

# **Influence of Prenatal Exposure to Intimate Partner Violence on Neonatal Birth Weight: Evidence from an Unmatched Case-Control Study at Bafoussam Regional Hospital**

## **Abstract**

**Background:** Intimate partner violence (IPV) during pregnancy represents a significant public health concern with detrimental effects on both maternal and foetal health, including low birth weight. IPV takes many forms, including physical violence, sexual violence, stalking and psychological aggression. Despite global evidence, data on this association remain limited in Cameroon. This study examined the impact of IPV during pregnancy on neonatal birth weight at Bafoussam Regional Hospital.

**Methodology:** We conducted a hospital-based unmatched case-control study involving 272 pregnant women (68 cases of low-birth-weight infants and 204 controls). Participants were consecutively recruited from the hospital's maternity unit. Data were collected using a pretested questionnaire adapted from WHO instruments and analyzed using Epi-Info 7.2.5. Bivariate and multivariate logistic regression models assessed associations between IPV and birth outcomes.

**Results:** Out of 272 study participants, 50.37% were aged 20-29 years and 56.99% were married. 120 (44.12%) had experienced IPV during their index pregnancy period, with psychological violence being most common (41.5%), followed by physical (11.0%) and sexual violence (10.3%). Mothers of low-birth-weight (LBW) infants reported significantly higher IPV exposure (63.2% vs 37.8%; OR=2.84, 95%CI:1.61-5.01) compared to mothers of infants with normal birth weight (NBW). Factors associated included parental history of IPV (OR=2.00), Not having a civil and religious marriage (OR=0.51), and partner controlling behaviour (OR=9.05). After adjustment, any IPV exposure tripled the likelihood of LBW (aOR=3.26, 95%CI:1.76-6.05).

**Conclusion:** IPV during pregnancy is prevalent in our setting and strongly associated with low birth weight. These findings highlight the urgent need for routine IPV screening during antenatal care (ANC) and implementation of support services for affected women to improve pregnancy outcomes.

**Keywords:** Intimate partner violence, pregnancy, outcomes, fetal birth weight, Cameroon

## **Introduction**

Intimate Partner Violence (IPV) encompasses physical violence, sexual violence, stalking, and psychological abuse perpetrated by a current or former partner or spouse. In this study, our focus is specifically on violence directed toward women by male intimate partners—a form of domestic violence. Globally, approximately 30% of women have experienced physical and/or sexual violence by an intimate partner at some point in their lives [1]. Pregnancy is recognized as a particularly vulnerable period, as physiological and emotional changes may increase a woman's susceptibility to abuse [2].

IPV during pregnancy can compromise maternal and fetal health through direct physical trauma as well as the physiological consequences of chronic stress. These stressors have been linked to adverse reproductive outcomes such as preterm labor, low gestational weight gain, reduced breastfeeding rates, and low birth weight—all of which are known contributors to neonatal morbidity and mortality [3,4]. As such, IPV in pregnancy is both a critical health concern and a broader social issue with lasting repercussions for maternal and neonatal well-being.

In Cameroon, data from the 2004 Demographic and Health Survey (DHS) estimated that 39.8% of women had experienced some form of IPV [5]. Specifically, 38.7% reported physical violence, 30.7% emotional abuse, and 14.8% sexual violence from their intimate partners over their lifetime [6]. Estimates of IPV during pregnancy vary widely, with prevalence rates ranging from 1.6% to 78% globally [7]. In sub-Saharan Africa, the prevalence of IPV during pregnancy is estimated at 7–20% for physical violence [8], 9.7–18% for sexual violence [9], and 17–29% for psychological violence [10].

The Centers for Disease Control and Prevention (CDC) highlight pregnancy as a critical window of opportunity for identifying IPV, as it often brings vulnerable women into contact with healthcare services [11]. This increased access to care presents a unique chance to screen for and address abuse. Given the scope, severity, and potential outcomes associated with IPV during pregnancy, there is a pressing need for robust, context-specific data to inform healthcare responses. While numerous studies have explored the impact of IPV on maternal and child health globally and across Africa, there remains a gap in evidence from Cameroon, particularly regarding the influence of IPV on birth weight. To address this gap, we aimed to assess the relationship between intimate partner violence during pregnancy and neonatal birth weight at the Bafoussam Regional Hospital (BRH).

## **Methods**

### **Study design and setting**

We conducted a hospital-based unmatched case-control study at Bafoussam Regional Hospital (BRH), the main referral center for Cameroon's West Region. The study compared two groups: cases (mothers of term newborns weighing  $<2500\text{g}$ ) and controls (mothers of term newborns  $\geq 2500\text{g}$ ), recruited during the same period. The hospital hosts an obstetrics and gynecology department, composed of several specialized units, as well as a neuropsychiatry department that provides care for victims of intimate partner violence (IPV).

### **Study period and population**

Participants included all delivering mothers at BRH's maternity unit between February 1<sup>st</sup> to May 27<sup>th</sup>, 2022. Cases were defined as mothers who delivered term newborns with a birth weight below 2500 grams, while controls were mothers who delivered term newborns weighing 2500 grams or more, all within the same time frame and hospital setting.

### **Study sampling**

Using consecutive sampling, we enrolled 272 women (68 cases, 204 controls) from 280 eligible participants (90% response rate), excluding 8 incomplete questionnaires. Sample size was calculated based on anticipated IPV prevalence differences between groups.

### **Data collection procedure**

Trained interviewers administered a pretested questionnaire adapted from the WHO Multi-Country Study on Women's Health. The tool assessed: three IPV forms (psychological, physical, sexual), partner controlling behaviors and sociodemographic and obstetric characteristics. Interviewers received one-week training on ethical IPV research, including safety protocols and interview techniques.

### **Data management and analysis**

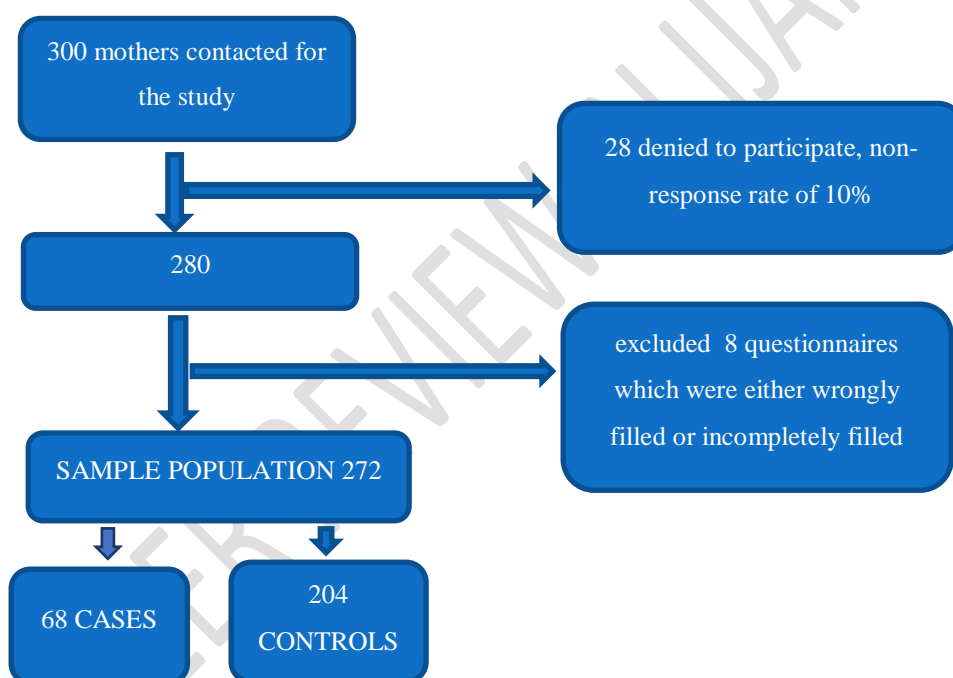
Data were entered into Epi Info version 7.2.5 using a custom-designed data entry interface with built-in error detection, range checks, and consistency validations. Categorical variables were summarized using proportions with corresponding 95% confidence intervals. The strength of association between IPV during pregnancy and selected covariates was analyzed using odds ratios derived from logistic regression models and chi-square tests. Logistic and multivariate regression analyses were employed to examine the association between IPV (as the exposure) and birth weight (as the outcome). Variables with  $p\text{-values} \leq 0.05$  in univariate analyses were included in the multivariate model to control for potential confounders. Statistical significance was set at a  $p\text{-value} \leq 0.05$ .

## Ethical Considerations

The West Regional Ethics Committee approved the study. We obtained written informed consent, ensured confidentiality through anonymized data collection, and provided referral options for participants needing support. Interviews were conducted privately with safety protocols for violence disclosure.

## Results

Among the 300 mothers contacted, 280 completed the interview (response rate of 90%) and 8 were excluded due to incomplete questionnaires (figure 01).



**Figure 1:** flowchart of inclusion

## Sociodemographic Characteristics of the Study Population

Of our participants, the most represented age group 137 (50.37%) were those aged 20 to 29 years. The women's partners were mostly aged between 30 to 39 years. A total of 155 (56.99%) women in our study were married and 219(80.51%) lived in rural areas. The majority 90 (33.09%) of our participants were housewives and we had 177(65.07%) women that were multigravida. A significant number 235(86.4%) of mothers had attained at least a secondary education and 207 (76.10%) of our participants lived with their partner as of the time of our interview. (Table 01)

**Table 1:** Sociodemographic characteristic of study participants and their partners in BRH, West Cameroon.

Variables	Mothers with LBW babies Proportion (%)	Mothers with NBW babies Proportion (%)	TOTAL Proportion (%)
<b>Total</b>	68	204	272
<b>Age group (years)</b>			
< 18	1(1.47)	00	1(0.37)
18 – 20	12(17.65)	10(4.90)	22(8.09)
20 -29	32(47.06)	105(51.47)	137(50.37)
30-39	18(26.47)	83(40.69)	101(37.13)
40-49	5(7.35)	6(2.94)	11(4.04)
<b>Age group of partner (years)</b>			
20 – 29	28(41.18)	41(20.10)	69(25.37)
30 – 39	23(33.82)	98(48.04)	121(44.49)
40 – 49	15(22.06)	46(22.55)	61(22.43)
50 – 59	1(1.47)	12(5.88)	13(4.78)
>60	1(1.47)	7(3.43)	8(2.94)
<b>Religion</b>			
Catholic	30(44.12)	116(57.43)	146(54.07)
Protestant	26(38.24)	54(26.73)	80(29.63)
Pentecostal	7(10.29)	16(7.92)	23(8.52)
Animist	1(1.47)	8(3.96)	9(3.33)
Muslim	4(5.88)	8(3.96)	12(4.44)
<b>Marital status</b>			
Married	33(48.53)	122(59.80)	155(56.99)
Single	35(51.47)	77(37.75)	112(41.18)
Others (widow, separated)	00	5(2.45)	5(1.84)
<b>Residence</b>			
Urban	61(89.7)	46(22.55)	53(19.49)
Rural	7(10.29)	158(77.45)	(80.51)
<b>Maternal occupation</b>			
Government worker	9(13.24)	20(9.80)	29(10.66)
Private employee	11(16.18)	51(25.00)	62(22.79)
Housewife	25(36.76)	65(31.86)	90(33.09)
Merchant	7(10.29)	30(14.71)	37(13.60)
Farmer	4(5.88)	4(1.96)	8(2.94)
Student	12(17.65)	34(16.67)	46(16.91)
<b>Partners occupation</b>			
Government employee	13(19.12)	36(17.65)	49(18.01)
Private employee	33(48.53)	83(40.69)	116(42.65)

Merchant	14(20.59)	49(24.02)	63(23.16)
Farmer	4(5.88)	16(7.84)	20(7.35)
Student	4(5.88)	20(9.80)	24(8.82)
<b>Maternal level of education</b>			
Not schooled	4(5.88)	6(2.94)	10(3.68)
Primary	8(11.76)	19(9.31)	27(9.93)
Secondary	25(36.76)	78(38.24)	103(37.87)
More than secondary	31(45.59)	101(49.51)	132(48.53)
<b>Partners level of education</b>			
Not schooled	6(8.82)	4(1.96)	10(3.67)
Primary	3(4.41)	15(7.35)	18(6.62)
Secondary	22(32.25)	61(29.90)	83(30.51)
More than secondary	37(54.41)	124(60.78)	161(59.19)
<b>Gravidity</b>			
Primigravida	24(35.29)	71(31.80)	95(34.93)
Multigravida	44(64.71)	133(65.20)	177(65.07)
<b>Parity</b>			
Multipare	24(35.29)	68(33.33)	92(33.82)
Primipare	44(64.71)	136(66.67)	180(66.18)
<b>Currently living with partner</b>			
Yes	45(66.18)	162(79.41)	207(76.10)
No	23(33.82)	42(20.59)	65(23.90)

\*LBW: Low-birth-weight, NBW: Normal-birth-weight

Among the 272 mothers interviewed regarding their experiences of IPV during pregnancy, 120 reported experiencing at least one form of IPV, yielding an overall prevalence of 44.1% for IPV during pregnancy. Psychological violence emerged as the most prevalent form, reported by 113 participants (41.54%). A higher proportion of mothers who delivered low birth weight (LBW) infants reported experiencing some form of IPV compared to those with normal birth weight (NBW) infants: 43 (63.24%) vs. 77 (37.75%), respectively. Women who experienced any form of IPV during pregnancy were nearly three times more likely to deliver a low-birth-weight infant (OR= 2.83; 95% CI: 1.60–5.00;  $p < 0.05$ ) compared to those who did not experience violence. Specifically, the experience of psychological violence (OR=2.80, 95% CI: 1.58–4.89;  $p < 0.05$ ) increased the likelihood of having low birth weight babies. Women with controlling partners (N=68) had greater likelihood to deliver a LBW infant (OR= 2.18; 95% CI: 1.20–3.96).

145 **Table 2:** IPV during pregnancy and the risk of delivering a low-birth-weight infant

Violence	LBW	NBW	OR [95%CI]	P value
<b>Sexual violence n=28 (10.3%)</b>				
Yes	7(10.29)	21(10.29)	1.00 [0.41-2.47]	1.00
No	61(89.71)	183(89.71)		
<b>Physical violence n=30 (11.0%)</b>				
Yes	9(13.24)	21(10.29)	1.33 [0.58-3.06]	0.50
No	59(86.76)	183(89.71)		
<b>Psychological violence n=113 (41.5%)</b>				
Yes	41(60.29)	72(35.29)	2.78 [1.58-4.89]	<0.001
No	27(39.71)	132(64.71)		
<b>Over all types of violence n=120 (44.1%)</b>				
Yes	43(63.24)	77(37.75)	2.84 [1.61-5.01]	<0.001
No	25(36.76)	127(62.25)		
<b>Partners controlling behaviour n=68 (25.0%)</b>				
Yes	25(36.76)	43(63.24)	2.18 [1.19-3.9 6]	0.01
No	43(21.08)	161(78.92)		

146

## 147 **Patterns of IPV**

148 The most common psychological abuse was verbal insults (81 cases, 29.8%), while physical  
 149 violence most frequently involved slapping or throwing objects (22 cases, 8.1%). Sexual  
 150 violence primarily manifested as forced intercourse (19 cases, 7.0%). Controlling behaviours  
 151 were reported by 68 women (25.0%), with partners frequently demonstrating suspicion of  
 152 infidelity (15 cases, 5.5%) or anger when women spoke to other men (26 cases, 9.6%).

153 **Table 3:** Patterns of IPV among pregnant women in BRH, West Cameroon

Pattern of IPV	Yes	Percent (%)
<b>SEXUAL VIOLENCE N=28 (10.29%)</b>		
Forced to do something sexual that is degrading or humiliating	1	3.6
Having unwanted sexual intercourse because of fear from partner	10	35.7
Physically forced to have sexual intercourse	19	67.9
<b>PHYSICAL VIOLENCE N= 30 (11.03%)</b>		
Threatened to use or actually used a gun, knife or other weapons on you	2	6.7

Choked or burnt you on purpose	0	0
Hit you on the abdomen	1	3.3
Hit you with his fist or something else that could hurt you	4	13.3
Push you or shoved you or drag your hair	5	16.7
Slapped you or throw something at you that could hurt you	22	73.3
<b>PSYCHOLOGICAL VIOLENCE N=113 (41.54%)</b>		
Threatened when visiting friends/family	14	12.4
Scared or intimidated on purpose	10	8.8
Belittled or humiliated Infront of others	14	12.4
Insulted or made to feel bad about yourself	81	71.7
<b>PARTNER'S CONTROLLING BEHAVIOUR N=68 (25.0%)</b>		
Did he often get suspicious that you are unfaithful	15	22.1
Did he get angry if you speak with another man	26	38.3
Did he insist on knowing where you are all the time	12	17.6
Did he ignore you and treat you indifferently	15	22.1
Did he try to restrict contact with your family of birth	4	5.9
Did he try of keep you from seeing your friends	12	17.6
He expects you to ask for permission before seeking ANC for yourself	10	14.7

## **RISK FACTORS OF INTIMATE PARTNER VIOLENCE IN OUR STUDY POPULATION**

We identified three factors associated with IPV in our study population. Mothers with parental history of IPV were two times more likely to experience IPV than those who had no parental history of IPV OR: 2.00[1.15-3.47] P<0.05.

Also, women who had partners with controlling behaviour were up to 9 times more likely to experience IPV than those with non-controlling partners OR: 9.05[4.62-17.72]P=0.00.

On the other hand, mothers who had a religious marriage were two times less likely to experience IPV OR:0.51[0.26-1.01]. This association was statistically significant as p value was 0.05.

Women who were currently living with their partners were less likely to experience IPV OR:0.83[0.47-1.44]. but this association was not statistically significant (p>0.05)

Women who experienced violence in their childhood were 1.5 times more likely to experience IPV OR: 1.52[0.67-3.42]. This too was not statistically significant..



Women who had desired their pregnancy were less likely to experience IPV OR: 0.85[0.47-1.54] compared to those women who had not desired the pregnancy. This association was not statistically significant.

There was almost no association between level of education and the experience of IPV OR:1.0[0.61-1.62]

Housewives were less likely to experience IPV compared to women with other professions OR: 0.70[0.42-1.17]. This association was however not statistically significant  $p>0.05$

Women whose partners consumed alcohol everyday were less likely to experience IPV; OR:0.78[0.46-1.31]. This association was not statistically significant  $p>0.05$ .

**Table 4:** Bivariate logistic regression analysis with IPV among pregnant women at the BRH.

VARIABLE	IPV : n (%)	NO IPV : n (%)	OR [95% CI]	P-Value
<b>Total</b>	120(100%)	152(100%)	1.14 [0.62-2.09]	0.67
<b>Residence</b>				
Urban	98(81.67)	121(79.61)	1.14 [0.62-2.09]	0.67
Rural	22(18.33)	31(20.39)		
<b>Currently living with partner</b>				
Yes	89(74.17)	118(77.63)	0.83 [0.47-1.45]	0.50
No	31(25.83)	34(22.37)		
<b>Violence in childhood</b>				
Yes	14(11.67)	12(8.0)	1.52 [0.67-3.42]	0.31
No	106(88.33)	138(92.0)		
<b>Parental history of IPV</b>				
<b>Yes</b>	<b>40(33.33)</b>	<b>30(20.0)</b>	<b>2.00 [1.15-3.47]</b>	<b>0.01</b>
<b>No</b>	<b>80(66.67)</b>	<b>120(80.0)</b>		
<b>Desire of pregnancy</b>				
Yes	94(78.33)	123(80.92)	0.85 [0.47-1.54]	0.59
No	26(21.67)	29(19.08)		
<b>Civil marriage</b>				
Yes	32(26.89)	46(30.46)	0.84 [0.49-1.43]	0.52
No	87(73.11)	105(69.54)		
<b>Religious marriage</b>				
Yes	14(11.76)	31(20.67)	<b>0.51 [0.26-1.01]</b>	<b>0.05</b>
<b>No</b>	<b>105(88.24)</b>	<b>119(79.33)</b>		
<b>Controlling behaviour</b>				
Yes	55(45.83)	13(8.55)	<b>9.05 [4.62-17.72]</b>	<b>&lt;0.001</b>
<b>No</b>	<b>65(54.17)</b>	<b>139(68.14)</b>		
<b>Education level of the mother (more than secondary)</b>				
Yes	59(50.43)	73(30.34)	0.99 [0.61-1.62]	0.99

No	58(49.57)	72(49.66)		
<b>Mother's occupation (housewife)</b>				
Yes	44(38.60)	46(38.67)	0.70 [0.42-1.17]	0.17
No	70(61.40)	104(69.33)		
<b>Alcohol consumption by partner (everyday)</b>				
Yes	48(49.48)	49(50.52)	0.78 [0.46-1.31]	0.34
No	60(43.13)	79(56.83)		

## RISK FACTORS OF LBW IDENTIFIED IN OUR STUDY POPULATION

Following a bivariate logistic regression analysis, some factors were found to be associated with LBW in mothers at the Bafoussam regional hospital.

The mothers who resided in an rural setting were two times more likely OR: 2.54[1.08-5.93] to have low birth weight babies and this association was statistically significant. P-value;0.03

Also, those mothers who did not live with their partners were less likely to have low birth weight babies OR:0.51[0.28-0.93]. This association was statistically significant (P-value:0.0281). Also mothers who did not have both civil and religious marriage were two times more likely to have low birth weight babies OR:2.40[1.34-4.29] and 2.17[1.09-4.28]. these associations were both statistically significant (p-value<0.05)

As concerns the participants gravidity, primigravida were 1.02 times more likely to have low birth weight babies compared to multigravida OR:1.02[0.5751-1.8154]. This finding was not statistically significant since the p-value>0.05.

**Table 5:** Bivariate logistic regression analysis with LBW among pregnant women at the BRH

Variable	LBW : n(%)	NBW : n(%)	OR [95%CI]	P-value
Total	68(100%)	204(100%)		
<b>Residence (Urban/Rural)</b>				
Rural (Yes)	7(10.29)	46(22.55)		
Urban(No)	61(89.71)	158(77.45)	2.54 [1.09-5.93]	0.03
<b>Currently living with partner (Yes/No)</b>				

Yes	<b>23(33.82)</b>	<b>42(20.59)</b>		
<b>No</b>	45(66.18)	162(79.41)	<b>0.51 [0.28-0.93]</b>	<b>0.03</b>
<b>Gravidity (Primigravide/Multigravide)</b>				
Yes	24(35.29)	71(34.80)	1.02 [0.58-1.82]	0.94
No	44(64.71)	133(65.20)		
<b>Parity (Primiparous/Multiparous)</b>				
Yes	68(33.33)		1.09 [0.61-1.94]	0.77
No	136(66.67)			
<b>Desire of pregnancy (Yes/No)</b>				
Yes	51(75)	166(81.63)	0.69 [0.36-1.32]	0.26
No	17(25)	38(18.63)		
<b>Civil marriage</b>				
Yes	29(43.28)	49(24.14)		
<b>No</b>	<b>38(56.72)</b>	<b>154(75.86)</b>	<b>2.40 [1.34-4.29]</b>	<b>0.003</b>
<b>Customary marriage</b>				
Yes	37(55.22)	92(45.32)	1.48 [0.85-2.59]	0.16
No	30(44.78)	111(54.68)		
<b>Religious marriage (Yes/No)</b>				
Yes	17(25.76)	28(13.79)		
<b>No</b>	<b>49(74.24)</b>	<b>175(86.21)</b>	<b>2.17 [1.09-4.29]</b>	<b>0.03</b>
<b>Educational status of mother (More than secondary)</b>				
Yes	31(48.44)	101(51.01)	1.11 [0.63-1.95]	0.72
No	33(51.56)	97(48.99)		
<b>Occupation of mother (Housewife)</b>				
Yes	25(39.06)	65(32.50)	0.75 [0.42-1.35]	0.34
No	39(60.94)	135(67.50)		

200

201

202 After running a multiple regression analysis, the risk factors of LBW were all type violence  
203 aOR 3.26[1.76-6.04], rural residence aOR2.67[1.05-6.78] and partners controlling behavior  
204 aOR2.18[1.20-3.96]. Not living with partner had a protective role aOR 0.5294[0.27-1.03]  
205 which was not statistically significant p=0.06. Not having a civil and religious marriage were  
206 also risk factors aOR 1.74[0.74-4.12] and 2.04[0.99-3.95] respectively though they were not  
207 statistically significant.

208

209 Table 6: Factors independently associated with IPV and LBW

Variable	Adjusted OR	P-value
Currently living with partner	0.5294[0.2721-1.0300]	0.0611
Religious marriage	1.7441[0.7368-4.1282]	0.2058

All type violence	3.2639[1.7611-6.0488]	<u>0.0002</u>
Civil marriage	2.0471[0.9997-4.1918]	0.0501
Rural Residence	2.6743[1.0541-6.7853]	<u>0.0384</u>
Partners controlling behaviour	2.1781[1.1992-3.9560]	<u>0.0106</u>

## Discussion

This study was conducted to determine the prevalence, patterns, and factors associated with IPV during pregnancy among mothers of LBW and NBW infants at the BRH, and to investigate whether IPV is a factor associated with LBW. To achieve this, we carried out an unmatched case-control, hospital-based study. Of the 272 participants, 68 (25%) were mothers of LBW babies, while 204 (75%) were mothers of NBW babies. The most common form was psychological violence (41.54%). Multivariate analysis revealed that "any type of IPV" and partner's controlling behaviour were significantly associated with LBW.

Our reported IPV prevalence (44.12%) shows remarkable consistency with hospital-based studies from neighboring countries including Cameroon (38.7%) [12], Ethiopia (41.1% to 44.5%) [13,14], Kenya (37%) [15], and Nigeria (44.6%) [16]. These similarities are likely due to comparable study designs and similar data collection tools. However, our prevalence contrast with significantly lower rates reported in China (7.7%) [17], Namibia (8%) [18], Tanzania (27%) [9], and South Africa (20%) [19]. Conversely, studies in The Gambia (67%) [20] and Zimbabwe (65.4%) [21] reported higher IPV rates than ours. These disparities likely stem from a complex interplay of methodological differences, healthcare system factors, and Cameroon's unique sociocultural environment, where ongoing civil unrest may have intensified violence against women [22].

The predominance of psychological violence (41.5%) in our findings reveals important patterns about the nature of abuse in this population. While this mirrors trends observed in The Gambia (43%) [20], it substantially exceeds estimates from Ethiopia (16-20%) [14] and Kenya (29%) [15]. This variation may reflect fundamental cultural differences in how emotional abuse is perceived, experienced, and reported across different societies. The relatively lower but still concerning prevalence of physical violence (11.0%) presents an interesting contrast - while it's significantly lower than Ethiopian reports (29%) [23], it closely aligns with findings from high-income countries like the United States (11.1%) [24]. This similarity across vastly different contexts suggests potential universal thresholds for reporting

physical abuse, possibly due to shared stigma surrounding physical violence against pregnant women. The reported sexual violence prevalence (10.3%) occupies a middle ground between higher Ethiopian (19.8%) [13] and lower Brazilian (3%) [25] estimates, possibly reflecting regional norms around sexual autonomy in marriage. Sexual violence (10.29%) in our study was lower than in Ethiopia (19.8%) [13] but higher than in Brazil (3%) [25]. Cultural beliefs, particularly the misconception that sexual violence does not exist in marriage, could contribute to underreporting and variation across studies.

Our analysis of factors associated with IPV in our population were partner's controlling behaviour. This supports findings by Aizpurua et al. (2017), who noted controlling behaviour as an early indicator of IPV [26]. This finding aligns with comprehensive multinational studies [20,27] and rigorous longitudinal research [28] demonstrating how childhood exposure to violence shapes future relationship dynamics. Perhaps most striking was the exceptionally strong association with partner controlling behaviours (OR=9.05), which not only corroborates global evidence identifying control as a precursor to violence [26] but suggests it may be an even more potent predictor in our study context. The apparent protective effect of religious marriage invites interesting questions about the role of social support systems and community accountability in preventing IPV, though we must consider potential reporting biases in these sensitive matters [29].

From a clinical perspective, our most significant contribution is the robust demonstration of IPV's independent association with low birth weight (aOR=3.26) after controlling for key confounders. This finding provides strong support for biological pathways linking chronic stress from abuse to impaired fetal growth and development [3,4]. The consistency of this effect size with studies from Brazil and South Africa [19,25] suggests these mechanisms may operate similarly across diverse populations. The unexpected association between urban residence and LBW (aOR=2.67) merits special attention, as it contradicts some conventional wisdom about rural health disparities. This may reflect unique environmental stressors in urban Cameroon or differences in help-seeking behaviours that warrant targeted investigation.

#### **Study strengths and limitations:**

In our study, the unmatched case-control methodology provided adequate statistical power to detect significant associations between IPV and birth outcomes. Our use of a WHO-adapted questionnaire enabled standardized measurement of all IPV forms (psychological, physical, and sexual), enhancing comparability with international studies. Despite these strengths, our

study is subjected to some limitations. While providing clinical insights, our recruitment from a referral hospital may limit generalizability to community populations. Also, underreporting of IPV due to stigma remains a concern, particularly for sensitive forms like sexual violence, potentially leading to prevalence underestimated. Thirdly, the cross-sectional design prevents definitive conclusions about whether IPV exposure preceded or caused the observed birth outcomes. Finally, the retrospective reporting of childhood exposures and violent experiences may be subject to memory inaccuracies, especially for psychological abuse.

## Conclusion

This study investigated the link between intimate partner violence (IPV) during pregnancy and low birth weight (LBW) in a Cameroonian hospital setting. The results demonstrate that IPV is a significant concern, with psychological abuse being the most reported form. Women exposed to IPV had increased likelihood of delivering LBW infants compared to those who did not experience violence. Other associated factors included a history of parental violence, absence of religious marriage, and controlling behaviours by partners. These findings reinforce existing evidence on the harmful consequences of IPV on maternal and fetal health. To address this public health challenge, we recommend integrating routine IPV screening into prenatal care and implementing support programs for affected women. Such measures could help mitigate the impact of violence and improve pregnancy outcomes. Strengthening awareness and healthcare responses to IPV remain crucial for safeguarding maternal and child well-being.

## Conflict of Interest

The authors declare that they have no conflict of interest

## References

1. Stöckl H, Sardinha L, Maheu-Giroux M, Meyer SR, García-Moreno C. Physical, sexual and psychological intimate partner violence and non-partner sexual violence against women and girls: a systematic review protocol for producing global, regional and country estimates. *BMJ Open*. 2021 Aug 19;11(8):e045574.
2. Gebreslasie KZ, Weldemariam S, Gebre G, Mehari MA. Intimate partner violence during pregnancy and risk of still birth in hospitals of Tigray region Ethiopia. *Ital J Pediatr*. 2020 Jul 27;46(1):107.
3. Chai J, Fink G, Kaaya S, Danaei G, Fawzi W, Ezzati M, et al. Association between intimate partner violence and poor child growth: results from 42 demographic and health surveys. *Bull World Health Organ*. 2016 May 1;94(5):331–9.

4. Murphy CC, Schei B, Myhr TL, Du Mont J. Abuse: a risk factor for low birth weight? A systematic review and meta-analysis. *CMAJ Can Med Assoc J J Assoc Medicale Can.* 2001 May 29;164(11):1567–72.
5. The DHS Program - Cameroon DHS Key Indicators [Internet]. [cited 2021 Sep 5]. Available from: <https://dhsprogram.com/topics/Youth-Corner/cameroon-dhs-key-indicators.cfm>
6. Njim T, Mbolingong FN. Intimate partner violence and depression among pregnant women in the North west region of Cameroon: a research proposal. *BMC Res Notes* [Internet]. 2018 [cited 2021 Sep 5];11. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6282249/>
7. Román-Gálvez RM, Martín-Peláez S, Martínez-Galiano JM, Khan KS, Bueno-Cavanillas A. Prevalence of Intimate Partner Violence in Pregnancy: An Umbrella Review. *Int J Environ Res Public Health.* 2021 Jan 15;18(2):E707.
8. Stöckl H, Watts C, Kilonzo Mbwambo JK. Physical violence by a partner during pregnancy in Tanzania: prevalence and risk factors. *Reprod Health Matters.* 2010 Nov;18(36):171–80.
9. Mahenge B, Likindikoki S, Stöckl H, Mbwambo J. Intimate partner violence during pregnancy and associated mental health symptoms among pregnant women in Tanzania: a cross-sectional study. *BJOG Int J Obstet Gynaecol.* 2013 Jul;120(8):940–6.
10. Makayoto LA, Omolo J, Kamweya AM, Harder VS, Mutai J. Prevalence and associated factors of intimate partner violence among pregnant women attending Kisumu District Hospital, Kenya. *Matern Child Health J.* 2013 Apr;17(3):441–7.
11. Donovan BM, Spracklen CN, Schweizer ML, Ryckman KK, Saftlas AF. Intimate partner violence during pregnancy and the risk for adverse infant outcomes: a systematic review and meta-analysis. *BJOG Int J Obstet Gynaecol.* 2016 Jul;123(8):1289–99.
12. Alio AP, Salihu HM, Nana PN, Clayton HB, Mbah AK, Marty PJ. Association between intimate partner violence and induced abortion in Cameroon. *Int J Gynaecol Obstet Off Organ Int Fed Gynaecol Obstet.* 2011 Feb;112(2):83–7.
13. Azene ZN, Yeshita HY, Mekonnen FA. Intimate partner violence and associated factors among pregnant women attending antenatal care service in Debre Markos town health facilities, Northwest Ethiopia. *PLoS ONE.* 2019 Jul 1;14(7):e0218722.
14. Abebe Abate B, Admassu Wossen B, Tilahun Degfie T. Determinants of intimate partner violence during pregnancy among married women in Abay Chomen district, Western Ethiopia: a community based cross sectional study. *BMC Womens Health.* 2016 Mar 10;16:16.
15. Makayoto LA, Omolo J, Kamweya AM, Harder VS, Mutai J. Prevalence and Associated Factors of Intimate Partner Violence Among Pregnant Women Attending Kisumu District Hospital, Kenya. *Matern Child Health J.* 2013 Apr;17(3):441–7.
16. Onoh R, Umeora O, Ezeonu P, Onyebuchi A, Lawani O, Agwu U. Prevalence, Pattern and Consequences of Intimate Partner Violence During Pregnancy at Abakaliki Southeast Nigeria. *Ann Med Health Sci Res.* 2013;3(4):484–91.
17. Wang T, Liu Y, Li Z, Liu K, Xu Y, Shi W, et al. Prevalence of intimate partner violence (IPV) during pregnancy in China: A systematic review and meta-analysis. *PLoS ONE*

- [Internet]. 2017 [cited 2022 Jun 17];12(10). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5624577/>
18. Bikinesi LT, Mash R, Joyner K. Prevalence of intimate partner violence and associated factors amongst women attending antenatal care at Outapi clinic, Namibia: A descriptive survey. *Afr J Prim Health Care Fam Med*. 2017 Dec 6;9(1):1512.
  19. Groves AK, Moodley D, McNaughton-Reyes L, Martin SL, Foshee V, Maman S. Prevalence and rates of intimate partner violence among South African women during pregnancy and the postpartum period. *Matern Child Health J*. 2015 Mar;19(3):487–95.
  20. Jatta JW, Baru A, Fawole OI, Ojengbede OA. Intimate partner violence among pregnant women attending antenatal care services in the rural Gambia. *PLoS ONE*. 2021 Aug 5;16(8):e0255723.
  21. Shamu S, Abrahams N, Zarowsky C, Shefer T, Temmerman M. Intimate partner violence during pregnancy in Zimbabwe: a cross-sectional study of prevalence, predictors and associations with HIV. *Trop Med Int Health TM IH*. 2013 Jun;18(6):696–711.
  22. Quantifying the Ripple Effects of Civil War - PMC [Internet]. [cited 2022 Jun 17]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8233021/>
  23. Abebe Abate B, Admassu Wossen B, Tilahun Degfie T. Determinants of intimate partner violence during pregnancy among married women in Abay Chomen district, Western Ethiopia: a community based cross sectional study. *BMC Womens Health*. 2016 Mar 10;16:16.
  24. Cokkinides VE, Coker AL, Sanderson M, Addy C, Bethea L. Physical violence during pregnancy: maternal complications and birth outcomes. *Obstet Gynecol*. 1999 May;93(5 Pt 1):661–6.
  25. Nunes MAA, Camey S, Ferri CP, Manzolli P, Manenti CN, Schmidt MI. Violence during pregnancy and newborn outcomes: a cohort study in a disadvantaged population in Brazil. *Eur J Public Health*. 2011 Feb;21(1):92–7.
  26. Aizpurua E, Copp J, Ricarte JJ, Vázquez D. Controlling Behaviors and Intimate Partner Violence Among Women in Spain: An Examination of Individual, Partner, and Relationship Risk Factors for Physical and Psychological Abuse: *J Interpers Violence* [Internet]. 2017 Aug 24 [cited 2022 Jun 20]; Available from: <https://journals.sagepub.com/doi/full/10.1177/0886260517723744>
  27. Mannell J, Lowe H, Brown L, Mukerji R, Devakumar D, Gram L, et al. Risk factors for violence against women in high-prevalence settings: a mixed-methods systematic review and meta-synthesis. *BMJ Glob Health*. 2022 Mar 16;7(3):e007704.
  28. Ehrensaft MK, Cohen P, Brown J, Smailes E, Chen H, Johnson JG. Intergenerational transmission of partner violence: a 20-year prospective study. *J Consult Clin Psychol*. 2003 Aug;71(4):741–53.
  29. Mchome Z, Mshana G, Aloyce D, Peter E, Malibwa D, Dwarumpudi A, et al. “Don’t You Think It Is Violence Forcing Me to Have Sex While Not Happy?” Women’s Conceptualization of Enjoyable Sex and Sexual Intimate Partner Violence in Mwanza, Tanzania. *Int J Environ Res Public Health*. 2020 Nov;17(21):7937.