\leq 24$ : 9.9 %, n = 169;  $\leq 6$ : 9.1 %, n = 44).

#### 3.2. Association between IPV and breastfeeding practices

##### 3.2.1. Early initiation to breastfeeding: association with IPV and other determinants

From **Table 2**, results of the unadjusted model estimation showed that two IPV indicators, namely emotional abuse and sexual abuse, were significantly associated with early initiation to breastfeeding. Specifically, compared to unexposed mothers, mothers of children (under 24 months of age) who were exposed to emotional or sexual abuse were less likely to practice early initiation to breastfeeding (OR: 0.675; 95 % CI: 0.528, 0.864;  $p < 0.05$ ; OR: 0.741; 95 % CI: 0.525, 1.046;  $p < 0.1$ ). No significant association was found with exposure to physical violence. Two main results emerged from the adjusted model estimates. Firstly, mothers who were exposed to emotional abuse were less likely to introduce their children to early breastfeeding (OR: 0.678; 95 % CI: 0.526, 0.873;  $p < 0.05$ ), whereas the experience of sexual abuse no longer had a significant association. Secondly, the mother age (20–24 years), the sex of the head of household (female) and the area of residence (rural) were associated with low chances of early initiation to breastfeeding (OR: 0.656; 95 % CI: 0.446, 0.967;  $p < 0.05$ ; OR: 0.728; 95 % CI: 0.556, 0.953;  $p < 0.05$ ; OR: 0.697; 95 % CI: 0.526, 0.924;  $p < 0.05$ ), as long as the use of at least prenatal visits by the mother during the last pregnancy was significantly associated with high probabilities of early initiation (OR: 1.709; 95 % CI: 0.967, 3.022;  $p < 0.1$ ).

##### 3.2.2. Exclusive breastfeeding: association with IPV and other determinants

From the estimation of the unadjusted model in **Table 3**, it appears that all the dimensions of IPV were not significantly associated with exclusive breastfeeding. The estimates of the adjusted model illustrate that mother age (40–49) and the number of children under five in the household were associated with low odds of exclusive breastfeeding of children under 6 months (OR: 0.237; 95 % CI: 0.054, 1.05;  $p < 0.05$ ; OR: 0.845; 95 % CI: 0.704, 1.014;  $p < 0.1$ ). On the other hand, the child's birth order (rank 4) and household wealth (middle, rich and richest) were associated with high odds of exclusive breastfeeding (OR: 2.217; 95 % CI: 0.924, 5.32;  $p < 0.1$ ; OR: 2.198; 95 % CI: 1.087, 4.445;  $p < 0.05$ ; OR: 3.167; 95 % CI: 1.341, 7.482;  $p < 0.01$ ; OR: 2.369, 95 % CI: 0.864–6.494,  $p < 0.1$ ).

### 4. Discussion

Using data from the last Demographic and Health Survey of 2018, this paper analyzes the relationship between the dimensions of IPV and two breastfeeding practices recommended by the WHO: early initiation to breastfeeding for mothers of children under 24 months of age and exclusive breastfeeding for mothers of children under 6 months of age. The results of the logistic regression model estimates highlight four major lessons:

Firstly, when compared to unexposed mothers, mothers of children under 24 months who were exposed to emotional or sexual abuse were less likely to initiate their children to early breastfeeding, but no significant association was found when compared with

**Table 3**Association of IPV with exclusive breastfeeding among mothers of children less than 6 months of age ( $n = 484$ ).

Variables	Unadjusted model		Adjusted model	
	OR	95 % CI	OR	95 % CI
<i>IPV Indicators</i>				
Anyphysical violence	0.924 (0.211)	0.595–1.435	0.880 (0.214)	0.547–1.417
Anyemotional violence	1.156 (0.270)	0.735–1.818	1.075 (0.265)	0.663–1.742
Anysexual violence	1.502 (0.513)	0.771–2.928	1.448 (0.517)	0.719–2.915
<i>Control variables</i>				
Sex of child: female			1.005 (0.201)	0.679–1.488
Birth order ( <i>ref = 1</i> )				
2			1.102 (0.402)	0.539–2.254
3			1.870 (0.761)	0.842–4.152
4			2.217* (0.990)	0.924–5.32
≥5			1.705 (0.762)	0.71–4.095
Age of mother ( <i>ref = 15–19</i> )				
20–24			0.742 (0.298)	0.337–1.631
25–29			0.666 (0.281)	0.291–1.525
30–34			0.710 (0.329)	0.286–1.763
35–39			0.905 (0.476)	0.322–2.54
40–49			0.237* (0.180)	0.054–1.05
Education of mother ( <i>ref = uneducated</i> )				
Primary			1.014 (0.301)	0.567–1.815
Secondary			1.015 (0.354)	0.513–2.011
Higher			1.163 (0.709)	0.352–3.842
Religion of mother ( <i>ref = other religion</i> )				
Christian			0.676 (0.397)	0.214–2.138
Moslem			1.290 (0.733)	0.424–3.926
Worked last 12 months			0.912 (0.197)	0.597–1.393
Received adequate ANC: ≥4 visits ( <i>ref = 0–3</i> )			0.878 (0.531)	0.268–2.87
Delivery assisted by a skilled provider			0.900 (0.254)	0.517–1.566
Received PNC during 2 days after delivery			1.155 (0.266)	0.735–1.815
Sex of household head: female ( <i>ref = male</i> )			1.121 (0.309)	0.653–1.925
Place of residence: rural ( <i>ref = urban</i> )			1.286 (0.349)	0.755–2.189
Number of children under 5			0.845* (0.0787)	0.704–1.014
Wealth quintile ( <i>ref = poorest</i> )				
Poor			1.258 (0.401)	0.673–2.351
Middle			2.198** (0.790)	1.087–4.445
Richer			3.167*** (1.389)	1.341–7.482
Richest			2.369* (1.219)	0.864–6.494
Observations		484	484	

(continued on next page)



**Table 3** (continued)

Received adequate ANC: $\geq 4$ visits ( <i>ref</i> = 0–3)		0.878	0.268–2.87
Prob > chi2	0.003	0.075	
McKelvey and Zavoina's R2	0.006	0.105	
Akaike criteria (AIC)	665.963	679.656	

Source: Calculated from data provided by CDHS, 2018.

physical abuse. This result partially validates the first hypothesis of the study since the association is confirmed for two dimensions out of three. Indeed, during pregnancy, emotional or sexual violence is likely to generate trauma, mental depression, anxiety disorders and risks of sexually transmitted infection and HIV/AIDS [27]. This violence can also damage the mother's self-esteem which disconnects the emotional bond between the mother and her child [31]. These various negative consequences of emotional and sexual violence reduce the ability of mothers to make better choices for the nutritional health of their children, which may in turn explain the negative association of IPV with early breastfeeding. Many studies found similar results in the binding literature. For illustration purposes, it was found in 51 low-and middle-income countries that exposure to any form of IPV was associated with lower odds of early initiation to breastfeeding [31]. Emotional violence In Tanzania, physical IPV in Zimbabwe and sexual violence in Zambia were associated with lower odds of early initiation [10]. Another evidence found that physical IPV was associated with a 37 % reduced likelihood of early breastfeeding practice, while psychological IPV was associated with a 34 % reduced likelihood [16]. However, in India, no significant association was found between exposure to any form of IPV and early initiation to breastfeeding [32].

Secondly, after controlling for child, mother and household characteristics, only exposure to emotional abuse was associated with lower odds of early initiation. Examining other determinants of early initiation, it appears that mothers aged 20–24 were less likely to early initiate their children to breastfeeding compared to mothers aged 15–19. Compared to male-headed households, female-headed households were less likely to have newborns introduced to early breastfeeding. This can be explained by the weight of responsibilities and family burdens typically faced by mother heading household, which may reduce their likelihood of initiating breastfeeding early. Similar findings were reported in Amibara district of Northeastern Ethiopia [33].

In rural households, compared to households living in urban areas, it is unlikely for mothers to introduce their newborns to breast milk within 1 h following childbirth. This can be explained by the large practice of childbirth outside specialized health facilities in rural regions, and often without the assistance of qualified healthcare professionals. Thus, women from rural areas may struggle to received and adhere to the essential breastfeeding recommendations. For illustration purposes, the DHS 2018 report show that in rural areas, 50 % of mothers gave birth at home against 11.4 % in urban areas. Moreover, in rural areas 52.5 % of delivery were assisted by a skilled provider against 89.5 % in urban areas. Previous studies have found similar results in Tanzania [34], Nigeria [35] and Uganda [36]. In Bangladesh, it was found that women living in rural areas were more likely to early initiate to breastfeeding than women who lived in urban areas [37]. The last determinant of early initiation to breastfeeding is the number of antenatal visits. In fact, women who attended more than 4 antenatal visits were more likely to initiate early breastfeeding. This result is in line with the explanation that antenatal visits are key opportunities for expectant mothers to receive guidance on appropriate breastfeeding practices postpartum [38]. In the literature, some studies have reached similar results [38–40], although other works have found no significant association [11,41].

Thirdly, no IPV indicator was found to be significantly associated with exclusive breastfeeding, with or without controlling factors, which invalidates the second hypothesis of the study. This result can be explained by the time between the moment of IPV victimization and the moment of the report of exclusive breastfeeding. Indeed, the harm caused by IPV can fade over time. Thus, by the time the mother reports exclusive breastfeeding, there is a good chance that these prejudices have disappeared, hence the absence of correlation between IPV and exclusive breastfeeding. In the literature, no association between any indicator of IPV and exclusive breastfeeding was found in Tanzania and Nigeria [8], and in Zimbabwe and Malawi [42]. However, it should be noted that several studies have concluded that exposure to some or all dimensions of IPV was associated with a low chance of exclusive breastfeeding [5, 8,19,32]. An atypical finding, i.e., a positive association between physical IPV and exclusive breastfeeding, was found in Tanzania and Zambia [42].

Fourthly, examining other determinants of exclusive breastfeeding, it appears that compared to children born in the first position, children aged 0–5 months born in the fourth position were more likely to be exclusively breastfed during the 24 h preceding the interview. Mothers from households with medium or high standards of living were more inclined to exclusively breastfeed compared to those from the poorest households, consistent with findings from Ethiopia [2] and rural districts of Pakistan [43]. But in India, a negative association was found between wealthy households and exclusive breastfeeding [19,44], while in Ethiopia, no significant association was obtained [11]. Furthermore, the mother's age (40–49) was associated with a low chance of exclusive breastfeeding. Indeed, at this age, it is likely that a mother will have several children. She therefore no longer has the same propensity to breastfeed the child exclusively with breast milk up to 6 months. The number of children under five living in the household was also associated with a low chance of exclusive breastfeeding. This result can be explained by the fact that the more we have an increase in the number of children under 5 living in each household, the greater the burden on the woman in that household, and the less time she has to exclusively breastfeed. She will therefore tend to resort to other liquids or substitute foods [45–47].

## 5. Robustness analysis

### 5.1. Association between IPV and exclusive breastfeeding across sub-samples

In Cameroon, legislation specifies a duration of maternity leave of three months. Consequently, once this leave ends -that is after the first three months following childbirth-a mother return to work could probably reduce her ability to breastfeed the child exclusively with breast milk until her sixth month. To examine the robustness of our previous conclusions while considering this parameter, it would be relevant to estimate and analyze the association of IPV with exclusive breastfeeding across two subsamples: the subsample of mothers of children aged 0–2 months and the sub-sample of mothers of children aged 3–5 months. The results presented in Table 4 align with those of Table 3 since they indicate no significant association between any form of IPV and exclusive breastfeeding in the two sub-samples, hence the robustness of our conclusions.

### 5.2. Another approach of IPV measurement

We performed an additional robustness analysis by providing another measurement of IPV, notably the intensity of any form of IPV instead of experiencing any form of IPV. Thus, three indicators of IPV were constructed: the intensity of physical IPV, the intensity of emotional IPV and the intensity of sexual IPV. For a specific dimension (or form) of violence, the intensity of IPV (*IPV\_Intensity*) is obtained as follows:

$$IPV\_Intensity_d = \sum_{i=1}^m Q_i$$

where  $Q$  is the binary variable associated with each question of the domestic violence dimension taking the value 0 or 1.  $d$  represents the dimension (or form) of IPV, and  $m$  denotes the number of questions that a dimension contains. Thus, the intensity of physical IPV has values between 0 and 7, the intensity of emotional IPV has values between 0 and 3, and values between 0 and 2 for sexual IPV.

Results of the logistic regression estimate of the association between IPV intensity and breastfeeding practices are contained in Tables 5 and 6. They indicate similar conclusions as those obtained with Tables 2 and 3 respectively, which confirms the robustness of our conclusions.

## 6. Limitations

This study has five main limitations. Firstly, the cross-sectional nature of the data used (DHS data) do not allow a decision to be made on the causal relationship between IPV and the breastfeeding practices. This means that the relationship between these factors could work both ways [19]. Secondly, the analysis of the association between IPV and breastfeeding behaviors required the exclusion of women who do not meet certain criteria (selection for the domestic violence module, interview, absence of non-responses), or this approach can be a source of bias for the sample selection. Thirdly, the responses of mothers based on recall or remembrance regarding the timing of early initiation to breastfeeding may contain errors. But since childbirth is a happy event for a woman, there is a good chance that these risks of error that could influenced the answer only concerns a small proportion of women [48]. Fourthly, to measure

**Table 4**

Association of IPV with exclusive breastfeeding across sub-samples of mother-infant (0–2 months) dyads and mother-infant (3–5 months) dyads ( $n = 327$ ).

Variables	Mother-infant (0–2 months) dyads				Mother-infant (3–5 months) dyads			
	Unadjusted model		Adjusted model <sup>a</sup>		Unadjusted model		Adjusted model <sup>a</sup>	
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
<b>IPV Indicators</b>								
Any physical violence	0.80 (0.311)	0.373–1.715	1.639 (0.769)	0.653–4.115	1.314 (0.482)	0.639–2.700	1.639 (0.769)	0.653–4.115
Any emotional violence	0.996 (0.391)	0.461–2.152	0.586 (0.274)	0.234–1.465	0.910 (0.348)	0.430–1.927	0.586 (0.274)	0.234–1.465
Any sexual violence	1.056 (0.641)	0.321–2.471	1.242 (0.135)	0.364–4.241	1.193 (0.655)	0.407–3.499	1.242 (0.778)	0.364–4.241
Observations	155		155		172		172	
Prob > chi2	0.938		0.216		0.845		0.216	
McKelvey and Zavoina's R2	0.07		0.168		0.017		0.277	
Akaike criteria (AIC)	324.582		451.071		2022.098		249.065	

<sup>a</sup> Control variables of the adjusted model are: Sex of child; Birth order; Age of mother; Education of mother; Religion of mother; Worked last 12 months; Received adequate ANC; Delivery assisted by a skilled provider; Received PNC during 2 days after delivery; Sex of household head; Place of residence; Number of children under 5; Wealth quintile.

Source: Calculated from data provided by CDHS, 2018. **Note:** Women who had no work during the 12 months preceding the survey (157) are not considered, which brings the sample for this analysis to 327 instead of 484.

**Table 5**Association of IPV with early initiation to breastfeeding among mothers of children less than 6 months of age ( $n = 1704$ ).

Variables	Unadjusted model		Adjusted model <sup>a</sup>	
	OR	95 % CI	OR	95 % CI
<i>IPV intensity indicators</i>				
Physical violence intensity	1.028 (0.045)	0.944–1.12	1.015 (0.046)	0.929–1.109
Emotional violence intensity	0.856*** (0.051)	0.761–0.963	0.861*** (0.053)	0.763–0.971
Sexual violence intensity	0.764* (0.114)	0.569–1.025	0.763 (0.117)	0.565–1.031
<i>Control variables</i>				
Observations	No 1704		Yes 1704	
Prob > chi2	0.002		0.000	
McKelvey and Zavoina's R2	0.011		0.049	
Akaike criteria (AIC)	2345.056		2350.874	

<sup>a</sup> Control variables of the adjusted model are: Sex of child; Age of child; Birth order; Age of mother; Education of mother; Religion of mother; Worked last 12 months; Received adequate ANC; Delivery assisted by a skilled provider; Received PNC during 2 days after delivery; Sex of household head; Place of residence; Number of children under 5; Wealth quintile.

Source: Calculated from data provided by CDHS, 2018.

**Table 6**Association of IPV with exclusive breastfeeding among mothers of children less than 6 months of age ( $n = 1704$ ).

Variables	Unadjusted model		Adjusted model <sup>a</sup>	
	OR	95 % CI	OR	95 % CI
<i>IPV Indicators</i>				
Any physical violence	0.914 (0.077)	0.775–1.079	0.88 (0.214)	0.547–1.417
Any emotional violence	1.157 (0.131)	0.926–1.445	1.075 (0.265)	0.663–1.742
Any sexual violence	1.285 (0.391)	0.708–2.334	1.448 (0.517)	0.719–2.915
Observations	484		484	
Prob > chi2	0.424		0.075	
McKelvey and Zavoina's R2	0.007		0.105	
Akaike criteria (AIC)	665.421		679.656	

<sup>a</sup> Control variables of the adjusted model are: Sex of child; Age of child; Birth order; Age of mother; Education of mother; Religion of mother; Worked last 12 months; Received adequate ANC; Delivery assisted by a skilled provider; Received PNC during 2 days after delivery; Sex of household head; Place of residence; Number of children under 5; Wealth quintile.

Source: Calculated from data provided by CDHS, 2018.

exclusive breastfeeding, the study used the 24-h mother recall method, which could also cause recall/perception or measurement bias. The last limitation is related to the sensitivity analysis made in section 5.1. Where, it uses local legislation on the duration of maternity leave for women working in the formal sector. However, from the DHS data, it is difficult to clearly distinguish women working in the formal sector from those working in the informal sector, which makes the results in Table 4 questionable.

Despite these limitations, this research leads us to very important results with relevant achievements that could be exploited by any public health policy intervention unit whose objectives are geared towards the improvement of the nutritional health of children and infants. In addition, the results of the study are based on the exploitation of credible and most recent data. It therefore constitutes a point of reference for several future investigations. Concretely, in addition to analyzing other breastfeeding practices, future investigations could analyze these associations using large primary data that clearly distinguishes mothers who work in the formal sector from mothers who work in the informal sector. Such an analysis could lead to relevant policy recommendations regarding the length of maternity leave.

## 7. Conclusion

This study has a significant contribution in understanding the relationship between IPV and breastfeeding practices in African countries. It is the first of its kind to be made in the Cameroonian context characterized by an alarming prevalence of domestic violence and low level of adherence to WHO recommendations concerning breastfeeding practices. By considering the three dimensions of IPV, the results of this study suggest that the experience of sexual and emotional violence were significantly associated with low chances of early initiation to breastfeeding. But no dimension of IPV was associated with exclusive breastfeeding, independently or when controlling for the child, mother, and household characteristics. However, this last result should be interpreted with great caution since the sample size of mother-child dyads aged 0–5 months is not large enough. We further perform sensitivity analysis, and the findings

suggest that the associations are robust in considering another measure of IPV and the duration of maternity leave.

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### Data availability statement

The 2018 Cameroon Demographic and Health and Multiple Indicators Survey dataset used for this study is available online from the DHS website under the Woman's Recode subsection:

[https://dhsprogram.com/data/dataset/Cameroon\\_Standard-DHS\\_2018.cfm?flag=1](https://dhsprogram.com/data/dataset/Cameroon_Standard-DHS_2018.cfm?flag=1). Data can be accessed by applying through the DHS website. Registration is required and access is granted for legitimate research purposes. Further information about data access can be found at: <https://dhsprogram.com/data/Access-Instructions.cfm>.

### Additional information

No additional information is available for this paper.

### Ethical approval

Permission to use the datasets for this research was obtained prior to the study from the Demographic and Health Surveys (DHS) Program. Ethical approval was not required for this study because it used anonymized DHS data only. The IRB-approved procedures for DHS public-use datasets do not in any way allow respondents, households, or sample communities to be identified.

### CRediT authorship contribution statement

**Dimitri Tchakounte:** Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Benjamin Fomba Kamga:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Mayone Roussel Zintchem Mbassa:** Writing – review & editing, Writing – original draft, Investigation, Data curation.

### Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Dimitri TCHAKOUNTE reports article publishing charges was provided by Research4Life. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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