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Research Article

Unmarried motherhood and infant health: The role of intimate partner violence in Colombia

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Contents

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Abstract

BACKGROUND
Research has shown that growing family diversity, including motherhood among unmarried women, is associated with child well-being. However, little is known about whether and how intimate partner violence (IPV) shapes the relationship between family diversity and child outcomes. Colombia is an ideal case to study these relationships due to the country's high prevalence of unmarried motherhood and large fraction of women who report experiencing IPV.

OBJECTIVE
This study expands previous research by studying the association between the mother's partnership status and low birth weight, and examines the role of physical IPV during pregnancy in this Colombian context.

METHOD
The study draws on Colombian Demographic and Health Survey data (2000, 2005, 2010, 2015), and selects mothers with children aged 0–1 who were married, cohabiting, or separated at the time of the interview. Descriptive analysis shows trends across time in the partnership status of women with newborn children, and logistic regression models estimate whether the mother's partnership status was associated with low birth weight, and how experiencing IPV during pregnancy affected this relationship.

RESULTS
The results show that separated and cohabiting mothers reported higher levels of IPV during pregnancy than married mothers. The levels of IPV reported by cohabiting women decreased across the observation period to become more like those of married women. However, the difference in low birth weight between the infants of married and unmarried mothers can mostly be attributed to differences in maternal and child characteristics, as well as to disparities in healthcare utilization during pregnancy.

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CONTRIBUTION

The paper calls attention to the correlation between IPV and family forms in the Latin American context, and relates it to child outcomes.

1. Introduction

The significant changes in family formation that affected Western societies in the second half of the 20th century, and that are commonly seen as reflecting the second demographic transition (SDT), have been well documented (e.g., Lesthaeghe 2010). However, evidence indicating that many behavioral shifts, such as the spread of cohabitation, have been even more prevalent in other regions of the world has received less attention. Specifically, in Latin America, cohabitation as a form of union has increased sharply among all social groups. This rise in the proportion of unmarried mothers has been described as the 'cohabitation boom' in the scholarly literature (Covre-Sussai et al. 2015; Esteve, García-Román, and Lesthaeghe 2012).

Motherhood among unmarried women is commonly linked to social disadvantage, and is thus assumed to have significant repercussions for family dynamics and children's well-being (Brown 2010; Härkönen, Bernardi, and Boertien 2017). Similarly, it has been shown that a strong correlation exists between parental partnership status and child outcomes (Amato 2014; DeRose et al. 2017), particularly infant health (Bird et al. 2000; Castro-Martín 2010; Shah, Zao, and Ali 2011; Torche and Abufhele 2021). An important factor in the association between partnership status and infant health is intimate partner violence (IPV), which is typically defined as physical, sexual, or psychological abuse by an intimate partner, encompassing physical aggression, sexual coercion, and controlling behaviors (Garcia-Moreno et al. 2006). The literature has consistently found that intimate partner violence (IPV) is harmful to infant health (Shah and Shah 2010). Moreover, research conducted in Colombia has shown that married women are at lower risk of IPV than cohabiting and separated women (Friedemann-Sanchez and Lovatón 2012). The country has one of the highest percentages of women who report experiencing physical IPV during their lifetime, and specifically during pregnancy (Devries et al. 2010). Women in certain family forms seem to be subjected to IPV more frequently than others, which may in turn affect their children's well-being. However, there is little empirical research examining the role of IPV in the relationship between the mother's partnership status and child health.

Although nonmarital childbearing is an increasingly common phenomenon worldwide, most existing studies on the health disadvantage of children born to unmarried parents have been conducted with US or European data (Brown 2010; Bzostek

and Beck 2011). Colombia's consistently high shares of nonmarital fertility and cohabitation make the country an exceptional case study. Childbearing outside of wedlock is a traditional pattern in the region and has been attributed to the high prevalence of consensual unions since the colonial period. This pattern reflects the difficulties the Catholic Church has faced in imposing its views on marriage on the population, and the lack of integration of the lower social classes and distinct ethnic groups during the process of colonization (Castro-Martín 2002). However, the recent increase in nonmarital childbearing and the cohabitation boom among all socioeconomic groups have raised questions about how these trends have influenced children's well-being. Do the children of unmarried mothers fare worse in terms of health than the children of married mothers? What is the role of IPV in this relationship?

The data used in this study come from the 2000, 2005, 2010, and 2015 Colombian Demographic and Health Surveys (CDHS). The study focuses on mothers whose children were 12 months old or younger at the time of the interview. The great benefit of using the CDHS data is that they also include information about IPV during pregnancy. Furthermore, the data cover a 15-year period during which significant social changes took place in the country, enabling the expansion of research on family formation in Colombia. Whereas previous studies on partnership status and infant health only distinguished between married and unmarried mothers (Castro-Martín 2010; Torche and Abufhele 2021), the CDHS data allow us to adopt a more fine-grained definition of the unmarried group, distinguishing between mothers who were married, cohabiting, and separated. The three main objectives of this paper are to (1) describe trends in IPV and the partnership status of women with newborn children; (2) examine how the risk of low birth weight differs depending on the mother's partnership status; and (3) determine what role IPV during pregnancy plays in the association between the mother's partnership status and low birth weight.

2. Theoretical considerations

2.1 Diverse family forms and infant health

As a result of changes in partnership formation patterns and an increase in nonmarital childbearing, children's living arrangements have become much more diverse in recent decades. A robust literature from Western countries has explored the association between family forms and children's well-being (Brown 2010; Härkönen, Bernardi, and Boertien 2017). Studies focusing on Europe usually frame nonmarital fertility around the SDT, which attributes recent fertility changes to values related to individual autonomy and gender equality (Castro-Martín et al. 2011). Nevertheless, the SDT has been criticized,

particularly for its rigidity, lack of consideration of within-country variation, and ethnocentric bias (Zaidi and Morgan 2017). The theory offers only one of several possible explanations for changes in family formation patterns (Coleman 2004). Furthermore, some of the model's predictions are not consistent with the patterns observed in several countries. For example, while the SDT tends to portray changes in family forms as positive, some scholars have noted that women who have children outside of marriage are often from disadvantaged backgrounds, and have highlighted the importance of considering these mothers' ongoing challenges (Hogendoorn and Härkönen 2023; Perelli-Harris et al. 2010). Studies focusing on the United States have observed that nonmarital childbearing is more common in families from disadvantaged social strata with a high degree of instability. In a context where parental partnership status is linked to social inequalities, nonmarital fertility may play a role in the intergenerational transmission of poverty (McLanahan 2004).

In general, these studies have found that children with divorced or separated parents have lower educational attainment, socioeconomic status, and cognitive skills, as well as poorer health outcomes (Amato 2014; Amato and Patterson 2017; Bzostek and Beck 2011; Manning and Lamb 2003; Panico et al. 2019; Reynolds et al. 2018; Schmeer 2011). Naturally, the results vary depending on the child's age, the family context, the conceptualization of partnership status, and the prevailing social norms (Brown, Manning, and Stykes 2015; Foster and Kalil 2007; Kalmijn 2015; Pierce and Heaton 2020; Smith-Greenaway and Clark 2017). Most of the theories and findings of this literature are based on the US and European contexts, whereas little is known about the experiences of families in middle-income countries like Colombia (DeRose et al. 2017; Reynolds et al. 2018).

Of particular interest for this study is the relationship between the mother's partnership status and infant health, measured by low birth weight (LBW). Children's health in early life has significant repercussions for their long-term health, schooling, employment, and earnings (Case and Paxson 2010). LBW is associated with neonatal mortality and infant morbidity, and is a powerful predictor of children's long-term health, psychological development, and cognitive skills (Boardman et al. 2002; Torche and Conley 2016). Therefore, analyzing health inequalities at an early life stage can shed light on health inequalities later in life.

There are several reasons why the mother's partnership status might influence infant health. One contributing factor is the selection effects of unmarried motherhood: some mothers may have personal characteristics and behaviors that predispose them to separate or not to marry, and these factors might also affect their well-being and that of their children (Amato 2014). Additionally, unmarried mothers tend to be younger, have lower levels of education, and have more precarious economic circumstances than married mothers (Burstrom et al. 2010; Esteve, García-Román, and Lesthaeghe 2012). It has also

been shown that antenatal care utilization varies systematically by the woman's partnership status (Rurangirwa et al. 2017). A similar pattern has been observed for smoking during pregnancy (Kiernan and Pickett 2006), suggesting that health behavior may be an important factor linking family structure to child health. There is also evidence that a lack of social and emotional support from her partner can negatively affects a mother's physical and mental health, and consequently the health of her children (Hohmann-Marriott 2009).

Studies on infant health have shown that compared to the children of married mothers, the children of unmarried mothers have worse general physical health and are at increased risk of having LBW, being a preterm birth (PTB), and being small for their gestational age (SGA) (Shah, Zao, and Ali 2011). Using register data, Castro-Martín (2010) finds that unmarried mothers in Spain are more likely than married mothers to have a low-birth-weight infant, but also that the difference has been narrowing due to changes in the sociodemographic profile and increased social acceptance of unmarried motherhood. Similarly, Torche and Abufhele (2021) use the Chilean birth registry to show that the positive impact of marriage on infant health declined as nonmarital childbearing became more accepted in society. Research on how infant health differs depending on whether the mother is cohabiting or married is still rare. One of the few such studies, conducted in the US context, shows that infants born to married mothers experience birth weight benefits compared to infants born to both single mothers and cohabiting mothers (Song 2021).

2.2 Intimate partner violence as a risk factor for infant health

IPV is the most common form of violence against women, and is a public health problem that negatively affects both mothers and children (Campbell 2002; Garcia-Moreno et al. 2006). Physical IPV during pregnancy is particularly relevant when analyzing infant health. In cases of multiple partnerships, IPV during pregnancy is a more precise measurement for identifying the partner who perpetrated the violence, as it is usually the child's father (WHO 2005). Infants born to mothers who report experiencing IPV during pregnancy are found to have short- and long-term adverse health outcomes through a diverse set of mechanisms (Yount, DiGirolamo, and Ramakrishnan 2011).

The mechanisms linking IPV during pregnancy to infant health include the direct effects on fetal growth and development and indirect effects related to maternal mental and physical health, access to antenatal and delivery care, and risky maternal behavior. Direct effects through abdominal trauma might cause placental damage, premature rupture of membranes, or uterine contractions leading to PTB and LBW (Newberger et al. 1992). Indeed, research focusing on fetal growth and development has shown that

experiencing IPV during pregnancy increases the risk of adverse birth outcomes such as PTB and LBW (Da Thi Tran, Murray, and Van Vo 2022; Janssen et al. 2003; Murphy, Schei, and Myhr 2001; Sigalla et al. 2017; Valladares 2002). In a meta-analysis, Shah and Shah (2010) estimate that among women exposed to IPV, the odds of having a LBW infant increase by 53%.

Infant health is also indirectly affected by IPV. Female victims of IPV suffer from a range of harmful health consequences, such as injuries, chronic pain, malnutrition, depression, and stress (Campbell 2002). Previous research has shown the importance of analyzing prenatal maternal stress and its adverse effects on infant health (Almond and Currie 2011). Maternal stress has been linked to the production of hormones that may lead to intrauterine growth restriction or preterm birth (Valladares 2002). For example, using data from Chile, Torche (2011) finds that maternal exposure to stress during pregnancy increases the probability of having an infant with low birth weight. The stress levels of mothers who experience IPV during pregnancy might increase, which could in turn affect the health of the infant. Moreover, women who are exposed to IPV are at higher risk of prenatal smoking and alcohol abuse (Bailey and Daugherty 2007; Dutton et al. 2006). In addition, women who experience IPV might be less willing or able to seek antenatal care to prevent, identify, or treat health complications, even though they tend to need such care the most (Hindin, Kishor, and Ansara 2008; Nunes et al. 2010). Generally, women with poor health outcomes during pregnancy are more likely to give birth to an unhealthy child (Valladares 2002).

2.3 Intimate partner violence and partnership status

Studies have consistently shown that the risk of IPV varies according to partnership status, with the risk being higher in nonmarital relationships (Brown and Bulanda 2008; Brownridge 2008; Kenney and McLanahan 2006; Magdol et al. 1998; Manning, Longmore, and Giordano 2018; Rezey 2017; Romans et al. 2007; Siddique 2016). There is evidence that separated women are at greater risk of experiencing IPV than nonseparated women (Siddique 2016; Romans et al. 2007). For example, using a nationally representative household survey from the United States, Rezey (2017) shows that separated women are more likely to be victims of IPV than married women, even after accounting for sociodemographic characteristics. A potential explanation for this increased risk is that partner violence may lead to separation (DeMaris 2001). However, separating from a violent partner does not necessarily end the abuse as it may continue post-separation (Fleury, Sullivan, and Bybee 2000).

Scholars have also documented that cohabiting relationships have higher levels of IPV than married relationships (Brown and Bulanda 2008; Brownridge 2008; Kenney

and McLanahan 2006; Magdol et al. 1998; Manning, Longmore, and Giordano 2018). It has been argued that because cohabitation is an incomplete institution with fewer institutionalized rights and lower commitment levels than marriage (Nock 1995), cohabiting women tend to be in a more vulnerable position than married women. In a male-dominated society, married men may perceive their relationship as stable, decreasing their need to control their partner using force (Nock 1995). By contrast, men in a cohabiting union might feel threatened by the instability of their relationship, and thus use physical or emotional violence to control their partner. Nonetheless, as cohabitation gains social acceptance and becomes more common it is less frequently linked to adverse relationship outcomes (Liefbroer and Dourleijn 2006). Indeed, Brownridge (2008) reports that in Canada, the disparity in violence rates between married and cohabiting couples has diminished as cohabitation has become more prevalent and less selective.

3. The Colombian context

3.1 Historical context

Unlike in other societies, in Colombia nonmarital fertility is not a new trend, but is instead a traditional pattern reflecting the region's history, which has been linked to the high prevalence of consensual unions (Gutiérrez de Pineda 1968; Quilodrán 2003). Historical factors related to the colonial period in the country left legacies that still influence family formation. Precolonial societies and imported enslaved Africans had diverse marital customs, including polygamy, bride price, and occasionally sibling marriage. Against this background, colonizers tried to implement new rules to regulate marriage.

The Catholic Church had a pervasive impact through its efforts to impose its own definition of marriage based on monogamy and patriarchal values (De Vos 2000; Socolow 2000). The church considered any other type of informal union invalid, even if it was seen as a substitute for marriage among Indigenous and African families. Children born into nonmarital unions did not have the same rights as children born into formal marriages. In addition, weddings were often expensive, and intermarriage across social and ethnic groups was usually prohibited. Even so, some European men, including married men, had informal relations or a second family with Indigenous and African women (De Vos 2000; Socolow 2000). These relations were characterized by informality and unequal power dynamics between men (the conquerors) and women (the conquered).

In colonial times, marriage was associated with higher social status (Lavrin 1989). The elite, composed of Spanish-born colonists and wealthy landowners, primarily practiced formal marriage. Women with this social status were expected to marry,

fulfilling the role of wife and looking after the children. By contrast, men had more freedom, as they usually married while also engaging in casual relationships with women of lower social status. Within the lower social strata, marriage was not as common, and women experienced less societal pressure to marry. For most non-elites, civil or religious marriage was not seen as beneficial since they had no inheritance to protect and fewer economic resources to pay for a ceremony, and they often lived in rural areas where marriages were geographically challenging to arrange. In addition, enslaved women needed permission from their masters to get married and were usually forced to become concubines of white men. Women from lower social strata suffered because their partners and the fathers of their children had few legal obligations toward them. Thus, men frequently abandoned their children and used physical abuse to control women in intimate relationships (Socolow 2000). This dynamic led to extremely low marriage rates: Cohabitation was common among certain groups, and a high share of births occurred outside of marriage (Milanich 2002).

3.2 Recent trends

3.2.1 Family diversity

Colombia has one of the highest incidences of nonmarital fertility in the world (Bongaarts and Casterline 2022; Laplante et al. 2016), mostly related to the large number of consensual unions. Using census data from 2005 and information on the partnership status of mothers with children younger than 1 year, Castro-Martín et al. (2011) estimate that roughly 20% of births in Colombia take place within marriage, more than 50% within a consensual union, and around 20% outside a partnership – meaning that about 70% of all births in Colombia take place out of wedlock. Social systems created in the past are still present in Colombian society. Another potential factor contributing to the high share of children born outside of marriage is the influence of macro-level violence on the sex ratio of the population. In Colombia a female-biased sex ratio creates an unbalanced marriage market where men are in the more advantageous position, potentially making them more reluctant to enter a marital union (Jones and Ferguson 2006).

To ensure that children born to both married and unmarried mothers are treated equally, there is a widespread tendency to equalize the rights of children regardless of the type of union they are born into. The Colombian constitution recognized consensual unions in 1991, thereby ensuring that the children born within these unions receive the same support and inheritance rights as those born within marriage (Deere and León 2021). Maintenance and inheritance rights for couples in consensual unions were established much later, in the 2000s (ibid.). To take advantage of these rights, couples

must demonstrate relationship stability, such as cohabiting for at least two years or having a child together. While couples can choose to register their relationship, this depends on mutual agreement, resulting in low registration rates (ibid.). Thus, the success of legislative changes aimed at protecting women in various family forms hinges on women's awareness of their specific rights and their willingness to undertake a potentially costly and time-consuming process. It therefore appears that married couples continue to have more legal rights than couples in consensual unions.

An increase in cohabitation as a union form has been documented among both less-educated and – surprisingly – more-educated women in Colombia (Esteve, García-Román, and Lesthaeghe 2012). As this type of union has become more common among different groups, the social meaning of cohabitation in Colombia has been shown to vary. Covre-Sussai et al. (2015) argue that consensual unions can be divided into 'traditional' and 'modern' types. Traditional cohabitation is an alternative to marriage practiced by women who are less educated, give birth at younger ages, and bear more children. This type of consensual union is characterized by low levels of female independence and high instability, and thus imposes constraints on women with less bargaining power than men (Parrado and Tienda 1997). Modern cohabitation tends to be practiced by women who are older, highly educated, and have fewer children. Some scholars have argued that this form of cohabitation resembles that observed among higher educated groups in Western countries,[2] which mostly serves as a trial period before marriage (Covre-Sussai et al. 2015; Esteve, García-Román, and Lesthaeghe 2012).

Thus, in the Colombian case, it is difficult to determine whether the increase in nonmarital fertility is the result of the expansion of individual autonomy, new cultural patterns, and modernization, as stipulated by the SDT (Lesthaeghe 2010); or whether it reflects the exclusion of women from resources, gender inequality, and female subordination (Castro-Martín et al. 2011). Especially in a society with pervasive social inequalities, where the rigid stratification systems contribute to inequalities in union formation based on class, socioeconomic status, and ethnicity, childbearing outside of wedlock has a different meaning depending on the social group in which it occurs. On the one hand, nonmarital fertility may reflect gender equality and women's autonomy. On the other hand, having a child outside marriage might be associated with early pregnancy, father abandonment, or financial hardship.

[2] For research on the meaning of cohabitation in Western countries, see Hiekel, Liefbroer, and Poortman (2014) and Manning and Cohen (2012).

3.2.2 IPV

In Colombian society there are still unequal power dynamics between men and women, which are linked to physical abuse in intimate relationships. Historical class and ethnic differences reinforce men's control over women's sexuality and autonomy (Arriagada 2006), which may be expressed through emotional, physical, and sexual violence. In Latin America, violence is used to affirm masculine authority because social norms have not progressed as fast as women's education, labor force participation, and economic conditions (Castro, Casique, and Brindis 2008; Esteve, Castro-Martín, and Castro Torres 2022). In particular, men tend to use violence as a mechanism of control when they believe their role as breadwinner is being threatened (Menjívar 2011). Thus, progress toward gender equality has been slow in Colombia, despite the significant progress in women's education and labor market participation. It is also possible that women in Colombia have low bargaining power within the household because of the excess of women in the marriage market (Jones and Ferguson 2006), which could in turn increase their likelihood of experiencing violence.

Colombia has one of the highest percentages of women who report physical IPV worldwide. Using DHS survey data from 2005, Devries et al. (2010) estimate that in Colombia 40% of women have reported experiencing physical IPV, and 8% of ever-pregnant women have reported experiencing physical IPV during pregnancy. Also using DHS survey data, Kishor and Kiersten (2004) show that women are more likely to report experiencing physical violence than emotional or sexual violence. The determinants of IPV include union status, age, educational level, income, number of children, and place of residence (Fournier et al. 1999; McQuestion 2003). Married older women with higher educational levels and socioeconomic status are less likely to experience IPV. Women with more children or who live in urban areas are at higher risk of experiencing IPV. Overall, marriage seems to be a protective factor against violence perpetrated by a male partner, although the causal direction of this relationship is difficult to establish (Friedemann-Sanchez and Lovatón 2012).

3.3 The present study

A large body of research has investigated the relationship between the mother's partnership status and infant health (Shah, Zao, and Ali 2011). There is consistent empirical evidence showing that the differences between children born to unmarried and married mothers can be partially attributed to the differences in their sociodemographic characteristics (Brown 2010). Additionally, other studies have documented the adverse effects of intimate partner violence (IPV) on infant health, including increased risks of

low birth weight and other negative birth outcomes (Da Thi Tran, Murray, and Van Vo 2022). Further research has also suggested that the risk of IPV varies depending on partnership status, with unmarried mothers facing higher levels of IPV than married mothers (Manning, Longmore, and Giordano 2018; Rezey 2017). Despite this evidence, our understanding of how IPV influences the association between partnership status and infant health remains limited.

While substantial research has independently examined the associations between partnership status and infant health, IPV and infant health, and IPV in relation to partnership status, no prior studies have integrated these factors in order to explore how they may collectively influence infant health. In light of this research gap, the present study seeks to examine whether the negative effect of partnership status on low birth weight can be partially explained by the presence of IPV during pregnancy. Specifically, I hypothesize that the negative association between partnership status and low birth weight will be attenuated after controlling for IPV, suggesting a controlled direct effect of partnership status on low birth weight. While previous research has demonstrated that sociodemographic characteristics may account for much of this association, this study aims to assess whether IPV also plays a role in this relationship.

4. Data, variables, and methods

4.1 Data and analytical sample

This paper uses data from the Colombian Demographic and Health Survey (CDHS), a nationally representative and cross-sectional survey fielded in participating countries at roughly 5-year intervals (DHS Program 2023). The selected waves are from 2000, 2005, 2010, and 2015. The questionnaire used for this study includes information on reproductive-age women (13–49), their birth histories, and the sociodemographic characteristics of mothers and children. The CDHS sample selection has changed over time, with girls aged 13–14 being included from 2005 onward. The main advantages of using the CDHS data are that the sample sizes are large, the data can be used to make comparisons across time since the same program was applied over multiple years, and the surveys include questions on IPV. The analysis does not include previous years because information on IPV was only collected for the period covered by the CDHS data.

Since the information on the mother's partnership status and other sociodemographic characteristics was collected at the time of the survey and the birth of a child might have occurred at a different time, all analyses are restricted to mothers with children aged 0–1 year (N = 18,110); thus, the mothers' characteristics correspond to the period of time immediately after childbearing. The CDHS 2015 provides retrospective

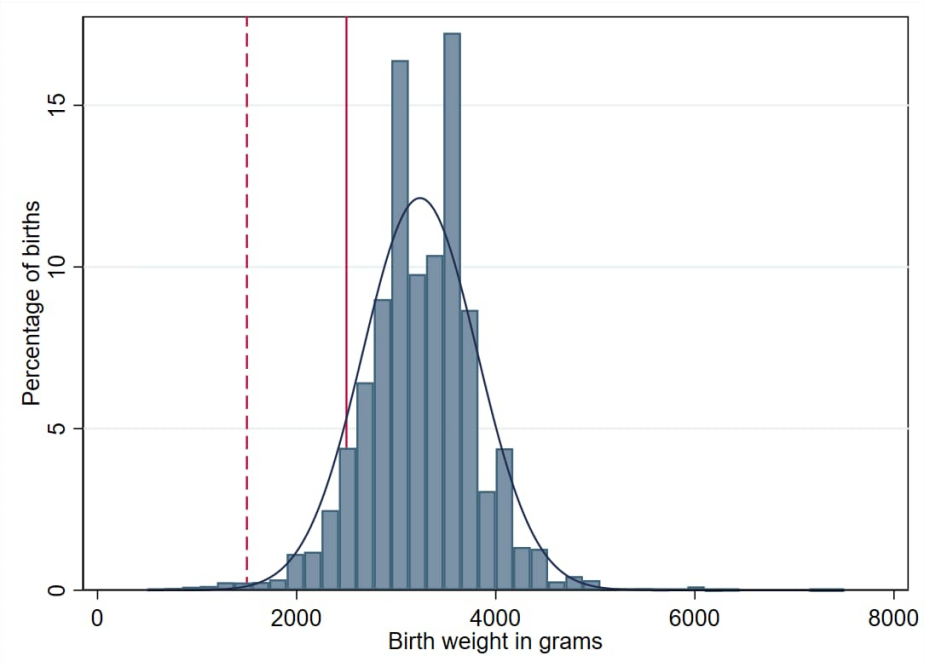
data on relationship histories, allowing for a more detailed assessment of partnership status. However, the sample size of this survey wave is too small to enable us to conduct the analysis with these data. The sample is further restricted to singleton births to avoid the distinct effects of multiple births on low birth weight (N = 17,974). In addition, only mothers with information on the outcome variable are selected (N = 14,258).[3] Finally, mothers categorized by the CDHS as "never in a union" are excluded as it is not possible to distinguish between those who were never partnered (not at risk of IPV) and those who were never in a cohabiting or marital union (at risk of IPV if they had a partner living in another household). Widowed mothers are also excluded due to the small sample size (0.65%). The total number of women who enter the analysis is 12,191, of whom 7.87% were subjected to IPV during pregnancy.

4.2 Dependent variable

The outcome variable used to capture infant health is *low birth weight*, defined as weight at birth below 2,500 grams (WHO 2014), measured as a binary outcome (1 = low birth weight; 0 = regular birth weight). The reporting of weight at birth in the CDHS is based on a written record or the mother's recall, which might influence the reliability of the measure (Boeke et al. 2012). Figure 1 shows the distribution of infant birth weights. As only 85 (0.70%) infants in the sample had a very low birth weight (below 1,500 grams), the analysis only distinguishes between low and regular birth weight. The average birth weight is 3,239 grams (SE = 5.21), and 819 newborns (6.72%) had a low birth weight. As low birth weight can result from intrauterine growth restriction and/or preterm birth, it would be informative to distinguish between these causes (WHO 2014). However, there is a lack of data on gestational length for the period analyzed. Thus, the outcome variable could be related to either of these two factors.

[3] Mothers who are separated (23.71%) and cohabiting (23.35%) have higher shares of missing values on the outcome variable than those who are married (13.33%).

Figure 1: Distribution of infant birth weights



Source: CDHS 2000, 2005, 2010, 2015; own estimates.
Note: The red solid line indicates LBW (<2,500 g) and the dashed line shows very low birth weight (<1,500 g).

4.3 Independent variables

The main independent variable is operationalized based on the mothers' answers regarding partnership status. I distinguish the following statuses:

(1) married: living with a partner and married;
(2) cohabiting: living with a partner and not married; and
(3) separated: not married but lived with a partner in the past.

The covariates include the mothers' and the children's characteristics associated with low birth weight. The children's characteristics are *sex* (male or female) and *birth order* (first, second, third, or higher). Birth order groups are based on the children's position in the birth history. The mothers' characteristics are *age at birth* (13–19, 20–34, or 35–49 years), highest *educational level* (primary or lower, secondary, or higher), and

place of residence (urban or rural). The urban category includes the capital cities and the remaining municipal capitals. In addition, the *number of antenatal care visits* (0–3 visits, 4–7 visits, or 8 or more visits) is used to indicate access to and use of healthcare during pregnancy. At least eight antenatal care visits are recommended for a positive pregnancy experience (WHO 2016). Mother's ethnicity and the wealth index built as a composite measure of a household's cumulative living standard would also be relevant for this analysis; however, the CDHS data does not include information on these variables for all survey rounds.

To account for IPV, a binary indicator of whether or not a mother reported experiencing *physical intimate partner violence during pregnancy* is included. This is part of the domestic violence module and follows the World Health Organization's ethical and safety guidelines, which stipulate that the staff implementing this module should receive special training, and should randomly select only one woman per household to answer these specific questions (WHO 2001). Once the women were selected they had to give additional informed consent, and their privacy had to be guaranteed by ensuring no one else in the household was present during the interview. Even with such rigorous procedures, survey questions on IPV are prone to social desirability bias and underreporting (Fernández-González, O`Leary, and Muñoz-Rivas 2013). The women were questioned about violence perpetrated by their current husband/partner if they were married or cohabiting, or by their most recent husband/partner if they were separated. Other variables that are part of the module indicate whether the women reported experiencing IPV in the 12 months preceding the survey (see Table A-1); however, I selected physical violence during pregnancy as the indicator, to precisely capture violence perpetrated close to the time the child was born.

Table 1 provides the summary statistics of the analytical sample by the mother's partnership status (see Tables A-2 and A-3 for summary statistics by whether the mother reported experiencing IPV during pregnancy and by year). The percentage of mothers with low-birth-weight newborns was higher among those who were cohabiting or separated (8.04% and 7.99%, respectively) than among those who were married (6.22%). The share of mothers who reported experiencing IPV during pregnancy was highest among those who were separated (15.02%), lower among those who were cohabiting (7.77%), and considerably lower among those who were married (3.65%). The share of mothers who completed the recommended number of antenatal care visits (8+ visits) was higher among those who were married (48.72%) than among those who were cohabiting (33.40%) or separated (33.07%), suggesting that unmarried mothers utilized healthcare services during pregnancy less frequently than their married counterparts. The sex of the child was, on average, evenly distributed across all family structures. The share of first-order births was higher among cohabiting and separated mothers (38.80% and 40.30%, respectively) than among married mothers (31.89%). The share of teenage mothers (<20

years old) was higher among the unmarried group (18.77% for cohabiting and 22.23% for separated mothers) than among the married group. Most of the mothers, irrespective of their family structure, were living in an urban area. In terms of educational level, the percentage of mothers who had completed higher education was higher in the married group (38.78%) than in the unmarried group, with cohabiting mothers (18.03%) more likely than separated mothers (15.23%) to have completed higher education.

Table 1: Sample statistics by mother's partnership status and 95% confidence intervals; mothers with children aged 0–1

	Married	Cohabiting	Separated
Low birth weight	6.22 [5.14–7.52]	8.04 [7.21–8.95]	7.99 [6.42–9.91]
IPV during pregnancy	3.65 [2.84–4.69]	7.77 [7.00–8.62]	15.02 [12.31–18.20]
Sex of child			
Male	52.21 [49.26–55.15]	52.20 [50.64–53.76]	49.43 [46.08–52.78]
Female	47.79 [44.85–50.74]	47.80 [46.24–49.36]	50.57 [47.22–53.92]
Birth order			
First	31.89 [29.00–34.92]	38.80 [37.31–40.31]	40.30 [37.01–43.67]
Second	38.64 [35.95–41.40]	32.72 [31.19–34.29]	31.28 [28.23–34.50]
Third or higher	29.47 [26.96–32.11]	28.48 [27.14–29.86]	28.42 [25.61–31.41]
Age at birth			
13–19	4.20 [3.37–5.22]	18.77 [17.63–19.97]	22.23 [19.66–25.03]
20–34	48.97 [46.08–51.87]	57.00 [55.43–58.55]	53.75 [50.41–57.05]
35–49	46.83 [43.87–49.81]	24.23 [22.83–25.69]	24.03 [21.36–26.91]
Place of residence			
Urban	76.64 [74.44–78.70]	74.03 [72.75–75.27]	80.19 [77.55–82.60]
Rural	23.36 [21.30–25.56]	25.97 [24.73–27.25]	19.81 [17.40–22.45]
Educational level			
Primary or lower	19.17 [17.31–21.17]	24.05 [22.81–25.34]	22.38 [19.82–25.16]
Secondary	42.05 [39.33–44.82]	57.92 [56.34–59.48]	62.39 [59.01–65.66]
Higher	38.78 [35.72–41.93]	18.03 [16.66–19.47]	15.23 [12.60–18.31]
Number of antenatal care visits			
0–3 visits	5.26 [4.35–6.35]	11.55 [10.61–12.55]	15.17 [12.99–17.65]
4–7 visits	46.02 [43.18–48.88]	55.05 [53.49–56.60]	51.76 [48.39–55.11]
8+ visits	48.72 [45.79–51.65]	33.40 [31.93–34.90]	33.07 [29.85–36.45]
Sample size	2,692	7,864	1,635

Source: CDHS 2000, 2005, 2010, 2015; own weighted estimates.

4.4 Analytical strategy

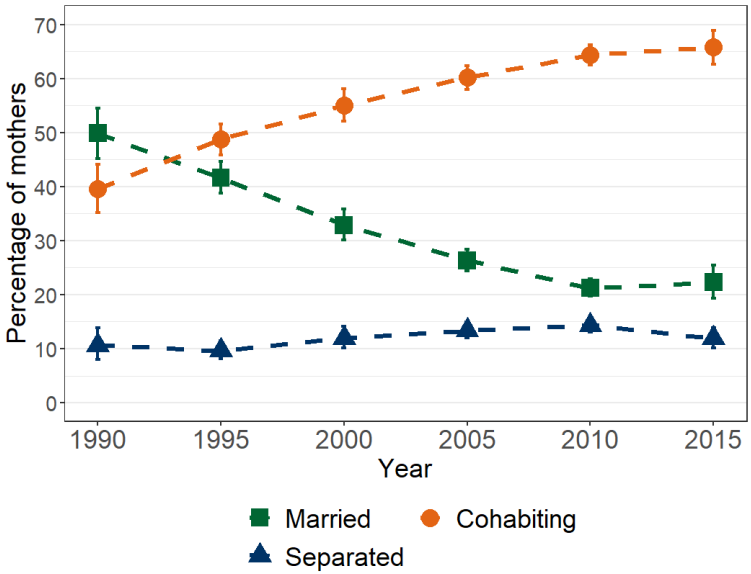
The analytical strategy is structured as follows. First, a descriptive analysis shows the trends in the partnership status of women with newborn children by calendar year and the trends in the risk of reporting IPV during pregnancy among the same group of women by partnership status and year. Second, logistic regression models are performed to investigate the relationship between the mother's partnership status and low birth weight. The first model includes only partnership status as a predictor. The second model adds controls for IPV during pregnancy, and the third model further incorporates maternal and child characteristics as additional controls. A stepwise strategy is used to untangle the controlled direct effect of mother's partnership status and low birth weight. All models control for calendar year. Ideally, separate analyses would be conducted for different time periods to examine whether the patterns had shifted with the change in the meaning of cohabitation. However, the small sample sizes do not allow for such an investigation. The logistic regression results are presented as odds ratios (OR).

5. Results

5.1 Descriptive results

Figure 2 shows the trends in the partnership status of mothers with children aged 0–1 by year (see Figure A-1 for the trends among all women). Since the indicator of partnership status is measured as a single point in time, it offers a rough sense of the partnership status prevalence among mothers with newborns. The most striking results are the steep decline over the study period in the percentage of mothers who were married and the increase in the percentage of mothers who were cohabiting, confirming that a cohabitation boom has occurred in Colombia. In 2015, 65.84% of mothers were cohabiting, while only 22.27% were married. The percentage of mothers who were separated increased slightly and then appeared to be constant over the remainder of the study period, reaching 11.89% in the last calendar year. Figure 2 further illustrates the importance of analyzing cohabitation as a distinct family form. Cohabiting mothers have been the predominant group since 1995, with the highest share of births occurring outside of marriage.

Figure 2: Share of mothers with children aged 0–1 by partnership status and calendar year



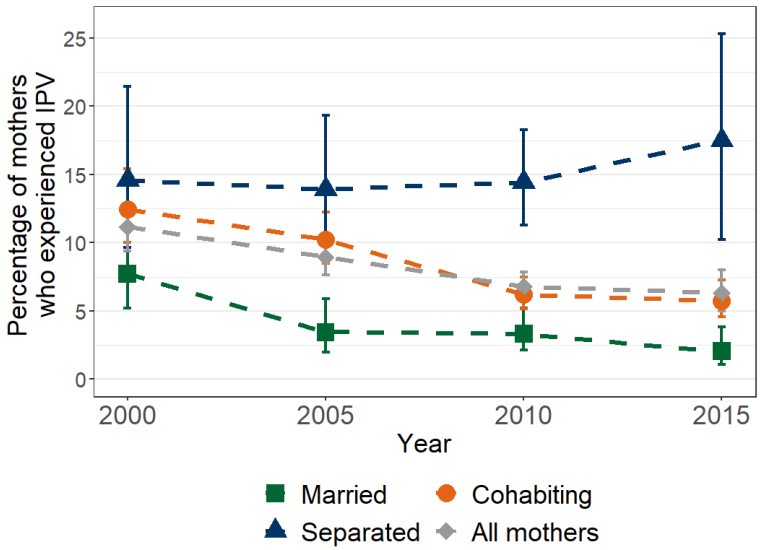
Source: CDHS 1990, 1995, 2000, 2005, 2010. 2015; own weighted estimates.
Note: N = 14,600. Sample not restricted to information on IPV. Vertical lines represent 95% confidence intervals.

Figure 3 illustrates the trends in the reported levels of IPV during pregnancy among mothers with children aged 0–1 by partnership status and year. On average, separated mothers reported the highest levels of IPV during pregnancy, followed by cohabiting mothers. Over the study period the share of women affected by IPV during pregnancy generally declined, except among those who experienced separation, for whom IPV levels increased. In 2000, separated and cohabiting mothers had similar shares of IPV during pregnancy, at 14.59% and 12.47%, respectively. However, cohabiting unions became less violent over the study period. In 2015, about 17.51% of separated mothers but only 5.75% of cohabiting mothers reported experiencing IPV during pregnancy. A possible explanation for the steep decrease in IPV among cohabiting mothers is that the composition of this group was changing as cohabitation became common among all social groups, including among highly educated women.[4] However, an additional analysis that uses IPV as outcome variable and that controls for sociodemographic

[4] See Table A-4 logit models of IPV during pregnancy as the outcome variable, which shows that education explains some but not all of the differences between groups.

characteristics still shows a decline in IPV among cohabiting mothers over time (see Figure A-2 in the Appendix). Another potential explanation is related to selection into separation. Experiencing IPV during pregnancy could be a reason for separation. Increased social acceptance of separation following IPV might explain the increase in IPV among the separated mothers and the decline among the other groups.

Figure 3: Share of mothers with children aged 0–1 who reported experiencing IPV during pregnancy, by partnership status and calendar year



Source: CDHS 2000, 2005, 2010. 2015; own weighted estimates. Vertical lines represent 95% confidence intervals.

5.2 Regression results

Table 2 provides the results of logistic regression models where the outcome variable is low birth weight as a binary outcome. Model 1 shows that married mothers were less likely than their counterparts to give birth to a LBW infant. Cohabiting mothers had 22% higher odds of having a LBW infant than married mothers and separated mothers 28% higher odds. Model 2, which includes IPV, shows that women who were subjected to IPV had 14% higher odds of having a low-birth-weight infant, although the parameter was not statistically significant at conventional levels. After controlling for IPV, differences by family form narrow slightly. In Model 3, the mothers' and the children's

characteristics and the number of antenatal care visits are included. After including these variables, the differences by partnership status are strongly attenuated.

Table 2: Odds ratio and 95% confidence intervals from logistic regression models of partnership status and infant birth weight

	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
Partnership status						
Married	Ref.		Ref.		Ref.	
Cohabiting	1.22	1.01–1.47	1.21	1.00–1.46	1.12	0.92–1.36
Separated	1.28	1.00–1.64	1.26	0.98–1.62	1.12	0.87–1.45
Year						
2000	Ref.		Ref.		Ref.	
2005	1.22	0.92–1.63	1.22	0.92–1.64	1.22	0.92–1.63
2010	1.29	0.97–1.70	1.30	0.98–1.72	1.33	0.99–1.76
2015	1.36	1.02–1.81	1.37	1.02–1.83	1.43	1.06–1.92
IPV during pregnancy			1.14	0.89–1.47	1.20	0.93–1.55
Sex of the child						
Male					Ref.	
Female					1.17	1.01–1.35
Birth order						
First					Ref.	
Second					0.71	0.59–0.86
Third or higher					0.62	0.50–0.78
Age at birth						
13–19					Ref.	
20–34					0.94	0.76–1.15
35–49					1.21	0.94–1.57
Place of residence						
Rural					Ref.	
Urban					1.07	0.91–1.33
Educational level						
Primary					Ref.	
Secondary					1.09	0.90–1.33
Higher					1.16	0.90–1.49
Number of antenatal care visits						
0–3 visits					Ref.	
4–7 visits					0.65	0.53–0.80
8+ visits					0.40	0.31–0.50
N	12,191		12,191		12,191	
Pseudo R^2	0.001		0.002		0.017	

6. Discussion

This study examines the relationship between a mother's partnership status and low birth weight, emphasizing the role of intimate partner violence (IPV) during pregnancy. IPV is widely recognized as both a human rights violation and a critical public health concern with serious consequences for women and their children (Campbell 2002; Garcia-Moreno et al. 2006). Understanding the role of IPV in this relationship is essential for addressing maternal and child health disparities. Drawing on data from the CDHS, this research offers a unique opportunity to analyze trends in maternal partnership status over time and to explore the role of IPV during pregnancy within the Colombian context.

Recent studies have shown that radical changes in living arrangements have occurred in Latin America (Covre-Sussai et al. 2015). This paper provides evidence of growing family diversity in Colombia, including a sharp rise in cohabitation among mothers. The results of descriptive analysis reveal that higher shares of separated and cohabiting mothers than of married mothers reported experiencing intimate partner violence (IPV) during pregnancy. These findings align with previous research showing that separated and cohabiting women face an elevated risk of IPV compared to married women (Brownridge 2008; Rezey 2017). However, these two groups exhibited distinct trends over time, with separated mothers experiencing an increase in IPV levels and cohabiting mothers experiencing a substantial decline.

The study also examines the sociodemographic correlates of unmarried motherhood. Consistent with prior research, I found that cohabiting and separated women differed systematically from married women. Compared to married mothers, unmarried mothers were less educated, more likely to have given birth as a teenager, and less likely to have attended antenatal care services. One might have expected married and cohabiting mothers to have similar characteristics, given that marriage is 'less normative' in Colombia than in many other countries. However, it is important to consider the history of the institutionalization of marriage in the region and how inequalities shaped family formation patterns. In addition, in Colombia cohabiting unions tend to be based on low commitment levels and a clear power imbalance between men and women. Even if cohabiting mothers in Colombia face less social stigma than in countries where marriage is the norm, their health behavior and IPV risk levels still differ from those of married mothers.

The logistic regression analysis showed that before accounting for IPV during pregnancy and sociodemographic characteristics, children born to unmarried mothers were at higher risk of having adverse health outcomes early in life. When IPV during pregnancy was accounted for the parameter for separated mothers decreased slightly from the previous model, yet differences in low birth weight between cohabiting and married mothers persisted. After the mothers' and the children's characteristics were included in

the model, there were no longer differences between unmarried and married mothers in the risk of having a low-birth-weight infant. Key factors, such as the number of antenatal care visits, played a critical role in explaining these differences. These findings highlight the importance of considering maternal and child characteristics and healthcare utilization during pregnancy when examining variations in infant health by maternal partnership status.

Contrary to expectations, I did not find a significant association between IPV during pregnancy and LBW. As noted in prior research, this may reflect the complexity of analyzing LBW as an infant health outcome (Travers, Devereux, and Yang 2021), particularly given the low prevalence observed in the current data. Additional analysis with the same data showed that IPV during pregnancy was highly associated with not having a live birth (see Table A-5). This pattern suggests that the effects of IPV during pregnancy may manifest even before the infant is born.

The analyses presented here have some limitations. Because of the nature of cross-sectional data, partnership status is measured at the time of the interview when the child was up to 12 months old. Ideally, it would have been measured during pregnancy. The CDHS data include partnership histories, which would enable us to construct a more precise measure of partnership status during pregnancy. However, as the sample size for cases with complete partnership histories is small, I could not draw on that data. Another related limitation is that the CDHS data include the category "separated mothers," but they do not provide information on whether these mothers were married or in a cohabiting union before dissolution, or if they had cohabited before they married. Such information could be used to improve our understanding of the specific characteristics of mothers in cohabiting unions and mothers who are separated. Due to the small sample sizes, examining whether the association between partnership status and child health changed over time was not possible. Additionally, although the models controlled for key confounders, other factors such as the mother's ethnicity and wealth could not be accounted for. Lastly, the study relied on one indicator of IPV. Measuring other forms of IPV apart from physical violence, such as emotional or sexual violence, could enrich the analysis. Emotional abuse, which includes behaviors that control, threaten, or intimidate women, and sexual violence, which involves forced sexual acts, are critical components of IPV that can have profound impacts on maternal stress levels, mental health, and antenatal care utilization. Including these additional forms of IPV in future analysis could provide a more comprehensive understanding of how different types of violence influence the relationship between partnership status and child health. Indicators of emotional and sexual violence are present in the CDHS data, but they were not necessarily applied during pregnancy, as the measurement used in this study was.

Despite these limitations, our findings highlight the importance of taking into account mother and child characteristics along with healthcare utilization during

pregnancy when examining differences in child health across diverse family forms. The study also reveals that cohabiting mothers reported less violence in more recent years than in earlier years, which may indicate that the meaning of cohabitation has changed or that separation after experiencing IPV has become more socially accepted over time. The latter explanation is supported by the decrease in reports of IPV among cohabiting women, mirroring the increase in reports of IPV among separated women. Given that women are more likely to experience violence from an intimate partner than from other perpetrators (Garcia-Moreno et al. 2006), this research provides important evidence of which women are at higher risk of experiencing IPV based on their partner status, and how these patterns are evolving.

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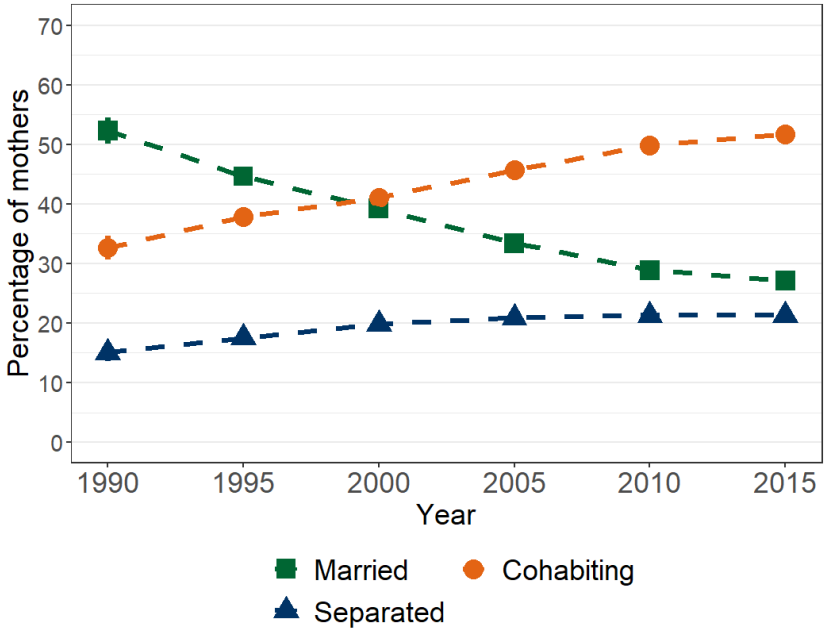
Appendix

Figure A-1: Share of women aged 13–49 by partnership status and year



Source: CDHS 1990, 1995, 2000, 2005, 2010. 2015; own weighted estimates.
Note: N=105,108. Vertical lines represent 95% confidence intervals.

Table A-1: Results from logit models with infant birth weight as the outcome variable

	IPV = Ever been pushed, shook, or had something thrown by husband/partner in the last 12 months		IPV = Ever been slapped by husband or partner in the last 12 months		IPV = Experienced any physical violence in the last 12 months	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Partnership status						
Married	Ref.		Ref.		Ref.	
Cohabiting	1.15	0.94–1.42	1.13	0.93–1.37	1.14	0.94–1.38
Separated	1.21	0.93–1.60	1.14	0.88–1.48	1.16	0.89–1.50
Year						
2000	Ref.		Ref.		Ref.	
2005	1.24	0.93–1.65	1.19	0.90–1.60	1.18	0.89–1.58
2010	1.31	0.98–1.74	1.30	0.98–1.72	1.30	0.98–1.73
2015	1.46	1.08–1.96	1.40	1.04–1.88	1.40	1.04–1.87
IPV	1.06	0.88–1.28	1.02	0.86–1.22	1.04	0.87–1.24
Sex of the child						
Male	Ref.		Ref.		Ref.	
Female	1.20	1.04–1.40	1.18	1.02–1.36	1.20	1.04–1.38
Birth order						
First	Ref.		Ref.		Ref.	
Second	0.73	0.60–0.89	0.72	0.60–0.87	0.72	0.60–0.87
Third or higher	0.67	0.53–0.84	0.63	0.51–0.79	0.62	0.50–0.77
Age at birth						
13–19	Ref.		Ref.		Ref.	
20–34	0.92	0.75–1.14	0.92	0.75–1.14	0.94	0.76–1.15
35–49	1.22	0.93–1.59	1.19	0.92–1.55	1.24	0.95–1.60
Place of residence						
Rural	Ref.		Ref.		Ref.	
Urban	1.06	0.89–1.26	1.08	0.91–1.28	1.09	0.92–1.29
Educational level						
Primary	Ref.		Ref.		Ref.	
Secondary	1.09	0.90–1.33	1.10	0.91–1.33	1.09	0.90–1.31
Higher	1.14	0.87–1.48	1.16	0.90–1.49	1.17	0.91–1.50
Number of antenatal care visits						
1–3 visits	Ref.		Ref.		Ref.	
4–7 visits	0.66	0.54–0.81	0.65	0.53–0.79	0.65	0.54–0.80
8+ visits	0.42	0.33–0.53	0.40	0.32–0.51	0.40	0.31–0.50
N	11,234		12,194		12,412	
Pseudo R^2	0.016		0.017		0.018	

Note: 1 = low birth weight; 0 = regular birth weight. Odds ratio (OR) and 95% confidence intervals.

Table A-2: Sample statistics by report of experiencing IPV during pregnancy (%) and 95% confidence intervals; mothers with children aged 0–1

	IPV during pregnancy	No IPV during pregnancy
Low birth weight	8.91 [6.69–11.78]	7.48 [6.83–8.19]
Partnership status		
Married	11.36 [8.89–14.41]	25.14 [23.91–26.42]
Cohabiting	62.89 [58.05–67.48]	62.63 [61.29–63.94]
Separated	25.75 [21.41–30.62]	12.23 [11.45–13.06]
Sex of the child		
Male	46.06 [41.55–50.65]	52.32 [50.98–53.66]
Female	53.94 [49.35–58.45]	47.68 [46.34–49.02]
Educational level		
Primary or lower	28.27 [24.67–32.18]	22.18 [21.18–23.23]
Secondary	58.08 [53.36–62.66]	54.41 [53.05–55.76]
Higher	13.64 [9.85–18.59]	23.41 [22.10–24.77]
Place of residence		
Urban	75.84 [72.17–79.17]	75.45 [74.39–76.47]
Rural	24.16 [20.83–27.83]	24.55 [23.53–25.61]
Age at birth		
<20 years	20.01 [16.78–23.67]	15.36 [14.50–16.27]
20–34	53.13 [48.52–57.68]	54.76 [53.41–56.11]
>34 years	26.86 [23.20–30.88]	29.88 [28.56–31.23]
Birth order		
First	22.48 [18.35–27.24]	38.58 [37.28–39.90]
Second	32.41 [28.18–36.94]	34.08 [32.81–35.38]
Third or higher	45.11 [40.63–49.67]	27.34 [26.20–28.50]
Number of antenatal care visits		
1–3 visits	17.94 [14.80–21.58]	9.89 [9.18–10.65]
4–7 visits	49.58 [44.95–54.22]	52.68 [51.34–54.02]
8+ visits	32.48 [27.98–37.33]	37.43 [36.10–38.77]
Sample size	960	11,231

Source: CDHS 2000, 2005, 2010. 2015; own weighted estimates.

Table A-3: Sample statistics by year (%) and 95% confidence intervals; mothers with children aged 0–1

	2000	2005	2010	2015	All years
Low birth weight	5.08 [3.94–6.54]	7.76 [6.61–9.10]	8.26 [7.18–9.48]	7.50 [6.26–8.93]	7.59 [6.96–8.28]
Partnership status					
Married	32.77 [29.99–35.67]	26.41 [24.46–28.46]	20.97 [19.40–22.63]	22.14 [19.17–25.42]	24.08 [22.91–25.28]
Cohabiting	55.10 [52.08–58.09]	60.02 [57.79–62.21]	64.56 [62.66–66.42]	65.99 [62.73–69.11]	62.65 [61.36–63.91]
Separated	12.13 [10.29–14.24]	13.57 [12.11–15.16]	14.46 [13.13–15.90]	11.87 [10.16–13.83]	13.28 [12.46–14.14]
Educational level					
Primary or lower	36.32 [33.48–39.25]	30.45 [28.40–32.58]	20.48 [18.97–22.07]	11.51 [10.16–13.03]	22.66 [21.68–23.66]
Secondary	53.46 [50.44–56.46]	54.42 [52.17–56.66]	57.40 [55.46–59.33]	51.98 [48.83–55.12]	54.69 [53.39–55.99]
Higher	10.22 [8.43–12.34]	15.13 [13.60–16.79]	22.12 [20.51–23.82]	36.50 [33.17–39.96]	22.65 [21.40–23.96]
Place of residence					
Urban	74.01 [71.30–76.56]	74.05 [72.18–75.84]	76.48 [74.83–78.06]	76.34 [74.08–78.45]	75.48 [74.46–76.46]
Rural	25.99 [23.44–28.70]	25.95 [24.16–27.82]	23.52 [21.94–25.17]	23.66 [21.55–25.92]	24.52 [23.54–25.54]
Age at birth					
<20 years	17.05 [14.92–19.43]	17.08 [15.35–18.95]	16.05 [14.69–17.51]	13.28 [11.80–14.91]	15.72 [14.88–16.61]
20–34	51.81 [48.78–54.82]	54.05 [51.79–56.30]	53.68 [51.72–55.63]	57.58 [54.35–60.74]	54.63 [53.34–55.92]
>34 years	31.14 [28.34–34.08]	28.87 [26.89–30.94]	30.27 [28.46–32.13]	29.14 [25.89–32.62]	29.64 [28.39–30.93]
Birth order					
First	36.43 [33.58–39.38]	35.02 [32.95–37.15]	37.62 [35.74–39.54]	39.91 [36.84–43.05]	37.33 [36.09–38.60]
Second	30.09 [27.41–32.91]	32.16 [30.02–34.38]	34.42 [32.57–36.31]	36.84 [33.90–39.88]	33.95 [32.73–35.20]
Third or higher	33.49 [30.68–36.41]	32.81 [30.75–34.95]	27.97 [26.26–29.73]	23.25 [20.91–25.78]	28.71 [27.60–29.85]
Number of antenatal care visits					
0–3 visits	15.12 [13.12–17.37]	12.55 [11.21–14.04]	9.39 [8.34–10.56]	7.92 [6.50–9.62]	10.51 [9.81–11.27]
4–7 visits	51.84 [48.81–54.85]	56.98 [54.75–59.18]	52.59 [50.63–54.54]	47.38 [44.33–50.46]	52.44 [51.15–53.73]
8+ visits	33.04 [30.23–35.98]	30.47 [28.47–32.54]	38.02 [36.13–39.95]	44.70 [41.56–47.88]	37.05 [35.77–38.34]
Sample size	1,186	3,649	4,267	3,089	12,191

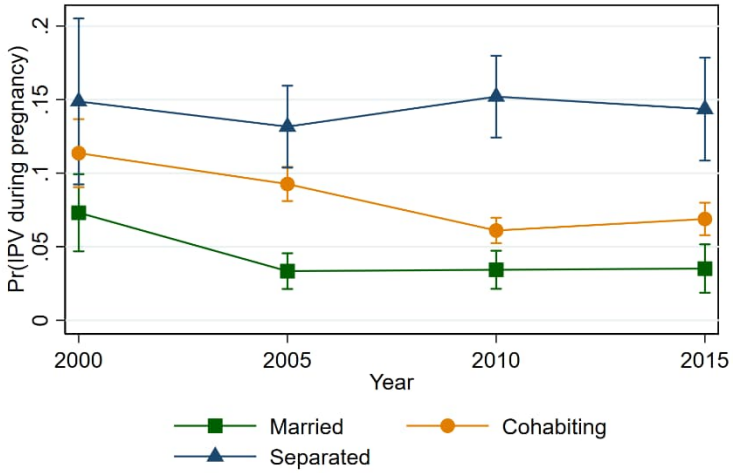
Source: CDHS 2000, 2005, 2010, 2015; own weighted estimates.

Table A-4: Results from logit models with IPV as the dependent variable

	Model 1		Model 2		Model 3		Model 4		Model 5	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Partnership status										
Married	Ref.		Ref.		Ref.		Ref.		Ref.	
Cohabiting	2.26	1.82–2.81	2.02	1.62–2.52	2.39	1.92–2.98	2.13	1.71–2.66	2.13	1.70–2.67
Separated	4.62	3.62–5.89	4.18	3.27–5.35	4.87	3.81–6.22	4.40	3.44–5.63	4.35	3.38–5.60
Educational level										
Primary or lower			Ref.				Ref.		Ref.	
Secondary			0.72	0.62–0.84			0.75	0.65–0.87	0.95	0.81–1.12
Higher			0.37	0.29–0.47			0.41	0.32–0.52	0.71	0.54–0.92
Year										
2000					Ref.		Ref.		Ref.	
2005					0.73	0.59–0.91	0.77	0.62–0.96	0.72	0.58–0.90
2010					0.54	0.43–0.67	0.60	0.48–0.74	0.56	0.45–0.70
2015					0.52	0.41–0.66	0.63	0.50–0.80	0.60	0.47–0.76
Place of residence										
Rural									Ref.	
Urban									1.19	1.02–1.40
Age at birth										
13–19									Ref.	
20–34									0.48	0.39–0.59
35–49									0.39	0.30–0.50
Birth order										
First									Ref.	
Second									2.33	1.89–2.86
Third or higher									4.91	3.94–6.14
N	12,191		12,191		12,191		12,191		12,191	
Pseudo R^2	0.025		0.037		0.032		0.040		0.074	

Note: 1 = experienced IPV during pregnancy; 0 = did not experience IPV during pregnancy. Odds ratio (OR) and 95% confidence intervals.

Figure A-2: Predicted probabilities of IPV during pregnancy as the dependent variable. Results from logit model with interaction between mother's partnership status and calendar year



Note: 1 = experienced IPV during pregnancy; 0 = did not experience IPV during pregnancy.
Model controls for educational level, place of residence, age at birth, and birth order. Vertical bars represent 95% CI.

Table A-5: Results from logit models with pregnancy outcome as the dependent variable

	Model 1		Model 2		Model 3	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Partnership status						
Married	Ref.		Ref.		Ref.	
Cohabiting	1.98	1.75–2.23	1.93	1.71–2.18	1.66	1.46–1.88
Separated	1.68	1.46–1.95	1.61	1.39–1.86	1.37	1.18–1.59
Year						
2000	Ref.		Ref.		Ref.	
2005	0.90	0.76–1.06	0.91	0.77–1.07	0.91	0.77–1.08
2010	0.76	0.64–0.89	0.77	0.65–0.90	0.78	0.66–0.91
2015	0.63	0.53–0.74	0.64	0.54–0.76	0.63	0.53–0.75
IPV during pregnancy			1.58	1.37–1.81	1.72	1.49–1.98
Sex of the child						
Male					Ref.	
Female					0.99	0.90–1.08
Birth order						
First					Ref.	
Second					0.81	0.72–0.91
Third or higher					0.67	0.58–0.77
Age at birth						
13–19					Ref.	
20–34					0.77	0.68–0.88
35–49					0.53	0.45–0.63
Place of residence						
Rural					Ref.	
Urban					1.16	1.04–1.30
Educational level						
Primary					Ref.	
Secondary					1.14	1.02–1.27
Higher					1.17	1.01–1.37
Number of antenatal care visits						
0–3 visits					Ref.	
4–7 visits					0.89	0.75–1.05
8+ visits					0.75	0.64–0.88
N		63,280		63,280		63,280
Pseudo R^2		0.001		0.012		0.027

Note: 1 = miscarriage, abortion, or stillbirth; 0=live birth. Odds ratio (OR) and 95% confidence intervals.