Prevalence, severity, and health outcomes associated with intimate partner violence during pregnancy among adolescents in sub-Saharan Africa

Caroline Adjimi Nyemgah

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London School of Hygiene and Tropical Medicine

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Department of Global Health and Development

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I, Caroline Adjimi Nyemgah, confirm that the presented work in this thesis is my own. Where information has been derived from other sources, I confirm that it has been indicated in the report. This thesis has been supervised by Professor Dr. Heidi Stockl and Dr. Meghna Ranganathan (London School of Hygiene and Tropical Medicine). The advisory committee for this thesis included Dr. Nambusi Kyegombe and Milly Marston (London School of Hygiene and Tropical Medicine).

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ABSTRACT

Background

Intimate partner violence (IPV) is a pervasive and deeply entrenched global public health issue that transcends geographic, cultural, and socioeconomic boundaries. IPV encompasses various forms, including physical, sexual, and psychological violence, each leaving indestructible marks on the lives of those affected. Adolescents, particularly those residing in sub-Saharan Africa (SSA), are at elevated risk of experiencing IPV, particularly during pregnancy. In SSA, where cultural norms, gender inequalities, and economic disparities intersect, understanding the complex landscape of IPV during pregnancy among this vulnerable group is paramount. Although the issue is urgent, there has not been any systematically conducted rigorous research analysing the evidence about the prevalence, severity, and effects of physical IPV during pregnancy among adolescents (15-19) in SSA. By analysing the multidimensional nature of physical IPV during pregnancy within the context of SSA, this study aims to close this important information gap. I intend to shed light on the difficulties experienced by adolescents, with an emphasis on the severity and health effects, by appraising the available literature and analysing data from Demographic Health Surveys (DHS). The ultimate goal of this research is to support evidence-based policies that prioritise adolescents' health in SSA, helping to create a future free from IPV both during and outside pregnancy.

Methods

This research employed a comprehensive approach, drawing on a systematic literature review and data analysis from DHS conducted in eight SSA countries. This thesis includes three studies: 1) a systematic review of the literature on IPV during pregnancy among adolescents

living in SSA; 2) an analysis of the prevalence and severity associated with the experience of physical IPV during pregnancy among adolescents in SSA using data from the DHS; 3) an analysis of health outcomes including exclusive breastfeeding (EBF) and pregnancy termination associated with adolescents who have experienced physical IPV during pregnancy in SSA using data from the DHS.

Results

We found evidence of IPV during pregnancy among adolescents in SSA from nine studies selected for the systematic review. Further, analysis of DHS data from eight countries revealed a high prevalence and severity of physical IPV among adolescents. Adolescents who reported physical IPV during pregnancy were more likely to report severe lifetime physical violence and severe injuries. An association was found between physical IPV during pregnancy and pregnancy termination only after controlling for covariates, but no association with EBF even after controlling for variables.

Conclusion

In conclusion, this study emphasises the urgency for countries in SSA to address IPV during pregnancy among adolescents. The complex combination of social, gender, and cultural norms in SSA contributes to IPV's prevalence and long-lasting effects in vulnerable communities. This study has unravelled the complex nature of physical IPV during pregnancy violence by drawing attention to the interplay between IPV during pregnancy, severity, and adverse health outcomes. Additionally, our research has shed some light on the repercussions of physical IPV during pregnancy on adolescent development, including inadequate breastfeeding behaviours and pregnancy termination. My results highlight the need to implement interventions and evidence-based policies to prevent and address physical IPV during pregnancy in SSA. We can work towards a future where adolescent

empowerment and well-being are prioritised by recognising the intersecting variables that form their experiences of IPV and the specific barriers and challenges adolescents face.

Acknowledging the impact of COVID-19 on postgraduate research programmes: guidance for RD students, Supervisors and Examiners on inclusion of a COVID-19 impact statement with theses.

We appreciate that the COVID-19 pandemic has had a direct and/or indirect impact on the work of many of our RD students, and is continuing to do so.

Many of our RD students have been/will be able to accommodate the disruption to their research plans by changing the scope, phasing or design of their project; others have/will have circumstances that necessitate an extension to their programme or to the thesis/portfolio submission date. But some will not have been able to take an extension.

We encourage RD **students** who wish to make their examiners aware of the impact COVID-19 has had on their research plans and thesis/portfolio to prepare an **Impact Statement** for consideration during the examination process.

We also encourage **supervisors** to discuss with their students whether an impact statement would be helpful. RD students should discuss the statement with their supervisory team before submitting the statement with the thesis presented for examination.

LSHTM recommends that **Examiners** take the Impact Statement into account when assessing the thesis/portfolio and RD student at the viva, albeit without compromising the principles for a level 8 qualification as set out in The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies*, which emphasise that doctoral degrees should be awarded based on the quality of outcomes of research undertaken and the candidate's acquisition of intellectual and practical competencies.

Examiners should use their academic judgment when deciding whether, as set out in the regulations, the criteria for the degree have been met, whilst bearing in mind that they should judge the thesis in relation to what can be reasonably expected within a period of study (3 years FTE for a PhD or 18 months for a DrPH) *that has been conducted in the context of*

disruption caused by COVID-19. (Note that for the DrPH the period for the combined portfolio of Research Study I (OPA) and Research Study II (thesis) would be 2.5 years FTE.)

The Impact Statement should include the following information:

1. **Details on how disruption caused by COVID-19 has impacted the research (e.g., an inability to collect/analyse data as a result of travel restrictions/restricted access to labs/additional caring and health responsibilities/additional difficulty related to an underlying disability/ has returned to clinical service/has worked in a voluntary capacity or for a project other than the focus of their own research - 500 words maximum);**

The COVID-19 pandemic has significantly disrupted the course and trajectory of my PhD research, altering both the scope and methodology initially envisaged for the study. One of the major impacts was the inability to conduct fieldwork as planned in Tanzania for the MAISHA study due to travel restrictions imposed during the pandemic. Additionally, the alternative plan to collaborate with a local organization in Cameroon focusing on adolescent issues was thwarted by the closure of their programs for an extended period, making it impossible to obtain permissions or conduct research activities.

Moreover, the pandemic took a toll on my health, impeding the progress of the thesis by causing an 8-month delay. Contracting COVID-19 multiple times, along with subsequent health complications including pneumonia, typhoid, malaria, and a near-death experience due to an ectopic pregnancy, significantly hampered my ability to work on the thesis. These health challenges not only affected my physical well-being but also took a toll on my mental resilience and capacity to engage in research activities effectively.

In response to these unprecedented disruptions, a pivot in the research methodology became imperative. Instead of relying on the originally planned data from the MAISHA study, I shifted the focus to using the Demographic Health Survey (DHS), a broader source of

data covering intimate partner violence during pregnancy in sub-Saharan Africa. This shift was partly motivated by the need to fulfill the requirements set by the Economic and Social Research Council (ESRC), which necessitated incorporating Advanced Quantitative Methods (AQM) into the thesis. Despite the unforeseen challenges, this decision allowed me to meet the academic criteria while still exploring the crucial subject matter of intimate partner violence during pregnancy in the SSA context.

Conducting data analysis as the sole researcher in a remote setting from home in Cameroon presented additional challenges. Limited internet connectivity hindered communication and access to resources, intensifying the isolation of the research process. Working alone in such conditions compounded the difficulties caused by the pandemic-related disruptions, impacting the efficiency and pace of the research activities.

In summary, the COVID-19 pandemic profoundly impacted my PhD research, altering the study's original scope, causing significant health setbacks, and necessitating a shift in methodology. Despite these challenges, the resilience and adaptability fostered during this period enabled me to restructure the research approach, ensuring that the thesis met the requisite academic standards while addressing the critical issue of intimate partner violence during pregnancy in sub-Saharan Africa.

2. A description of how the planned work would have fitted within the thesis' narrative (e.g. through method development, development of analytical skills or advancement of hypotheses - 500 words maximum);

The intended study was strategically designed to complement and augment the existing literature on intimate partner violence (IPV) during pregnancy among adolescents in sub-Saharan Africa (SSA). While the systematic review provided a valuable synthesis of available evidence, the proposed qualitative research would have significantly enriched the

thesis narrative by delving deeper into the actual experiences of adolescents facing IPV during pregnancy.

Primarily, the study aimed to fill a critical gap in the thesis by conducting qualitative inquiries directly with adolescents in SSA who have encountered IPV during pregnancy. This approach would have allowed for a nuanced understanding of their lived experiences, perceptions, and coping mechanisms in the context of intimate partner violence, which quantitative analysis alone often cannot capture. By exploring the narratives of adolescents, the research intended to provide a more holistic view of the multifaceted nature of IPV during pregnancy.

Furthermore, the proposed study sought to explore the intricacies of risk and protective factors contributing to the occurrence and perpetuation of IPV among pregnant adolescents in SSA. By engaging directly with the adolescents, the research aimed to identify and comprehend the various contextual, sociocultural, and individual factors influencing their vulnerability to IPV during pregnancy. This qualitative exploration would have contributed valuable insights into the underlying determinants of this issue, offering a foundation for future targeted interventions and policy formulation.

Moreover, the intended research aligned seamlessly with the thesis' narrative by extending the methodological spectrum beyond quantitative analyses. While the systematic review focused on summarizing existing empirical evidence, the qualitative study intended to develop a richer narrative through in-depth interviews or focus group discussions. This methodological expansion would have fostered the advancement of analytical skills, offering a qualitative lens to comprehend the complexities of IPV experiences among pregnant adolescents.

The study's objective to explore into adolescents' lived experiences of IPV during pregnancy was a vital aspect of advancing the thesis' hypotheses. The qualitative exploration aimed to substantiate and elaborate on the findings obtained from the systematic review, providing a comprehensive portrayal of the issue. By integrating qualitative narratives into the thesis narrative, it aimed to fortify the hypotheses and theoretical underpinnings concerning the lived realities of adolescents facing IPV during pregnancy in SSA.

In summary, the intended research would have seamlessly integrated into the thesis' narrative by providing a qualitative dimension to the understanding of IPV among pregnant adolescents in SSA. It aimed to extend the thesis' analytical scope, develop a more comprehensive narrative, and enhance the depth of understanding regarding the experiences, perceptions, and contextual determinants of IPV during pregnancy among this vulnerable population.

2. **A summary of any decisions / actions taken to mitigate for any work or data collection/analyses that were prevented by COVID-19 (500 words maximum).**

One of the primary decisions made in response to the travel restrictions and closure of fieldwork sites was to pivot the data collection strategy. Originally intending to collect data from married or cohabiting women in the MAISHA study based in Mwanza city, Tanzania, I was unable to travel and access the study site due to the pandemic. Consequently, I shifted the focus to using secondary data sources, particularly the Demographic Health Survey (DHS) for sub-Saharan Africa, which provided a comprehensive dataset covering intimate partner violence during pregnancy. This decision allowed me to access a broader scope of data, although it deviated from the originally planned qualitative approach.

To navigate the closure of local organizations in Cameroon, a planned alternative for the fieldwork, attempts were made to communicate and gain permission remotely.

Unfortunately, prolonged closures and difficulties in communication rendered this approach unfeasible. Consequently, the reliance on secondary data sources, primarily the DHS, emerged as the most viable option to advance the research in the absence of primary data collection.

A major mitigating strategy involved adapting to remote work conditions and making the most of limited resources. Working from home in Cameroon with intermittent internet connectivity posed significant challenges to accessing materials and communicating with supervisors specifically. However, I employed various strategies such as obtaining the DHS and LSHTM IRB permission to download and use the data for my thesis. Because I needed to maintain communication with my supervisors, I bought a high speed internet modem which really didn’t help as much.

Despite the challenges posed by the pandemic, I sought to enhance the thesis's depth and rigor within the constraints. To compensate for the lack of direct qualitative insights into adolescent experiences of intimate partner violence during pregnancy in SSA, I ensured a comprehensive literature review and incorporated available qualitative evidence from systematic reviews and existing studies. This strategy aimed to augment the study's richness by integrating and synthesizing the available qualitative findings on the topic.

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ABBREVIATIONS

ADS	Antenatal Depressive Symptoms
AOR	Adjusted Odd Ratio
AQM	Advanced Quantitative Methods
BC	Before Christ
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
CTS	Conflict Tactics Scale
COVID-19	Coronavirus Disease -19
DHS	Demographic Health Surveys
DV	Domestic Violence
EBF	Exclusive Breastfeeding
EIGE	European Institute of Gender Equality
EPDS	Edinburgh Postnatal Depression Scale
GBV	Gender-Based Violence
HICs	High-Income Countries
HIV	Human Immunodeficiency Virus
IPV	Intimate Partner Violence
IRB	Institutional Review Board
IVAWS	International Violence Against Women Surveys

LBW	Low Birth Weight
LMICs	Low and Middle-Income Countries
LSHTM	London School of Hygiene and Tropical Medicine
MDD	Major Depressive Disorder
MDE	Major Depressive Episode
OR	Odds Ratio
PTSD	Post-Traumatic Stress Disorder
SDGs	Sustainable Development Goals
SES	Socio-Economic Status
SEM	Socio-Ecological Model
SSA	Sub-Saharan Africa
UN	United Nations
UNHCR	United Nations High Commissioner For Refugees
UNICEF	United Nations Children's Fund
USA	United States of America
WHO	World Health Organisation

1. CHAPTER 1: INTRODUCTION AND HISTORY OF INTIMATE PARTNER VIOLENCE

IPV has been recognised as a significant public health concern and a violation of human rights, which occurs at every stage of life (1). There are many definitions for partner violence, but the World Health Organisation (WHO) defines it as acts of physical, sexual, or psychological violence committed by a man against his female partner (1). Given that pregnancies are typically viewed as joyful events, one of the times when IPV is least anticipated is during pregnancy.

Worldwide, IPV is not recent. Historically, society regarded women as the "property" of their husbands, and husbands had a duty under law and morality to physically control their wives' behavior (2). Since 753 BC, when Romulus ruled, The Laws of Chastisement, often known as "The Rule of Thumb," considered wife beating legal as long as the rod or stick being used for physical punishment had a circumference no larger than the girth of the base of a man's right thumb (3). The Roman Catholic Church encouraged husbands to beat their wives in the 14th century due to their care for their wellbeing (3). This pattern persisted to the point where they were out of concern for their spiritual well-being (3). Things changed dramatically when in the United States of America (USA), Alabama and Massachusetts outlawed wife-beating in 1871 (32). After the turn of the century, the Temperance movement, the Social Purity movement, and the women's Suffragist movements (4) made wife-beating an important issue of discussion in the USA (4).

Because the USA legal system has historically been so divided on domestic violence (DV) cases, the legal movement against DV has progressed slowly. In order to avoid judicial procedures, abusers' actions were unwillingly made illegal (5). Even if victims received protection or restraining orders in the 1970s, they were not adequately enforced, and the legal penalty was insignificant compared to the violation (5). Fortunately, several states, including

New York (3), have strengthened their domestic abuse laws and provided more support for people of all ages (6). Although the history of IPV in the USA does not apply worldwide, every country still experiences IPV against women, which has numerous detrimental repercussions, particularly mental health (7).

However, significant regional differences in IPV rates indicate that cultural variables may also be involved. Even though IPV against women happens in every country, the exact rates vary significantly worldwide (7). For instance, a recent systematic review by Sardinha and colleagues indicated that women's prevalence of lifetime physical or/and sexual IPV ranged from 10% to 30% across countries (7). The variations in IPV prevalence among countries may also indicate that cultural influences impact IPV (8). Race, ethnicity, gender, religion, sexual orientation, socio-economic class, country of origin, degree of assimilation and acculturation, tradition, disability status, class, and language are all factors that influence culture (9). Such global variation raises the possibility that cultural influences affect IPV. Religion, for instance, is one cultural element that may encourage IPV against women and affect how they respond to it, as it also supports patriarchal attitudes and practices that may put women in weak and vulnerable positions (10). Adding to that, evidence shows that women with low education and low social and economic status (11) are at a greater risk of experiencing IPV, even more so for ethnic minorities (11) and migrants (12).

When it comes to IPV during pregnancy, it does not shield women from violence; instead, it can make them more vulnerable to it because it is a time of significant physical, mental, social, and economic transformation (8).

1.1. DEFINITION OF INTIMATE PARTNER VIOLENCE

The term " intimate partner violence" has a rigorous definition, according to the USA Center for Disease Control and Prevention (CDC). "Violence" encompasses physical

violence, sexual violence, threats of physical or sexual violence, and psychological/emotional abuse, but only when it occurs in the context of the above-specified acts of violence. An 'intimate' partner may be a current or former sex or dating partner, whether or not the couple has lived together.

1.2. TYPES OF INTIMATE PARTNER VIOLENCE

1.2.1. **Physical partner violence**

The emphasis on physical violence in intimate relationships as the primary criterion for this Ph.D. thesis stems from the fact that, traditionally, IPV has mainly been characterised in terms of physical abuse (13). Concentrating on physical violence to address the impact of physical IPV during pregnancy on health outcomes and severity is helpful. This focus is not intended to downplay the possible negative consequences of psychological abuse or other types of IPV during pregnancy on women's health. Acts of physical IPV include slapping, hitting, kicking, and beating (1,13,14). Violence is frequently employed to address a masculine identity crisis, occasionally brought on by poverty or the inability to control women (14). There is a higher risk of physical violence in groups or communities where using force is frequently accepted as the norm. More violence occurs in conflict-filled relationships than in tranquil ones, especially when those confrontations centre on money, resentment, and women's violations of gender roles (14).

According to a comparative study of DHS data from nine different nations, the proportion of women who had ever been in a relationship and said they had ever been physically abused by their spouse or cohabiting partner ranged from 18% in Cambodia to 48% in Zambia (15). Physical IPV ever reported by currently married women ranged from 17 to 75% in a 10-country examination of DHS data (15). Adolescent girls and older adult women are both impacted by IPV. It also affects informal partnerships like dating

relationships and formal unions when young girls marry. The frequency of physical IPV against women and girls is estimated to be quite variable (1). In South-Africa, 42% of women between the ages of 13 and 23 said they had ever been the victim of physical IPV (16).

Women's physical and mental health is impacted by physical violence in two ways: directly via damage and indirectly through chronic health issues that might arise from prolonged stress. As the world community recognises physical violence against women as a serious violation of human rights, numerous studies have been conducted in various socio-economic classes, geographic locations, and countries, as women in developing countries endure more physical IPV than women in industrialized countries (17).

1.2.2. **Sexual partner violence**

Intimate partner sexual violence has been described in a variety of ways. Any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, acts to traffic or otherwise target a person's sexuality using coercion, by any person, regardless of their relationship to the victim, in any setting, including but not limited to home and work, is considered sexual violence by the WHO (1). Although the WHO definition is relatively broad, many more specific definitions exist. For instance, some definitions of sexual assault for research only include actions that use force or the threat of physical harm. According to the WHO multi-country research conducted by Garcia-Moreno and colleagues (18), sexual assault is any act that causes a woman to have sexual intercourse when she does not want to because she is afraid of what her partner might do or was forced to do something sexual that she found degrading or humiliating.

This concept of intimate partner sexual violence is the focus of the population-based survey data, but some also cover childhood sexual abuse and sexual abuse by non-partners (18). According to women who participated in the WHO multi-country (18) research, after

the age of 15, someone other than an intimate relationship pushed them to engage in sexual activity or perform a sexual act.

As with all types of sexual activity, women are typically hesitant to disclose violent encounters, specifically sexual violence (19). Furthermore, women may not be aware of their experience of intimate sexual violence, therefore enabling them to identify themselves as survivors. So, when considering the prevalence of intimate sexual violence, it is crucial to keep in mind that due to these complications, the prevalence rates are probably too low (19). The lack of a precise, universally recognized definition of IPV, the requirement for sensitive questions about sexual partner violence, and the failure to identify sexual violence imply that many surveys may underreport the prevalence of sexual partner violence.

1.2.3. **Psychological partner violence**

Compared to physical and sexual abuse, psychological violence is considered the most prevalent type of IPV in the USA and Europe (20), affecting between 35 and 49% of men and women (21). Due to this, lawmakers in various European countries have made psychological violence a separate crime that carries the same penalties as physical violence in England (21). Contrary to Follingstad (2009) IPV cannot be defined as trauma due to the confusion in the conceptualisation of psychological IPV and because it does not fit the first requirement for diagnosing PTSD (22). However, psychological violence is recognized legally, and its effects on mental health have been documented. The severity of psychological violence varies along a continuum, with milder forms including yelling and insults at one end and more serious forms referred to as coercion at the other, such as threats and isolation (22). The environment in which psychological aggression happens, when it occurs in a sequence, how it is read, and whether it is considered abusive all have a role in how we understand it and differentiate it from more severe abuse (21,22).

The fact that psychological IPV is frequently described in a variety of ways presents another difficulty. As an illustration, ‘coercive control’ can be conceptualised in one of two ways: as an overarching endeavor to control one's partner, in which case IPV is a means of gaining control (23); alternatively, as a subtype of IPV that is comparable to the idea of psychological violence. The former manifests gender inequality because it is more severe and gender-asymmetrical structurally (24). The latter displays an IPV spectrum that ranges from psychological aggression to more oppressive behaviors that constitute an assault (22).

On a similar note, the European Institute of Gender Equality (EIGE) defines psychological violence as: "Any act or behavior which causes psychological injury to the partner or former partner (25). Threats, yelling, swearing, or insults can all be used as psychological tools to destroy someone's self-esteem and exert control over their conduct. Contrary to physical and sexual IPV, verbal abuse during pregnancy is frequently grouped under the umbrella category of IPV and is rarely examined, in particular since studies specifically note the frequency of verbal abuse in conjunction with other types of violence (26).

The psychometric tools created to measure psychological violence invariably consider these variations in terminologies. The fact that psychological violence is used differently in different contexts and has different definitions makes it challenging to compare the results of empirical investigations that emphasise the importance of determining how these differences affect mental health.

1.2.4. **Economic abuse**

Economic abuse is a unique form of IPV and includes behaviours that control a survivor’s ability to acquire, use, and maintain resources. These tactics can result in someone becoming economically dependent on their partner and may limit their ability to leave the

relationship and establish independence (27). One partner may control access to money, bank accounts, or credit cards in a relationship. They might keep track of and examine each financial transaction, leaving the victim with little money and little control over their lives (28). Scholars have attempted to classify the various manifestations of economic abuse. According to Postmus, Plummer, and Stylianou (2016) actions that manipulate, take advantage of, or undermine a person's financial resources—including their job—are considered forms of economic abuse (29). Examples of economic abuse include controlling finances, exploiting financial resources, withholding money, or destroying properties (27,28).

However, the terms financial and economic abuse are commonly used synonymously in the literature (30). Another way to define abuse would be to say that it results in economic or financial insecurity or compromises the financial security of IPV victims. The definition of economic abuse was modified by Sharp-Jeffs (31), who suggested replacing the word "economic abuse" with "financial abuse." Financial abuse and economic abuse are distinguished here by the fact that while both involve similar behaviours, financial abuse focuses exclusively on an individual's money and finances rather than economic resources such as employment, housing, transportation, and education (31). Notably, instead of providing a definition, a large portion of the literature that is currently available lists a variety of controlling behaviours or strategies that may keep survivors of IPV economically and socially isolated (32). Restrictions on access to money and assets, deliberate destruction of property or nonpayment of rent or mortgage, and nefarious meddling with employment and educational pursuits are a few strategies of economic abuse (32).

1.2.5. Controlling behaviour

According to the WHO, controlling behavior is "isolating a person from family and friends; monitoring their movements; restricting access to financial resources, employment,

education, or medical care" (1). This distinction between psychological violence and coercion is evident from the WHO's definition of psychological violence as "insults, belittling, constant humiliation, intimidation, threats of harm, threats to take away children." (1). These two meanings are distinct based on the specific acts of violence, yet they are combined based on the overall psychological violence.

In particular, Johnson (2008) suggested that control is a form of violence rooted in patriarchal traditions of male supremacy (33). Although most IPV instances do not fit a general need for dominance or control, several academics have shown that control strategies are frequently reported in large, widely representative samples (34). Additionally, new examinations of the dynamics involved in situational couple violence have brought attention to the fact that attempts to exert control are frequently the driving force behind using violence against an intimate partner. Controlling behaviours are also seen as psychological aggression and are highly indicative of interpersonal terrorism (57, 58), coercive controlling abuse, and more prevalent types of relationship violence. According to Krantz and Dang Vung (2009), controlling behaviours are characterized by an attempt by one partner to systematically control the other partner's behavior, relationships, and activities (36). The employment of controlling behavior in a romantic setting creates a rigid behavioural pattern in which the survivor faces the consequences for breaking the coercive party's rules (37). The offender imposes this control through verbal or physical threats of severe hostility, intimidation, or physical assault (38). Because control appears to be a more common characteristic of relationships when violence is present than has been suggested by past theoretical theories, researchers must continue to examine the function of control in IPV utilizing community-based samples (34).

1.3. **PROBLEM STATEMENT**

Since IPV can injure both the expectant mother and the growing foetus during pregnancy, it presents a particularly serious problem. The goal of this study is to examine the difficulties and adverse effects of IPV during pregnancy among adolescents in SSA. Although IPV during pregnancy is a serious public health concern, its true prevalence is inconsistently reported (39). This underreporting hampers the identification and provision of appropriate interventions for pregnant women experiencing IPV. Due to their younger age, adolescents aged 15-19 who experience IPV while pregnant are more likely to suffer from adverse health effects, including injury and complications such as miscarriage, preterm birth, low birth weight (LBW), or maternal death (40–43). Emotional and psychological violence can increase stress, anxiety, depression, and poor prenatal care use (44–46). The growing foetus may come into contact with physical injury directly or indirectly through the mother's stress. This exposure may negatively impact the newborn's general health and future development, which may also cause developmental abnormalities, long-term health concerns, and fetal harm (47–49). Since children who grow up in violent households are more likely to experience violence or become perpetrators of violence themselves, IPV during pregnancy likely also contributes to a cycle of violence (50,51). In order to break the pattern and support healthy family situations, it is critical to address IPV during pregnancy at an earlier age. This intergenerational transmission of violence serves as a strong reminder of this issue.

IPV during pregnancy can be influenced by a multitude of factors at the individual, relationship, and community levels. Factors such as history of IPV, low education or income levels, lack of social support, partner's history of violence, substance abuse, unemployment, communication and conflict-resolution skills, poverty, lack of resources, and social inequality have been all cited as major triggers and risk factors associated with the experience of IPV during pregnancy (52). For this reason, pregnant women and those experiencing IPV

frequently face obstacles when seeking support and resources. The low availability and utilization of support systems result from several factors, including financial reliance, lack of knowledge about available services, place of residence, cultural obstacles, and inadequate training of healthcare providers (47,53–55). Therefore, a thorough approach is required to address the issue of IPV during pregnancy. It entails increasing awareness, enhancing screening and identification procedures, assuring access to secure and private support services, improving healthcare practitioner training, encouraging neighbourhood partnerships, and implementing laws safeguarding and assisting survivors (47,53–55).

For research on the relationship between IPV and adolescent pregnancy, SSA is particularly important because of its distinct socio-cultural, economic, and health characteristics. First, IPV is highly prevalent in the SSA (56). Studies continually highlight how widespread IPV is in the area, impacting a significant number of women. Based on statistics from the WHO, approximately 37% of women in SSA have suffered IPV either physically or sexually (56). This disturbing data highlights the startlingly high rate of IPV in this SSA. Second, one of the main issues in SSA is the high prevalence of adolescent (15-19) pregnancy.

In comparison to other regions, this one has a higher prevalence of early childbirth, with a disproportionately large percentage of girls giving birth during their youth (57). According to UNICEF's 2020 forecasts, 28% of girls in SSA become mothers before turning 18 years old. A complicated interaction of cultural norms, restricted educational possibilities, early marriage practises, and insufficient access to reproductive health treatments is responsible for the elevated rate of adolescent pregnancy (57).

The urgent need to investigate the consequences of physical IPV during pregnancy within this environment is highlighted by the coexistence of high rates of IPV and a significant incidence of adolescent pregnancies in SSA. It is critical to acknowledge that

young girls are disproportionately affected by these obstacles that put them at risk for mental health problems, sexual and reproductive health concerns, and a lack of possibilities for personal development (57). Comprehensive knowledge of this intersection can help design focused treatments, laws, and initiatives that improve the wellbeing of adolescent girls in the area while lowering the prevalence of IPV. By addressing these issues, we may work to build healthier families and communities by helping pregnant adolescents and their unborn children live in a safe and caring environment.

1.4. OBJECTIVES OF THE STUDY AND RESEARCH QUESTIONS

The main objective of this study was to explore and understand the experience of IPV during pregnancy among adolescents in SSA.

Objective of Ph.D. Paper 1: To analyze existing knowledge on prevalence, risk factors, and health outcomes associated with IPV during pregnancy among adolescents in SSA through a systematic review.

Research Questions Addressed by Ph.D. Paper 1:

- What is the state of existing knowledge regarding the prevalence and correlates of IPV during pregnancy among adolescents in SSA?

Objective of Ph.D. Paper 2: To examine the prevalence and severity of reported physical IPV during pregnancy and its association with severe lifetime physical IPV and severe injuries among ever-pregnant adolescents (aged 15-19) using the DHS.

Research Questions Addressed by Ph.D. Paper 2:

- What is the prevalence of physical IPV during pregnancy among adolescents?

- Do adolescents who reported physical IPV during pregnancy also report severe lifetime physical IPV and severe injuries due to violence by a partner than those who did not report it?
- Is physical IPV during adolescent pregnancy a risk marker for severe lifetime physical IPV experience and severe injuries due to IPV?

Objective of Ph.D. Paper 3: To investigate the health outcomes, including EBF and termination of pregnancy and their association with physical IPV during pregnancy among adolescents (aged 15-19) using the DHS;

Research Questions Addressed by Ph.D. Paper 3:

- Is there a difference in EBF practices between adolescents who reported physical IPV during pregnancy and those who did not report physical IPV during pregnancy?
- Are adolescents who reported physical IPV during pregnancy more likely to terminate pregnancy, including having a miscarriage, abortion, or stillbirth, than those who did not report physical IPV during pregnancy?

1.5. **OVERVIEW OF THESIS CHAPTERS**

This thesis has been divided into nine consecutive chapters**.** Chapter one sets the context of this thesis by presenting the background on IPV during pregnancy among women of reproductive age. Chapter two presents existing knowledge related to IPV during pregnancy precisely and in more detail, including prevalence, severity, and adverse outcomes in SSA. Chapter three discusses the theoretical framework associated with IPV during pregnancy. Chapter four focuses on the research methods and design adopted to accomplish the study. Chapters five, six, and seven present the results of each paper written for this thesis, whilst the eighth and ninth chapters provides a discussion. Chapters five, six, and seven present the results of each paper, including Paper 1) Systematic review of the literature

on IPV during pregnancy among adolescents living in SSA; Paper 2) Prevalence and severity of physical IPV during pregnancy among adolescents in eight SSA countries: a cross-sectional study; Paper 3) Evidence from demographic and health surveys linking physical IPV during pregnancy against adolescent girls to EBF and pregnancy termination in eight SSA countries. The eighth chapter provides a discussion of the findings, whereas chapter nine discusses study limitations and policy recommendations for improving interventions targeting IPV during pregnancy among adolescents in SSA.

2. CHAPTER 2: PREVALENCE, SEVERITY, AND HEALTH OUTCOMES ASSOCIATED WITH INTIMATE PARTNER VIOLENCE DURING PREGNANCY

This chapter focuses on the global prevalence of IPV during and outside pregnancy in women of reproductive age versus adolescents. Concerns surrounding the timing of the administration of IPV screening tools and variations in subject agreement regarding whether acts constitute IPV have been acknowledged as limitations in properly measuring the prevalence of IPV during pregnancy (59).

2.1. The global prevalence of intimate partner violence, with a focus on pregnancy

I present below the prevalence of IPV and IPV during pregnancy in developed and developing country using systematic review and population-based studies.

2.1.1. Prevalence of intimate partner violence

IPV is an act of aggression, including sexual, physical, and emotional, inflicted by a partner. It is a public health issue that restricts women's rights and hinders their well-being (60–62). The prevalence of any IPV varies across countries and settings, ranging between 1.2% to 66% (63,64). Based on a comprehensive examination and analysis of the available survey data, WHO released the first global and regional estimates of the prevalence of IPV and non-partner sexual violence in 2013. The estimates covered physical, sexual, or both types of violence. The study's findings showed that 30% of all women who had ever been in a relationship had experienced IPV, with the highest prevalences occurring in South-East Asian, Eastern Mediterranean, and African nations, where 37% of cases were reported. This review had not been updated until 2018 when Sardinha and colleagues conducted a global, regional, and national prevalence of physical or sexual, or both, IPV against women. Overall,

their study revealed that 27% of all ever-partnered women had at least once in their lives experienced physical or sexual abuse, or both, at the hands of a current or prior intimate partner (7). This study also highlights the high rates of recent or ongoing IPV experienced by young women, with one in six (16%) of them reported to have experienced either physical or sexual IPV or both in the year before the survey.

2.1.2 Prevalence of intimate partner violence during pregnancy: a review of population-based studies and systematic reviews

IPV during pregnancy is more common in low and middle-income countries (LMICs) than in high-income countries (HICs), according to a 2010 review of prevalence data from 19 countries (65). The WHO estimates that the prevalence of IPV during pregnancy varies between 1% and 28% worldwide (64). A meta-analysis by Bazyar and colleagues revealed an average global prevalence of 17% for sexual IPV during pregnancy, with underdeveloped countries (66) reporting a greater frequency, ranging in Africa from 2.3% to 57.1% (67). Among all the types of IPV during pregnancy, the most prevalent types appeared to be psychological violence (2-49%), followed by physical violence (23-40%), and sexual violence (3-27%) (68).

Population-based studies have indicated varying prevalence rates of IPV during pregnancy across different regions. In Denmark and Australia, the prevalence of IPV during pregnancy was reported to be relatively low, with rates of 1.8% and 2%, respectively. On the other hand, studies in African countries document a higher prevalence of IPV during pregnancy, ranging from 3.8% to 13.5%. Latin American countries also showed significant prevalence rates, ranging from 4.1% to 11.1%. In Asian countries, the prevalence of IPV during pregnancy fell within the range of 2% to 5%. (69). According to this risk, developing countries are predicted to experience frequently more negative outcomes related to IPV

during pregnancy on both mother and child health (70).

Within SSA, more precisely, the prevalence of IPV during pregnancy among women of reproductive age (15-49) varies and has been inconsistently reported(71), more so for adolescents (15-19). A systematic review of African studies on quantitative articles regarding women living in SSA investigated the prevalence and risk factors associated with IPV during pregnancy (68). There appeared to be wide variation in the estimates due to measurement and reporting bias. Nine out of 13 countries reported a prevalence above 27% (72), with the overall prevalence meta-analysis yielding 16% (72). In Nigeria, a systematic review gathering evidence on 19 studies about DV during pregnancy among pregnant women revealed a variation in prevalence ranging from 2.3% to 44.6% (73). Eight studies in another systematic review and meta-analysis conducted in Ethiopia estimated the Ethiopian national prevalence of IPV during pregnancy to be 26.1%. Psychological IPV (21%) appeared to be the most common form, followed by 16% of physical IPV during pregnancy (71). Another systematic review found that the prevalence of IPV during pregnancy in Africa ranged from 14% to 43.4% (72) in the last 12 months. However, the overall lifetime prevalence of IPV during pregnancy among women in Africa varied between 2.3% and 57.1% (72). Besides, a secondary analysis of 20 DHS from 15 countries and the International Violence Against Women Surveys (IVAWS) (4 surveys from 4 countries) from Africa, Latin America, Asia, and Europe on the prevalence of IPV during pregnancy estimated the prevalence to be between 2% and 13.5% (65). The prevalence was higher among participants between 15 and 35 years old, with African and Latin-American countries reporting higher prevalence than Asia and Europe (69). A more recent article published in 2017 on IPV association with pregnancy spacing among women in 29 LMICs demonstrated that even though IPV impact waned over time, IPV was linked to a 51% rise in the chance of incident pregnancies (74).

Despite methodological and contextual differences and the origin of the sample used, these findings from systematic reviews revealed a higher prevalence of IPV during pregnancy than those previously found using the nationally representative sample, including the WHO, DHS, and IVAWS (65). The methodological differences could explain the discrepancy between the studies since the DHS and the IVAWS include specific reports on IPV during pregnancy using similar methods. At the same time, the systematic reviews only dealt with reports from different studies using a wide range of methodology approaches.

Even though IPV is widely acknowledged as a serious public health issue, there is still a significant knowledge gap in its prevalence and dynamics among adolescents between the ages of 15 and 19, especially in the context of SSA. Most IPV research to date has been on adult populations, with relatively little attention paid to adolescents. As a result, little is known about this age group's unique difficulties. Additionally, IPV is experienced by adolescents in LMICs at proportionally higher rates than it is by adults (63), and the risk rises during pregnancy. The amount of research examining the frequency and subtleties of IPV during pregnancy, particularly among SSA adolescents, is still notably lacking despite these concerning developments. This knowledge gap is a major obstacle to creating and applying successful interventions and policies.

2.2. The prevalence of intimate partner violence during pregnancy among adolescents in high-income and low-income countries

Adolescents in LMICs experience IPV more than adults and those in HICs (63). Researchers from LMICs have recognised the increased prevalence of this issue among adolescents, with early marriage being the leading risk factor (75). A cross-sectional study in nine countries examining the prevalence and associated factors of IPV during adolescent pregnancy revealed it to be around 50% or higher (76).

The prevalence of IPV during pregnancy is higher in adolescents and young women compared to adult women in developed countries such as the USA, where most studies on IPV in adolescents have been conducted (77). The prevalence of IPV during pregnancy varies from 12 to 50% nationwide, with American Indian and homeless adolescents being relatively more at risk (78–80). High prevalence has also been found when specific behavioural issues are mentioned. When researchers refer to specific behaviours such as "being kicked," the results demonstrate that urban adolescents are more at risk for experiencing violence during pregnancy (81).

A cross-sectional multi-country study investigating the prevalence, associated factors, and health outcomes related to IPV during pregnancy and non-partner violence among adolescents in vulnerable urban areas of five countries, including Baltimore, Delhi, Ibadan, Johannesburg, Shanghai, revealed that Johannesburg in South Africa scored the highest prevalence of IPV 36.6% with pregnancy being one of the most leading factors (63).

Given that certain studies show significant rates of IPV during pregnancy, it is still unclear whether pregnant adolescents are more at risk for the problem. Therefore, investigating physical IPV during pregnancy, including prevalence, severity, and health outcomes associated with this adverse experience, will contribute to the evidence of violence around pregnancy intervention and inform policy.

2.3. The severity of intimate partner violence during pregnancy

Because violence is not a rare event, studies have suggested that even during pregnancy, women are still at risk for experiencing trauma and even more severe violence (82). As a result, IPV can take many forms; whether severe or not, this has been linked to a higher risk of adverse health outcomes. According to Clarke et al., one in five women experienced more frequent or severe IPV during pregnancy (83). However, it is not well

known whether IPV starts, worsens, or changes during pregnancy since research on violence patterns in pregnancy is also lacking (83). Their results demonstrated that a quarter or participants reported at least one form of physical IPV during pregnancy, including slapping, hitting, and beating (83). Although, in certain instances, it may be a continuation of violence that existed before the pregnancy and is likely to persist after the baby is born. It has been hypothesised that physical IPV during pregnancy may start during pregnancy. It is not feasible to scientifically examine whether pregnancy per se raises the risk for violence by relying on reports from pregnant women or hospital-based samples because self-report approaches might not sufficiently account for confounding factors, recall bias, or underreporting, thereby impeding a scientifically sound examination of the causal link between pregnancy and the risk of experiencing violence (84). Research has drawn some criticism for their victim-blaming stance by portraying women as passive victims while downplaying the male partner's role in the violence (84). This can perpetuate a culture of victim-blaming where women are held responsible for the abuse they endure. However, the stress of impending fatherhood, a woman's hormonal changes in mood, greater physical susceptibility, helplessness, and a conscious or unconscious wish to end the pregnancy were all cited as possible explanations for IPV during pregnancy (84).

Current research reveals that pregnant women who experience violence may be more likely to suffer severe violence. In a sample of men convicted of spousal assault, violence against pregnant partners was almost twice as frequent and severe as violence against non-pregnant couples. These scores were significantly higher for violence against previous pregnant partners than for previous non-pregnant spouses (85). The risk of being a victim of femicide, which is the intentional killing of women because of their gender, is significantly higher for women who experience IPV during pregnancy (85). Research has shown that women who suffer violence during pregnancy are at a risk level that is three times higher

compared to those who do not experience such violence (85). This heightened risk is alarming and has been associated with several documented cases of femicide, where women are tragically killed due to IPV (85). (85).

2.4. Adverse outcomes associated with intimate partner violence during pregnancy among adolescents

The relationship between IPV and negative health outcomes—especially for adults—has been well-studied. However, newer studies are concentrating on identifying comparable relationships among adolescents, which may help to clarify the particular difficulties this age group faces in coping with IPV during pregnancy. For instance, a study investigating the association between IPV and pregnancy termination among adolescent girls and young women in 25 SSA countries (86) revealed an overall prevalence of 19%, combining all 25 countries with Gabon at 41.2% scoring the highest prevalence and Tchad with the lowest 7.8%. Some limited research on violence during pregnancy in adolescents and young women has been conducted as described above.

However, existing studies primarily investigated IPV during pregnancy in HICs (87), leaving the issue in SSA and other LMICs much less explored. Pregnancy comes with pressures such as energy, strength reduction, and other physical and emotional changes (88). Some of the demands during pregnancy include relationship management and financial resources to manage the pregnancy better. Unfortunately, for many adolescents, the lack of means to fulfill pregnancy demandsexposes them to an increased likelihood of experiencing IPV (88,89). IPV during pregnancy has been proven to be a severe issue, detrimental to both the mother's and the child's health. These adverse effects include physical harm and implications during pregnancy and delivery, mental health symptoms, pregnancy termination, neonatal outcomes, breastfeeding practices, and behavioural problems with the baby, as

included in Figure 2.4 below.

The decision to focus specifically on EBF practices and pregnancy termination among adolescents in SSA stems from several considerations. Firstly, while a wide range of health outcomes is associated with IPV during pregnancy, including LBW, mental health issues, and neonatal complications. However, the literature addressing the specific intersections of physical IPV during pregnancy, EBF practices, and pregnancy termination among adolescents in SSA remains limited and often lacks comprehensive exploration. This thesis aims to dig into areas where there is a significant gap in existing research within the SSA context.

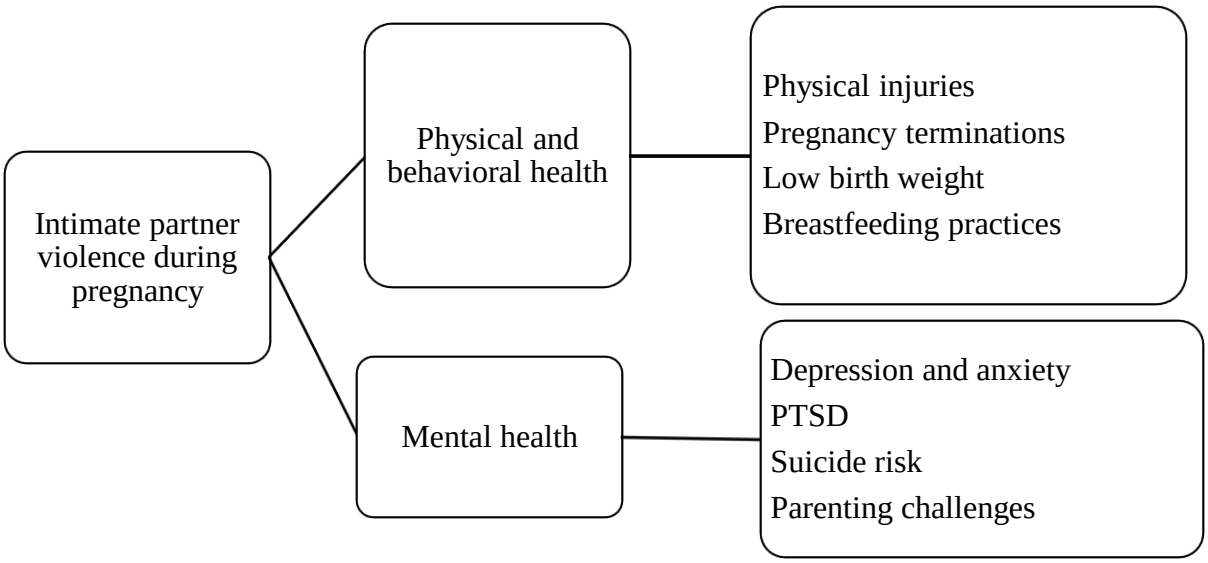
Moreover, EBF and pregnancy termination are critical indicators of reproductive health and well-being among adolescents, with potential longer-term consequences. For instance, pregnancy termination can have profound mental health impacts on young mothers, influencing their emotional well-being and future reproductive decisions (90,91). On the other hand, EBF is not only essential for the infant's immediate health but also has significant implications for their cognitive, physical, and social development in the long term (91). Adequate breastfeeding practices contribute to reducing the risk of infections, allergies, and chronic diseases in children, highlighting its importance beyond the immediate postnatal period.

Furthermore, the choice to concentrate on EBF and pregnancy termination was partly influenced by data availability, especially given the constraints imposed by the COVID-19 pandemic, which limited access to collect primary data. This limitation has been acknowledged as central to the thesis's scope and emphasises the need for further research to explore a broader spectrum of health outcomes associated with IPV during pregnancy among adolescents.

By focusing on these specific outcomes, the thesis highlights the unique challenges

faced by adolescent mothers in navigating the complex intersection of IPV, pregnancy, and reproductive health in SSA. By examining these specific outcomes, the study aims to bridge the existing gap in knowledge and contribute valuable insights into understanding how physical IPV during pregnancy affects these essential aspects of adolescent reproductive health in SSA.

Figure 2.4. **Health outcomes associated with intimate partner violence during pregnancy**



2.4.1. Physical injuries and pregnancy implications during pregnancy and delivery

Approximately 8% of pregnancies are impacted by trauma, the primary cause of non-obstetric maternal death (92). Pregnant women are an especially vulnerable population for physical IPV because the mother and the unborn are affected. Higher mortality, mental illness, suicide, and recurring IPV after childbirth are among the negative results for mothers. In contrast, death, early birth, and LBW are adverse outcomes for foetuses, possibly partially attributed to physical injury to the mother's abdomen. For instance, a study of 7557 women in Saudi Arabia assessing the prevalence of IPV during pregnancy found that 40% who reported

physical IPV during pregnancy also reported antenatal hospitalization and severe injuries, including premature labour; trauma due to a fall or blow to the abdominal area; trauma due to the blows/kicks to the abdomen resulted in three cases of ruptured uterus (93). The same results were reported in early research in the USA investigating maternal complications due to physical IPV during pregnancy (92,94). Preterm labour and other issues, such as severe foetal harm and death, can result from a blow to a pregnant woman's abdomen. The indirect mechanism relates to a woman's experience of physical IPV during pregnancy and how that can cause psychological distress, leading to poor utilisation of medical facilities and increasing the chances of adverse effects (92,94). A study even analysed the hospital facilities' admission level between pregnant women who experienced IPV and those who did not. The results demonstrated that only women who experienced physical IPV during pregnancy were diagnosed with multiple injuries, including suffocation, contusions, and unspecified head injuries, compared to those who did not experience it. However, they were much more likely to be hospitalised (82,92).

2.4.1.1. Pregnancy termination

Very little data is available on how IPV affects the number of induced abortions performed on women, especially since it is banned in most African countries, increasing the chance of harmful practices (95). Every pregnancy increases the risk of maternal mortality, but this risk is more prominent for women whose pregnancies are terminated voluntarily or involuntarily (86). Research has found three types of pregnancy termination: induced abortion, miscarriages, and stillbirth (95–98). According to research, any conception that does not result in a live birth because of a direct action made to end the pregnancy is referred to as an "induced abortion (97) ". Unskilled individuals usually perform unsafe abortions in a setting that does not meet the bare minimum of medical requirements (96,99). On the other

side, stillbirth and miscarriage were defined by the WHO in 2020 as the death of a 28-week foetus inside the womb before delivery and foetal death that occurs before the 28th week of pregnancy (100,101). According to research, between 10 and 20% of abortions occur worldwide, but SSA countries appear to be the most impacted by the majority of induced abortions, stillbirths, and miscarriages among adolescents (102–104). Nonetheless, pregnancy terminations, whether induced abortion, miscarriage, or stillbirth, have been found in recent research to be associated with IPV and more so among adolescents compared to adult women (105–107).

Due to severe mental health problems left by the detrimental effects of IPV, a study done in Nigeria, Zambia, and Uganda found that women choose to terminate their pregnancies through induced abortion (106,107). For this reason and many more, the United Nations (UN) programs have focused since 2015 on the Sustainable Development Goals (SDGs) 5.2 and 16.1 goals to ensure the elimination of all forms of violence against women and girls and related deaths significantly (108). Currently, only four studies have been reported associating IPV and pregnancy termination in SSA, including Nigeria, Tanzania, Cameroon, and Ethiopia, with no focus on adolescents specifically, which will be the focus of this thesis (95,109–111).

2.4.1.2. Breastfeeding practices

In Bangladesh's Chandpur district, a study examining recent experiences with physical, psychological, and sexual IPV after childbirth found that over 30% of women reported experiencing IPV during their pregnancies and postpartum period (112). Numerous factors, including those affecting an individual, a relationship, a community, and society as a whole, have been recognised as IPV triggers (1) with detrimental consequences on women's caring attitudes toward children (113). The quality of a mother's care and parents' capacity to

meet their children's needs are compromised in IPV settings. However, information linking IPV during pregnancy and breastfeeding is rare, and available research presents inconsistent findings (114).

For example, using data from 51 LMICs' cross-sectional DHS, a population-based analysis found that all three kinds of IPV were independently linked to a lower chance of early breastfeeding initiation (115). However, no difference was found in two studies investigating breastfeeding practices and IPV (116,117). Research has become more prevalent in this area due to the prevalence of violence against women and the significance of this issue for mother and child health, although studies have traditionally looked at IPV and breastfeeding practices independently (118,119).

Using the DHS in eight countries from SSA, this thesis aims to investigate the connections between physical IPV during pregnancy and EBF practice among adolescents specifically. This will help us evaluate the effects of physical IPV on breastfeeding practices and maternal mental health implications.

2.4.1.3. Low birth weight and preterm babies

The health of the newborn is also affected by the impacts of IPV. A substantial amount of evidence links physical IPV to LBW and higher rates of preterm birth. (120–122). Leading factors for new-born morbidity and mortality include LBW and preterm babies, which are widely known (123). After adjusting for smoking mother age, government aid, and education, an analysis of the USA pregnancy Risk Assessment Monitoring System (PRAMS) data found a substantial link between IPV during pregnancy and LBW (124). In a study looking at the maternal, foetal, following neonatal, and infant outcomes of women hospitalized due to IPV during pregnancy, it was discovered that compared to those who did

not experienced IPV, women who gave birth and were hospitalized were more than three times as likely to deliver a LBW neonate (odds ratio (OR) = 3.10, 95% confidence interval [95% CI] = 1.25-7.71).

In addition, women who had been released after IPV and gave birth later had an increased risk of pregnancy termination (OR=1.8, 95% CI=1.3-2.5), haemorrhage (OR=1.8, 95% CI=1.4-2.5), and LBW (OR=1.7, 95% CI=1.5-1.9). These results demonstrate the necessity of carefully monitoring assaulted pregnant who haven't given birth (43,125). Moreover, research on IPV in pregnancy and the risk of hospitalization in the USA has also shown that more frequent abuse is associated with a higher risk of giving birth to an underweight neonate (OR=2.9, 95% CI=1.2-6.6) (126). Finally, similar to the above findings, pregnant women with documented police reports of IPV were more likely to deliver LBW neonates or extremely LBW infants weighing under 1500 grams (127). However, it is crucial to remember that contrary to the studies described above, there is no conclusive evidence that IPV increases the risk of preterm delivery or LBW neonatal birth. Due to the low rate of IPV reported during pregnancy, prior studies were unsuccessful in establishing links between abuses and new-born outcomes. It is significant to highlight that generalisations across studies reporting positive connections are challenging due to methodological reasons, likely because they did not all account for sociodemographic characteristics linked to IPV during pregnancy in the study.

2.4.2. Mental health problems

Below are the different mental health problems found associated with IPV during pregnancy.

2.4.2.1. Depression and anxiety

Physical violence during pregnancy can affect women's metal health during and after pregnancy. In a study aiming at determining the associations between mental illness and

factors associated with the experience of physical IPV among pregnant women in Cape Town (South-Africa), 376 adult women attending antenatal facilities were recruited and interviewed using the CTS (Conflict Tactics Scale) and the Mini-International Neuropsychiatric Interview to assess IPV both physically and psychologically and diagnose common mental disorders including Major Depressive Disorder (MDE). Among those who reported IPV, regardless of the forms of abuse, 40% were diagnosed with MDE, and 20% had a recorded history of mental health issues (128).

Similar results were found in India, where women who reported experiencing physical violence reported more somatic symptoms and higher depression scores than those who did not; moreover, they were more likely to report PTSD symptoms with lower life satisfaction (129). In Bangladesh, physical and sexual violence by a spouse was one of the main risk factors for Antenatal Depressive Symptoms (ADS) in 720 women selected for a study examining the associated factors with anxiety and depression during pregnancy. In fact, 20% of women reported having a bad relationship with their partners and mothers-in-law; their primary support source is their partners' father (130). The same results were found in Ethiopia, where an association between psychological violence and prenatal depression was found among women in rural areas (131).

The above studies were done among women in the reproductive stage without emphasizing adolescents. However, few reports have investigated mental health during pregnancy among young women (14-19) since they are much more likely to experience violence by their partner during pregnancy before age 25 (132,133). Both adolescents and adults have reported psychological problems during pregnancy (134–136). However, due to the scarce research leading to the inconsistency of reports associated with IPV during pregnancy among adolescents and perinatal depression, it is difficult to make any conclusions.

2.4.2.2. Post-traumatic stress disorder

Living with IPV has severe effects on mental health, and there is growing knowledge of the prevalence of depression and PTSD in women experiencing IPV. Previous studies below have revealed that the consequences of IPV on mental health may impact women survivors' capacity to parent. There is proof that maternal stress negatively impacts newborns' and kids' development and physical and mental health (137). Depression, posttraumatic stress disorder (PTSD), phobias, anxiety, panic disorders, and substance abuse are just a few of the numerous mental health consequences experienced by abused women, with PTSD being one of the most mentioned psychological consequences (138) According to Golding's thorough meta-analysis, abused women had a three to five-fold higher risk of depression, suicidality, and PTSD than the general population (139).

According to a population-based study on IPV during pregnancy, women who experienced psychological abuse were more likely to experience postpartum depression (140). Comorbidities such as depression and PTSD are more common in abused women than non-abused women. According to one study specifically looking at the co-occurrence of Major Depressive Disorder (MDD) and PTSD in battered women by their intimate partners, major depression occurred in conjunction with PTSD in 49–75% of the cases (141). Similar findings were made by Levendosky and colleagues, who discovered that increased IPV was linked to lower mental health, including anxiety, low self-esteem, and depression (142) with contributing factors such as the severity and frequency of violent events, the existence of forced sex, a history of child sexual abuse, trauma-related guilt, dominant partners, and avoidant coping mechanisms (137). Additionally, these researchers discovered that the cumulative impact of IPV increases the severity of depression in their prospective study of adolescent mothers (141,142).

2.4.2.3. Suicide risks

As the USA's most prominent cause of maternal death, suicidality during the perinatal period poses a serious public health concern (143). Suicidal ideation is an important issue to address when it is discovered during pregnancy because it significantly predicts suicide attempts and completions (144). The rate of suicidal ideation is inconsistent and difficult to report because very few studies have been carried out addressing IPV during pregnancy and suicide risk (145) . Although some research indicates that pregnant women have a lower risk of acts of suicide, other research has found that suicidal ideation is more prevalent in unwanted pregnancies (146,147). According to a recent study conducted in an urban community in the USA, the prevalence of suicidal ideation among pregnant women in the USA was higher compared to non-pregnant women (147).

However, there is a wide range of factors associated with the suicidal risk during pregnancy: suicidal ideation was more likely to occur when one was unmarried, had a history of mental illness, or used drugs. Reports of intimate partner rape were linked to suicidal ideation in a small sample of non-pregnant IPV survivors living in a shelter, albeit this relationship was moderated by depression and post-traumatic stress disorder (148,149). The research above demonstrates that pregnancy does not protect against suicidal ideation. Therefore, pregnancy being the only time they receive regular treatment from the healthcare system, it is the opportune moment to diagnose and intervene in suicidal ideation. A more profound comprehension of the link between IPV and suicidal thoughts during pregnancy is crucial since these thoughts carry additional dangers during the prenatal stage due to the possibility of injury to the foetus.

2.4.3. Challenge with parenting

The detrimental effects of IPV on women's mental health are well-established, but it also impacts the mother-child bond and, consequently, the developing child through its damaging impacts on maternal parenting (150,151). Several theories have been put up to understand the connection between women's IPV and their parenting styles. According to the Belsky ecological model of parenting, the effectiveness of the partner or marital connection significantly impacts parental effectiveness (152) . Similarly, family systems theory argues that poor relationships may have a "Spillover" effect on the quality of connections (150) although findings from the “Spillover” theory are mixed (153). In fact, the disagreement may negatively impact parenting behavior through various processes and spill over into the parent-child connection (153). According to a meta-analysis of 11 studies on IPV and both observed and self-reported positive parenting, higher levels of IPV were associated with lower levels of positive parenting (151). This collection of evidence demonstrates that IPV might influence how parents interact with their children and permeate the caregiving system.

2.5. RESEARCH GAPS

The basis of this thesis is the assumption that IPV during pregnancy among adolescents in SSA is more prevalent and carries severe adverse outcomes compared to adults. This hypothesis has helped us justify the reasons for this research. Looking at the scarcity of evidence portraying IPV during pregnancy among adolescents, there are several reasons to investigate why IPV during pregnancy is essential to research. The rationale for this study is outlined below:

- There is limited evidence on IPV during pregnancy among adolescents in SSA using population-based studies. Most studies have been carried out with women in their

reproductive age with little emphasis on adolescents, despite the importance of adolescence on women's future reproductive health, wellbeing, and vulnerabilities.

- In scientific research, there is no good understanding of the prevalence, severity, and health outcomes, particularly for this age group. (58). Adverse health consequences, such as preterm birth, LBW are more likely among pregnant adolescents with IPV. Studying these vulnerabilities in this age group can highlight their difficulties and help guide initiatives to enhance mother and child health.
- Beyond direct survivors, IPV has wider-ranging effects during pregnancy. Violence experienced during pregnancy may have a long-term impact on a child's development, behavior, and health. Examining IPV among adolescent mothers-to-be can provide insights into its consequences across generations and help shape interventions that are meant to end the cycle of violence.
- In SSA, research on IPV during adolescent pregnancy might help guide evidence-based policy decisions and interventions. In addition to improving healthcare services for expectant adolescents, it can help identify the underlying social and cultural causes of IPV and help establish comprehensive measures to prevent and respond to IPV.

Researchers can contribute to the larger efforts to reduce gender-based violence (GBV) in the region by learning more about IPV during pregnancy among adolescents in SSA. This knowledge will help to advance the rights and well-being of young women, improve maternal and child health outcomes, and promote the well-being of young women.

2.6. CHAPTER SUMMARY

In this chapter, I discuss the global prevalence and multi-faceted aspects of IPV during and outside pregnancy, with a specific focus on adolescents, particularly in SSA. The

chapter elucidates the varying prevalence of IPV across different countries and regions, underlining the substantial impact of this pervasive issue on women's rights and well-being. It dissects the complex landscape of IPV during pregnancy, which is notably more prevalent in LMICs than in HICs and demonstrates the diverse prevalence rates in different parts of the world. Additionally, the chapter scrutinizes the adverse health outcomes associated with IPV during pregnancy, such as physical injuries, pregnancy termination, and adverse neonatal and breastfeeding practices, emphasizing the dearth of research, particularly in SSA. It also elucidates the profound implications of IPV on the mental health of women, including depression, anxiety, PTSD, and suicidal ideation. Furthermore, the chapter highlights how IPV disrupts parenting, affecting the mother-child bond and ultimately influencing child development. Throughout, it emphasizes the importance of understanding the prevalence, dynamics, and consequences of IPV during pregnancy, particularly among adolescents, to inform effective interventions and policies in addressing this critical public health concern.

The literature review identified significant gaps in understanding the relationship between IPV during pregnancy and specific health outcomes, especially among adolescents in SSA and other LMICs. While studies in HICs have explored various health implications of IPV during pregnancy, research in SSA and LMICs remains limited, particularly concerning outcomes like EBF and pregnancy termination among adolescent mothers. The thesis aims to address these gaps by focusing on prevalence, severity and two specific health outcomes, EBF and pregnancy termination as critical indicators of reproductive health and well-being among adolescents in SSA. By doing so, it seeks to advance previous evidence by providing comprehensive insights into how physical IPV during pregnancy impacts these essential aspects of adolescent reproductive health, thus contributing to more tailored and effective policies and programs for this vulnerable demographic group in SSA. The next chapter discusses the theoretical framework identified to be associated with IPV during pregnancy.

3. CHAPTER THREE: THEORETICAL FRAMEWORK AND RISK FACTORS ASSOCIATED WITH INTIMATE PARTNER VIOLENCE

This chapter explores the theoretical framework that forms the basis for our knowledge of intimate partner violence, examining the various dimensions of this phenomenon as they relate to psychological and socio-ecological paradigms. We also investigate the complex network of risk factors linked to violence against intimate partners, looking at how they interact at the individual, relational, social, and cultural levels.

3.1. Theoretical framework

The theories that attempt to explain IPV and IPV during pregnancy include those based on feminist theory, power and control wheel, social learning, trauma bonding, walker's cycle of violence, situational and background theory, Stockholm syndrome, Goode's classical resource, socio ecological model (**Table 3.1**). When taken as a whole, they offer a context for a deeper understanding of adolescents' demands and problems and some general guidance for future research. The fundamental ideas of these theories are introduced in this chapter, followed by a discussion in chapter eight of how they differ and the benefits of taking a comprehensive approach to IPV, particularly physical IPV during pregnancy among this age group.

In my thesis, theory was crucial in defining the concept of IPV in SSA, even if risk and protective factors were not directly examined. The intricate interactions between social, cultural, and ecological elements that influence adolescent experiences with IPV can be better understood by using theoretical frameworks as a lens. These theories enabled a deeper understanding of the prevalence, severity, and associated health outcomes of IPV during pregnancy by facilitating a thorough exploration of the complex nature of the practice. The thesis obtained a strong basis by grounding the research in preexisting theories, which

facilitated the examination and interpretation of empirical data and offered a more comprehensive framework for tackling IPV among pregnant adolescents in SSA.

In summary, the investigation of diverse theories concerning physical IPV during adolescent pregnancy and its interaction with EBF and pregnancy termination in SSA attempts to provide a thorough grasp of the intricate dynamics impacting the health and overall welfare of adolescent girls. This framework can then be used to inform interventions and policies that more effectively tackle the complex issues of IPV, in general in SSA.

Table 3.1. Overview of IPV theories and variable of interests used in this study

IPV theories	Authors	Variable of interest
Feminist	Dobash & Dobash (1977)	Power imbalances; sexism stemming from society's patriarchal beliefs; female inequality
Power and control wheel	Pence and Paymer, 1993, The Duluth Model, 1993	Gender inequality, social acceptance of violence, societal beliefs about IPV, family conflict
Social learning	O'Leary (1988) Bandura 1977	Family conflict; modeling; reinforcing consequences of aggression; sex-role characteristics
Trauma bonding	Patrick Carnes (1997)	The power imbalance present in the relationship
Walker's cycle of violence	Walker 2006	Dynamics of an abusive relationship
Situational and background	Riggs & O'Leary (1989), Riggs & O'Leary (1996)	History of maltreatment and abuse, psychopathology, social acceptability of violence, arousability, and traits of an aggressive personality; Interpersonal conflict, drug usage, relationship satisfaction, level of closeness, problem-solving abilities,

		expectations regarding violence, and communication style;
Stockholm syndrome	Graham (1995)	IPV victim psychological condition
Goode's classical resource	Goode 1971	Use of violence to maintain the dominant position
Socio ecological model (SEM)	Urie Bronfenbrenner (1977)	Individual, relationship, community, and societal factors of IPV

3.1.1. Sociocultural theories

In this section I focusspecifically on sociocultural theories including feminist theories and The power and control wheel.

3.1.1.1. Feminist theories

Feminist theories of IPV emphasize the underlying assumptions of perpetrators' need for power and control and the patriarchal structures and tolerance of violence against women in society that enable specific abusers to view their actions as acceptable. These ideas include elements of the social learning theory, which holds that engaging in abusive behavior is a decision to employ a collection of learned behaviors (154–156)

Women and other vulnerable groups are disadvantaged in developing equitable power relationships with their partners and society due to extra elements and complexity that intersect with gender, which feminist theory has evolved to account for. Social scientists, DV activists, and minority women conceptualized violence against women as much more than just a gender issue (155). For instance, the Black feminist theory emerged in response to the predominantly white women's movement and the male black civil rights movement, neither of which fully captured the experience of being black and a woman (155) in line with this research on adolescents who are not only young but pregnant.

Feminist theorists and other social scientists have advocated using feminist intersectionality to conduct research and create interventions that address health disparities and gain a deeper understanding of the multiplicative effects of social inequalities experienced by marginalized and vulnerable groups (157). The goal of feminist intersectionality is to explain how various social positions, such as gender, race, ethnicity, class, age, sexual orientation, disability status, and religion, affect the health of individuals, families, communities, and society as a whole (158,159).

More importantly, it emphasizes how traditional gender roles and societal expectations can exacerbate power inequalities, raising the likelihood of IPV in the context of adolescent pregnancy. Feminist theory highlights on how these characteristics interact with pregnancy to increase vulnerability to physical IPV. Adolescents may encounter particular difficulties negotiating power and autonomy within their relationships. Additionally, it emphasizes how crucial it is to address problems at the individual level and larger societal and structural disparities to prevent and address IPV among pregnant adolescents successfully.

3.1.1.2. The power and control wheel

Based on the experiences of more than 200 victims in a Duluth battered women's shelter, the Power and Control Wheel was developed by Pence and Paymer in 1993 (155,159). This model is frequently used with both victims and perpetrators of IPV. The offender uses a set of behaviors or activities known as the "power and control wheel" to keep control of his intimate partner (**See figure 3.1.1.2**) (160,161). The phrase "power and control" is positioned at the center of the wheel to represent this. The spokes of the wheel are methods that are frequently employed to exert control over an intimate relationship and leave them open to physical and sexual abuse (161). The eight strategies listed in the wheel

include (1) intimidation; (2) emotional abuse; (3) isolation; (4) minimization, denial, and blame; (5) use of children; (6) use of privilege; (7) economic abuse; and (8) use of coercion and threats. Through these systems of oppression, the methods might take several forms. Aligning with this thesis, if a pregnant adolescent's boyfriend threatens to deny pregnancy responsibility, this can be used to illustrate economic abuse.

When used in the context of physical IPV experienced by adolescents during pregnancy, it offers important insights into the processes at work. The wheel demonstrates how abusers may resort to physical force as one of their strategies to keep their pregnant adolescent victims under their thumb, potentially escalating the hazards and vulnerabilities of adolescent pregnancy. It is crucial to comprehend this dynamic to create effective treatments and support systems that safeguard and help pregnant adolescents experiencing IPV.

Figure 3.1.1.2. Understanding the power and control wheel - Adapted from the Duluth Model, 1993 (source: Domestic Abuse Intervention Programs).

3.1.2. Psychological theories

In this section, I emphasise social learning theory, background situational theory, trauma bonding theory, Walker cycle theory, and Stockholm theory as all parts of the psychological theories of IPV.

3.1.2.1. Social learning theory

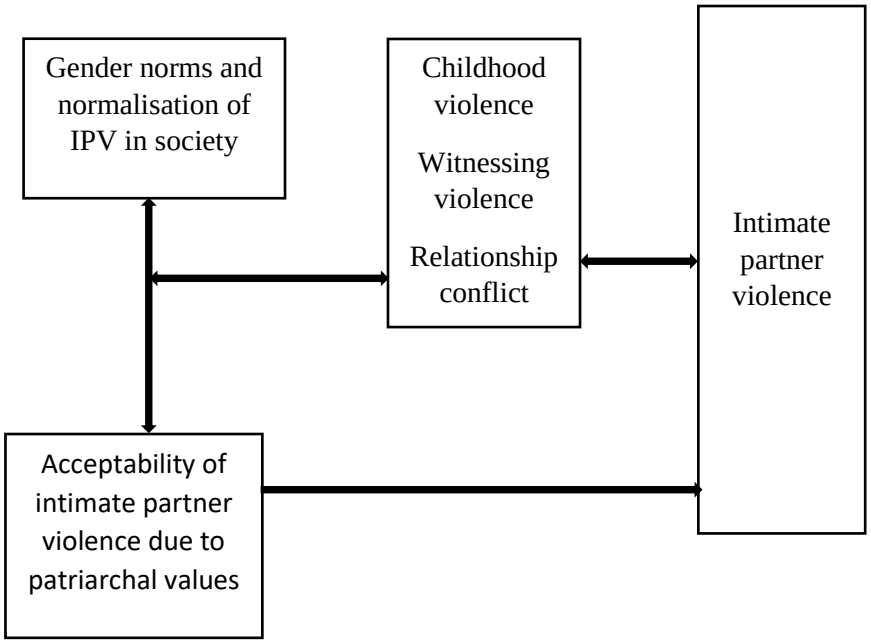
Albert Bandura (1977) established the social learning concept that individuals can learn from one another through observation, imitation, and modeling. In fact, one of the most common explanatory stances in the research on marital violence is social learning theory. According to the theory, people emulate behaviors they were exposed to as children (162). By observing how their parents and other significant adults behave in intimate partner relationships, children and adolescents can learn how to behave in similar situations (**Figure 3.1.2.1.)**. As a result, children who have experienced violence in the family learn that it is an appropriate and valuable strategy for altering the behavior of others or resolving conflicts. Because of this, adolescents will generally regard DV as the norm (2). According to McCue's research, sociologists claim that males abuse because they learned violence in their homes as kids and that women choose violent partners because they witness their moms being mistreated (163). Yount and Carrera (2006) added that a woman's propensity to be in a violent relationship might be learned through observation or experience of corporal punishment, violence throughout childhood, or DV (164).

In relation to IPV, those who have seen someone they respect use aggression towards a partner are more likely to engage in IPV. Additionally, individuals who define themselves in ways congruent with the use and normalization of IPV and those who believe that the benefits of partner violence outweigh the costs are more likely to engage in it (165) Additionally, the theory aims to explain how violence might be passed down through

generations from a younger age to adulthood. In fact, To explain how IPV is transmitted between generations, children get feedback from others about their behaviors, which helps them form standards for judging their behavior and look for role models who conform to these standards (166) For instance, men are more likely to mistreat their wives if they witnessed their fathers assaulting their mothers when they were children (167,168).

This theory indicates that young people may watch or experience violence in their environment and develop aggressive behaviors as a way of problem-solving or conflict resolution when applied to the setting of IPV during pregnancy among adolescents. They may act out the violent behaviors they have witnessed in their families or communities, and if these behaviours are supported or accepted, they may help to perpetuate IPV in adolescent pregnancies. Furthermore, the social learning theory emphasises the significance of social norms by arguing that adolescents may be more inclined to engage in risky behaviours if their community tolerates or normalises IPV during pregnancy.

Figure 3.1.2.1. Drivers of intimate partner violence (developed by the candidate)



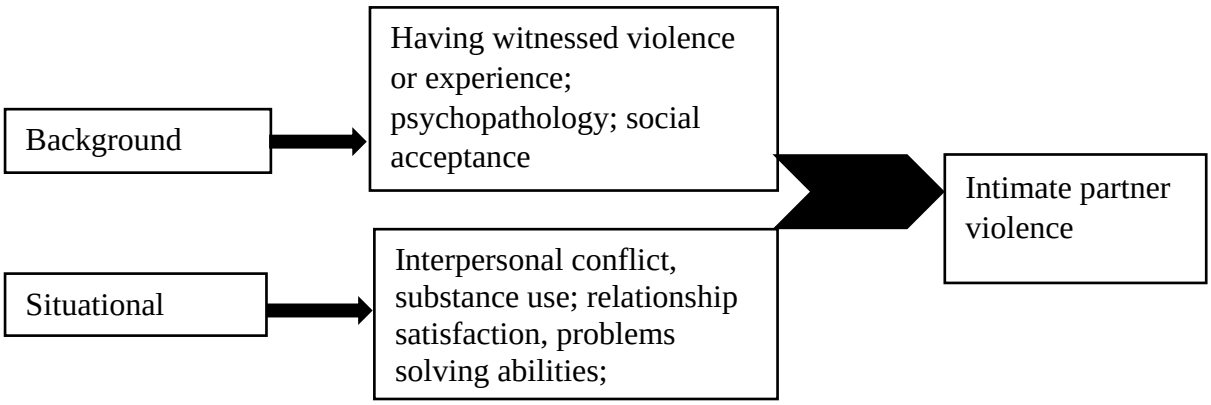
3.1.2.2. Background/situational model

In 1996, Riggs and O'Leary built on social learning theory to create a model to explain courtship aggression, a type of IPV (169,170). The model highlights important predictor elements for interpersonal aggression within each of the two general components—background and situational factors—that are likely to contribute to the emergence and maintenance of courting aggressiveness (171). The background component is the historical, cultural, and personal traits determining who will become violent (**Figure 3.1.2.2.**). Background factors include having witnessed or experienced abuse in the past, having an aggressive personality trait such as impulsivity, having used aggressiveness in the past, having psychopathology, and the social acceptance of using aggression as a form of conflict resolution (171). The second part of the model deals with the circumstances that lead to violence. Situational characteristics that are thought to be connected to the beginning of a violent episode include interpersonal conflict, substance use, relationship satisfaction, intimacy levels, problem-solving abilities, personal expectations of consequences of violence, and communication styles. In fact, how these two factors interact may affect how intense a couple's conflict is and, consequently, whether or not there will be physical violence (170,171).

Both situational and background theories emphasise the relevance of analysing current social and cultural norms. Traditional gender norms and patriarchal frameworks persist in power disparities in relationships, raising the risk of IPV in many communities. Adolescents may internalise these standards, which could result in a tolerance for violence as a legitimate method of controlling or resolving conflict. Adolescents frequently rely on their spouses for financial support, a major underlying factor in physical IPV during pregnancy. Their ability to exit abusive situations and seek help is constrained by economic

disempowerment. Teenagers may become trapped in abusive relationships for fear of financial instability or homelessness.

Figure 3.1.2.2. Background/situational model and IPV pathways – (developed by the candidate)



3.1.2.3. Traumatic bonding theory

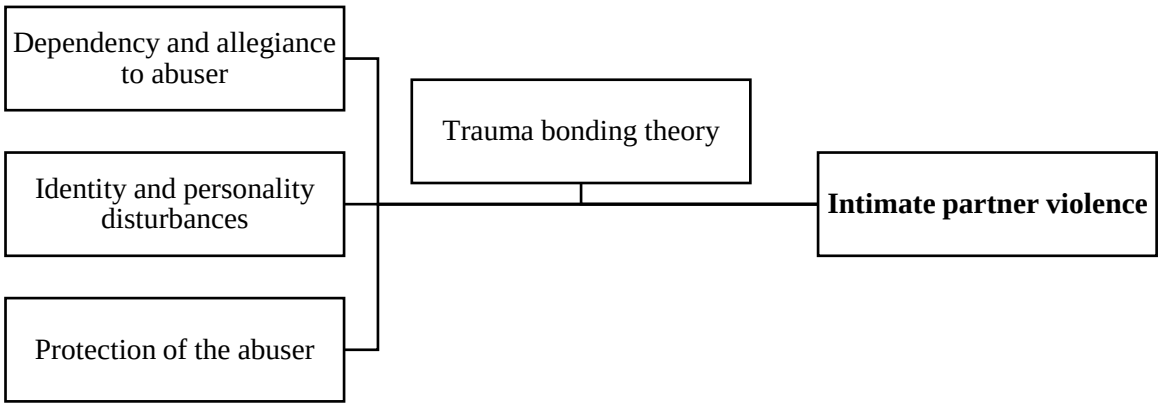
Patrick Carnes (1997) defined trauma bonding as allegiance to a destructive person or the idea that deep emotional bonds are created by intermittent abuse (172). This theory aids in our understanding of the reason women continue to live with their abusers (173). This can be explained in two ways: the intermittent nature of the abuse and the power imbalance in the relationship that causes the perpetrator to feel superior to the victim. According to this theory, the dominator becomes increasingly dependent on the subordinate as the power dynamics between the two people progress. The connection is strengthened when positive displays of love and affection occur between abusive acts(172). In addition to serving the aforementioned purposes, the theory contributes to the current study by explaining why some women who have initially left an abusive relationship may later return to it—traumatic bonding results from a power imbalance and the intermittent nature of violence in a relationship. A possible factor in the recurring leave-return cycle is the traumatic bonding or

post-separation attachment. The actions solidify the relationship and place the victim's self-esteem in the abuser's hands (172). Doychak and Raghavan (2023) show recently in their paper illustrating the dynamic in trauma-coerced attachment that victims will feel dependency and pay allegiance to their abuser, which obstructs their identity since they begin to see the abuser as supreme (173). Unfortunately, this interaction leads to the victim protecting the abuser from others (**See Figure 3.1.2.3**).

The trauma bonding theory may assist in explaining why some pregnant adolescent women continue to be in physically violent relationships despite the risk to themselves and their unborn children. These young women might have come to depend on their relationships for security and worry about the repercussions of leaving, such as financial ruin or social isolation.

Additionally, because of their attachment to the abuser, adolescents going through trauma bonding may find it challenging to recognize the abuse as a problem. Adolescents who experience physical IPV during pregnancy could compound this dynamic further since it can cause feelings of helplessness, hopelessness, and even shame, reinforcing the trauma bond. Therefore, these adolescents may view their companions as a source of comfort and a threat, creating a paradoxical emotional connection that keeps them trapped in the cycle of violence.

Figure 3.1.2.3. Relationship between traumatic bonding theory and IPV - (developed by the candidate)



3.1.2.4. The Walker cycle of violence

In 1979, Dr. Lenore Walker created the cycle of violence theory. Walker claims there are three phases to the cycle of violence, each occurring again inside an abusive relationship. The three stages (**Figure 3.4.3**) include the "tension-building" stage, the "acute battering" or explosion, and the honeymoon stage, sometimes known as "loving contrition."(174). Walker claims that minor assaults like yelling or throwing the woman down may happen during the initial stage of 'stress building.' Many battered women take all reasonable measures to stop these occurrences from worsening, like attempting to satisfy the man's demands. However, by refusing to comply with the man's requests, a woman can potentially hasten the escalation of the episodes. Walker contends that the woman has at least some minimal control over the frequency and severity of the abusive occurrences at this stage (175).

The second stage, known as "acute battering," is the most abusive, although it is typically shorter than the first and third stages. Unless the victim needs medical assistance, there isn't much a woman can do to stop the battering, and she typically doesn't ask for help after this point. Usually, the second stage of "loving contrition" is promptly followed by the third. Throughout this phase, the man apologizes and acts lovely, caring, and attentive toward the woman. Walker claims that this third phase motivates the woman to stay in the relationship by providing her hope that the partner's "meanness" will vanish and his "nice

side" will take control of his personality. This is the point at which the victimization of the woman is finished (175)

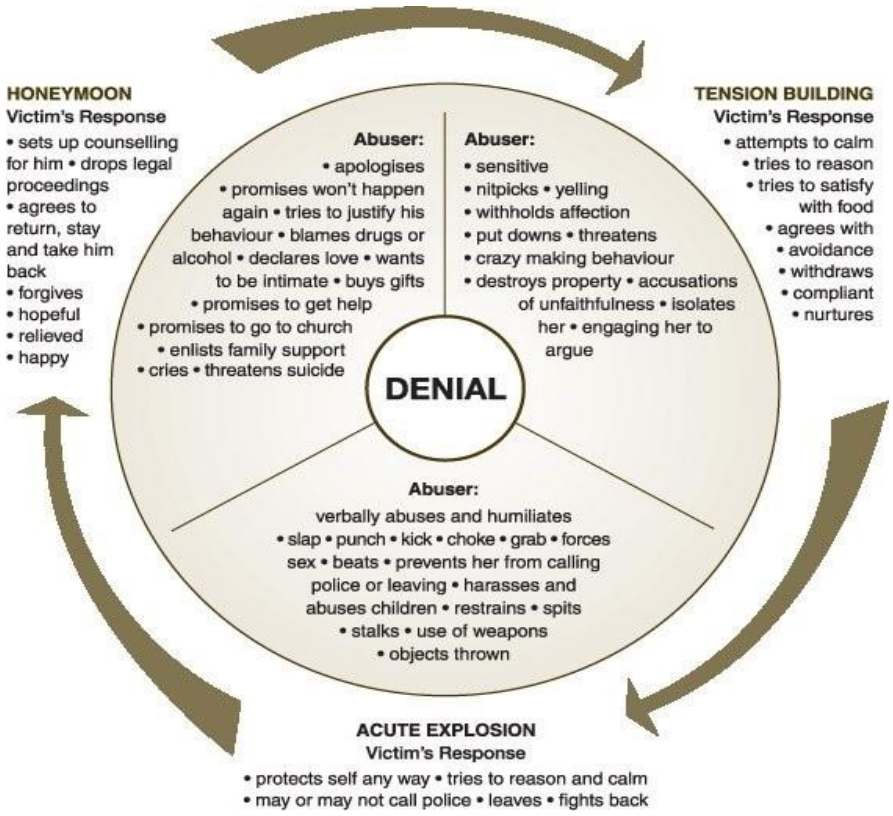
Unfortunately, as time passes, the "tension building" phase intensifies while the "loving contrition" phase becomes less intense. When comparing women who had left abusive relationships to those still living with the abuser, Walker discovered that "tension building" to "loving contrition" varied more dramatically for the former group. Women who stayed in the relationship reported greater "positive reinforcement" than those who had broken up, according to Walker. Often, the abuser becomes more affectionate in an attempt to win her back and becomes more violent if he fails (175).

Adolescents may endure more emotional and psychological abuse throughout the phase of tension-building, which can get worse as the pregnancy goes on. Due to the expectant mother's increased susceptibility, the acute battering phase, frequently characterized by physical violence, becomes particularly worrisome. Adolescents' physical abuse during pregnancy can seriously impact their health and the health of their unborn child. The honeymoon stage, typically viewed as a time of peace and regret in the cycle, may provide momentary comfort, but it can also feed the process by enticing adolescents back into the union in the hopes of a turnaround. Adolescents may be more receptive to the promises of transformation when pregnant because they may fear being alone or without support during this crucial time.

According to a study by Hoff (1990), the decision to leave an abusive relationship is complicated, and the circumstances and events that each woman experiences to make that decision are different. The Walker and Cycle of Abuse Model illustrates intimate partner abuse's several stages. Walker's research thus helps us recognize the psychological signs at each violent intimate partner relationship stage. The theory supports the present study's

findings by demonstrating a relationship between physical IPV during pregnancy, IPV severity, and health effects (176).

Figure 3.4.3: The Walker Cycle of Violence - developed in 1979 by Dr Lenore Walker



3.1.2.5. The Stockholm syndrome

Bejerot coined the phrase "Stockholm syndrome" in 1973 to describe the actions of three women and one male who were kept hostage in a bank vault in Stockholm, Sweden, for six days (177). Graham (1995) built the Stockholm syndrome theory on the psychology and actions of these groups, linking it explicitly to IPV. According to Graham (1995), the four predecessors of Stockholm syndrome—felt threat to survival, perceived kindness, isolation, and the perception of being unable to escape—were essential for its emergence (177) The abuser justifies violent behavior, suppressing their own, feeling the need to "get inside the

abuser's head" to understand how to appease the victim. Moreover, the victim expresses extreme gratitude for any small acts of kindness performed by the abuser. They frequently have post-traumatic stress disorder symptoms and view the world through the abuser's eyes (178) The symptoms of trauma bonding, which include unfavorable feelings towards potential rescuers, support for the motives and actions of abusers, and the inability to engage in behaviors that will help release or detachment from abusers, are what make Stockholm Syndrome applicable to the current study.

As Graham and Rawlings (1995) described, Stockholm Syndrome is a coping technique abuse victims use to help them cope with stressful experiences. Their findings suggest that some adolescent victims of IPV may become dependent on and emotionally attached to their abusive partners due to the emotional trauma they experience during IPV, particularly during pregnancy, because the power and control dynamics that are inherent to IPV can foster an environment in which adolescents may believe that their abusive partners are the only people who can provide them with support and protection (179).

3.1.3. Sociological theories

The sociological theories encompass Goode’s Classical resource theory and the ecological model.

3.1.3.1. Goode's classical resource theory

Goode's resource theory was the first sociological approach to violence(180). Goode's classical resource theory has proven to be a popular option for academics researching IPV across cultures. This argument suggests that IPV against women is more likely to occur in households where the men are less well off than their female counterparts. Men will use force or violence against women to maintain their dominance in the relationship, display their

masculine authority in the home, or assert control over women because they lack economic resources (180) Research has shown that assets like home wealth, occupational standing, and educational level are good indicators of IPV against women in non-Western civilizations. In other words, women are more likely to experience IPV if they have less or more wealth than their male spouses (181). Women who lack resources frequently rely on their male spouses for financial assistance. As a result, even though they are more likely to experience IPV, their ability to exit an abusive relationship is decreased (182).

The majority of the empirical data supporting sociological theories on partner violence are quantitative, cross-sectional, nationally representative survey data collected in various countries or small-scale studies. The assertions of sociological theoretical approaches are factual and quantifiable, such as the link between partner violence and low income and the impact of unrelated circumstances on established linkages (183). Sociological theories use pregnancy as an additional stressor on the couple's resources and relationship as well as a prospective condition that lessens their social isolation to explain partner violence during pregnancy. Instead of identifying specific risk and protective factors specific to pregnancy, sociological theories consider the impact of pregnancy when identifying risk and protective factors for partner violence (183).

Furthermore, according to Goode's idea, major life events like childbearing may make resource imbalances more challenging. Unplanned pregnancies can present issues for adolescents, who may deal with increased stress, financial pressure, and emotional turmoil. Conflicts within the relationship may intensify due to this added strain, possibly resulting in physical IPV. So that we can better understand how resource inequalities and the stress of pregnancy may contribute to physical IPV among adolescents in romantic relationships, Goode's classical resource theory provides a lens for our analysis. However, it is essential to understand that IPV during pregnancy is a complex issue driven by multiple personal,

interpersonal, and social variables, and Goode's theory is only one lens through which we might look at these dynamics.

3.1.3.2. Socio-ecological model

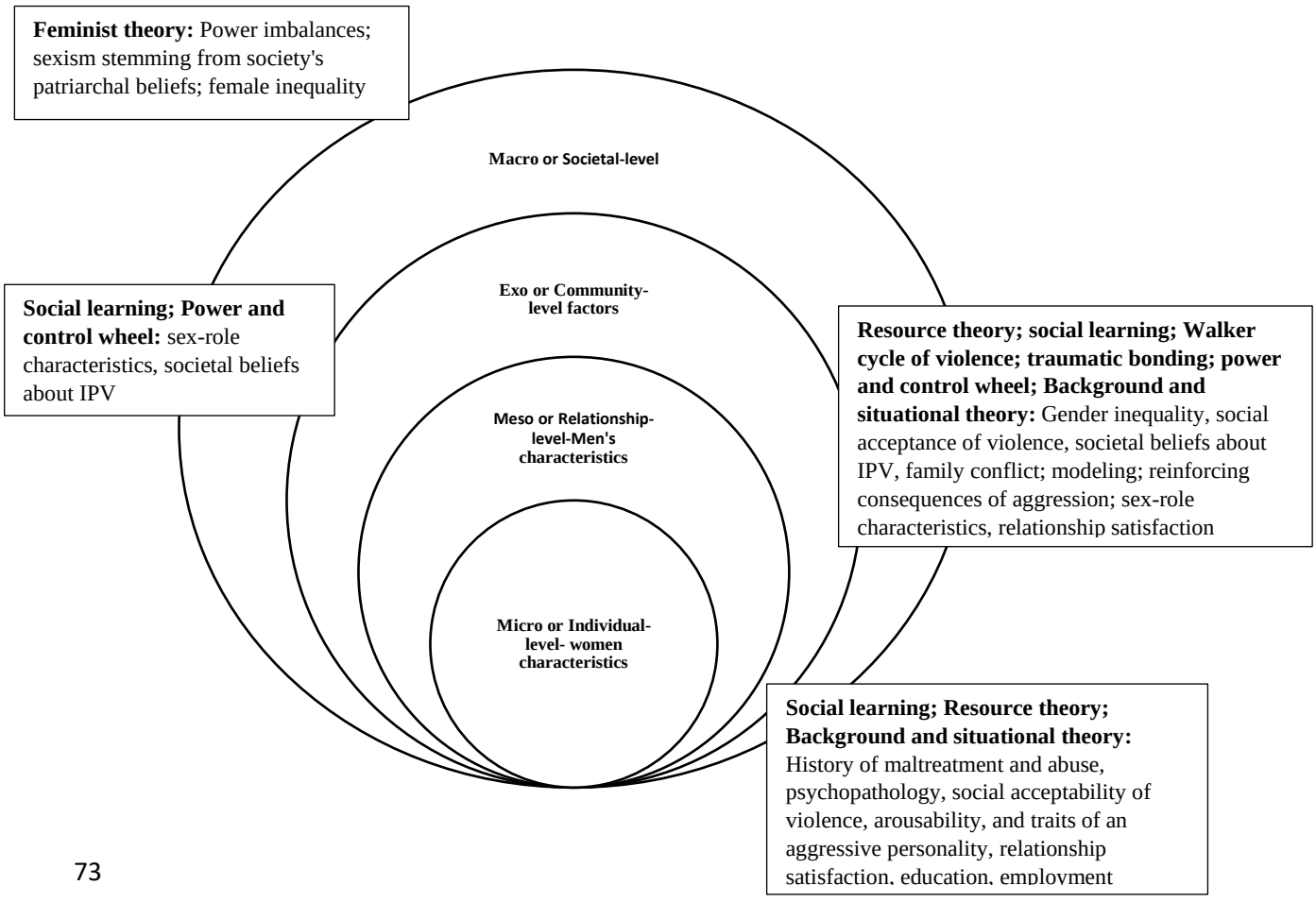
The WHO has proposed the ecological framework by Urie Bronfenbrenner (1977) to define violence as a worldwide public health issue (157,184). Feminist theory and research findings from several disciplines are combined in this framework to provide an explanation for the causes of gender-based violence in intimate relationships (185). Although the causes of violence have been well researched, the reality is that they are still very complex and differ from the environment (186). Reported risk factors related to IPV during pregnancy include more individual and family-related factors (187,188). Environmental factors at family and individual levels included living with their partner, payment of dowry, and those who underwent marriage ceremonies (189) strongly emphasize HIV status, history of violence, alcohol abuse, low socioeconomic status (SES), weak family support, and young age (67,190). Most studies not only examined IPV during pregnancy in adults at the individual level, omitting that violence is a complex and intergenerational reality that applies to every woman, even at a younger age. Different frameworks and theories attempt to explain partner violence during pregnancy. However, for this research addressing violence during pregnancy among adolescents, the ecological approach is the most essential as it considers all the environmental factors that favour the occurrence of violence and outlines marital dependency theory and Connell’s theory which emphasize how gender is socially constructed and how power operates within gendered relationships.

The ecological approach sees IPV as a complex phenomenon that results from the dynamic interaction of personal, interpersonal, social, and cultural elements that affect a person's propensity to use or experience violence (risk and protective factors); the preventive

methods that can be deployed to address these elements at each level (**Figure 3.1.3.2.**). These variables can be visualized as nested concentric rings within a bigger circle (191,192) as demonstrated by Lorei Heise and Ben Cisgali in their social norms in the dynamic framework (193) .

The socio-ecological model (SEM) of IPV during adolescent pregnancy emphasizes the interaction of these numerous elements. It highlights the requirement for multi-level treatments that target personal competencies, interpersonal dynamics, social norms, institutional responses, and societal structures. Comprehensive solutions that advance gender equity, provide resources and assistance, and improve people's ability to handle this pressing issue are needed to prevent and mitigate IPV during adolescent pregnancy.

Figure 3.1.3.2. The socio-ecological model and theory diagram drawn from Lori Heise social norms in the dynamic framework and adapted by the candidate



3.1.3.2.1. Micro or individual-level factors

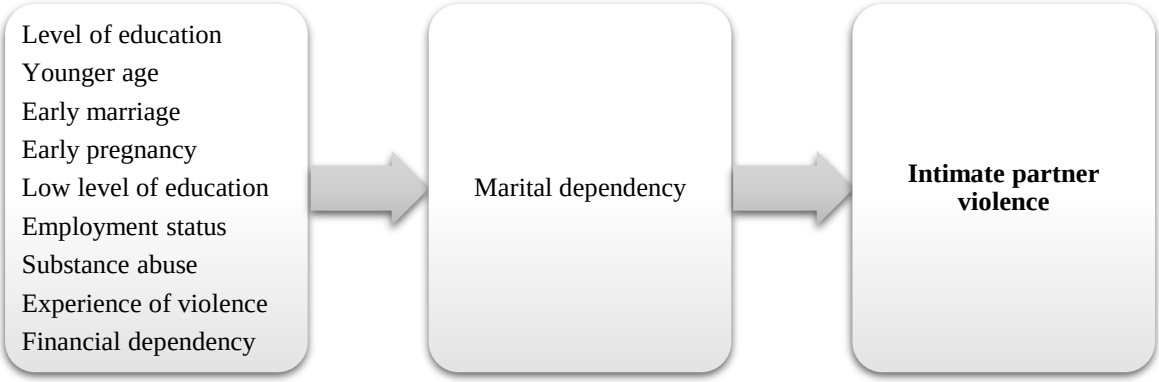
An individual who abuses or is abused has a distinct set of biological, psychological, and personal traits as well as a distinct life story, all of which have an impact on how they act and engage with others, including their intimate partner, the community, and society (184). Aside from demographic characteristics like education, age, and money, some individual-level risk factors for being abusive include having an absent or emotionally abusive parent, consuming drugs, and having witnessed or experienced physical or sexual abuse as a child (157) (**Figure 3.1.3.2.1.)**.

At the individual level, there is evidence to suggest that IPV is more common among women and girls from minority groups who had their first child at a young age, had their first sexual encounter at a young age and/or against their will, and who lacked a pro gender equality attitude (1,194). The age of women has also been linked to IPV, but research indicates that this association is context-dependent. Walton-Moss et al. (2005) discovered that younger women are at higher risk than older women using data from the United States (195). On the other hand, particularly for emotional and physical IPV, the association with age is best captured by an inverted U-shaped curve utilizing data from 36 countries (196). Findings also suggest that the IPV risks change when women's ages are combined with other demographic factors (196).

Resources are frequently justified as empowering and safeguarding against intimate partner abuse at the individual level (181). In fact, stress is linked to poverty and is thought to affect the severity of IPV. The frustration-aggression theory is the most prevalent psychological explanation of the relationship between poverty and IPV (197). Beyond how they affect wealth and income, employment and education shield against IPV. According to the WHO, female employment should be extensively encouraged to lessen physical and psychological IPV (198). In a large body of research, a negative correlation exists between

having a high level of education and being the victim or the abuser (181) According to Pierotti (2013), education may broaden horizons and increase exposure to international discourses that condemn partner abuse. It is also thought to influence behavior through identification and knowledge of the ethical foundations of society (199). Friedman, Kremer, Miguel, and Thornton (2011) take advantage of a randomized scholarship program that increased secondary education for girls in Kenya and discover a decline in the acceptance of wife-beating (200).

Figure 3.1.3.2.1. Individual drivers of IPV – developed by the candidate



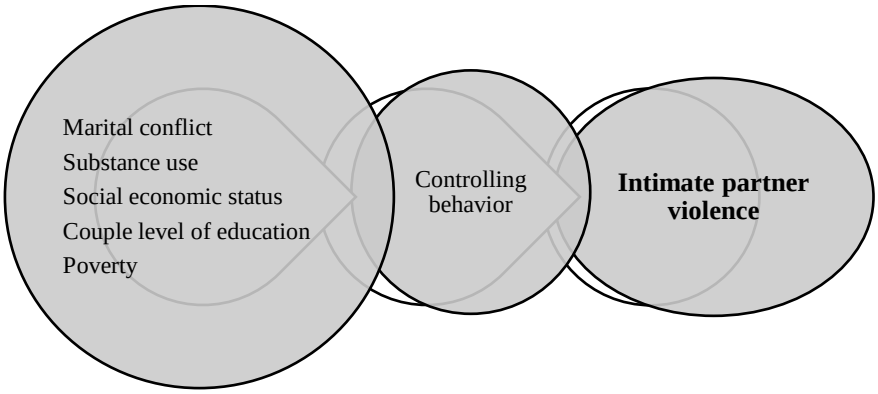
3.1.3.2.2. Meso or relationship-level factors

Close interactions with partners, family members, and peers make up the second level of influence, which can affect a person's propensity to use or suffer violence (184). It has been determined that a number of relationship-level characteristics, particularly those related to family composition and functioning, are risk factors for the emergence of IPV. These include marital conflict, particularly in relationships with asymmetrical power structures, male economic and decision-making authority in the family, and male control of income and resources (157) (**Figure 3.1.3.2.2.)**. Regarding the personal connection, some research has discovered that various partner traits—young age, low education levels, regular alcohol

intake, and poverty—correlate with IPV. Stockl et al. (217) validate these findings using data from SSA. The aforementioned characteristics, however, reflect the woman's condition in relation to her boyfriend rather than being risk factors in and of themselves. For instance, Rapp et al. (2012) found that in India and Bangladesh, lower IPV chances are seen among couples with the same degree of education (201). Similar findings for the Tanzanian instance presented in Abramsky et al. (2019) support the hypothesis that differences in a woman's partner's economic level increase her likelihood of IPV (202). According to research, characteristics exacerbating IPV in a woman's relationships with her peers and family include an uneven division of housework, crowding, and a lack of social support systems (196).

The marital dependency approach provides an additional perspective to this level, including causes of GBV at the relationship level, family, and society in general (203–205). These theories will help to understand how physical violence during pregnancy exposed young girls to adversities that could impact their lives or those of the unborn children within a context of poverty, lack of resources, and a patriarchal society. From the marital dependency approach, economically disadvantaged women and dependents are at risk of experiencing IPV (203). This theory will help understand the relationship between economic resources and dependence and how they increase or decrease adolescents' likelihood of experiencing physical IPV during pregnancy. This theory revealed the need to empower women to stand up for themselves by leaving their partners (206). Although women's economic and social empowerment has been established to address poverty (204), they have also been found to improve help-seeking behavior, antenatal attendance, and contraceptive methods (203).

Figure 3.1.3.2.2. Relationship drivers of IPV – developed by the candidate



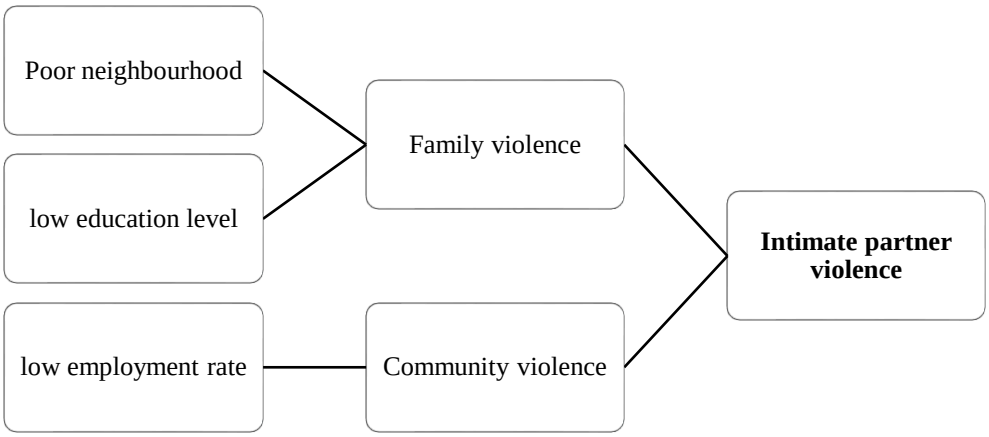
3.1.3.2.3. Exo or community-level factors

The community, the third level of variables, consists of neighborhoods, schools, and workplaces that provide the framework for people's lives and interpersonal connections (184). For instance, research at this level of influence has shown that communities with significant residential mobility, a high flow of people moving in and out, high population densities, and a lack of resident cohesion are linked to greater levels of violence. Poverty and unemployment rates in the community and local drug and gun markets have all been recognized as risk factors for perpetrating violence or being its victim (157). Findings show that women living in urban areas, communities with high crime rates, communities with a large number of immigrants, unfavorable socioeconomic conditions, and/or gender inequitable conditions are more likely to experience IPV (207).

A substantial correlation between IPV and community-level characteristics, such as exposure to neighborhood violence and poverty, has also been seen in numerous research (**Figure 3.4.7.)** (208,209) Interpersonal violence, especially IPV, is thought to be a valid negotiating weapon since it is considered that violent cultures lack cohesion (210) According to Gelles' social structural theory, IPV is a conditioned reaction to "socially structured stress," or stress related to social circumstances, including poor income and education levels, illiteracy, and unemployment. The disparity between socioeconomic classes is a stressor

that marginalized people encounter, which may make them more violent (211). According to this theory, a study found that when the proportion of unemployed, working-class, and poor individuals expanded, and the number of high school graduates within a neighbourhood decreased, the rate of IPV increased (208). Therefore, it is plausible that men's actual threat and use of violence against their female partners will increase due to views about IPV interacting with exposure to neighbourhood violence.

Figure 3.4.7. Community drivers of IPV – developed by the candidate



3.1.3.2.4. Macro or societal-level factors

Societal variables comprise the final and fourth levels of the hierarchy of factors. The most constant risk factors at the societal level are poor government, a high crime rate, social unrest, and a high prevalence of sexist attitudes and beliefs (212,213). At this level of analysis, the patriarchal foundations of IPV and other oppressive institutions are revealed (**Figure 3.1.3.2.4)** (184).

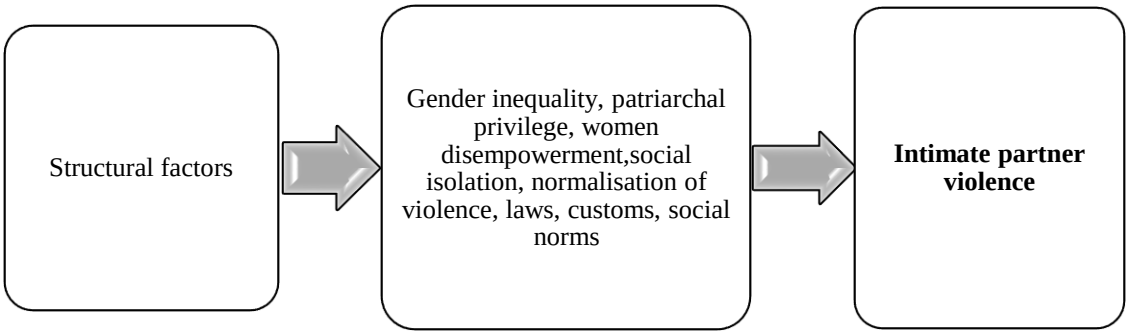
The patriarchy

IPV has a long history, and patriarchy, which justifies male domination over women, is a long-standing social phenomenon. According to Dobash and Dobash (156), the term "patriarchy" refers to a system of principles and assumptions that support male dominance over women. Because it maintains the emphasis on authority, gender, and power, the concept of patriarchy has the capacity to theorise violence against women (214). Gender imbalance in marriage and the family results from patriarchy, and patriarchal practices are frequently associated with IPV that can be seen as one-way men exert power over women (156).

The term "patriarchy" has been developed by proponents of gender and feminist ideas to include theories about how the concept of patriarchy affects broad societal structures. They show how women have always been considered inferior to men and at risk of male violence in most male-dominated communities and throughout history (215,216). According to Strauss and Hunnicutt, there are gender differences in the violent victimisation of women and differences in the contexts in which these incidents occur. As an illustration, women are more likely than males to be murdered by an intimate partner. The historical backdrop of male authority, where social laws and policies have discriminated against women and subjected them to the legal, cultural, and social approval of violence against them, is mainly responsible for different perspectives on IPV (215,216).

In summary, broad societal variables, such as the laws, customs, and social norms that regulate individual behavior and social injustices amongst groups, can encourage or discourage violence at the community, interpersonal, and individual levels. For instance, social isolation has been recognised as a societal factor connected with violence. Women who have been socially isolated from their social network might not have easy access to resources of support and aid, rendering them susceptible to IPV and its effects (157).

Figure 3.1.3.2.4. Societal drivers of IPV – developed by the candidate



3.2. The socio-ecological approach of IPV during pregnancy among adolescents

The ecological approach has been frequently used in research on violence, notably in adolescent violence and revictimisation experiences. Just as community violence has significantly increased individual violence, healthy family functioning significantly reduces violence (217). Research has shown that African American youth are more likely to be exposed to community violence when they live in high-poverty areas, which can affect their development of appropriate parenting techniques and violent behavior (218). Nevertheless, the community also plays a crucial role in preventing violence (219). For instance,it has been demonstrated that solid community ties considerably lessen the impact of childhood emotional abuse on a person's likelihood of experiencing physical IPV as an adult (220). Researchers have tried to pinpoint potential risk factors for IPV involvement in adolescents precisely. The demographic characteristics (gender, place of residence, age, education level, and marital status), the individual-level factors (mental illness, substance misuse, etc.), and the family system elements (child maltreatment, parental IPV, adverse childhood experiences) are among the risk factors.

Reported risk factors related to physical IPV during pregnancy include more individual and family-related factors (188,221). Most studies not only examined IPV during

pregnancy in adults at the personal level, omitting that violence is a complex and intergenerational reality that applies to every woman, even at a younger age. Among all women of a reproductive stage, IPV during pregnancy has been associated at the individual level with the level of education, place of residence, tolerance of violence, history of violence and abuse, alcohol use, and unemployment. At the relationship level, the factors include being a housewife, alcohol intake, relationship duration, lack of support system, isolation, and polygamy marriage (222–225). Factors associated with IPV during pregnancy at the individual level include unemployment, childhood trauma (226,227), and substance use. In contrast, relationship and community factors include the perception of violence as an expression of masculinity, violence in the community, lack of support, quarrelling with the husband (228), food insecurity, polygamy, gender norms, husband cruelty, the experience of other forms of violence (229).

Regarding IPV in adolescents, the research has found it higher and likely to be even higher during pregnancy. Factors associated with adolescents' physical violence during pregnancy are similar to those of adults, who seem to experience it more than adults due to vulnerability. The factors associated with adolescents' experience of IPV during pregnancy include alcohol and tobacco use, condom non-use, multiple sexual partners, initiating physical and sexual violence, higher stress in the city (230), family violence, and many sexual partners (231), early marriage, unplanned and unwanted pregnancies (232). The occurrence of physical violence during pregnancy by adolescents could be explained by their younger age, which creates expectations they were not prepared to deal with (233).

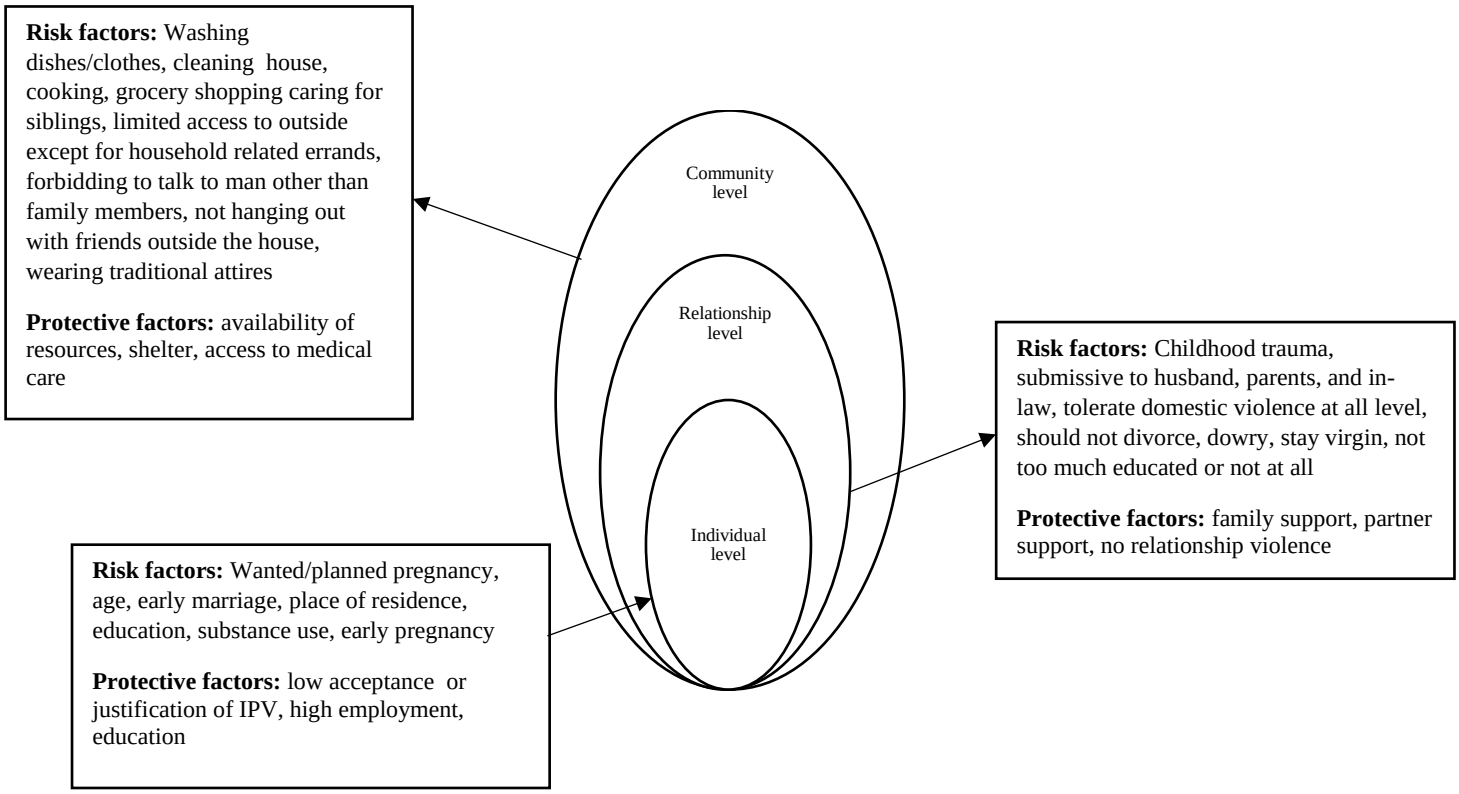
Traditional gender norms and expectations in patriarchal society frequently lead to normalizing and accepting violence to exercise control and dominance over others, particularly women. Adolescents may internalise these standards, encouraging IPV in their interpersonal interactions. Girls may be socialised to accept or tolerate abusive behaviours,

whereas boys may learn that dominance and aggression are desirable attributes. In addition, patriarchal socialisation frequently maintains unequal power relations by encouraging male dominance and control while expecting female submission and compliance. These power disparities can foster IPV because the subordinate partner may feel trapped and powerless, and the dominating partner may feel entitled to dominate and abuse their partner. It is necessary to question and destroy the patriarchal norms and systems supporting violence to address IPV in adolescents. This entails cultivating respectful, nonviolent relationships, advocating for gender equality, and educating people about healthy relationship dynamics. It is critical to foster respect, consent, and communication within partnerships and to provide boys and girls the tools they need to reject and question traditional gender norms.

Different frameworks and theories attempt to explain partner violence during pregnancy. However, for this research addressing violence during adolescent pregnancy, the ecological theory will be used since it considers all the individual, relationship, and community environmental factors that favour physical violence during adolescent pregnancy. This theory will be used as the basis of this thesis to understand better how physical IPV during pregnancy exposed young girls to adversities that could impact their lives or those of the unborn children within a context of poverty, lack of resources, and a patriarchal society. Environmental factors at family and individual levels included living with their partner, dowry, and those who undergo marriage ceremonies (189). Other studies strongly emphasise HIV status, history of violence, alcohol abuse, low socioeconomic status, weak family support, and young age (68,234). Evidence regarding physical IPV during pregnancy in adolescents in SSA is scarce, and there is also a lack of evidence examining IPV during pregnancy as a multidimensional phenomenon happening at different levels within their environment. Following the empirical studies on violence among all women of reproductive age (15-49), the DHS provides additional risk and protective factors at three levels for

adolescents, as illustrated in figure 3.2 below **drawn from existing literature on risk and protective factors associated with IPV during pregnancy among**. Therefore, studying physical IPV during pregnancy at different levels could better inform programs that deal with gender-based violence during and outside pregnancy from a younger age.

Figure 3.2. Adolescents (15-19) experience of physical IPV during pregnancy in the literature – adapted from the CDC Social-Ecological Model: A Framework for Prevention



3.3. Limitations of existing IPV theories

Although there are certain drawbacks, the current IPV theories have the potential to contribute considerably to our understanding of physical IPV in adolescent pregnancies. Even though many theories concentrate on human or interpersonal variables, they frequently ignore broader structural and environmental factors that drive IPV among adolescents. Additionally, it's possible that current theories do not adequately account for

the particular dynamics of IPV between adolescence and pregnancy. This highlights the need for a more thorough approach to creating theory.

3.3.1. Research inconsistency

There are several drawbacks to current IPV theories. The absence of or inconsistent empirical support for some theoretical principles has been noted as a major drawback for some of the existing IPV theoretical hypotheses. Findings in the empirical literature have partially supported both the feminist and power theories, and subsequent research has failed to support specific aspects of either theory. For instance, a study evaluating the prevalent approaches to IPV through an international literature review and supporting the feminist theory suggests a connection between patriarchal views and the prevalence of IPV (235). However, other researchers have found no evidence of such a connection (170). Early study have discovered less IPV in households where the spouse upheld more traditional, patriarchal norms. However, only one conducted in Buffalo (USA) in 1996 was available to inform this thesis (170). The researchers found higher levels of male-to-female violence than in egalitarian or female-dominated cultures if strong patriarchal norms directly result in male-initiated partner aggression (170).

3.3.2. Complexity of IPV perpetration

The primary shortcoming of current IPV theories is their inability to appropriately account for the complexity of IPV perpetration. Each of the aforementioned theories names a collection of variables, such as sociocultural influences, relationship characteristics, or early development factors, and each of these theories has received some level of empirical backing. However, each falls short in its ability to foresee IPV perpetration and explain inconsistent results thoroughly. Feminist theory, for instance, is inconsistent in explaining why some men

with traditional sex-role values do not physically abuse their partners or why there is no correlation between IPV perpetration rates after batterers' treatment and changes in attitudes toward women (169). Similar criticisms have been levelled at the social learning model for failing to recognize that many victims and abusers claim they did not see or experience abuse when they were young and that many victims of abuse as children never go on to become adult abuse victims or abusers of intimate partners (236). While there have been recent improvements to IPV theory and research to address the apparent heterogeneity of IPV cases, such as the development of batterer subtypes (237) and the ecological model that captures some solutions to overcome IPV, further work is still needed to understand the complexity and diversity of IPV perpetration.

3.3.3. Methodological approach

The lack of a theoretically derived, systematic technique for choosing and adjusting the inclusion of variables into a predictive model of IPV perpetration is another weakness of existing IPV theories (169,170). Current IPV theory and research significantly influence the creation of new IPV theories. Although it is crucial for theoretical development to consider prior research, this tactic can also limit the theory's versatility by limiting the conceptualisation's scope to a certain IPV situation. As a result, incorporating empirical findings that uncover novel variables relevant to comprehending IPV perpetration into the theory at hand may be difficult. It might be challenging to integrate empirical data showing that particular personality traits and psychopathology may be linked to an increased risk for IPV perpetration into a specific theory, such as the feminist or power theory, which does not consider these factors as causally related variables (169,170). Additionally, it could be challenging to adjust the current theory to account for empirical results that in some way go against or contradict its premises without significantly altering or demolishing the theoretical

framework. The feminist theory, for instance, has come under fire for failing to effectively explain female IPV perpetration and IPV in same-sex relationships, where the "victim" and "perpetrator" roles are more ambiguous and perhaps less affected by traditional sex-role assumptions (238).

3.3.4. Inability to improve IPV-related programmes and interventions.

Numerous IPV theories currently in existence mention static and distal factors like genetic predisposition, early developmental experiences, attachment style, and personality traits (239,240). These factors may be more complex to alter and, as a result, may not be as helpful to target in an IPV prevention or treatment setting. For instance, current IPV theories cannot significantly increase the clinical efficacy of IPV preventive and treatment programs. Even though many of these theories have considerably impacted physical IPV prevention and treatment programs, these initiatives have not been very successful in lowering IPV perpetration rates over time (239,240). It is possible that the field's limited theoretical and empirical understanding of proximal factors related to IPV episodes limits the efficacy of these programs and IPV prevention programs, even though the small effect sizes in perpetrator treatment programs may be at least partially attributed to outcome studies' methodological limitations, high attrition rates, and difficulties converting theory into clinical practice (239,241).

3.4. Chapter Summary

This chapter explored various theories that relate to IPV among adolescents, with a particular focus on IPV during pregnancy. These theories include sociocultural theories like feminist theories and the power and control wheel, psychological theories like social learning theory and traumatic bonding theory, and sociological theories like Goode's classical resource

theory. I bring it together within the umbrella of the SEM. These theories shed light on the complex factors contributing to IPV and its effects during pregnancy. However, existing theories have limitations, including inconsistencies in research findings, the complexity of IPV perpetration, methodological challenges, and limitations in improving IPV-related programs and interventions. The chapter emphasised the need for a more comprehensive approach to understanding and addressing IPV during adolescent pregnancies, considering individual, relationship, community, and societal factors within a patriarchal context. To further understand the experience of IPV during pregnancy by SSA adolescents, a specific methodological approach was used. In the next chapter, I present the paradigm supporting the choice of the method used for this thesis, a description of the research design, study population, sampling procedures, data collection and analysis strategy, and ethical considerations.

4. CHAPTER FOUR: RESEARCH METHODOLOGY

This chapter focuses on the methods used for data analysis and interpretation to determine the PhD's conclusions. This study's two primary data sources are the DHS and peer-reviewed papers for the systematic review.

A systematic review and DHS analysis were used to have a comprehensive overview of physical IPV during pregnancy in SSA. The systematic review provided us with evidence on research on IPV during adolescent pregnancy to establish the existing knowledge on IPV during pregnancy among adolescents in SSA. The DHS analysis offers comprehensive data on the prevalence, severity, and health outcomes of physical IPV during pregnancy and a nationally representative prevalence rate. However, due to the DHS's general focus on IPV, the measurement of physical IPV during pregnancy and its information on pregnancy-specific health outcomes is limited.

Before presenting the details of each methodological approach that led to the results, I present the aim and research objectives. This is followed by a discussion of the methodological paradigm – evidence synthesis and quantitative approach.

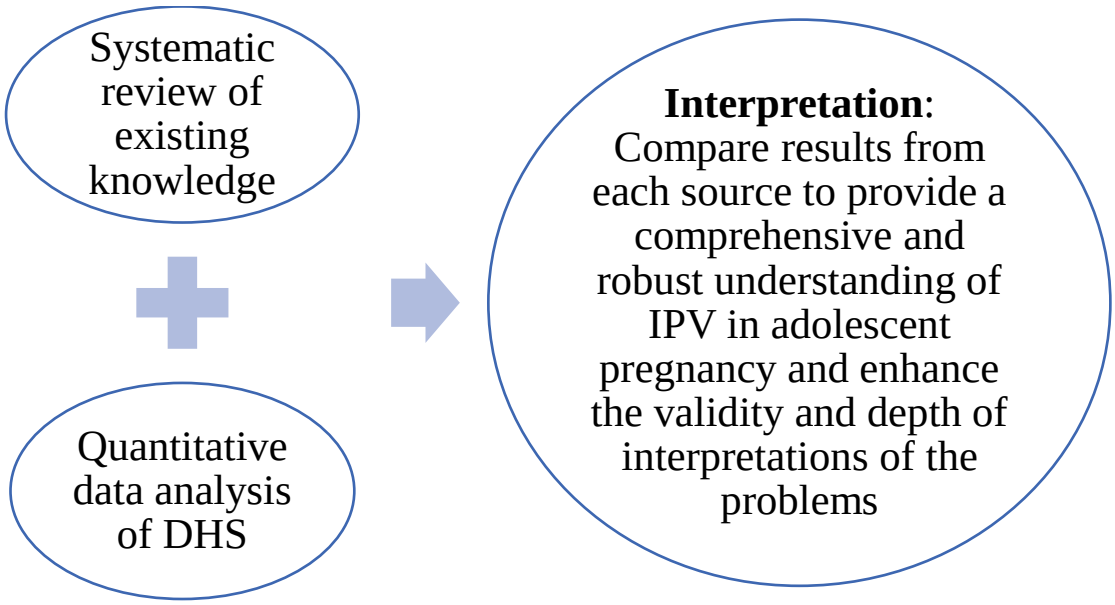
4.1. The methodological paradigm: Concurrent triangulation design as a mixed methods approach for my PhD

Two methods including quantitative and systematic review has been combined in a single study in order to yield stronger conclusions than utilising either approach alone (242). Put differently, a systematic review and quantitative analysis papers contributed to a comprehensive understanding of the subject by incorporating insights from observations and interviews with data on the prevalence of features in a population from surveys. By offering a more comprehensive picture that can improve the description and comprehension of the phenomenon, these two methods seek to provide a richer and deeper knowledge (242).

My study, which employs a systematic review methodology alongside data analysis from the DHS, can be considered a Concurrent Triangulation Design although I did not collect any qualitative data other than the ones included in the systematic review. Concurrent Triangulation Design is an approach within the mixed-method designs that involves collecting both qualitative and quantitative data concurrently or at the same time, then analysing them separately, and finally comparing or integrating the findings to corroborate, validate, or provide a comprehensive understanding of the research problem (243). In my case, conducting a systematic review involved gathering and synthesizing qualitative evidence from existing literature related to IPV during pregnancy among adolescents in SSA.

The systematic review played a pivotal role in informing the quantitative analysis through an iterative approach that integrated both methods seamlessly. The systematic review provided a solid foundation by synthesizing existing literature, identifying gaps in knowledge, and highlighting key research findings related to IPV during pregnancy among adolescents in SSA. This informed the development of research questions and hypotheses for the quantitative phase. The systematic review findings guided the selection of variables, measurement instruments, and analytical approaches for the quantitative study. For example, the prevalence rates and health outcomes identified in the systematic review informed the research questions and the statistical models used in the quantitative analysis. By integrating the systematic review findings into the quantitative analysis iteratively, I was able to triangulate data from multiple sources, enhance the validity and reliability of the study findings, and generate comprehensive insights into the prevalence, determinants, and consequences of IPV among vulnerable adolescents in SSA.

Figure 4.1: Concurrent Triangulation Design used for this study (*adapted from Creswell et al., 2009*)



4.2. Rational for the systematic review

IPV during pregnancy among adolescents in SSA is a critical public health issue with significant implications for maternal and child well-being. Despite growing awareness, existing research lacks comprehensive synthesis and systematic analysis. A systematic review offers a robust methodology to amalgamate existing evidence, address gaps, and provide an in-depth understanding of the prevalence, determinants, consequences, and potential interventions related to IPV during pregnancy among adolescents in SSA (244).

Higgins and Munn (245,246) have highlighted the significance of systematic reviews in health research, advocating for rigorous methodologies to synthesise evidence effectively. Adopting their guidance, a systematic review of IPV during pregnancy among SSA adolescents provides a structured and transparent approach to collecting, assessing, and synthesising available literature. By utilising their recommendations, including the PRISMA

guidelines for conducting systematic reviews (247), this study will ensure methodological rigor, reducing biases and enhancing the reliability and validity of the findings.

This systematic review aims to elucidate the prevalence rates of IPV during pregnancy among adolescent girls in SSA, identify risk factors associated with IPV, and explore its impact on maternal and child health outcomes. By following Higgins and Munn's methodological framework, this review employed comprehensive search strategies across five databases, adhering to predetermined inclusion and exclusion criteria to ensure the selection of relevant and high-quality studies.

Furthermore, employing a systematic review, as suggested by Higgins and Munn, enabled the quantitative and qualitative synthesis of data from the nine selected studies, providing an overall state of knowledge of IPV during pregnancy among adolescents in SSA including potential moderators or factors and health outcomes contributing to variations across studies. Additionally, this review critically appraised the quality of included studies using appropriate tools (248), ensuring robustness and credibility in drawing conclusions and making recommendations for future research and interventions.

In conclusion, a systematic review of IPV during pregnancy among adolescents in SSA, guided by Higgins and Munn's methodological insights, contributed to consolidating evidence, informing policy and practice, and fostering a deeper understanding of this critical issue.

4.3. Rationale for the quantitative method approach

My dissertation research focused on exploring the prevalence and dynamics of physical IPV during pregnancy among adolescents in SSA, utilizing data from the DHS. My study aims to contribute to the understanding of this critical issue, shedding light on the

experiences of adolescent mothers facing IPV and its implications for maternal and child health outcomes in the region. As per Creswell (2009), employing quantitative methods in this research allows for systematic data collection and objective measurement, enabling precise assessment of the prevalence and patterns of physical IPV among the 2289 ever-pregnant adolescents included in the survey (242). This aligns with Bryman's (2016) emphasis on the generalizability of findings, which is particularly important in understanding the broader implications of physical IPV among this demographic in SSA (249).

Moreover, Johnson and Christensen et al. highlight the significance of quantitative analysis in educational research, emphasizing its empirical investigation and statistical rigor, which will be pivotal in uncovering associations related to physical IPV during pregnancy with lifetime physical violence, EBF, and pregnancy termination among adolescents in the specific context of SSA (250). Trochim and Donnelly (2008) further underscore the importance of quantitative methods in generating reliable evidence through systematic procedures and statistical inference, a crucial aspect in examining the prevalence and implications of physical IPV among adolescent pregnant women in this region. My dissertation aims to investigate these dimensions by leveraging quantitative methods to provide a comprehensive understanding of the prevalence, severity, and health implications of physical IPV during adolescent pregnancy in SSA.

4.4. Research method objective 1: Systematic review of intimate partner violence during pregnancy among adolescents living in Sub-Saharan Africa

The systematic review aimed at providing and overview of the available knowledge around IPV during pregnancy among adolescents living in SSA, including prevalence and health outcomes. This section presents the systematic review process that served as the first paper of this thesis.

4.4.1. Inclusion criteria and exclusion criteria

The inclusion criteria are (1) studies focused on adolescents (aged 10-19 years) who have experienced physical, sexual, and psychological violence during pregnancy; 2) studies from SSA; 3) quantitative and qualitative peer-reviewed studies with data collected from pregnant or ever-pregnant adolescents; 4) studies published in English in a scientific peer-reviewed journal between 2000-2021. We excluded reviews, letters, editorials, dissertations, books, studies conducted in humanitarian contexts, and non-English studies. The search was conducted until February 2022, and the review was registered with the Prospective Registry of Systematic Reviews (PROSPERO) number CRD42022320144.

4.4.2. Search strategy

Five health and social science databases were systematically searched to obtain studies: Ovid Medline, CINAHL, Web of Science, Cochrane Library, and Africa Wide. Independently, two reviewers extracted articles and screened abstracts after they were imported into Rayyan (251), a systematic review management platform. After resolving any discrepancies, an extraction sheet was created in Excel to extract the information for quantitative and qualitative articles. The following search terms were used: domestic violence, spouse abuse, intimate partner violence, physical abuse, sex offence/s, rape, IPV, spousal abuse or dating violence, pregnancy, gravidity, pregnancy in adolescence, pregnancy outcome, unplanned pregnancy, unwanted pregnancy, sub-Saharan Africa, Africa south of the Sahara, adolescent, teen, teenager, and underage (Appendix D: Search terms).

After implementing the database search, the systematic review followed a rigorous screening procedure to identify relevant studies. Initially, titles and abstracts were screened based on predefined inclusion and exclusion criteria. Studies that met the criteria proceeded

to full-text screening, where detailed assessments were conducted to determine their eligibility for inclusion in the review. Any discrepancies or uncertainties during the screening process were resolved through discussion and consensus among the reviewer. Following the screening process, data extraction was performed systematically from the selected studies. Data extraction involved capturing key information such as study characteristics, participant demographics, intervention details, outcomes of interest, and methodological quality indicators using an excel sheet to ensure consistency and accuracy in data extraction across all included studies.

To assess the risk of bias in the included studies, a methodological appraisal was conducted using the Joanna and Briggs Institute's critical appraisal tool. This assessment involved evaluating various aspects of study design, conduct, and reporting that could potentially introduce biases and affect the reliability of the findings. The risk of bias assessment was performed independently by two reviewers, and any discrepancies were resolved through discussion and consultation with the supervisors if necessary. Finally, a synthesis method was employed to analyze and interpret the findings from the included studies. This synthesis involved summarizing the extracted data, identifying patterns or themes across studies, and synthesizing the results to draw meaningful conclusions.

4.5. Research objectives 2&3: prevalence severity associated with physical intimate partner violence during pregnancy

The best data source to inform us of physical IPV during pregnancy in SSA countries remains the DHS. Since 1984, the DHS has been conducted in more than 80 countries with an initial focus on providing information to the United States Agency for International Development (USAID) and countries on issues related to fertility (252). Other modules

covering sexual behaviours and other behavioural modules and biomarkers have been included over the years, making it the most significant national representative survey (253).

4.5.1. Study design

Information was gathered from all completed population-based surveys conducted between 2017 and 2021 as part of the DHS initiative. We used cross-sectional household data from the DHS to conduct a secondary analysis and look at trends by age and country to determine the prevalence of physical IPV among adolescents. The DHS runs every five to six years across various countries, primarily in LMICs. These surveys use standardized procedures and questionnaires and cover multiple subjects, such as demographic information, reproductive, maternal, and pediatric health, sexual behavior, and nutrition (254).

A standardised set of questions on DV was created in the late 1990s, and most countries now include it in the DHS. All the countries chosen for this study collected data on the frequency of physical abuse during pregnancy. Each country's nationally representative household samples are used to administer the surveys to eligible women. Data on the women's backgrounds, reproductive and birth histories, family planning, maternity history, child immunization, child health and nutrition, marriage and sexual activity, fertility preferences, husband's background, and knowledge and behaviors regarding HIV as well as other health issues were collected using the standard woman's questionnaire. Census enumeration regions are chosen in the first stage of a multi-stage sample selection process with probability proportionate to size. Households are chosen at random from a comprehensive list of households within the selected enumeration zones.

4.5.2. Questionnaire design

To ensure confidentiality and safety, the DHS questionnaire was completed by one randomly eligible woman in each household using the WHO Violence Against Women ethical guidelines for conducting DV research (69). Interviewers were recruited and specially trained to administer the DV survey. The training includes ensuring confidentiality privacy, and building rapport with the respondent (19, 20).

An affirmative answer to the following question constituted physical IPV during pregnancy: "Has anyone ever hit, slapped, kicked, or done anything else to hurt you while pregnant?". Those who said yes were asked about the perpetrator, including husband, spouse, former partner, current boyfriend, and former boyfriend (Figure 1). All the perpetrators cited above will be referred to as intimate partners for research purposes.

The severity of lifetime physical IPV was measured by reported physical injuries resulting from the husband's acts and the reported level of physical IPV according to the WHO classification of severity of violence (1). The reported physical injuries were measured by at least one positive response to (1) if a woman ever had eye injuries, sprains, dislocations, or burns; (2) had deep wounds, broken bones, teeth, or any other serious injury as a result of IPV. The reported severe physical IPV was measured by at least one affirmative answer to the following three questions that asked whether respondents had ever been: (1) kicked or dragged; (2) strangled or burned; (3) threatened with a knife/gun or other weapons by a husband or any other current or previous male partner in the last 12 months preceding the survey.

To derive EBF, we use the WHO-recommended indicators (256) within an hour of birth. EBF refers to the proportion of infants who received breastmilk exclusively in the first six months. We categorize them as exclusively breastfed infants under six months of age who received no solid, soft, or semi-solid foods from their children the day before the interview.

To assess pregnancy termination**,** women were asked to answer "yes" or "no" to each item question if they had ever had a pregnancy that terminated in a miscarriage, abortion, or stillbirth. Adolescents who responded with affirmative responses to any question on miscarriage, induced abortion, or stillbirth were considered to have terminated a pregnancy.

An affirmative answer to any of the questions above was considered as having experienced one of the outcomes. Adolescents who answered "yes" were coded as "1" and "no" as "0". However, due to an inability to determine whether or not the severity of reported physical violence and injuries by intimate partners also occurred during pregnancy, we consider all the reported severe acts of IPV as occurring in their lifetime.

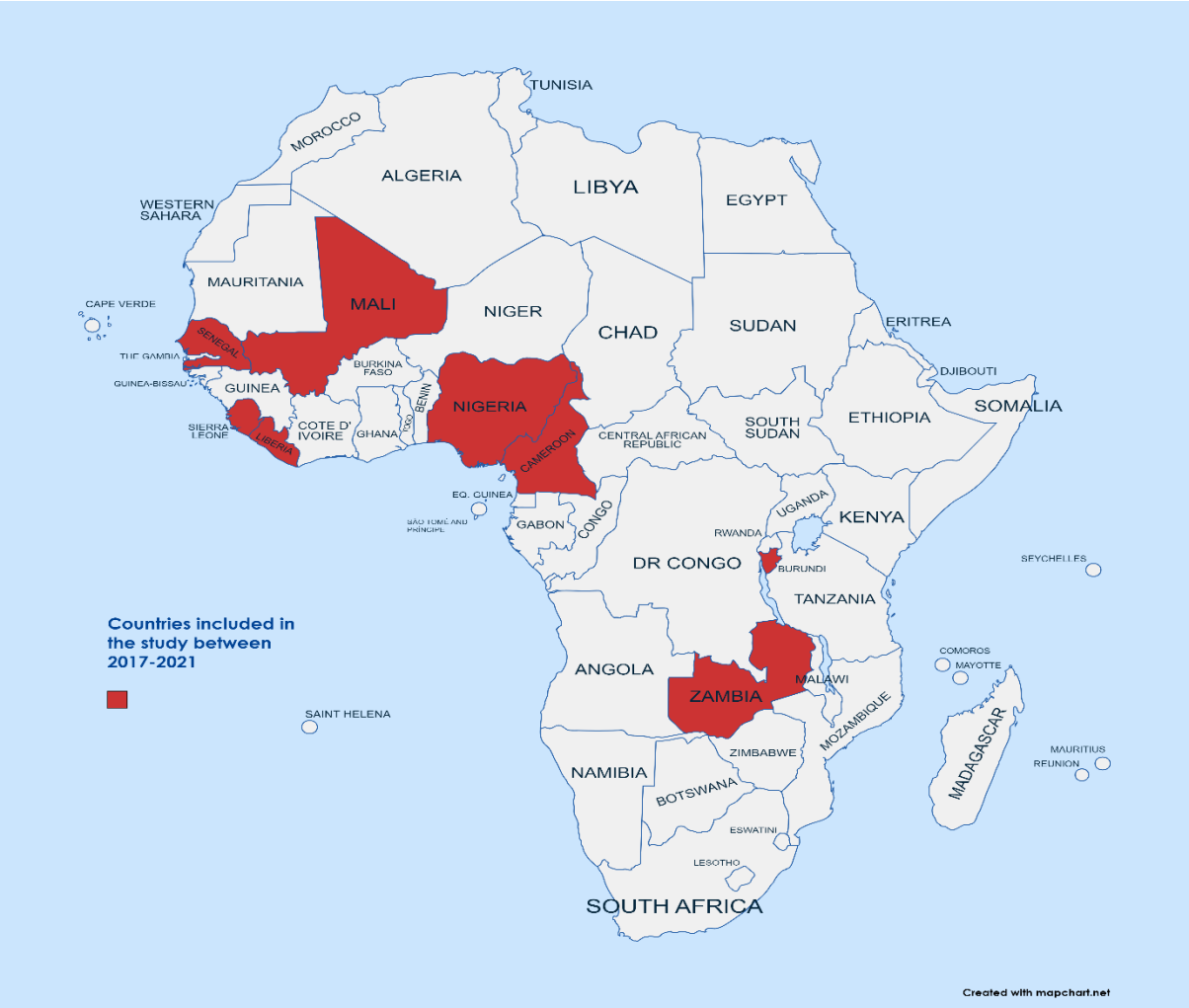
4.5.3. Study population and setting

The nationally representative sample of 126,236 women between 15-49 years of age selected for this study included 47,676 women selected and interviewed in the DV module, out of which 8095 were adolescents. Among the selected and interviewed women, 38,869 had ever been pregnant, 10,159 were never in a union, 33,693 were currently in a union, and 3,824 were formerly in a union. Because the current study concerned adolescents' experience of physical IPV during pregnancy and their lifetime, the sample was further restricted to 2289 ever-pregnant adolescents from eight SSA countries, including Burundi, Cameroon, Liberia, Nigeria, Senegal, Mali, Sierra Leone, and Zambia **(table and figure 4.5.3).**

TABLE 4.5.3. Sample overview of all ever-pregnant adolescents selected and interviewed for the domestic violence module

Sample of all ever pregnant women by country	Survey years	The number of women sampled in the DHS	Number of women selected and included in the DV module	Number of adolescents included in the DV module	Number of ever-pregnant adolescents included in the DV module and used in the analysis
Burundi	2017	17,269	10,188	1,787	197
Cameroon	2018	10,656	3,290	690	229
Liberia	2019	8,065	3,120	533	235
Mali	2018	10,519	3,784	650	298
Nigeria	2018	41,821	10,678	1,557	437
Senegal	2019	15,574	5,248	866	239
Sierra Leone	2019	8,649	1,865	365	67
Zambia	2018	13,683	9,503	1,647	587
Total		**126,236**	**47,676**	**8,095**	**2,289**

Figure 4.5.3. : Location of the eight sub-Saharan Africa countries included in the study (Created on Map chart https://www.mapchart.net/africa.html)



4.5.4. Characteristics of Study Participants

For this paper, only countries in SSA whose DHS was collected and published between 2017-2021 and included the DV module with specific questions on physical IPV during pregnancy were included. The restriction to a specific year was to capture the most recent acts of physical violence and its association with EBF and pregnancy termination. The sample for this study consisted of eight countries (Burundi, Cameroun, Mali, Liberia, Nigeria, Senegal, Sierra Leone, and Zambia) for a total number of 126,236 women who took

part in the survey, out of which 47,676 were selected in the DV module, 7,990 were adolescents (15-19), and 2,289 were ever-pregnant.

4.5.5. Key explanatory variable

The main explanatory variable for this study was physical IPV during pregnancy. Only those who responded with an affirmative answer to physical IPV during pregnancy by partner, husband, current boyfriend, former boyfriend, and former partner were included in the study. The outcome is to examine the difference in health outcomes regarding EBF and pregnancy termination between ever-pregnant adolescents who reported physical IPV during pregnancy compared to those who did not report physical violence during pregnancy.

4.5.6. Covariates

Based on what has been found in the literature research (257) related to physical IPV during pregnancy and health outcomes, the following six covariates will be used. We control specific confounding variables found in the research to explain possible non-exclusive (258) (259) and the reason for pregnancy termination (40,260,261). They include antenatal care visits, exposure to media, the place of residence (urban vs. rural), adolescent level of education (no education, primary, secondary, and higher), employment status (employed, unemployed), and marital status defined as being currently married or living with a partner, formerly married or divorced, not living together, separated, and never married.

4.5.7. Data analysis procedure

Analyses were carried out using Stata version 16 SE. The prevalence was calculated separately for each country and merged with the others. One woman is selected in each household, and each survey is weighted to adjust for non-response. The prevalence was

extracted using inferential statistics in adolescents, including percentages, and illustrated using charts of adolescents from 15 to 19 years of age. Furthermore, the chi-square test of independence was used to determine the associations between physical IPV during pregnancy, lifetime severe physical IPV, and physical injuries in each of the eight countries. Two regressions were run to assess the association between physical IPV during pregnancy, lifetime severe physical IPV, and physical injuries due to an intimate partner. The results were presented using odd ratios with 95% confidence intervals.

Then, the prevalence of pregnancy termination and EBF and the prevalence of adolescents who had experienced physical IPV during pregnancy, pregnancy termination, and EBF were calculated and presented using charts. Furthermore, the independent associations between physical IPV during pregnancy, pregnancy termination, and EBF in each country were examined. Finally, bivariate and multivariate logistic regression models investigated the effect of physical IPV experiences during pregnancy on pregnancy termination and EBF in each country. The outcomes were displayed as odds ratios (UORs) and adjusted odds ratios (AORs) at 95% confidence intervals (CIs). Following the DHS recommendations and the survey command, the women's sample weights for the DV module (d005/1,000,000) were used to produce unbiased estimates.

4.5.8. Ethical considerations

Prior to the systematic review, a protocol was submitted and approved by the international prospective register of systematic reviews (PROSPERO). A written authorization letter was obtained from the DHS Institutional Research Board (IRB) for public usage and ethical approval from the London School of Hygiene and Tropical Medicine (LSHTM) for both the systematic review and the secondary data analysis (Appendix A and B).

4.5.9. Candidate's role in the research design and overall thesis

I arrived at LSHTM as a scholar supported by the Economic and Social Research Council, specializing in Advanced Quantitative Methods (AQM). My original intention was to utilize data from the MAISHA study to investigate the lives of adolescents, mainly focusing on their relationships in Tanzania through quantitative and qualitative analysis. Unfortunately, due to the impact of COVID-19 (Coronavirus Disease), I could not conduct the planned fieldwork. Despite this setback, I substituted the intended primary data source with the DHS, which also contains valuable information on physical IPV during pregnancy. My analysis primarily revolved around secondary quantitative data the DHS program collected, analysed, and disseminated. I did not play a role in devising the study or constructing the survey. Throughout my first year, I engaged in quantitative methods and statistics courses to acquaint myself with the structure of the dataset and its coding. This effort gave me a comprehensive understanding of the survey dataset, encompassing its strengths and limitations concerning my research objectives. Under the guidance of one of my supervisors, I developed an external usage guideline. I formulated my thesis's research inquiries and methodological approach for all three papers. Additionally, the thesis includes documentation outlining the specific contributions of the candidate (myself) and co-authors to each research paper.

4.6. Chapter Summary

This chapter summarizes the research methodology I used, which combined a systematic review and the use of the DHS. The combined systematic review and DHS data analysis approach was meticulously designed to gather a holistic understanding of IPV during pregnancy among adolescents in SSA. By carefully crafting a thorough search strategy that

included several academic databases, we started the study process with a systematic review. Clear inclusion and exclusion criteria served as our search's roadmap to ensure the selection of high-caliber, pertinent studies. Then, I carried out a secondary data analysis using DHS data to support and reinforce the systematic review results. The DHS is a well-known dataset renowned for its reliability and representativeness. Data selection was explained in depth, including the random sampling methods used to ensure the study population was representative of all SSA countries. To improve our ability to assess prevalence, severity, and health effects, we highlighted the standardized survey tools used in the DHS-DV module to gather thorough data on physical IPV during pregnancy. My analysis strategy included advanced statistical methods that combined descriptive and inferential statistics to uncover relationships and trends in physical IPV during adolescent pregnancy.

5. CHAPTER FIVE. Results paper one: Systematic review of the literature on intimate partner violence during pregnancy among adolescents living in Sub-Saharan Africa

Paper one is a systematic review looking at the state of knowledge of IPV during pregnancy among SSA adolescent. It has been accepted in publication in BMJ Injury Prevention.

5.1. Preamble paper one

This chapter reports on the prevalence, severity, and health outcomes associated with physical IPV during pregnancy in SSA. The systematic review of the literature serves one important aim: to provide available research on adolescents' experiences of physical IPV during pregnancy in SSA. It identified gaps in our current knowledge and raised future research questions. Adolescent girls are considered to be a vulnerable group, as if they fall pregnant during this stage, they may face particular difficulties such as improper diet, inadequate rest, financial problems that exposes them to increase the likelihood of experiencing IPV (88,89,262). Understanding the scope of the problem, the effects, and the variables driving IPV during pregnancy among adolescents can be accomplished by systematically reviewing the literature on this topic among adolescents. The findings showed a dearth of studies on adolescents and IPV during pregnancy in the SSA context. This study offers evidence to highlights gaps that are there to improve programmes and advocacy activities to guarantee the safety and well-being of young pregnant adolescents.

London School of Hygiene & Tropical Medicine
Keppel Street, London WC1E 7HT
T: +44 (0)20 7299 4646
F: +44 (0)20 7299 4656
www.lshtm.ac.uk

RESEARCH PAPER COVER SHEET

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SECTION A – Student Details

Student ID Number	lsh1900749	**Title**	Ms
First Name(s)	Caroline		
Surname/Family Name	Adjimi Nyemgah		
Thesis Title	Prevalence, severity, and health outcomes associated with physical intimate partner violence during pregnancy among adolescents In eight sub-Saharan African countries		
Primary Supervisor	Dr. Meghna Ranganathan		

If the Research Paper has previously been published please complete Section B, if not please move to Section C.

SECTION B – Paper already published

Where was the work published?			
When was the work published?			
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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	BMJ-Journal of Injury Prevention
Please list the paper's authors in the intended authorship order:	Caroline Adjimi Nyemgah Meghna Ranganathan Heidi Stockl

5.2. Paper one, accepted for publication in BMJ Injury Prevention

Intimate partner violence during pregnancy against adolescents in sub-Saharan Africa: a systematic review

Caroline Adjimi Nyemgah[1], Meghna Ranganathan[1], Heidi Stöckl [1,2, 3]

[1] Faculty of Public Health and Policy, Department of Global Health and Development, London School of Hygiene and Tropical Medicine, United Kingdom

[2] Institute of Medical Information Processing, Biometry and Epidemiology, Public Health and Health Services Research, LMU Munich

[3] Pettenkofer School of Public Health, Munich, Germany

Correspondence to:

Caroline, Adjimi Nyemgah

Adjimi-Nyemgah.Caroline2@student.lshtm.ac.uk

+447471960295

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Abstract: 240 (Target: 250)

References: 30 (60 references, in Vancouver style)

Contributors and sources

CA is a doctoral student interested in adolescent sexual and reproductive health in low-and middle-income countries. MR is an Assistant Professor of Social Epidemiology at the London School of Hygiene and Tropical Medicine (LSHTM), affiliated with the Gender Violence Health Center. HS is Professor of Public Health Evaluation at the Institute for Medical Information Processing, Biometry, and Epidemiology (IBE) at the medical faculty at the Ludwig Maximilian University Munich, Germany. She is also an honorary Professor at the London School of Hygiene and Tropical Medicine.

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Declaration of Conflicting Interests: We, the authors, declare that we have no conflict of interest in the publication of this review.

Provenance and peer review: Commissioned; externally peer-reviewed.

Abstract

Background*:* Adolescent pregnancy and intimate partner violence (IPV) are major public health issues that are linked to poor health outcomes particularly during pregnancy. In sub-Saharan Africa (SSA), previous studies on IPV during pregnancy have primarily focused on adults. This review examines the available evidence on adolescents' experience of IPV during pregnancy in SSA.

Design: Systematic review.

Methods*:* We searched multiple databases for articles that met our inclusion criteria. Included studies investigated IPV during pregnancy, including prevalence, risk factors, and health outcomes among ever-pregnant adolescents aged 10-19 years old or younger in SSA. Studies were peer-reviewed studies from SSA, quantitative and/or qualitative; and published in English regardless of the year of publication.

Results*:* Nine studies out of 570 abstracts screened, published between 2007 and 2020, met the inclusion criteria. The prevalence of IPV during pregnancy among adolescents in SSA ranged from 8.3% to 41%. Mental health symptoms, particularly depression, and anxiety, were associated with adolescent IPV during pregnancy and qualitatively linked to poor coping strategies when dealing with IPV.

Conclusion*:* This review found evidence of a linkage between pregnancy and IPV during pregnancy among adolescents. Given the long-term negative effects of IPV during pregnancy on adolescents and children, this conclusion points to the critical need for developing interventions to improve IPV detection during pregnancy in SSA among adolescents to interrupt its continuation into adulthood.

Keywords*:* Intimate partner violence, domestic violence, pregnancy, adolescents, sub-Saharan Africa, prevalence, health outcomes

Funding: Economic and Social Research Council Ph.D. scholarship (ES/P000592/1)

Key messages

What is already known on this topic

• Adolescent mothers seem more likely than adult women to experience intimate partner violence during pregnancy with significant adverse outcomes on both the mother's and the foetus’s health .

What this study adds

• There is a paucity of quantitative and qualitative evidence on intimate partner violence during pregnancy among adolescents in sub-Saharan Africa.

How this study might affect research, practice or policy

• This paper offers evidence to help develop strategies and interventions for antenatal care to prevent physical and psychological violence-related injuries impacting the well-being of adolescent mothers and children.

INTRODUCTION

Physical and sexual violence against women by intimate partners has been recognised as a global public health concern. In 2018, the global, regional, and national estimates for intimate partner violence (IPV) revealed that 27% of ever-married/partnered women between 15-49 experienced IPV, [1]. Among adolescents, research by Sardhina and colleagues (2021) showed a higher prevalence of IPV among adolescents ranging between 21% and 28%, with sub-Saharan Africa (SSA) being among the most affected, [2]. There is also evidence on the high rate of IPV during pregnancy, [3]. Within SSA, the prevalence of IPV during pregnancy among women of reproductive age (15-49) varies and has been inconsistently reported among adolescents aged 15-19, [4,5].

Adolescents and young women in low and middle-income countries (LMICs) experience IPV at a higher rate than adults, and during pregnancy, it is even likely to be higher, [6]. A cross-sectional multi-country study that explored IPV among adolescents in vulnerable urban areas of five countries, including Baltimore, Delhi, Ibadan, Johannesburg, and Shanghai revealed that Johannesburg had the highest prevalence of IPV (36.6%), with pregnancy being one of the main reasons cited by adolescents experiencing violence by their partners, [6]. Several risk factors have also been associated with adolescents' experiences of IPV in pregnancy in SSA, including women's low level of education, early marriage, substance abuse, childhood trauma, unemployment status, multiple sexual partners, and marital status including being single or unmarried, [7–10]. Forced marriage and poverty have also been found to be associated with IPV and pregnancy termination among adolescent girls and young women in 25 SSA countries, [7] creating an opportunity for partners to abuse the adolescents using different forms of IPV, including physical, sexual, and emotional abuse, [7].

Moreover, other maternal factors, including age and the experience of IPV, have all been associated with neonatal complications and adverse outcomes. For instance, the foetus is directly affected by the mother's exposure to violence during this time, [8], increasing the likelihood of adverse maternal and child health outcomes, such as pre-term and LBW, [11–13]. Adolescents are already more likely to develop complications, such as asphyxia and neonatal death, than older women during pregnancy, even without experiencing IPV, [14]. From the mental health standpoint, research done in South Africa examining the effect of IPV's on mental health among pregnant adolescents between 14 and 21 years of age reported higher levels of depression, anxiety, and prenatal distress among adolescents who reported IPV during pregnancy, [11].

Pregnancy comes with pressures such as lower energy, strength reduction, and other physical and emotional changes, [12]. Some of the demands during pregnancy include relationship management and financial resources to manage the pregnancy. Unfortunately, for many adolescents, the lack of means to fulfil those pregnancy demands exposes them to an increased likelihood of experiencing IPV, [8,10,15]. This systematic review aims to provide evidence on the prevalence of IPV during pregnancy, coping strategies, community response, and mental health outcomes associated with IPV during pregnancy among adolescents in SSA. This is important as adolescence is a crucial time for laying the groundwork for quality of life and future health programmes, [(263,264).

MATERIALS AND METHODS

Inclusion and exclusion criteria

The inclusion criteria are: (1) studies focused on adolescents (aged 10-19 years) who have experienced physical, sexual, and psychological violence during pregnancy; 2) studies from SSA; 3) quantitative and qualitative peer-reviewed studies with data collected from

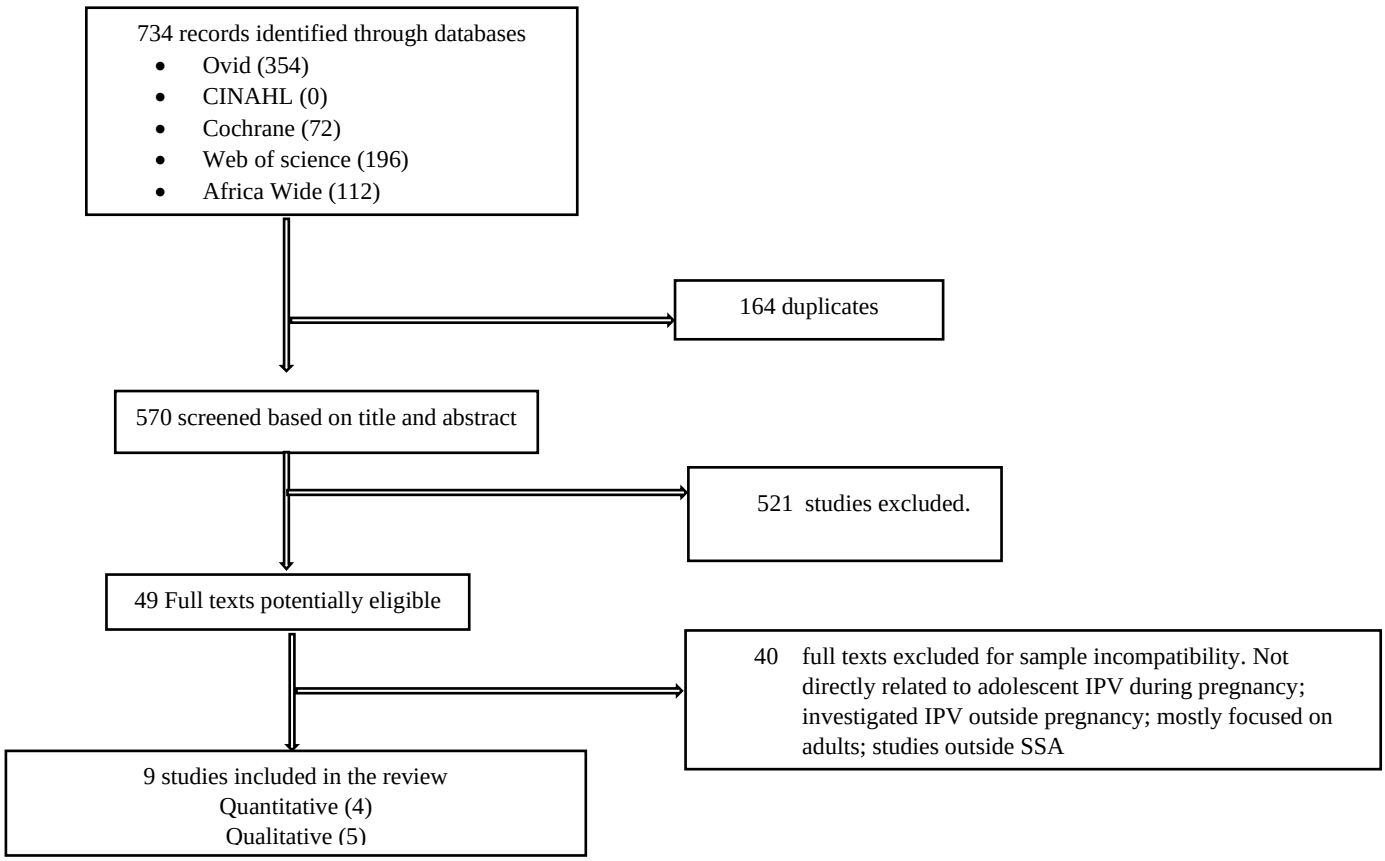
pregnant or ever-pregnant adolescents; 4) studies published in English in a scientific peer-reviewed journal between 2000-2021. We excluded reviews, letters, editorials, dissertations, books, studies conducted in humanitarian contexts, and non-English studies. The search was conducted until February 2022, and the review was registered with the Prospective Registry of Systematic Reviews (PROSPERO) number CRD42022320144.

Search strategy

Five health and social science databases were systematically searched to obtain studies: Ovid Medline, CINAHL, Web of Science, Cochrane Library, and Africa Wide. Independently, two reviewers extracted articles and screened abstracts after they were imported into Rayyan, [18], a systematic review management platform. After resolving any discrepancies, an extraction sheet was created in Excel to extract the information for quantitative and qualitative articles. The following search terms were used: domestic violence, spouse abuse, intimate partner violence, physical abuse, sex offence/s, rape, IPV, spousal abuse or dating violence, pregnancy, gravidity, pregnancy in adolescence, pregnancy outcome, unplanned pregnancy, unwanted pregnancy, sub-Saharan Africa, Africa south of the Sahara, adolescent, teen, teenager and underage (Appendix A: Search terms).

The results yielded 734 potential studies. The first author (CA) and a second reviewer (CL) screened the 734 abstracts, during which one hundred and sixty-four (164) duplicates were removed, yielding 570 abstracts. The 570 abstracts were screened against the inclusion criteria to determine their eligibility. This process produced 49 potentially eligible articles. After a full-text review against the inclusion criteria, nine (9) articles were selected. The articles were discussed in detail with other authors (HS and MR) to ensure rigorous and critical data analysis. Fig 1 below describes within a PRISMA flowchart the overall identification process of the studies included in this systematic review.

Fig 1. PRISMA extraction flowchart illustrating the process of identifying included studies.



Study selection and data extraction

A pre-established framework created for the research in Excel was used to extract data from the chosen studies. Data were extracted and organized into the following categories: author, setting, sample size, study type, study design, measures, quality appraisal, and study outcomes.

Quality assessment

Quality appraisal of cross-sectional studies was conducted using the Joanna Briggs Institute (JBI) Critical Appraisal Skills checklist for studies reporting prevalence data, [19], while the Critical Appraisal Skills Programme checklist (CASP), [20] was adapted to assess

qualitative studies. Additionally, the focus of the systematic review was on synthesizing evidence regarding prevalence, risk factors, and health consequences/outcomes of IPV during pregnancy. Given the complexity and heterogeneity of risk factor and consequence studies in this domain, attempting to apply a generic quality appraisal tool may not adequately capture the nuances and methodological rigor of each study.

The checklist for studies reporting prevalence was a nine-item questionnaire grouped into categories to evaluate the sample, study design, the possibility of bias, and data analysis. Qualitative studies were reviewed by adopting ten questions assessing the number of participants, design, and analysis. A question was asked initially on four scales, including "Yes," "Can't tell," and "No." The questionnaire was readapted as follows to meet our study objectives on adolescent pregnancy and IPV "Yes=1, No=0, Unclear=0, Not applicable=0". Three questions were added to the CASP as a guide to the reviewers to determine whether the papers directly investigated issues related to IPV during pregnancy among adolescents in SSA.

According to the checklist, a combined score between six and nine indicates high quality, whereas zero to five indicates low quality. The assessment score of the first author was carefully reviewed and discussed with co-authors following a conclusive quality assessment decision. The quality of all qualitative studies was deemed satisfactory, with an average score of 8. On the other hand, quantitative studies were judged to be of low-quality ranging between 2 and 5. However, no study was excluded from the review because of unsatisfactory quality. This decision was made after careful consideration and discussion during the review process. It is important to note that excluding studies solely based on quality appraisal scores can lead to publication bias and may overlook valuable insights or perspectives from these studies. In cases where studies were deemed to be of low quality but

still provided relevant and meaningful data contributing to the overall synthesis and understanding of the topic, it was deemed appropriate to include them in the review.

Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research as this is a systematic review.

RESULT

Table 1 highlights the main findings of studies investigating IPV in adolescent pregnancies. Nine studies were identified all conducted in SSA and published between 2007 and 2020: three in Uganda, [15,16,21], two in South Africa, [17,22], two in Ethiopia, [23,24] and one study each in Kenya, [25] and Nigeria, [26]. Five studies were done in health facilities, and the remaining four in communities. The sample size varied from 15 to 61 adolescents for qualitative studies and 29 to 61 in quantitative studies. The adolescents' age ranged from 10 to 19 years.

Table 1. Quantitative and qualitative studies included in the study

Author(s) and publication year	Number of adolescents from total sample	Location	Study design	Type of IPV	IPV instrument	Age range	Data collection occasion	Source of sample	Study inclusion criteria	Adolescent Prevalence	Quality appraisal	Health outcomes
Musa et al., 2020	29	Ethiopia	Cross-sectional	Physical, sexual, or emotional	WHO multi-country study on women's health and domestic violence against women questionnaire	<20	Had given birth	Hospital-based	Women 15-49 living in SSA; women who gave birth in the public hospitals, have been partnered, experienced IPV during pregnancy, aged 15-19	37.93%	5	
Fawole et al., 2008	36	Nigeria	Cross-sectional	Physical or sexual	Self-developed semi-structured questionnaire to assess IPV	<20	Pregnant	Health facility	Only women who had made at least one previous visit to the antenatal clinic; all pregnant women attending the antenatal clinic	8.30%	2	
Gebrekristos et al., 2020	61	South-Africa	Cross-sectional	Psychological and physical	WHO modified conflict tactics scale on physical and psychological violence	14-19	Had given birth	Public hospital's maternity ward	Adolescents who had given birth in the past six weeks; were between 14 and 19 years old, neither they nor their baby had any major health issues, and had planned to live in the township for six months; HIV-negative.	41%	4	Sexually transmitted infections (gonorrhoea, chlamydia, trichomonas)
Belay et al., 2019	41	Ethiopia	Cross-sectional	Physical, sexual, and emotional violence	WHO multi-country study on women's health and domestic violence against women questionnaire	15-19	Pregnant	Community-based	Pregnant women with gestational age 25–34 weeks enlisted by the Health Extension Workers (HEWs), living in the selected two urban and three rural kebeles	17.10%	4	Maternal depression
Apolot, 2020	15	Uganda	In-depth interviews	Physical violence	Self-developed questionnaire	10-17	Pregnant	Hospital-based	Adolescents who had given birth two years prior to the study; have participated in at least one community report card CSC meeting.		8	Severe physical injuries
Musyimi, 2020	21	Kenya	Focus group discussions	Physical and emotional violence	Semi-structured interview guides	13-19	Pregnant	Community-based	Must reside in the study area for at least six months; willing to participate in the study voluntarily; must be pregnant or below six weeks postnatal; aged between 13-19 years.		8	suicidal ideation, and depression
Kaye, 2007	16	Uganda	Focus group discussions and in-depth interviews.	Not specified	abuse assessment screen	Not specified	Pregnant	Community-based	Pregnant adolescent domestic violence survivors		9	
Govender, 2020	18	South-Africa	Focus group discussions	Physical and emotional abuse	Focus group discussion guide	13-19	Ever-pregnant	Public hospital	First-time adolescent mothers and repeated mothers; Willing to share their experiences.		8	
Maly, 2017	26	Uganda	In-depth interviews	Emotional abuse	Semi-structured interview guide	15-17	Currently pregnant	Community-based	Adolescents between 15-17; sexually active in the past 12 months; consent to partake in the study		8	

Study characteristics

The four quantitative studies used cross-sectional designs, [22–24,26], three qualitative studies used focus group discussions, [15,17,25], and the other two qualitative studies used in-depth interviews, [16,21]. Eight studies collected data specifically on adolescent experiences of partner violence during pregnancy. One of the studies focused on women of reproductive age in general, but because it contained useful information on adolescents, it was included, [26]. IPV was measured differently: two studies used the WHO multi-country study on women's health and DV against women questionnaire, one used the WHO modified conflict tactics scale on physical and psychological violence, and one used a self-developed semi-structured questionnaire, whereas four qualitative studies used semi-structured interview guidelines and one abuse assessment screen questionnaire. Overall, all the quantitative studies focused on physical, sexual, and/or emotional IPV, whereas qualitative studies focused on physical or emotional IPV as shown in the supplementary table 1. The quantitative findings were reported in percentages, odd ratios, p-values, and confidence intervals, and the qualitative studies reported key themes related to adolescent experiences of IPV during pregnancy.

Study outcomes

The quantitative studies reported on prevalence and health outcomes with sample sizes ranging from 15 to 61 adolescents. The prevalence of IPV during pregnancy ranged from 8.3% in Nigeria, [26] to 41% in South Africa, [22]. The two studies in Ethiopia in 2019 and 2020 reported a prevalence of 17.1% and 37.9%, [23,24]. Regarding evidence on IPV

during pregnancy and health outcomes the systematic review only found and reported associations with sexually transmitted infections, and depression. A cross-sectional study of IPV experience during pregnancy in South Africa showed an association between IPV and postpartum sexually transmitted infections in 61 adolescent mothers (RR: 4.32; 95% CI: 0.95, 19.69). 13.1% of adolescents who reported IPV during pregnancy were diagnosed with at least one sexually transmitted infections (gonorrhoea, chlamydia, trichomonas) compared to those who did not report any IPV during pregnancy even after controlling for covariates (aRR: 4.43; 95% CI: 1.31–14.97), [22]. In Ethiopia, maternal depression was found to be associated with IPV during pregnancy with 17.7% of adolescents reporting experiencing IPV while pregnant and also reporting being depressed, [24].

Furthermore, we noted that the only health outcomes investigated in the quantitative studies captured only sexually transmitted infections and depression, while a much wider range of health outcomes are known to be associated with violence during pregnancy among women of reproductive age. Future studies on violence during pregnancy among adolescents need to explore a wider range of health outcomes

There were three salient overarching themes that emerged from the qualitative studies and are presented below. These are: (a) partner denial of pregnancy responsibility and controlling behaviours, (b) adolescents coping mechanisms to adapt and survive physical and psychological violence by partner, and (c) partner and community responses to adolescent pregnancies.

Theme 1: Partner denial of pregnancy responsibility and controlling behaviours.

Included qualitative studies reported that IPV during pregnancy is inflicted by partners who deny pregnancy responsibility and exercise pressure on adolescents to terminate the pregnancy through physical violence. In Uganda, 15 pregnant adolescent mothers reported physical violence, including beating leading to hospitalization and bleeding inflicted by partners who denied pregnancy responsibilities, [21]. Similar findings were reported among adolescent mothers in Kenya, [25], where male spouses threatened to leave or demanded that the adolescent mother terminate her unplanned pregnancy. The persistent quarrels were exacerbated by substance abuse by the male partner, acceptance of IPV, and the stigma displayed in the community. Adolescents also expressed worries regarding paternity and the mindset imposed on them by the situation. This situation exposes them to elevated stress levels, suicidal ideation, and depression due to their partners' denial of pregnancy responsibility, [25].

Theme 2: Coping strategies used by adolescents to deal with IPV during pregnancy

As described by Kaye et al. in their study examining adolescents coping mechanisms within the context of IPV during pregnancy, [(265), withdrawal of partners was a common strategy used by pregnant adolescents, yet one that rarely succeeded. Pregnant adolescents found themselves unable to detach themselves from the love and emotional attachment they had with the abuser and his economic support, and ultimately leave. One of the participants discussed how despite the violence it was difficult to leave because she does not know how to look after herself when pregnant without him, so remains hopeful that he will change. In the same study, many respondents reported using any excuse and available opportunity to leave

their partners temporarily. Some adolescents used retaliation or fought back in response to the violence. This included informing the police or local council leaders to have the spouse penalized or reprimanded.

Theme 3: Partner and community responses to adolescent pregnancies

Adolescent mothers mentioned that while sometimes favourably, most often negatively, the news of their pregnancy changed their relationships with their partners. Rejection and rage were the unfavourable responses. In South Africa, one study found that adolescent pregnancy can cause physical and emotional violence by partners and community members. Exploring the experiences among a sample of 18 adolescent parenting mothers from KwaZulu-Natal,' the relationship with the father of the child and the father-child interaction emerged as complex. The group discussions revealed adverse reactions to the unplanned pregnancy by partners, including denial of responsibility, abuse through vulgar language, public humiliation, aggressiveness, cheating, and lack of attention throughout the pregnancy, [17].

Adolescent girls or young women who became pregnant while unmarried faced severe repercussions, including stigma and social isolation, within the community, in schools, homes, and from male partners, fostering negative sentiments such as abortion towards the pregnancy, [16]. Another study in Uganda exploring the pregnancy experience of 26 adolescents in the Rakai community cohort study found similar results, [16]. A 7 year-old participant spoke about the stigma encountered by those who chose to have an abortion.

Although several coping strategies were used to seek help, the outreach often worsened IPV [15]. Reaching out to friends, family, and local leaders was another coping

mechanism used by expectant adolescents. These individuals could step in and stop the attack by reprimanding the partner. However, in some cases, it worsened the situation for adolescent mothers because it exacerbated DV, even though it was occasionally of great assistance to some participants. Some respondents advised against it and named it one of the things that made their reputation worse. For example, when one woman explained that she reported her partner to the local chairman, she could see a positive effect on him, yet one that only lasted for a few days.

DISCUSSION

To our knowledge, this is the first systematic review of IPV during adolescent pregnancy in SSA. This study examined available knowledge from nine studies of adolescent experiences of IPV during pregnancy in five SSA countries. The prevalence of IPV during pregnancy among adolescents ranged from 8.3 to 41%. Yet, these rates are not directly comparable due to different study designs, settings and populations. The findings suggest an association between adolescent IPV during pregnancy and antenatal depression. A direct association between IPV during pregnancy and depressive symptoms has been well-researched in adults compared to adolescent-related studies, (266).

Women of reproductive age (15-49) have been found vulnerable to mental issues, with a peak during pregnancy, [28]. In Ethiopia, a survey of women of reproductive age showed a consistently higher prevalence of depression during the antenatal period among adolescents compared to other age groups, [24]. In the current review, the type of IPV associated with depressive symptoms included physical, sexual, and psychological violence, [(267), which is consistent with those found in women of reproductive age in India, [(268)

and Bangladesh, (130), where physical and sexual IPV were more likely to be associated with depressive symptoms during pregnancy. Women who reported emotional, physical, and sexual IPV were also more likely to be diagnosed with depression. Due to adolescents lacking basic life skills, such as problem-solving and decision-making, this can affect their ability to handle stressful events, (265), thus exposure to physical IPV during pregnancy may be more likely to lead to depression among adolescents compared to older women, but further research is needed. Nonetheless, the impact of IPV on depressive symptoms can be affected by a number of variables, including the severity and frequency of the violence, the timing of the violence during pregnancy, and the social support that the individuals have access to. Since adolescent pregnant women have special experiences, it is therefore important to carefully analyse the individual nuances of these connections even though there may be similarities in the association between IPV types and depressive symptoms across age groups. Due to adolescents lacking life skills for problem-solving and decision-making that can affect their appraisal of stressful events, [(265), exposure to physical IPV during pregnancy may be more likely to lead to depression among adolescents compared to older women, but further research is needed.

The qualitative studies also showed different ways adolescents cope with partner violence. These coping strategies include withdrawal, retaliation, and help-seeking. These coping strategies are similar to research on adults dealing with IPV from Uganda, [15]. Adults coping strategies within a power relationship context, divided into four stages: the binding stage, the enduring stage, the disengagement stage, and the recovery stage, carry some similarities with those of adolescents. However, these stages have been defined from a problem-focused viewpoint of adults, while adolescents are emotionally focused [15].

Violence during pregnancy by a partner, paired with rejection and denial of pregnancy responsibility, prompted adolescents to isolate themselves, increasing the risk for mental health problems and decreasing their self-esteem and sense of hopelessness, [15]. Our findings showed that denial of pregnancy responsibilities and pressure on adolescents to terminate pregnancies increased the risk of experiencing different types of IPV, leading to severe and mild consequences such as beating and bleeding. Both partners and community members have been found to encourage and reinforce IPV during adolescent pregnancy by not taking appropriate action to deal with the complaints. Unfortunately, the lack of action from community members or stakeholders and the adolescents' inability to decide on their reproductive health appears to increase the chance of experiencing IPV during pregnancy, [31].

Strengths and limitations

The comprehensive synthesis of prior research by this systematic review on IPV during adolescent pregnancy provides gives a clearer picture of the current level of knowledge in this research space. It presents this strong viewpoint on the subject by incorporating studies of various quality levels and by using a mixed-methods methodology. Additionally, because it shines light on a vulnerable population group and emphasises the need for focused interventions and assistance, the review's focus on adolescent pregnant women is particularly pertinent. Although this review is only based on a small sample of adolescent studies and cannot be conclusive, it presents consistent information across countries to indicate that pregnancy does not appear to protect adolescents from IPV. This current review and the focus on SSA are believed to be of great interest and positive impact

as it provides information about potentially important predictors and health outcomes for planning prevention work in antenatal care and implementing new programmes and routines to identify adolescents who experienced partner violence during pregnancy in SSA.

Nevertheless, our review revealed crucial gaps in knowledge. To date, the evidence on IPV during adolescent pregnancy is limited to only nine small-scale studies. Due to the limited empirical evidence related to IPV during adolescent pregnancy in SSA and the focus only on specific countries, the findings may not be generalizable to all adolescents living in SSA. Adding to that, the low sample size of the individual quantitative studies included in the review present a serious limitation. The underlying reasons for the small sample sizes were due to logistical limitations and the complex nature of the subject. While these studies offer valuable insights into the experiences of adolescent mothers, the limited sample sizes compromise the overall generalizability of the systematic review and results have to be interpreted accordingly.

To only include empirical articles, the search was limited to peer-reviewed papers, excluding evidence related to IPV during pregnancy among adolescents in SSA, such as book chapters and WHO reports. This study excluded any study done in a language other than English, thus decreasing the chance of inclusion for studies done in non-English-speaking SSA countries. Finally , most studies were done in East Africa, with only one study in West Africa. Few studies report on risk and protective factors, as most focused on the prevalence and health outcomes. Therefore, future studies must investigate the drivers leading to IPV during adolescent pregnancy and explore family dynamics to unravel more clues to uncover the causes of IPV during pregnancy to propose research-oriented solutions and policy recommendations. As very few studies focused on interventions for IPV during pregnancy,

there is an urgent need for more research studies that should suggest appropriate interventions for each setting since social norms significantly influence the approval and disapproval of IPV, [32]. In order to establish an adolescent-focused theories from which treatments to reduce IPV during pregnancy would be derived, it is necessary to strengthen IPV-related theories, such as sociological theory.

Using a socio-ecological lens could provide essential insights into the larger societal dynamics, power relationships, and cultural norms influencing IPV prevalence and persistence among this vulnerable population. Incorporating socio-ecological lens can explore how age, gender, socialization, and power dynamics intersect to shape the experiences of pregnant adolescents because adolescence is a time of dynamic social transformations and identity construction. This will give a detailed insight of the impact of socio-cultural factors on the prevalence and consequences of IPV, allowing for the development of interventions to support young mothers and subvert harmful norms. Having a better understanding of the socio-ecological factors influencing IPV during adolescent pregnancy can help build successful prevention initiatives and policy recommendations.

It is crucial to highlight that adding studies with lower quality, as is the case with most quantitative studies included in this review. We have included them given the general dearth of quantitative studies on this issue, and to highlight that even those that exist are not of good quality, calling for an increase of quantitative studies on the subject. Given the patchy evidence base, even the low-quality studies unfortunately are the only evidence based we can have to understand IPV during pregnancy in adolescents in sub-Saharan Africa.

Conclusion

In response to the lack of research on IPV during pregnancy among adolescents in SSA, we systematically reviewed empirical studies to synthesise the evidence of IPV during pregnancy and its health consequences. Although some studies showed valuable information regarding adolescents' experiences of IPV during pregnancy, it is difficult to conclude that adolescents are more likely to experience IPV than adults; therefore, more studies should investigate the prevalence, severity, drivers, mechanisms, and interventions that can intervene early before adolescents enter relationships. We hope this research will be considered as a basis for developing future research questions and hypotheses that will deepen our understanding of adolescents' experiences of IPV during pregnancy and move toward more evidence-based practices and adolescent-focused interventions.

Declaration of Conflicting Interests

We, the authors, declare that we have no conflict of interest in the publication of this review.

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5.3. Paper one Summary

This systematic review synthesises the evidence on IPV during pregnancy among adolescents in SSA. The prevalence of IPV during pregnancy ranged from 8.3% in Nigeria to 41% in South Africa. Among the most reported types of violence, physical IPV appears to be the one most experienced by adolescents between 10 and 19 years old among the five countries: Kenya, Uganda, South Africa, Ethiopia, and Nigeria. Although the prevalence varied across countries, issues of smaller sample size could have resulted in the low prevalence. However, the qualitative studies revealed a consistent association between IPV during pregnancy and health outcomes with an emphasis on depressive symptoms. The study findings provide a basis to advocate for including IPV response and referral systems in pregnancy programs that target adolescents in SSA and globally in line with the Sustainable Development Goals (SDGs).

6. CHAPTER SIX. Paper two: Prevalence and severity of physical intimate partner violence during pregnancy among adolescents in eight sub-Saharan Africa countries: a cross-sectional study

Paper two captures the result of the quantitative analysis on the prevalence and severity of physical IPV during pregnancy among SSA adolescents. The paper is currently under revise and resubmit in PLOS Global Public Health.

6.1. Preamble paper two

This paper explores a crucial subject that touches on gender dynamics, public health, and societal well-being. Adolescent pregnancy presents a unique set of difficulties in SSA countries, in which IPV worsens as shown by the findings of the systematic review paper. This study's primary goal is to give a thorough understanding of the prevalence and severity of physical IPV among adolescent pregnant women in SSA. Using the DHS the paper estimates the prevalence and severity of physical IPV during pregnancy. To capture the most recent experiences of physical IPV during pregnancy, I selected surveys from eight countries with data collected between 2017-2021. The countries include Burundi, Cameroon, Liberia, Mali, Nigeria, Senegal, Sierra Leone, and Zambia. This study offers insights that influence advocacy, policy, and programming for health. This study intends to increase the awareness about this essential issue by highlighting how widespread it is and the seriousness of physical IPV during adolescent pregnancy.

London School of Hygiene & Tropical Medicine
Keppel Street, London WC1E 7HT

T: +44 (0)20 7299 4646
F: +44 (0)20 7299 4656
www.lshtm.ac.uk

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Surname/Family Name	Adjimi Nyemgah		
Thesis Title	Prevalence, severity, and health outcomes associated with physical intimate partner violence during pregnancy among adolescents in eight sub-Saharan African countries		
Primary Supervisor	Meghna Ranganathan		

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Stage of publication	**Submitted**

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	As the first and corresponding author, I designed the methodology, conducted the data analysis, drafted the first draft and revised it based on supervisory feedback. .

SECTION E

Student Signature	Caroline Adjimi Nyemgah
Date	14.12.23

Supervisor Signature	Meghna Ranganathan
Date	14.12.2023

6.2. Research paper two, revised and resubmitted version in PLOS Global Public Health.

Prevalence and severity of physical intimate partner violence during pregnancy among adolescents in eight sub-Saharan Africa countries: a cross-sectional study

Caroline Adjimi Nyemgah[1,#a,*], Meghna Ranganathan[1], Doreen Nabukalu[2], Heidi Stöckl [1,3,4],

[1] Faculty of Public Health and Policy, Department of Global Health and Development, London School of Hygiene and Tropical Medicine, United Kingdom

[2] Faculty of Epidemiology and Population Health, Department of Statistics, London School of Hygiene and Tropical Medicine, United Kingdom

[3] Institute of Medical Information Processing, Biometry and Epidemiology, Public Health and Health Services Research, LMU Munich, Germany

[4] Pettenkofer School of Public Health, Munich, Germany

[#a] Current Address: Faculty of Public Health and Policy, Department of Global Health and Development, London School of Hygiene and Tropical Medicine, London, United Kingdom

[*]Caroline, Adjimi Nyemgah

Email: caroline.adjimi-nyemgah@lshtm.ac.uk (CAN)

ABSTRACT

Background and methodology

Globally, intimate partner violence (IPV) is highly prevalent. Adolescents are particularly vulnerable, but their experiences during pregnancy remain underexplored. This study aims to determine the prevalence and severity of physical IPV among pregnant adolescents in Sub-Saharan Africa (SSA).

We analyze data from the Demographic Health Surveys (DHS) from eight SSA countries collected between 2017-2021 from 2,289 ever-pregnant adolescents aged 15-19. We define physical IPV during pregnancy as experiencing physical harm while pregnant by a husband, former partner, current boyfriend, or former boyfriend. The severity of physical IPV captured experiencing kicking, choking, being threatened with a knife or weapon, ever had eye injuries, sprains, dislocations, or burns, deep wounds, broken bones, teeth, or ever having had any other serious injury due to IPV. We conducted logistic regression analysis and the results were displayed as unadjusted odds ratios (uORs) and adjusted odds ratios (aORs) with a 95% confidence interval (CI) both by country and combined results.

Results

The prevalence of physical IPV during pregnancy among adolescents in the eight SSA countries ranged from 2.99% to 12.69%. 5.68% experienced severe lifetime physical IPV and 6.38% severe physical injuries. We found evidence of an association between physical IPV during pregnancy and severe lifetime physical IPV (aOR: 6.84, 95% CI :4.48-10.44) and severe injuries (aOR: 9.24, 95% CI: 6.00-14.22) after adjusting for covariates.

Conclusion

Physical IPV during pregnancy is common among adolescents in SSA and is a risk factor for severe physical lifetime IPV. Addressing this issue in low-resource settings requires collaborative efforts among stakeholders and policymakers to protect adolescent girls during pregnancy.

INTRODUCTION

IPV is an act of sexual, physical, or emotional abuse inflicted by an intimate partner. It is a public health issue that restricts women's rights and hinders their well-being, even during pregnancy (1,2). In 2015, according to the WHO multi-country study on IPV, the prevalence of IPV varied across countries and settings, ranging between 1.2 to 66% (3,4), with a worldwide average prevalence of 30% (5.6). A 2018 analysis showed that 27% of ever-partnered women of reproductive age (15-49) had experienced physical or sexual IPV in their lifetime (7). Adolescent girls and young women (15–24 years old) have the greatest prevalence of recent IPV (7). Consistent research shows that pregnancy can increase the likelihood of IPV, primarily because of several factors like higher stress levels, increased physical susceptibility of pregnant women, and complex emotional dynamics within intimate relationships during this time(8). These pressures create an environment where IPV is more likely, especially when it intersects with potential partner-related variables including resentment, denial of pregnancy responsibility, substance abuse, marriage dissatisfaction, infidelity or termination of pregnancy (9-11).

Global evidence worldwide shows that violence may occur during pregnancy (12). Within sub-Saharan Africa (SSA), the prevalence of IPV during pregnancy among women of reproductive age varies although it has been inconsistently reported, especially among adolescents (13). To help with intervention development and implementation, we need to understand the prevalence of IPV during pregnancy.

Furthermore, IPV during pregnancy among adolescents in SSA has received little attention from population-based studies. A multi-country, cross-sectional survey investigated

the prevalence, associated factors, and health outcomes related to IPV and non-IPV in adolescents in urban areas of five countries, including Baltimore, Delhi, Ibadan, Johannesburg, and Shanghai. The findings revealed that Johannesburg in South Africa scored the highest prevalence of IPV (36.6%), with pregnancy being one of the leading contributing factors for increasing IPV (3). In addition, a qualitative study in an Eastern Kenyan community investigated suicidal risk among pregnant adolescents using 27 focus group discussions (14). The group discussions centred around the cause of suicidal behaviours; one of the main themes that emerged was experiencing physical IPV. Two qualitative studies in the United States of America (USA) investigated childhood sexual abuse among adolescent mothers between 18-22 years old and the impact on their current pregnancy. The interviews showed that adolescent mothers with a history of child sexual abuse were more likely to experience IPV during pregnancy. Both studies suggested that adolescents raised in an environment where they witnessed or experienced sexual violence are also more likely to experience physical IPV during pregnancy. They often countered this situation by withdrawing or projecting negative emotions onto themselves and others (15,16).

There is evidence that IPV during pregnancy is linked to higher degrees of severity of violence as well as a variety of detrimental effects for both the mother and the baby on physical and mental health, including LBW, preterm delivery, and postpartum depression (8). One study in Cameroon involving adolescents has linked adverse health outcomes during delivery with IPV during pregnancy (17). The study analysed maternity reports from 2009-2016 to determine delivery outcomes between adolescents who have given birth once and those who have given birth two or more times in two primary healthcare facilities that covered most of Cameroon's rural area deliveries. The analysis revealed that the primiparous

adolescents were three times more likely to have LBW infants and a history of physical, sexual, and psychological violence during pregnancy (17). Moreover, research examining the impact of IPV during pregnancy on 61 adolescents postpartum in South-Africa showed that 40% of adolescents reported experiencing physical IPV during pregnancy (18). More importantly, adolescents who reported IPV during pregnancy were also more likely to be infected by STD at six months postpartum than those who did not report it (18). Another study from Durban, South Africa, investigating IPV and its effect on the mental health of pregnant adolescents between the ages of 14-21, found lower odds of having depression, anxiety, and prenatal distress among adolescents who did not report IPV during pregnancy (19). However, adolescents who reported experiencing IPV experienced all three outcomes, including depression, anxiety, and prenatal distress (19).

IPV, in all its forms, whether psychological, physical, and sexual, is a widespread issue with serious effects on women's health and wellbeing. Understanding the nature of IPV is crucial in the context of SSA countries, where deeply ingrained cultural and social norms intersect with violence dynamics (20). The multidimensional and often hidden nature of IPV during pregnancy poses a challenging situation as it not only has an impact on the mother's health, but also has long-lasting impacts on the unborn child. However, there is a considerable gap in the evidence base on the prevalence of IPV during pregnancy among adolescents (aged 15-19) in SSA. Adolescents and young women in low and middle-income countries (LMICs), especially in SSA experience IPV at a higher rate than adults (3), and it is likely to be even higher during pregnancy (3). Further, information on IPV prevalence among pregnant adolescents in SSA is frequently incorporated into data on women of reproductive age, making it challenging to determine whether patterns regarding adolescent experiences of

IPV during pregnancy vary across countries. Therefore, addressing the prevalence and severity of physical IPV during pregnancy among adolescents using population-based data and standardized measures is not only a public health concern but also a question of cultural significance within SSA, where cultural values can determine power dynamics and the acceptance of violence.

METHODS

Study design and setting

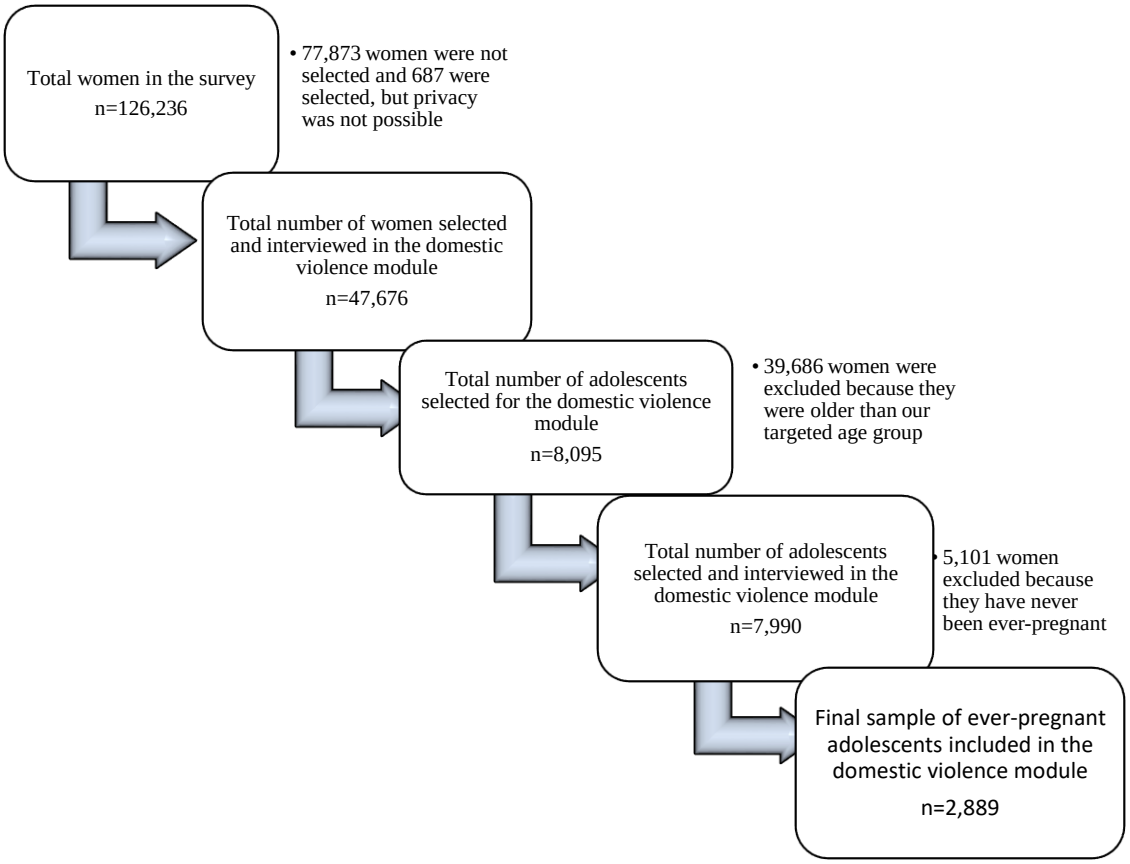
We used the population-based household DHS conducted between 2017-2021 in SSA to conduct secondary analyses on physical IPV among adolescents. The DHS runs every five to six years across various countries, primarily in LMICs. The DHS surveys use standardized procedures and questionnaires and cover multiple subjects, such as demographic information, reproductive, maternal, and pediatric health, sexual behavior, and nutrition (21). A standardized set of questions on domestic violence was created in late 1990 to be optionally added to the DHS, including also capturing data on the frequency of physical IPV during pregnancy (22). Census enumeration regions are chosen in the first stage of a multi-stage sample selection process with probability proportionate to size. From a comprehensive list of households within the selected enumeration zones, households were chosen at random. The selected countries were limited to those in SSA because DHS surveys from other regions did not meet the specified criteria, either due to the absence of IPV modules or the lack of data collected within the designated timeframe of 2017-2021. Therefore, the inclusion of only these eight countries including Burundi, Cameroon, Liberia, Mali, Nigeria, Senegal, Sierra

Leone, and Zambia was a strategic choice to capture the most recent experiences on physical IPV during pregnancy among adolescents.

Study population and recruitment

This sample included a nationally representative sample of 126,236 women between 15-49 years of age selected for this study. It included 47,676 women who completed the domestic violence (DV) module, with 8095 adolescents in the sample (See Table 1). As the current study is focused on adolescents' pregnancy, the sample was further restricted to 2289 ever-pregnant adolescents (ages 15-19) who completed the DV module (Figure 1).

Fig. 1. Selection procedure of the study sample from the DHS in eight countries.



To ensure confidentiality and safety, an informed consent was given prior to data collection. It was both signed by the participants and the investigator. The DHS questionnaire was completed by one randomly eligible woman in each household using the WHO violence against women ethical guidelines for conducting DV research (22). Interviewers were recruited and specially trained to administer the DV survey. The training includes ensuring confidentiality, privacy and building rapport with the respondent (22). A written authorization letter was obtained from the DHS Institutional Research Board (IRB) for public usage and ethical approval was received from the London School of Hygiene and Tropical Medicine (LSHTM) for this secondary data analysis (Appendix A and B).

TABLE 1: Sample of all ever-pregnant adolescents selected and interviewed for the DV module

Sample of all ever pregnant women by country	Survey years	Number of women sampled in the DHS	Number of women selected and included in the DV module	Number of adolescents included in the DV module	Number of ever-pregnant adolescents included in the DV module
Burundi	2017	17,269	10,188	1,787	197
Cameroon	2018	10,656	3,290	690	229
Liberia	2019	8,065	3,120	533	235
Mali	2018	10,519	3,784	650	298
Nigeria	2018	41,821	10,678	1,557	437
Senegal	2019	15,574	5,248	866	239
Sierra Leone	2019	8,649	1,865	365	67
Zambia	2018	13,683	9,503	1,647	587
Total		**126,236**	**47,676**	**8,095**	**2,289**

Variables and measurement

Exploratory variable

Physical IPV during pregnancy was the main explanatory variable for this study. Women were asked: *"Has anyone had ever hit, slapped, kicked, or done anything else to hurt you while pregnant?"*. An affirmative answer to the question constituted physical IPV during pregnancy (table 2). Follow-up questions asked about the perpetrators including intimate partners, friends, family, and acquaintances. The main explanatory variable considered only those who reported violence during pregnancy by intimate partners including husband, spouse, former partner, current boyfriend, and former boyfriend, coded as yes and no.

<u>Table 2.</u> Demographic and Health Survey Variable definitions

Sample	Definition of perpetrators	Form of violence	Timeline	Violence question	
Ever pregnant woman 15-19 capturing, currently pregnant, had a pregnancy that ended in stillbirth, miscarriage, or induced abortion.	Husband, spouse, former partner, current boyfriend, and former boyfriend	Physical violence	During pregnancy and lifetime	During pregnancy	Lifetime severe physical violence
				Anyone had ever hit, slapped, kicked, or done anything else to hurt them physically?	Ever had bruises because of husband/partner's actions; ever been "kicked or dragged; tried to strangle or burn; threatened with knife/gun or other weapons because of husband/partner.

Outcome variables

In order to determine the severity of physical IPV, we used the WHO classification of severity of violence (23) to capture two variables in the DHS: physical injuries and lifetime severe physical IPV. Including two separate measures for physical injuries due to IPV and severe physical IPV in the DHS allows for a more nuanced understanding of the severity of physical IPV experienced by adolescents.

For instance, physical injuries due to IPV refers to any physical harm or injuries sustained by an adolescents as a result of IPV. It encompasses a broad range of injuries including eye injuries, sprains, dislocations, or burns, deep wounds, broken bones, teeth, or any other serious injury as a result of IPV. Lifetime severe physical IPV on the other hand focuses on the most serious and potentially life-threatening forms of physical IPV including kicking, dragging, strangulation, burning, threatening with a knife/gun or other weapons in the last 12 months preceding the survey. An adolescents was considered to have experienced physical injuries or lifetime severe physical IPV if she had experienced at least one of the acts of severe physical IPV cited above.

The reason for including these variables separately rather than combining them into one measure is to capture the varying degrees of severity in physical IPV experienced by adolescents. Differentiating between physical injuries due to IPV and lifetime severe physical IPV would provide a better understanding of the spectrum of physical IPV experienced by adolescents, as well as offering a more comprehensive assessment of severity and the impact of physical IPV, ranging from minor injuries to severe and potentially lethal forms of violence.

Covariates

Based on the literature, the following five variables were chosen as covariates (24-26) : place of residence, education level, marital status, socio-economic status (SES), and employment status.

Data management and analysis

We used Stata version 16 SE for the analyses. The prevalence calculation was done separately for each country and merged. One woman is selected in each household, and each survey is weighted to adjust for non-response. Following the recommendation from the DHS and the survey command, the women's sample weights for the DV module (d005/1,000,000) were used to ensure that higher populated countries had a proportionate impact on the overall estimate compared to smaller countries. The use of sample weight helps adjust for non-response and ensures that the estimates are representative of the adolescent population. The prevalence was extracted using inferential statistics in adolescents, including percentages, and illustrated using charts of adolescents aged 15- 19 years (see Table 3).

Furthermore, the chi-square test of independence was used to determine the associations between physical IPV during pregnancy, lifetime severe physical IPV, and severe injuries in each of the eight countries. Two logistic regressions were run to examine the association between physical IPV during pregnancy, lifetime severe physical IPV, and severe IPV-related injuries. The results were presented using odd ratios with 95% confidence intervals and significance estimated with a p-value of 0.001.

RESULTS

Characteristics of Study Participants

A total of 2289 adolescents were included in the current study. The majority of adolescents lived in rural areas (73.53%), had a primary level education (37.83%), and were currently living with a man (70.12%). A little more than half were not employed (51.90%), with 28.09% being among the poorest adolescents (Table 3). Out of 2,289 adolescents selected and interviewed in the DV module, 179 (Table 4) had reported physical IPV during pregnancy from which 45 (25,14%) have also reported severe physical injuries due to violence by partner, and 43 (24%) have reported experiencing lifetime severe physical IPV.

Table 3. Characteristics of adolescents included in this study

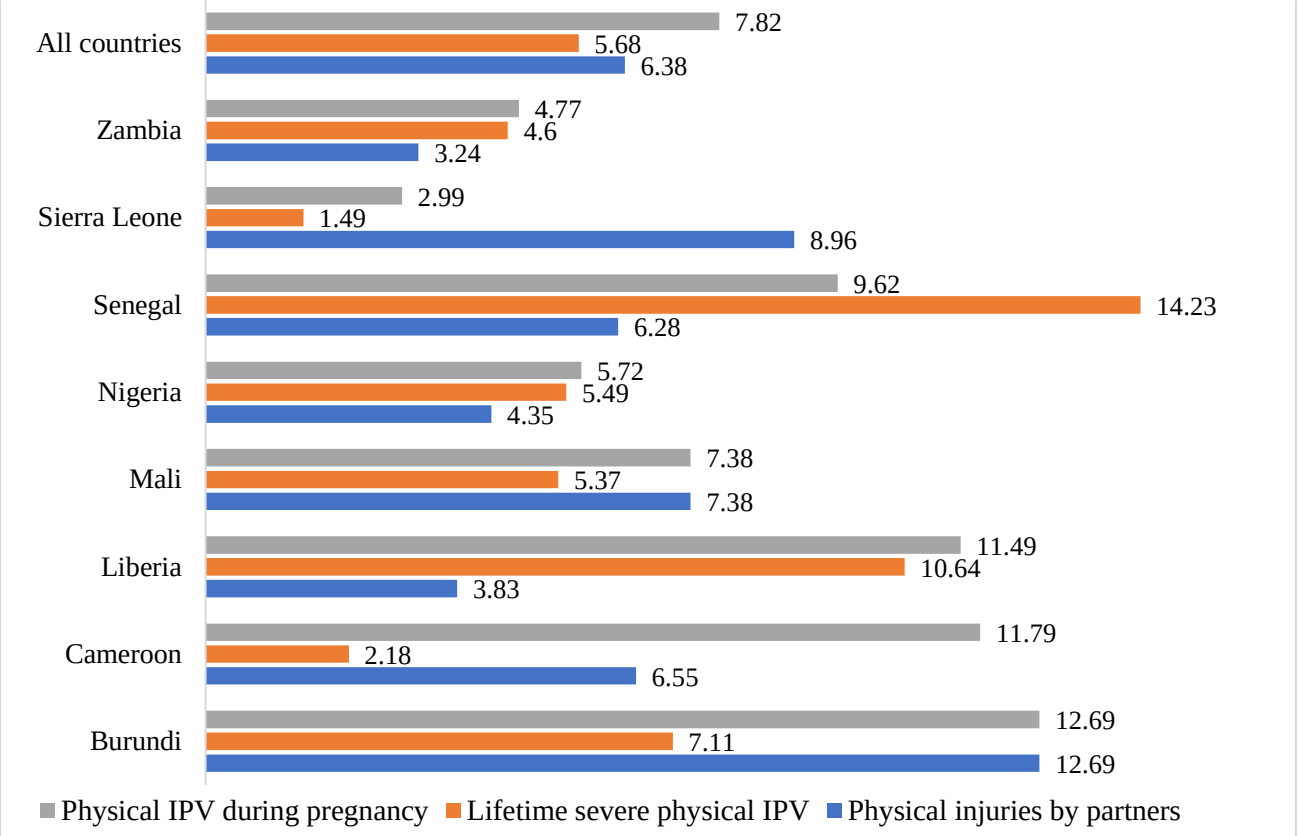
Place of residence	***n***	***%***
Urban	606	26.47
Rural	1683	73.53
Level of education		
No education	685	29.93
Primary	866	37.83
Secondary	737	32.20
Higher	1	0.04
Marital status		
Never in union	620	27.09
Currently in union/living with a man	1605	70.12
Formerly in union	64	2.80
Employment status		
Not employed	1188	51.90

Employed	1101	48.10
Socio-economic status		
Poorest	643	28.09
Poorer	592	25.86
Middle	491	21.45
Richer	369	16.12
Richest	194	8.48

Prevalence of physical IPV during pregnancy

The prevalence of physical IPV during pregnancy among ever-pregnant adolescents across all countries is 7.82 %, with the highest prevalence of 12.69% in Burundi and the lowest at 2.99% in Sierra Leone (Fig 2). The lifetime severe physical IPV and physical injuries by partners among ever-pregnant adolescents were 6.38% and 5.68%, respectively. The prevalence of injuries resulting from physical IPV ranges from 1.49% in Sierra Leone to 12.69% in Burundi, while reports of severe lifetime physical IPV ranges from 3.24% in Zambia to 14.23% in Senegal.

Fig 2. Prevalence of physical IPV during pregnancy, lifetime severe physical IPV and physical injuries by partner (%) among adolescents by country



Association between lifetime severe physical IPV and physical injuries by partners among ever-pregnant adolescents who reported physical IPV during pregnancy

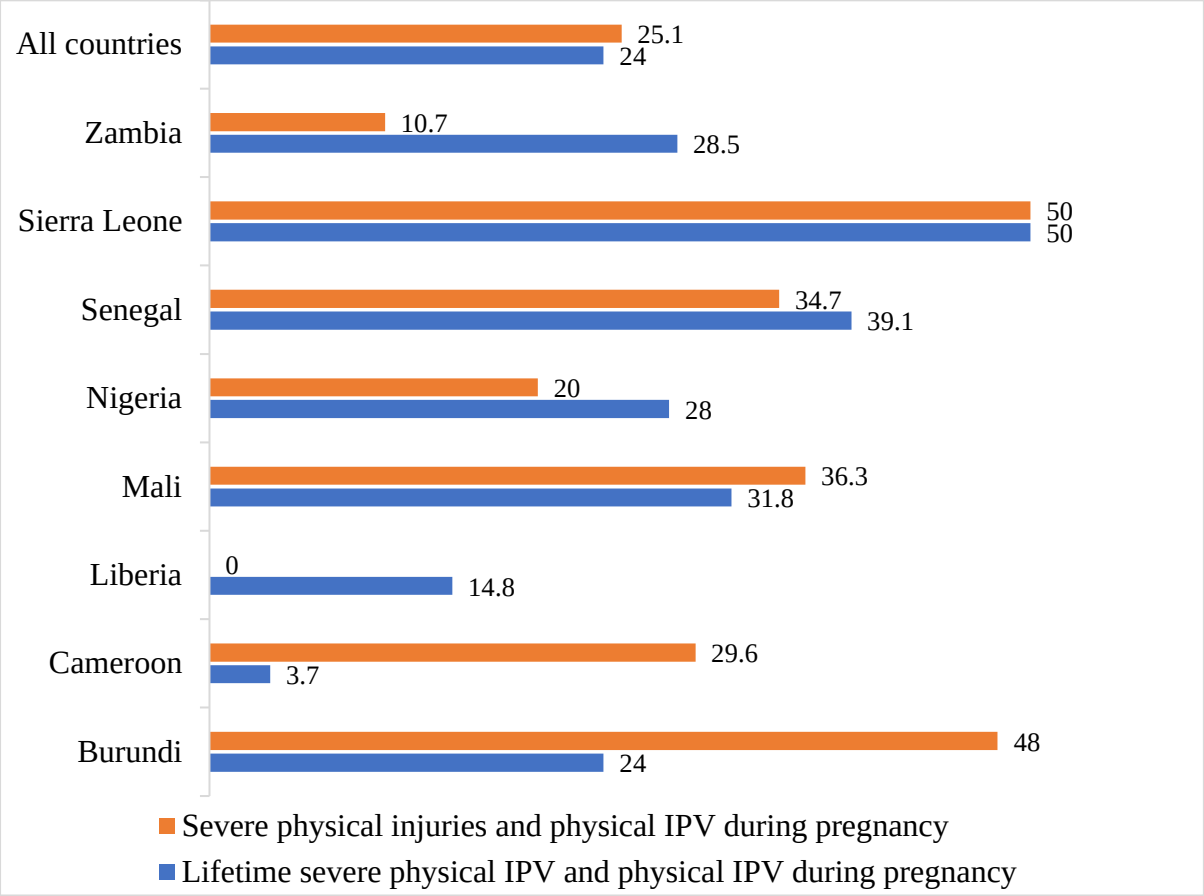
Table 4 below display the sample sizes of included adolescents, the prevalence of IPV during pregnancy, and a p-value to show the strength of association with lifetime severe physical IPV and physical injuries by partners among ever-pregnant adolescents who reported physical IPV during pregnancy. Figure 3 visualizes these findings. In all eight countries, the relationship between physical IPV during pregnancy, severe lifetime physical IPV, and physical injuries by a partner are significant among adolescents in six countries. No association was found with severe lifetime physical IPV in Cameroon and Liberia, and in

Liberia only with severe physical injuries due to violence by partners. These results are probably due to the low number of participants observed in the sample size.

Table 4: Association between lifetime severe physical IPV and severe physical injuries by partner among ever-pregnant adolescents reporting physical IPV during pregnancy

Country	Adolescent in domestic violence module	Number of adolescents who reported physical IPV during pregnancy		Lifetime severe physical IPV and physical IPV during pregnancy			Severe physical injuries and physical IPV during pregnancy		
		Count	%	Count	%	P-value	Count	%	P-value
Burundi	197	25	12.69	6	24%	0.000	12	48	0.000
Cameroun	229	27	11.79	1	3.70	0.565	8	29.63	0.000
Liberia	235	27	11.49	4	14.81	0.454	0	0	0.27
Mali	298	22	7.38	7	31.82	0.000	8	36.36	0.000
Nigeria	437	25	5.72	7	28	0.000	5	20	0.000
Senegal	239	23	9.62	9	39.13	0.000	8	34.79	0.000
Sierra Leone	67	2	2.99	1	50	0.000	1	50	0.03
Zambia	587	28	4.77	8	28.57	0.000	3	10.71	0.02
All countries	**2289**	**179**	**7.82**	**43**	**24.02**	**0.000**	**45**	**25.14**	**0.000**

Fig.3. Prevalence associations between lifetime severe physical IPV and physical injuries by partners among ever-pregnant adolescents reporting physical IPV during pregnancy



The results of the logistic regression analysis for the combined eight countries included in this study showed that the the odds of physical IPV were higher among adolescents who have experienced physical injuries due to IPV (OR=10.56, 95% CI=9.71-11.47) and lifetime severe physical IPV (OR=8.18, 95%CI=7.53-8.89) even after controlling for covariates; for both lifetime severe physical IPV (aOR=9.24, 6.00-14.22) and physical injuries (aOR=6.84, 4.48-10.44) (Table 5).

Table 5. Multivariable models showing the association between physical IPV during pregnancy with physical injuries and lifetime severe physical IPV

Model 1: Association of physical IPV during pregnancy and physical injuries			**Model 2:** Association of physical IPV during pregnancy and lifetime severe physical violence	
Countries	**OR [95% CI]**	**AOR [95% CI]**	**OR [95% CI]**	**AOR [95% CI]**
Burundi	100.67 [39.87 254.19] ***	7.94 [2.70-23.34] ***	100.67 [39.87-254.19]***	7.94 [2.70-23.34]***
Cameroon	38.17 [12.77-118.17]***	15.92 [4.59-55.21] ***	38.17 [12.77-118.17]***	15.92 [4.59-55.21]***
Liberia	0.02 [.013-0.04] ***	Low observations	0.02 [.013-0.04] ***	Low observations
Mali	20 [7.41-54.10] ***	21.16 [6.14-72.91] ***	20 [7.41-54.10]***	21.16 [6.14-72.91]***
Nigeria	21.87 [7.34-65.06] ***	10.35 [3.25-32.93] ***	21.87 [7.34-65.06]***	10.35 [3.25-32.93]***
Senegal	48.89 [16.60-144]***	22.20 [6.14-80.25] ***	48.89 [16.60-144]***	22.20 [6.14-80.25]***
Sierra Leone	71.4 [3.90-1309]***	Low observations	71.4 [3.90-1309]***	Low observations
Zambia	10.44 [2.88-37.71]***	4.92 [1.13-21.27] ***	10.44 [2.88-37.71]***	4.92 [1.13-21.27]***
All countries	25.63 [17.34-37.89]***	9.24 [6.00-14.22] ***	25.63 [17.34-37.89]***	9.24 [6.00-14.22]***

Model 1: unadjusted and adjusted model examining the independent association of physical IPV during pregnancy and physical injuries
Model 2: unadjusted and adjusted model examining the independent association of physical IPV during pregnancy and lifetime severe physical violence
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

DISCUSSION

The study provides valuable insights into the prevalence and potential implications of physical IPV during pregnancy among adolescents in SSA. It is worth noting that this analysis is the first to examine this issue in SSA using the DHS, making its findings significant for both the region and the broader understanding of IPV during pregnancy. The study identified that 7.82% of pregnant adolescents in the eight SSA countries disclosed experiencing physical IPV during their pregnancies, out of which 6.38% reported severe lifetime physical IPV, and 5.68% and partner-inflicted physical injuries. Our data suggest that physical IPV during pregnancy is prevalent among adolescents in SSA, aligning with previous results by the Devries et al (2010) multi-country analysis of IPV prevalence during pregnancy from 19 countries (22). However, it can be challenging to identify the true prevalence of physical IPV during pregnancy for various reasons, including excessive fear of retaliation if the offender were to learn about it through disclosure or any guilt felt by the woman exposed to IPV (28). Nevertheless, it is important to acknowledge the potential for the underreporting of physical IPV during pregnancy, which may be influenced by non-respondent bias. Similar research on pregnant adults has identified a tendency to underestimate IPV prevalence during early pregnancy due to this bias. Consequently, accurately quantifying the true prevalence remains a challenging endeavour (29).

Although our result was lower than the one found in a study in eastern Ethiopia that demonstrated that pregnancy could offer protection during pregnancy (25), the result from the association analysis indicate that physical IPV during pregnancy could be instead a marker for severe physical violence beyond adolescent pregnancy. In fact, physical IPV during pregnancy may not be isolated but rather part of a broader pattern of abuse. Moreover, countries reporting a high percentage of severe lifetime physical IPV and injuries due to

violence by a partner also reported high levels of physical IPV during pregnancy, except for Liberia and Cameroon . More than 10% of adolescents in each country who reported physical IPV during pregnancy reported severe IPV including physical injuries and severe lifetime physical IPV. Earlier research from both SSA and other regions, have provided context for this findings. It mentions studies suggesting that IPV during pregnancy can increase in frequency and severity, aligning with the current results (29,30). For instance, a study looking into how frequently adult women receiving regular antenatal care in six northern European countries has observed an increase in the frequency and severity of IPV (31). This finding suggest that adolescents could be as likely as adults and even experience more severe physical IPV. Therefore, physical IPV during pregnancy is not only a continuation of prior IPV but is a marker for severe physical violence (32) due to the partner's sexual frustration, the stress of expecting a child, the heightened physical vulnerability of the pregnant woman, and a conscious or unconscious wish to end the pregnancy (33).

Reasons for IPV during pregnancy are unknown, yet its prevalence is concerning as it is likely to mean that IPV is used by their intimate male partner to impose their will on their female partners since adolescents are emotionally and economically dependent on male partners (22). Nevertheless, it’s essential to consider that cultural and contextual factors could contribute to variations in prevalence across countries, potentially leading adolescents to perceive and accept IPV as normal within societies where there is a higher tolerance for such violence (34). It is also crucial to acknowledge the possibility that some women who have experienced IPV may suppress their distress as a coping mechanism, which could deter them from reporting their experiences (35) . For instance, adolescents may normalize their experiences of IPV in a society with a higher tolerance for IPV. It is also possible that adolescents included in the current study have recovered from previous physical IPV, may have experienced one instance of physical IPV only or a minor form of it, or have higher

levels of resilience. However, we cannot rule out the possibility that women who have experienced IPV may repress their distress as a coping mechanism, which might prevent them from reporting (35). This finding also implies that adolescents who experience IPV during pregnancy are more likely to have a history of severe violence and may continue to face severe IPV or IPV-related injuries in the future (22).

Certainly, it is essential to acknowledge prior studies that contribute to the broader understanding of IPV among adolescents in different contexts, including SSA. These studies provide valuable insights into the complex dynamics of IPV during adolescence and its potential health implications. The multi-country cross-sectional survey conducted in urban areas of Baltimore, Delhi, Ibadan, Johannesburg, and Shanghai revealed important findings regarding the prevalence and contributing factors of IPV among adolescents (3). Notably, the high prevalence of IPV in Johannesburg, South Africa (36.6%), with pregnancy identified as a leading contributing factor, underscores the significance of the issue. This research sheds light on the urban setting and provides a basis for comparison with the predominantly SSA-focused analysis in our study. Furthermore, this previous study emphasizes pregnancy as a contributing factor to increased IPV. This aligns with our findings, suggesting that physical IPV during pregnancy among adolescents in SSA could be a marker for severe physical violence. These converging results point out the importance of addressing the unique challenges faced by pregnant adolescents concerning IPV across various settings.

Additionally, exploring physical IPV during pregnancy among adolescents in SSA using the DHS is relevant as it illustrates the potential health consequences including miscarriages, stillbirths, and induced abortions, which is critical aspect that warrants consideration as Ahinkorah and colleagues have found (36). In our discussion, we must recognize that the prevalence and impact of IPV can vary significantly between urban and rural settings, as well as across different regions. While the Johannesburg study highlights the

high prevalence of IPV in an urban context, our analysis focuses on a broader SSA context, encompassing both urban and rural areas, to provide a comprehensive view of the issue. This distinction is essential as it acknowledges the diverse sociocultural and economic landscapes within SSA.

Policy implications and research recommendations

Prior studies in different regions, including urban areas and SSA, have contributed valuable insights into the prevalence, associated factors, and health outcomes related to IPV among adolescents. Even though the prevalence from this study is clear, it's important to comprehend the underlying causes and degree of severity. Based on our research, we were able to emphasise that physical IPV during pregnancy among adolescents in SSA should not be seen in isolation but rather as a dynamic interplay of different factors. It is crucial to recognise that there are many different elements, including those mentioned above that are intended to control or terminate the pregnancy, that go into physical IPV throughout pregnancy. Adolescents in SSA frequently encounter particular difficulties, such as their emotional and financial dependence on their male companions. For this reason, pregnancy may aggravate these vulnerabilities, resulting physical IPV.

In addition, Jewkes et al. (2002) (37) research shows that persistent gender norms that uphold male dominance and female subordination help to normalise IPV, making it more likely to happen during delicate times like pregnancy. We challenge the social acceptance of IPV by addressing these gender differences, thereby lowering its prevalence. Our study emphasises the need of tackling gender inequality as a crucial first step in reducing IPV among adolescent mothers in SSA. The inclusion of gender equity in interventions and policies empowers girls and questions conventional gender norms. When faced with IPV,

especially during pregnancy when vulnerability is increased, this enables women to stand up for their rights and seek support. In addition to promote healthier and more equitable relationships and encourages males to reject violent behaviour, girls empowerment will not only improve women's wellbeing but also foster a more just and secure environment for both pregnant mothers and their unborn children.

More importantly, future research recommendations that interact with male offenders and delve into their perspectives on IPV during pregnancy should be encouraged. Effective intervention and preventive efforts depend on having a thorough understanding of the causes and motivations driving physical IPV during pregnancy. Despite the fact that DHS data mostly consists of information from women who have experienced IPV, future research will tremendously benefit from directly interviewing men who are the perpetrators. In fact, gathering information from male offenders can as well shed light on the intricate dynamics that result in physical IPV during pregnancy among adolescents. By shedding light on the fundamental causes of physical IPV during pregnancy, it can offer insights into their viewpoints, motivations, and prospective triggers. This strategy would improve our understanding of the issue and help create focused solutions that target these underlying causes. We can create more successful measures to prevent and resolve IPV during pregnancy and eventually promote healthier and safer relationships for women and their unborn children by taking a comprehensive approach that takes into account both the victim and offender viewpoints. Finally, prenatal care has been shown by preliminary research to be a window of opportunity for identifying and supporting physically abused adolescents during pregnancy (38). Therefore, routine or case-based investigations for physical abuse during pregnancy should focus more on providing treatment for younger victims. Since antenatal care typically serves as a woman's only point of contact with the medical community, it

provides health services and support throughout her pregnancy, enabling healthcare professionals to establish the relationship required to effectively manage physical IPV (38).

Strengths and limitations

This paper is a cross-sectional design with prospectively collected data and compares physical IPV during pregnancy with severe lifetime physical violence and includes injuries among pregnant adolescents during the same time period. It provides the opportunity to investigate the prevalence of a particular act of physical IPV at a particular time. Physical IPV during pregnancy provides a narrow window of time, but with clear parameters to observe measurable acts of violence by partners. Moreover, the DHS is a credible data source that increases the likelihood of generalizability. Nevertheless, despite the strengths, the analysis still has several limitations that must be considered. For instance, our sample of adolescents must have included ever-pregnant adolescents until 2022 whose experience of physical IPV was still current to observe a more recent prevalence rate. An important limitation that could substantially impact the findings is the underreporting of (IPV) during pregnancy. The accuracy and completeness of data gathered through surveys or research studies might actually be severely impacted by factors including fear and stigma, linguistic obstacles, and lack of understanding about IPV during pregnancy. Additionally, using a variety of data collection techniques and sources, including interviews, self-administered questionnaires, and anonymous reporting channels, can assist paint a more complete picture of the problem. It's crucial to acknowledge the limitations imposed by the selection criteria of the included countries in terms of generalizability across the entire African continent and other LMICs outside of SSA. The findings and conclusions drawn from the current paper are thus primarily applicable to the contexts represented by the included countries and may not be directly transferable to regions or countries with different socio-cultural dynamics, healthcare systems, or levels of IPV awareness and reporting.Finally, the DHS only focused

on physical IPV during pregnancy without considering other types of violence, including sexual and emotional abuse, that have been shown to have adverse outcomes for both the mother and child (39).

CONCLUSIONS

This study shows that physical IPV during pregnancy is highly prevalent among adolescents. This is quite alarming for this age group transitioning into adulthood and the special vulnerabilities that they experience due to pregnancy. Therefore, it is essential to develop and implement programs to address gender inequalities and promote sexual and reproductive health, to ensure that adolescents in these contexts are ensured a life free of violence. Finally, policies and programs should also invest in more research to highlight the multiple health consequences of the adolescents' experience of IPV during pregnancy in SSA, which are crucial for sexual and reproductive health programs to address IPV (14).

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6.3. Paper two summary

This paper provides evidence on the prevalence and severity of physical IPV during adolescent pregnancy in SSA. It highlights the often-overlooked intersection of adolescent pregnancy and IPV, particularly within the unique context of this region. Using quantitative methods, this research paper utilized the DHS to explore this relationship. By covering multiple countries in SSA, the prevalence of physical IPV during pregnancy ranged from 2.9% to 12.6%. Findings revealed an association between physical IPV during pregnancy with lifetime severe physical IPV and injuries due to violence by a partner. The results of this study have broad repercussions for advocacy, practice, and policy because it highlights the connection between violence and adolescent pregnancy and the need to create evidence-based interventions that empower and safeguard young mothers.

7. CHAPTER SEVEN. Results paper three: Evidence from Demographic and Health Surveys linking physical intimate partner violence during pregnancy (IPV) among adolescent girls to exclusive breastfeeding and pregnancy termination in eight sub-Saharan African (SSA) countries

The present chapter includes the results of my third paper looking at the association between physical IPV during pregnancy, pregnancy termination and EBF using the DHS. The paper has been submitted in the Journal of Interpersonal Violence.

7.1. Preamble paper three

Building upon the findings of the previous paper 2, this paper examines the specific health outcomes associated with physical IPV during pregnancy among adolescent girls in eight SSA countries.

Adolescents are a vulnerable group and it is important to examine physical IPV during pregnancy in this group for several reasons. First,, they often lack access to comprehensive sexual and reproductive health education, making them more vulnerable to early pregnancies and potential IPV during this period. Additionally, adolescents may face unique challenges in seeking help or reporting violence, such as limited autonomy and fear of stigma or retaliation, which can exacerbate the impact of IPV on their health and well-being. Furthermore, the intersectionality of factors such as gender, age, and socio-economic status can magnify the vulnerability of adolescents to IPV during pregnancy, emphasizing the importance of focusing on this group demographic in research and interventions. This study aims to provide evidence-based insights into the consequences of physical IPV during pregnancy on two critical health outcomes: exclusive breast-feeding (EBF) and pregnancy termination. Our analysis utilizes data collected through DHS conducted in eight SSA countries, offering a comprehensive view of this pressing public health concern across

diverse contexts. Through this research, we aim to provide policymakers, healthcare providers, and advocates with valuable insights to inform evidence-based interventions and policies.

London School of Hygiene & Tropical Medicine
Keppel Street, London WC1E 7HT

T: +44 (0)20 7299 4646
F: +44 (0)20 7299 4656
www.lshtm.ac.uk

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SECTION A – Student Details

Student ID Number	lsh1900749	**Title**	Ms
First Name(s)	Caroline		
Surname/Family Name	Adjimi Nyemgah		
Thesis Title	Prevalence, severity, and health outcomes associated with physical intimate partner violence during pregnancy among adolescents in eight sub-Saharan African countries		
Primary Supervisor	Dr. Meghna Ranganathan		

If the Research Paper has previously been published please complete Section B, if not please move to Section C.

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Where was the work published?			
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Where is the work intended to be published?	Journal of Interpersonal Violence
Please list the paper's authors in the intended authorship order:	Caroline Adjimi Nyemgah Heidi Stockl Doreen Nabukalu Meghna Ranganathan

Stage of publication	**Submitted**

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	As the first and corresponding author, I designed the methodology, conducted the data analysis, drafted the first draft and revised it based on supervisory feedback. .

SECTION E

Student Signature	Caroline Adjimi Nyemgah
Date	14.12.23

Supervisor Signature	Meghna Ranganathan
Date	14.12.2023

7.2. Research paper three, submitted version to Sage Journal of Interpersonal Violence

Physical Intimate Partner Violence, Exclusive Breastfeeding And Pregnancy Termination Among Adolescent Girls: Analysis Of Demographic And Health Surveys In Eight Sub-Saharan African Countries

Caroline Adjimi Nyemgah[1], Heidi Stöckl [1,3,4], Doreen Nabukalu[2] , Meghna Ranganathan[1]

[1] Faculty of Public Health and Policy, Department of Global Health and Development, London School of Hygiene and Tropical Medicine, United Kingdom

[2] Faculty of Epidemiology and Population Health, Department of Statistics, London School of Hygiene and Tropical Medicine, United Kingdom

[3] Institute of Medical Information Processing, Biometry and Epidemiology, Public Health and Health Services Research, LMU Munich, Germany

[4] Pettenkofer School of Public Health, Munich, Germany

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Correspondence to: Caroline, Adjimi Nyemgah

Phone number: +447471960295

Email: adjimi-nyemgah.caroline2@student.lshtm.ac.uk (CAN)

ABSTRACT

Intimate partner violence has been linked to adverse outcomes, including pregnancy termination and inappropriate breastfeeding practices among women of reproductive age (15-49), with less evidence on adolescents (15-19). This study investigates the association between physical IPV during pregnancy, pregnancy termination, and exclusive breastfeeding practice among adolescents in sub-Saharan Africa. Demographic and Health Surveys conducted between 2017 and 2021 in eight sub-Saharan African countries were used. The sample included 2,289 pregnant adolescent girls who completed the domestic violence module. Physical intimate partner violence during pregnancy was defined as experiencing physical harm while pregnant, pregnancy termination refers to adolescents who experienced miscarriage, abortion, or stillbirth, and exclusive breastfeeding practice included infants who received breastmilk exclusively in their first six months. Binary logistic regression models were conducted, and results were displayed as unadjusted odds ratios (uORs) and adjusted odds ratios (aORs) with 95% confidence intervals (CIs). The prevalence of physical IPV in the eight countries was 7.8%. Among those who reported physical intimate partner violence during pregnancy, 6.9% practiced exclusive breastfeeding, while 11.7% had terminated a pregnancy. No significant association was found between those who experienced physical intimate partner violence during pregnancy and exclusive breastfeeding [uOR = 0.84, 95% CI = 0.57-1.24]. After controlling for covariates, an association was found with pregnancy termination [aOR = 2.3, 95% CI = 1.23-4.2]. The results suggest that addressing physical intimate partner violence is necessary to decrease pregnancy terminations among adolescents in sub-Saharan Africa. Therefore, policies and programs should focus on adolescents with a history of physical intimate partner violence during pregnancy.

Keywords

Physical Intimate Partner Violence, adolescent, sub-Saharan Africa (SSA), pregnancy termination, Exclusive Breastfeeding (EBF), Demographic and Health Survey (DHS), termination, sub-Saharan Africa

BACKGROUND

Intimate partner violence (IPV) during pregnancy is a serious public health issue associated with negative maternal and child health outcomes, especially among adolescents (1). Due to its pervasiveness and serious health impacts, violence against women, particularly by an intimate partner, is getting more attention. According to the World Health Organization (WHO), IPV refers to 'any behavior within an intimate relationship that causes physical, psychological or sexual harm to those in the relationship, (2). Evidence from the United States of America (USA), where most studies on IPV among adolescents and young adults originate, supports the assumption that the prevalence of IPV is higher among adolescents and young women (1). Although there are an increasing number of studies on the health effects of IPV among adolescents in low and middle-income countries (LMICs) (3), there is still limited evidence on the association between physical IPV during pregnancy, exclusive breastfeeding (EBF), and pregnancy termination in sub-Saharan Africa (SSA).

According to the WHO, EBF refers to feeding an infant exclusively with breastmilk within the first hour of their life and for the next six months following the birth (4). This practice is tied to a more robust immune system and lowers the risk of infant mortality and breast and ovarian cancers (4). Although research has demonstrated that breastfeeding initiation within the hour after giving birth is about 50% in LMICs (5), there is still strong evidence that IPV survivors who cohabitate in an abusive relationship have been reported to have depressive symptoms or other serious health problems that interfere with child care duties such as breastfeeding, (6). In the SSA context, two studies have investigated the relationship between physical, psychological, and EBF using the DHS from previous years. The first study in Nigeria found a 37% reduced likelihood of practicing EBF among women who have experienced physical IPV and a 34% reduced likelihood among those who reported

experiencing psychological IPV (7). A multi-country study using the DHS from eight SSA countries also found an association between different forms of lifetime IPV and reduced EBF among women aged between 15-49 (8).

Pregnancy termination, on the other hand, refers to stillbirths, miscarriages, or induced abortions (9), and its linkages with IPV are of concern in SSA. Many studies have evaluated the impact of IPV and its association with pregnancy termination (10-11). A study in Bangladesh exploring the link between IPV and pregnancy termination among married women found that women who reported sexual and physical IPV were more likely to report miscarriage, unwanted pregnancy, stillbirth, and induced abortion (12). In the Tigray region of Ethiopia, 3.6% of study participants who reported experiencing stillbirth (11) were at least three times more likely to have experienced IPV during pregnancy than those who did not.

Given that IPV has been linked to poor health and because it is more common in young people, this research aimed to look into the experiences among adolescents aged 15-19 of physical IPV during pregnancy in relation to pregnancy termination and EBF in Burundi, Cameroon, Liberia, Mali, Nigeria, Senegal, Sierra Leone, and Zambia.

METHODS

Data source

The best data source to inform us of physical IPV during pregnancy in SSA countries remains the DHS. Since 1984, the DHS has been conducted in more than 80 countries with an initial focus on providing information to the United States Agency for International Development (USAID) and countries on issues related to fertility (13). Other modules

covering sexual behaviors and other behavioral modules and biomarkers have been included over the years, making it the most significant national representative survey (14).

Information was gathered from all completed population-based surveys conducted between 2017 and 2021 as part of the DHS initiative. We used cross-sectional household data from the DHS to conduct a secondary analysis and look at trends by age and country to determine the prevalence of physical IPV among adolescents. The DHS runs every five to six years across various countries, primarily in LMICs. These surveys use standardized procedures and questionnaires and cover multiple subjects, such as demographic information, reproductive, maternal, and pediatric health, sexual behavior, and nutrition (15).

A standardized set of questions on DV was created in the late 1990s, and most countries now include it in the DHS. All the countries chosen for this study collected data on the frequency of physical abuse during pregnancy. Each country's nationally representative household samples are used to administer the surveys to eligible women. Data on the women's backgrounds, reproductive and birth histories, family planning, maternity history, child immunization, child health and nutrition, marriage and sexual activity, fertility preferences, husband's background, and knowledge and behaviors regarding HIV as well as other health issues were collected using the standard woman's questionnaire. Census enumeration regions are chosen in the first stage of a multi-stage sample selection process with probability proportionate to size.

Study population, design, and measures

A total of 7,990 adolescents were included in the DHS DV module data across the eight SSA countries. From this sample, 2,289 adolescents had ever been pregnant and responded to questions on physical IPV during pregnancy, EBF, and pregnancy termination in eight SSA countries (**Table 1)**. DHS rules required that in two-thirds of households, a

woman between the ages of 15 and 49 was chosen at random using a multi-stage sampling technique for DV. To ensure confidentiality and safety, the DV questionnaire was only delivered to one randomly eligible woman in each household using WHO Violence Against Women (VAW) ethical guidelines.

To capture the most recent experience of physical IPV during pregnancy and its association with EBF and pregnancy termination, only countries in SSA whose DHS was collected and published between 2017-2021 and included the DV module were included. This resulted in eight countries: Burundi, Cameroon, Liberia, Mali, Nigeria, Senegal, Sierra Leone, and Zambia.

Table 1. Demographic Health Survey adolescent sample distribution by country and year

Country	Survey years	Women included in the DHS	Women completing the DV module	Ever pregnant adolescents included in the DV module	Number of ever-pregnant adolescents	Physical IPV and EBF	Physical IPV and pregnancy termination
Burundi	2017	17,269	10,188	1,787	197	5	4
Cameroon	2018	10,656	3,290	690	229	8	4
Liberia	2019	8,065	3,120	533	235	5	1
Mali	2018	10,519	3,784	650	298	3	4
Nigeria	2018	41,821	10,678	1,557	437	4	3
Senegal	2019	15,574	5,248	866	239	5	1
Sierra Leone	2019	8,649	1,865	365	67	0	0
Zambia	2018	13,683	9,503	1,647	587	4	4
Total		**126,236**	**47,676**	**7,990**	**2,289**	**34**	**21**

Dependent variables

The EBF measure used in the study referred to infants under six months of age who exclusively received breast milk without any addition of solid, soft, or semi-solid foods. This measure was determined based on the WHO-recommended indicators, specifically assessing breastfeeding behaviour on the day before the interview date. The focus was on recent breastfeeding practices to capture the immediate postnatal period's impact on infant nutrition and health outcomes.

To determine pregnancy termination**,** women were asked to answer "yes" or "no" to each item question if they had ever had a pregnancy terminated in a miscarriage, abortion, or stillbirth.

Main explanatory variable

The main explanatory variable for this study was physical IPV during pregnancy. Physical violence during pregnancy was defined as a single-item question asking the respondent to answer yes or no if "anyone ever hit, slapped, kicked, or done anything else to hurt you physically while you were pregnant?" Those who said yes were asked about the perpetrator. Among many others, our perpetrators of interest only included a partner, husband, current boyfriend, former boyfriend, and former partner.

Covariates

Based on the literature on physical IPV during pregnancy and health outcomes (17), the following six covariates will be used to explain EBF and pregnancy termination: the place of residence (urban vs. rural), marital status (currently married or living with a partner, formerly married or divorced, not living together, separated, and never married). The measure

of media exposure captured various forms of media, including television, radio, newspapers. In the DHS respondents were categorised based on their reported exposure to these media channels, reflecting their potential access to information, communication platforms, and influence of media content on their knowledge, attitudes, and behaviours related to physical IPV during pregnancy, EBF, and pregnancy termination. The variable was recoded and categorised into two distinct variables: adolescents who have been exposed to at least one of the media channels and those who were not (exposed to media vs. not exposed to media).

Data analysis

Data analyses were conducted using STATA 16. First, the prevalence of pregnancy termination and EBF and the percentage of adolescents who had experienced physical IPV during pregnancy were calculated and presented using figures. Second, the independent associations between physical IPV during pregnancy, pregnancy termination, and EBF in each country were examined. Finally, the effect of pregnancy termination and EBF in each country was investigated using bivariable and multivariable logistic regression models. The outcomes were displayed as unadjusted odds ratios (UORs) and adjusted odds ratios (AORs) at 95% confidence intervals (CIs) in each country and combined. Following the DHS recommendations and the survey command, the sample weights for the DV module (d005/1,000,000) were used to produce unbiased estimates.

Ethical approval

A written authorization letter was obtained from the DHS Institutional Research Board (IRB) for public usage, and ethical approval was received from the London School of Hygiene and Tropical Medicine (LSHTM) for this secondary data analysis.

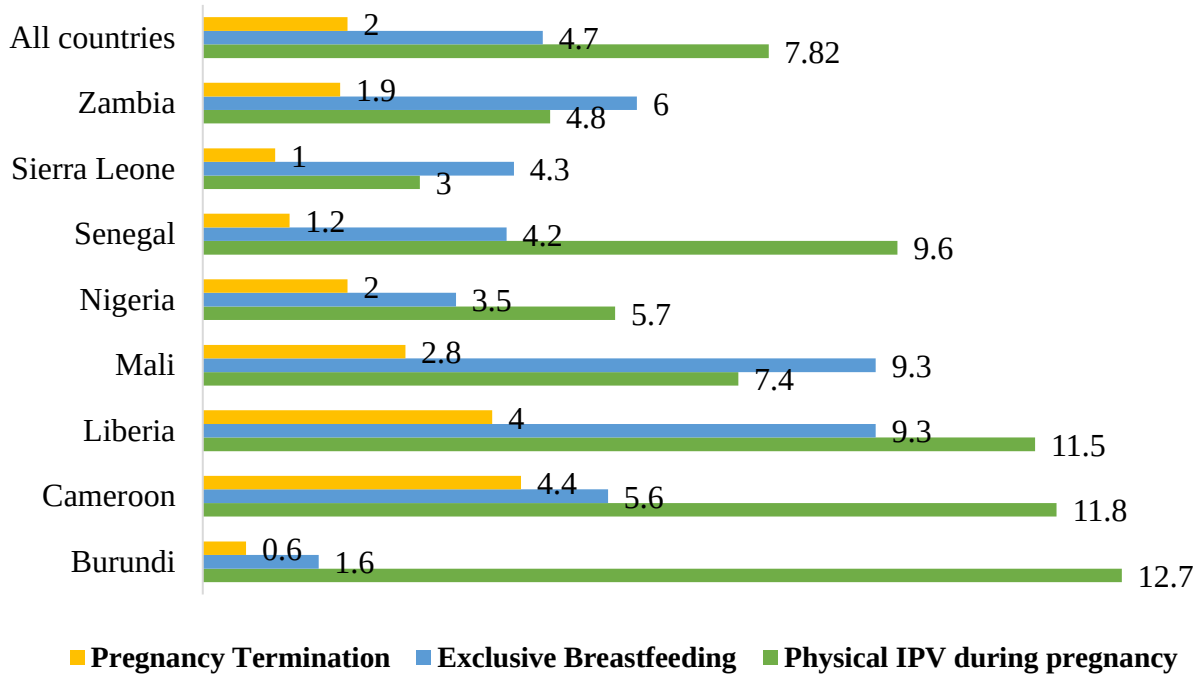
Patient and public involvement

Patients or the public were not involved in our research's design, conduct, reporting, or dissemination plans, as this is a systematic review.

RESULTS

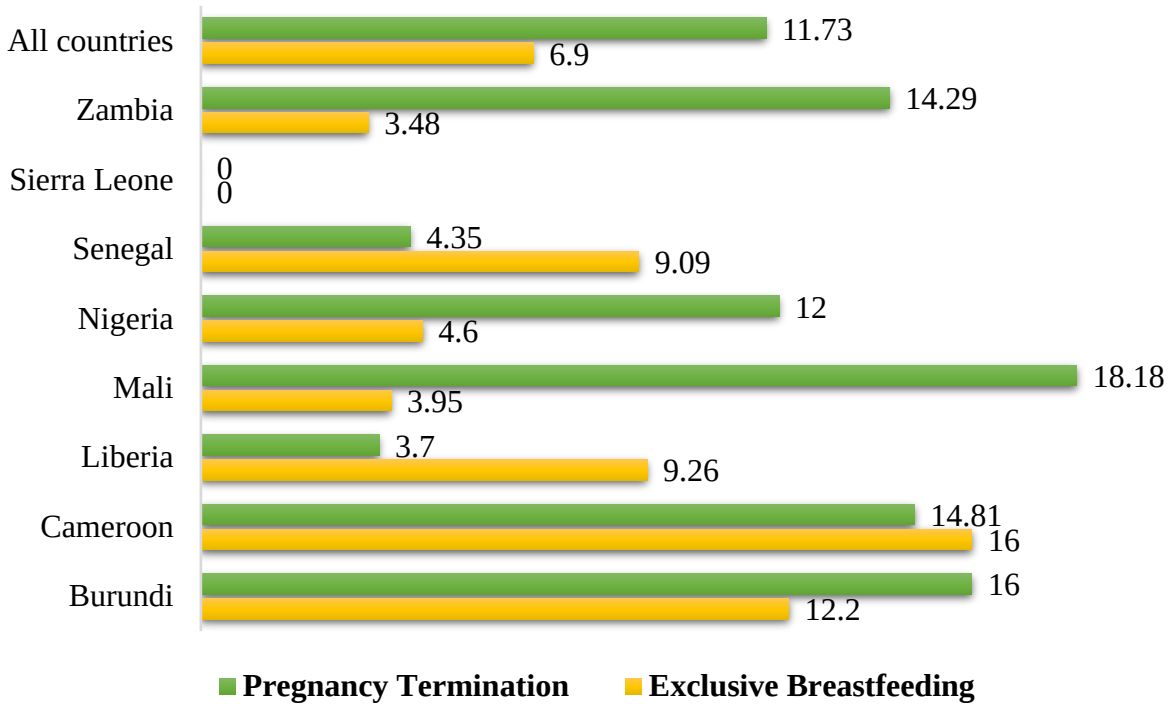
Of the 2,289 ever-pregnant adolescents, 73.3% lived in rural areas, 37.8% had a primary-level education, and 70.1% were currently living with a man. A little more than half were not employed (51.9%), 28% were among the poorest, 47.2% reported being exposed to media such as television, radio, newspapers, and internet, and 77% had more than three antenatal visits. The prevalence of physical IPV during pregnancy was 7.8% (Figure 1). The results of the bivariable analysis revealed that the prevalence of pregnancy termination and EBF among all adolescents was 2% and 4.7%, respectively (Figure 1).

Figure 1. Prevalence of physical IPV during pregnancy, exclusive breastfeeding, and pregnancy termination in eight countries



Among those who reported physical IPV during pregnancy, the prevalence was 6.9% and 11.7%. Sierra Leone is the only country among the eight included where no observations associating physical IPV during pregnancy, pregnancy termination, and EBF were found (Figure 2).

Figure 2. Prevalence of pregnancy termination and exclusive breastfeeding among adolescents who have reported physical IPV during pregnancy in sub-Saharan Africa by country



A significant association was found between physical violence during pregnancy and pregnancy termination among adolescents after adjusting for covariates **(Table 2).**

Table 2. Unadjusted and adjusted odds ratios (95% confidence intervals) examining physical IPV during pregnancy and EBF and physical IPV during pregnancy and pregnancy termination in eight countries in sub-Saharan Africa

Country	Exclusive breastfeeding				Pregnancy termination			
	UOR	[95% CI]	AOR	[95% CI]	UOR	[95% CI]	AOR	[95% CI]
Burundi	0.94	0.33-2.98	1.11	0.37-3.29	2.54	0.75-8.59	1.27	0.04-39.04
Cameroon	1.6	0.65-3.91	1.52	0.58-4.01	0.88	0.28-2.71	0.73	0.18-3.08
Liberia	0.74	0.26.2.05	0.75	0.26-2.15	0.28	0.37-2.17	Low observation (empty)	
Mali	0.44	0.13-1.53	0.41	0.12-1.48	2.57	0.80-8.25	4.81	0.96-24.07
Nigeria	0.75	0.25-2.25	0.79	0.25-2.39	1.05	0.30-3.67	2.49	0.61-10.12
Senegal	0.92	0.33-2.60	0.99	0.34-2.90	0.53	0.06-4.19	Low observation (empty)	
Sierra Leone	Low observation (empty)		Low observation (empty)		Low observation (empty)	Low observation (empty)		
Zambia	0.67	0.22-1.98	0.72	0.24-2.16	2.5	0.82-7.59	6.05	1.27-28.84
All countries	**0.84**	**0.57-1.24**	**0.79**	**0.52-1.19**	**1.3**	**0.80-2.10**	**2.29**	**1.23-4.24****

UOR: unadjusted model examining the independent association of physical IPV during pregnancy, breastfeeding;

AOR: adjusted for socio-demographic factors (place of residence, social and economic status, and exposure to media;

*p <0.05, **p <0.01, ***p <0.001

DISCUSSION

This study seeks to fill the evidence gap on the linkages between the experience of physical IPV during pregnancy and the effects on pregnancy termination and EBF among adolescents. The prevalence of pregnancy termination and EBF among adolescents in the eight countries were 2% and 4.7%, respectively. Among those who have reported physical IPV during pregnancy, the prevalence was 11.7% and 6.9%. In all eight countries, the odds of pregnancy termination were higher among adolescents who had experienced physical IPV during pregnancy after controlling for confounding factors, including place of residence, education level, social and economic status, exposure to media, and marital status.

More than 95% of infants in sub-Saharan Africa are breastfed, yet feeding habits are frequently insufficient: giving breastfed infants water and other liquids is a common practice (18). As a result, EBF is rarely practiced, especially in West Africa (19). Although we expected to find a higher prevalence of EBF among adolescents due to their younger age, research in Kenya has also found similar results consistent with ours on breastfeeding (20). The lower prevalence of EBF may be due to the unintended nature of most adolescent pregnancies and the positive correlation between EBF and intended pregnancies (20). Therefore, it may be possible that the nature of the pregnancy has fostered negative feelings related to EBF among this age group, resulting in a growth deficiency (21).

We expected an effect of IPV on EBF, given the existing evidence. For example, it has been suggested that IPV may impact the mother's mental state and, thereby, her capacity to care for or interact with the kids (17). According to Klingelhafer et al., the EBF period has been found to alter the relationship between the spouses and their wives because infants may not be allowed to share the mother's breasts with their partner, who may view them as their own (22). Nursing fosters a bond between the mother and child and promotes attachment that

excludes the spouse, who may view the child as a rival for the woman's attention and, as a result, discourages nursing and adopts a combative attitude (17). Nevertheless, there have been misconceptions associated with EBF among adolescents in low and middle-income countries (20-23). These misconceptions show that most adolescent females lack knowledge and accurate information regarding EBF-related information. Instead of the physical IPV experienced during pregnancy, inadequate information and misconceptions about breastfeeding may be potential reasons for this study's low EBF rates and lack of association with IPV.

Pregnancy termination has appeared high among all ever-pregnant adolescents in the last five years. For instance, 25% of Burundians reported pregnancy termination, including abortion, stillbirth, and induced abortion. The high rate found in Burundi was also mentioned by Ahinkorah et al. (2021) when reporting the rate of induced abortion in Eastern Africa (24). This study found an association between IPV and pregnancy termination, including miscarriages, stillbirths, and induced abortions among adolescents. The author argued that survey years, sample sizes, and target populations could cause variations across countries. For instance, several studies have focused on all women of reproductive age rather than just adolescents, which improves the likelihood that their findings would be significant due to larger sample sizes (24). A study conducted in Canada on adolescents' experiences with IPV and their propensity to seek abortions presumed that women who experience IPV have less control over their choice of contraceptive method. As a result, many of these women end up with unintended or unwanted pregnancies and seek abortions (25).

Study limitations

Certain limitations need to be recognized when interpreting the findings. First, a causal interpretation of the results cannot be established because the surveys used in this research were based on cross-sectional data. Second, because EBF, pregnancy termination, and physical IPV during pregnancy are all self-reported measures, there is a chance that information was omitted, underreported, or overreported due to social desirability bias. Despite the precautions taken to guarantee safety, privacy, and confidentiality so that adolescents more accurately report physical IPV during pregnancy, the prevalence rates mentioned in this study are likely to be underestimated because pregnancy termination, such as abortion, is illegal in all the countries unless it is life-threatening for the mother and IPV is a stigmatized issue that may prompt adolescents to refuse to disclose their experiences. Third, identifying significant associations among this age group in countries with a small sample size was challenging. Therefore, the lack of association found might be real or due to the limited sample size of ever-pregnant adolescents. The small sample size of adolescents who reported physical IPV during pregnancy further limited the ability to examine its association with complementary feeding, non-EBF, and later on with EBF and pregnancy termination.

Conclusions and recommendations

In summary, physical IPV during pregnancy is an essential factor in understanding pregnancy termination and EBF practices among adolescents. To our knowledge, this study is the first to investigate the association between physical IPV during pregnancy, EBF, and pregnancy termination in SSA. It is also the first to investigate physical IPV during pregnancy among adolescents in the region. It implies that, beyond causing severe psychological distress and injuries, physical IPV during pregnancy may have serious

consequences for adolescents' reproductive health. All efforts to increase EBF and decrease pregnancy termination among adolescent mothers may be ineffective if perceptions are not altered at the community level. Therefore, antenatal care providers must receive culturally sensitive training to identify adolescents during routine antenatal care visits and provide suitable interventions.

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7.3. Paper three summary

In Paper 3, the study focused on investigating physical IPV during pregnancy among adolescent girls in eight SSA countries and its potential impact on exclusive breast feeding (EBF) and pregnancy termination. The study revealed that the prevalence of physical IPV during pregnancy among adolescent girls in the eight SSA countries was 7.8%. This statistic highlights the alarming frequency of IPV experienced by adolescent girls during pregnancy in the region. Among adolescent girls who reported experiencing physical IPV during pregnancy, 6.9% practiced EBF. This result suggests that a relatively small proportion of these adolescents could engage in EBF despite the challenges posed by IPV during pregnancy. The study found that 11.7% of adolescent girls who experienced physical IPV during pregnancy had terminated a pregnancy. This indicates that a significant number of adolescent pregnancies were terminated in the context of IPV. Initially, in the unadjusted analysis, there was no evidence of an association between experiencing physical IPV during pregnancy and EBF. This implies that, at face value, the experience of physical IPV during pregnancy did not seem to impact EBF practices among adolescent girls. However, after controlling for various covariates including place of residence, marital status, exposure to media, the study identified a significant association between experiencing physical IPV during pregnancy and termination. The adjusted odds ratio (AOR) indicated that adolescent girls who experienced physical IPV during pregnancy were 2.3 times more likely to have terminated their pregnancies than those who did not experience such violence. Although this finding highlights a concerning consequence of physical IPV during pregnancy it may have limited the findings' applicability to other regions or countries with different social and cultural contexts and healthcare systems. In addition, the large confidence intervals for certain estimates, such as the one between physical IPV during pregnancy with termination, suggests that the observed effects may not be as precise, as expected. This could be due to

small sample sizes or demographic heterogeneity. To further explore the temporal associations between physical IPV during pregnancy, EBF, and pregnancy termination among adolescent girls in SSA, prospective or longitudinal studies are necessary. Additionally, the cross-sectional form of the study makes it impossible to demonstrate causation. These limitations emphasize the importance of interpreting the results cautiously and outlines the need for further research encompassing larger and more diverse samples to validate and refine the observed associations.

In summary, Paper 3 presents essential insights into the prevalence of physical IPV during pregnancy among adolescent girls in SSA countries and its potential effects on EBF and pregnancy termination. While there was no significant association between IPV and EBF, a strong association was found with pregnancy termination, indicating the profound impact of IPV on reproductive decisions. These findings emphasize the need for targeted interventions and support systems to address adolescent girls' unique challenges when they face physical IPV during pregnancy.

8. CHAPTER EIGHT: DISCUSSION OF THE FINDINGS

In this chapter, I detail the thesis' most important findings to advance our knowledge of the epidemiology of physical IPV during pregnancy among adolescent mothers in SSA and situate them within the broader literature. To develop a comprehensive understanding of physical IPV during pregnancy among adolescents in SSA, this discussion attempts to synthesize the findings of each results chapter produced for this thesis.

8.1.1. Systematic review and cross-cutting research knowledge

In paper 1 (Chapter 5), I synthesized the available evidence around IPV during pregnancy among adolescents in SSA using a systematic review. I used a structured process for consolidating and evaluating the existing body of research on IPV during pregnancy among adolescents in SSA, and I was able to identify the research gaps to contribute to advancing knowledge in the field of violence against women research. I searched five databases, screened 734 articles, and included nine articles; four using quantitative and five qualitative methods. The quantitative articles showed that the prevalence of IPV during pregnancy among adolescents between 10-19 ranged from 8.3% in Nigeria and 41% in South Africa, with physical and sexual violence being the most reported types of violence.

Qualitatively, three themes emerged from the systematic review including partner denial of pregnancy responsibility and controlling behaviours which sparked the violence, adolescents coping mechanisms to adapt and survive physical and psychological violence by partner, and partner and community responses to adolescent pregnancies. This resulted in physical and psychological IPV, leading to severe injuries, stigmatisation, and the use of coping strategies to protect themselves from their partner.

In addition to demonstrating the physical, sexual, and psychological IPV adolescents experience during pregnancy, the quantitative and qualitative studies also revealed the

various forms IPV can take, particularly in the case of physical and psychological IPV. Although a significant emphasis was placed on physical and psychological IPV, both analysis approaches recognized three distinct forms of IPV, including physical, sexual, and psychological violence. The research demonstrated how deeply these experiences influence adolescents during pregnancy when they are worried about their safety and well-being and the welfare of their unborn child. Additionally, it showed the adolescents' courageous but failed attempts to defend themselves from violence.

The prevalence rates for IPV during pregnancy by adolescents in SSA found in this study correspond with those found in other studies among women in reproductive age in general (15-49) in SSA countries. The reported prevalence rates for IPV during pregnancy among adolescents in the studies ranged between 8% and 40% (269–271). The stated prevalence statistics also align with most studies from the USA on physical and sexual abuse of pregnant adolescents (272,273). An early study by Berenson et. Al. (1992) suggested that IPV during pregnancy is only the continuation of violence outside pregnancy, sometimes decreasing due to the emotional attachment to the unborn child (274).

Moreover, my thesis suggests that the prevalence of IPV during pregnancy among adolescents found in the systematic review study is higher than some of those found in another research, including adult women in SSA (66). The stark discrepancy may reflect variations in the prevalence of IPV during pregnancy across different African areas. Given that most articles in my systematic review (3 out of 5) show prevalence of IPV during pregnancy above 15%, Africa has a very high prevalence of IPV during pregnancy. This is consistent with broader population patterns of IPV against African women (18). These high prevalences could result from gender inequality in Africa, mainly structured along patriarchal lines and conventional research methods (68). Qualitative investigations are required to

investigate these patterns and differences in prevalence rates generally and among pregnant adolescents.

Data on age trends demonstrate reasonably consistent age patterns, with a relatively steady prevalence in younger age groups (15 to 35) and a slight fall beyond that as shown by Devries and colleagues (65). However, our results demonstrate that the prevalence of IPV during pregnancy among adolescents between the age of 15 to 19 varies by country. This result shows that violence often occurs during a first pregnancy or early in pregnancy. They argued that as the average age of the first pregnancy rises across many countries, young mothers may represent a socioeconomically disadvantaged demographic group more likely to experience IPV.

The systematic review also provided information on IPV during pregnancy among adolescent mothers in terms of health outcomes. It established that IPV during pregnancy was associated with an increased risk of mental health issues and contracting sexually transmitted diseases. The rates of physical IPV during pregnancy were higher among adolescents with depressive symptoms (17.7%). This aligns with research from the USA, that showed that adolescents who experienced IPV during pregnancy were four times more likely to have depression and anxiety than those who did not experience IPV during pregnancy (273). These results are also consistent with those found in African-American women and pregnant adolescents(319,320). They concluded that pregnant adolescents who have experienced IPV are at a greater risk for depression and are less likely to have a healthy relationship than those without a history of IPV during pregnancy. International scientific literature indicates that postpartum depression affects adolescent mothers more frequently than adult mothers (277). Despite the significant burden of mental health issues during the perinatal period, particularly in adolescents, there is a dearth of data assessing the prevalence of perinatal depression in LMICs. According to a study done in Kenya, the percentage of

adolescents expressing clinically high depressive symptoms on the Edinburgh Postnatal Depression Scale (EPDS) was 32.5% (278).

Adolescent pregnancy and motherhood are associated with stigma, gender inequalities, and disruption of educational goals (279) are stereotyped and discriminated against which puts them at a high risk for postpartum depression and social marginalization (279). Moreover, low socioeconomic status, a lack of family support, social exclusion, a history of physical and sexual violence, and IPV are risk factors linked to severe depression in pregnant and postpartum adolescents (280). They may have greater rates of prenatal and postnatal depression than adult mothers since they are not screened for depression symptoms or are unaware of prenatal and postpartum depression (281). In light of this, pregnant adolescent girls could suffer in silence. An inquiry into this phenomenon is essential because it is currently unclear how frequently depression and physical IPV occur among pregnant adolescents in SSA.

The systematic review discovered a link between IPV during pregnancy and physical health. According to an American study on adolescent reproductive coercion, adolescents who reported IPV during pregnancy were more likely to seek STI treatment (323), and recent reproductive coercion and IPV were positively associated with STI testing (283). Other studies, nevertheless, also refutes this conclusion. For instance, Miller et al. reported that adolescents who experienced relationship abuse were likelier to have forgone health treatment, including not seeking care (284).

Given that different IPV experiences are linked to diverse risks for mental health, the distinct correlations identified by the systematic review support the necessity of screening adolescents for these experiences during pregnancy. Nevertheless, these results may be explained by a number of variables included in the qualitative findings. The qualitative analysis also recognized valuable information, such as coping strategies not always captured

by the quantitative results. For instance, studies have shown that IPV experiences during pregnancy have led to survivor responses to escape from the violence (265,273,285). In a study analyzing the coping mechanisms of pregnant adolescents, Landenburger four-stage process of coping with abuse in adult women was described (265). Rationalization occurs during the binding stage, with an emphasis on the favorable features of the relationship. Cover-up and self-blame occur in the enduring stage. There is help-seeking during the disengagement period. The recovery stage is a sign of letting it go (265). Another study on adolescent coping strategies discovered that most young people demonstrated an emotion-focused rather than a problem-focused style (286). Since adolescents lack the life skills that facilitate negotiation or decision-making, reluctance in decision-making shows the poor problem-solving abilities typical of adolescents and suggests difficulties in making strategic decisions. Pregnant women may feel driven to respond to IPV to protect their unborn child (287). Due to distinct developmental and environmental circumstances, such as physical, psychological, and cognitive changes, increased stress, and the transition to parenthood, all of which are psychologically stressful, IPV may be particularly severe in adolescent moms (285). IPV during pregnancy can be triggered by the stress of becoming a parent, and adolescents who become mothers may not be as emotionally prepared for parenthood and may be more financially dependent on their partners (288). According to the United States Pregnancy Risk Assessment Monitoring System Study, the majority of US women experience less IPV during pregnancy (289). However, some research suggests that violence against pregnant women can just be a continuation of violence against intimate partners in the past (289).

8.1.2. Prevalence and severity of physical intimate partner violence during pregnancy among adolescents in eight sub-Saharan African countries: a cross-sectional study

Although studies and analyses have been conducted using different sample populations, countries, and theories, the analysis presented here is the first to use data from SSA regarding physical IPV among adolescents during pregnancy and its correlation with severe injuries and lifetime severity of IPV. According to the results, the prevalence of physical IPV during pregnancy among the eight SSA countries ranged between 3% in Sierra Leone to 12.7% in Burundi, with an overall prevalence of 7.8% for all countries. This finding underscores the alarming extent of IPV experienced by this vulnerable population. Adolescents are at a critical juncture in their lives, and the experience of IPV during pregnancy can have profound and long-lasting effects on their physical and emotional well-being(133). These results align with findings from previous studies highlighting the heightened risk of IPV during pregnancy among adolescents in SSA (290). The factors contributing to this increased risk are multi-level including economic dependence, gender inequalities, and cultural norms perpetuating violence (291). This study reaffirms the urgent need for interventions to reduce the prevalence and severity of physical IPV during pregnancy among adolescents in this region.

Among adolescents who have reported physical IPV during pregnancy, the prevalence of severe injuries by partners was 25.14%, while the lifetime prevalence of severe physical IPV was 24%. These results revealed an interaction between physical IPV during pregnancy and severity of IPV during lifetime, such that those who experienced physical IPV during pregnancy were also more likely to have experienced severe physical IPV during their lifetime. Although there was an association between physical IPV and the severity of IPV, the results make it difficult to say if physical IPV rises during pregnancy. However, studies have

indicated that adolescents between the ages of 13 and 15 see an increase in the intensity of IPV (292,293).

Additionally, longitudinal studies from high income countries using survey data on dating victimization in public schools in USA have shown that the incidence of IPV among adolescents declines as they approach maturity (294–296). In Quebec, Canada, a study seeking to ascertain the prevalence of IPV between pregnant women and adolescents seeking abortions and those who choose to carry their pregnancy to a term found that the prevalence of IPV increased with age (297). A study that used the Canadian Nationally Representative Survey discovered that participants under 20 years who participated in the study during the 12 months before the birth of the baby had risky health behaviours associated with IPV (298).

A high prevalence of physical IPV during pregnancy among adolescents was also reported in a study looking at the correlation between IPV during pregnancy and mental health among adolescents living in New York. 38% of participants reported experiencing physical, sexual, and psychological IPV during pregnancy, with psychological IPV being the most prominent (273). The authors found that adolescents who experienced IPV during pregnancy were more likely to retaliate to defend themselves from getting hurt. However, the retaliation led to prenatal distress, putting adolescents at risk for severe injuries (273). Unfortunately, the likelihood of experiencing adverse mental health effects was highest in adolescents who engaged in bidirectional violence while pregnant. In particular, compared to adolescents who did not encounter IPV, pregnant adolescents were nearly four times as likely to suffer depression, nearly five times as likely to feel anxiety, and nearly three times as likely to have prenatal discomfort (299). In a study examining the prevalence of IPV during pregnancy by Latino adolescents in the USA, there was a higher prevalence of physical IPV among pregnant adolescents than adolescents who were not pregnant (299). Pregnant adolescents reported physical IPV as slightly higher (44%) than non-pregnant respondents

(39%). Adding to that, they were also more likely to report minor injuries but also more likely to inflict both psychological and physical injuries on their partners. This finding is consistent with prior research and aligns with the previous argument that adolescent couples have a high rate of mutual physical or psychological violence (273).

Based on the thesis findings drawn from the DHS analysis, I was unable to ascertain what proportion of physical IPV during pregnancy were conflict tactics due to situational violence, which is when control and IPV are not intended, resistant IPV, in which a partner defends against IPV, or mutual violent control, in which both partners are controlling and violent at the same time (273). In fact, physical IPV by both partners indicates a frequent and highly conflictual environment that unfortunately, may spread to early romantic relationships (273). IPV perpetrated by women while pregnant may have a larger impact on how they develop as adolescents and with whom they are in close relationships. Adolescents may lack the communication and negotiating abilities needed for the complexities of intimate relationships that could raise the risk of physical IPV throughout pregnancy and parenthood (273).

To fully comprehend the complexities associated with each growth pattern, further research is still required into the various developmental pathways that young individuals take from an early age with an emphasis on SSA settings. These findings highlight the importance of assessing harmful relationship behaviors among pregnant adolescents and promoting general education. This study supports the urgent need for developmentally appropriate programmes by emphasizing the impact of reproductive coercion on adolescents. Because IPV during pregnancy can manifest differently in adolescents compared to adults, it is crucial to look at groups of exclusively adolescents.

8.1.3. Exclusive breastfeeding, pregnancy termination and their association with physical IPV during pregnancy: the analysis of demographic and health surveys in eight sub-Saharan African countries

The investigation in paper 3 showed no meaningful correlation between physical IPV experienced during pregnancy and EBF. This result is a little surprising because it contradicts another study that found a connection between inadequate newborn feeding practices and IPV(300). One possibility is that because of their particular circumstances, such as early marriage or economic dependency, adolescents who experienced physical IPV during pregnancy could not have received enough assistance and information regarding breastfeeding (300). Furthermore, it is important to consider the intricate sociocultural environment of SSA, where a number of factors, such as access to healthcare services and community norms, may impact EBF practices. In fact, access to health services significantly influences EBF, with convenient and available healthcare facilities promoting lactation advice and support. Moreover, community norms and societal perceptions play a crucial role, as cultural beliefs and social attitudes toward breastfeeding impact a mother's decision and ability to exclusively breastfeed her infant (300).

On the other hand, with an adjusted odds ratio of 2.3, this study discovered a strong correlation between physical IPV during pregnancy and pregnancy termination. This finding emphasizes the significant influence of IPV on adolescent girls' reproductive decisions and results in SSA. These difficulties may manifest as compulsion, threats, or a fear of additional abuse from their partners, which may cause them to make decisions like ending a pregnancy. Similar links between IPV and pregnancy termination have also been found in another study conducted in the USA (301). Our result is in line with a systematic review using 25 SSA countries that found a link between IPV and pregnancy termination using the DHS from 25 SSA countries (98). This study suggests that 11% of adolescents between ages 15 to 19 who

have terminated pregnancy have also experienced IPV. Additionally, Ahinkorah discovered a link between IPV and adolescent girls' and young women's pregnancy termination in the SSA (302). Similarly, in New Zealand, Fanslow et al. (2008) found a link between IPV and pregnancy termination (303). Fanslow et al. (2008) explained the correlation by pointing out that women who encounter IPV could not be emotionally equipped to care for their offspring, leading them to choose to end their pregnancy. In addition to experiencing mental health issues, pregnant women who encounter IPV also choose to end their pregnancy (303). Furthermore, women who are in violent relationships may have little control over their sexual life, which puts them at risk of becoming pregnant against their will (304). In light of this, women in these kinds of relationships could feel pressured by their partners to end the pregnancy on the grounds that they don't want the child. Furthermore, women in violent relationships have little options available to them (304). These results urge for public health practitioners to pay close attention to the impact of IPV on patient situations, particularly among adolescents. This is especially true for those who offer prenatal and postabortion care. Nonetheless, this research highlights the necessity of policies and initiatives that enable adolescents girls to make independent decisions regarding their reproductive health.

Although this paper provides insightful information about the connections between physical IPV during pregnancy, EBF, and pregnancy termination, it is imperative to take an intermediate step that includes focused treatments and all-encompassing policies. In order to make a significant difference and help ensure that adolescents in SSA have healthy pregnancies and are able to make educated decisions during prenatal care visits, it is imperative that this knowledge gap be closed with useful recommendations. A first approach might be to put in place community-based initiatives that educate people about gender equality, reproductive health, and dispute-resolution techniques. Advocating for legislative changes that address GBV, improve access to healthcare services, and upholding adolescents'

rights to make informed decisions regarding their reproductive health is essential at the same time. These intermediary measures that combine research findings with practical interventions, can set the stage for a more substantial shift in encouraging healthier pregnancies and informed choices among adolescent girls in SSA.

8.2. The role of theoretical frameworks in understanding physical IPV during adolescent pregnancy

While the primary objective of this research was to examine the prevalence, severity, and health outcomes associated with physical IPV during adolescent pregnancy in SSA, it is essential to recognize the pivotal role theoretical frameworks play in comprehending and addressing this critical issue. The various theories that provide light on the complex interactions of power dynamics, cultural norms, psychological complexities, and contextual factors unique to this vulnerable group all contribute to a better knowledge of the subject. Their explanations go beyond traditional frameworks to show how socio-cultural elements, trauma, learned behaviours, gendered power dynamics, and resource inequalities all play a complex role in causing and sustaining IPV in adolescent pregnancy. By elucidating the multi-level factors contributing to IPV during adolescent pregnancy, my research underscores the complex interplay of individual, interpersonal, community, institutional, and societal influences on violence in this population. The findings both from the systematic review and the DHS analysis for instance showed how factors such as level of education, age, marital status, SES, community responses, early marriages, are been cited as risk factors for adolescents who have experienced physical IPV during pregnancy. While the SEM provides a comprehensive framework for understanding IPV, it is crucial to acknowledge and address certain critiques to ensure a nuanced and inclusive analysis. One significant critique of the social-ecological model is its tendency towards functionalism, which may oversimplify the

dynamics of power and oppression within intimate relationships. By viewing all factors within the model as equal and calculable, there is a risk of overlooking systemic inequalities such as patriarchy or racism, which can profoundly impact individuals' experiences of IPV.

Therefore, while adopting the social-ecological model as a framework for prevention and intervention in IPV is valuable, it is essential to integrate feminist critiques and principles into the analysis. Feminist theories offer a valuable perspective in highlighting the role of systems of power and oppression in shaping IPV dynamics. These theories emphasize the need to consider broader societal structures that perpetuate gender inequality and violence against marginalized groups. Incorporating feminist principles into the SEM involves recognizing and challenging power imbalances, interrogating societal norms that contribute to violence, and centering the voices and experiences of marginalized individuals within research and interventions.

This integration allows for a more nuanced understanding of the complexities of IPV, acknowledging the intersections of gender, race, class, and other social identities that influence individuals' vulnerabilities and experiences of violence. By embracing an intersectional and feminist approach, we can develop more effective and inclusive strategies to prevent and address IPV within diverse communities.

As a result, this all-encompassing approach calls into question earlier isolated frameworks and advocates for a more holistic viewpoint that considers the complex interplay between power dynamics, socio-ecological factors, and layers of vulnerability that shape IPV among pregnant adolescents. Applying theoretical perspectives can provide a deeper understanding of the complex dynamics surrounding IPV during adolescent pregnancy, highlighting the potential risk and protective factors. While this study primarily explored the empirical evidence, integrating theoretical underpinnings allows for a more holistic and nuanced perspective, acknowledging their importance for future studies. This section briefly

highlights the significance of theories that can be applied to understanding physical IPV during adolescent pregnancy. By doing so, I aim to provide a foundation for future research and interventions that consider the multifaceted aspects of this issue. This study contributes to a better knowledge of the scope of physical IPV in adolescent pregnancy and the complex factors that contribute to it in SSA.

Additionally, I have emphasised the potential pathways through which theoretical frameworks can inform policies and practices to prevent and address IPV among adolescent girls during pregnancy, ultimately working towards a safer and healthier environment for these vulnerable individuals. table 8.2 summarizes the key elements of each theory, including strengths and limitations. The interpretation below is based on my understanding of each theory and how they can be applied to physical IPV during pregnancy among adolescents in SSA.

Table 8.2. Strengths and limitations of theoretical approaches

IPV theories	**Strengths and** limitations in applicability of theory to IPV during pregnancy among adolescents	Relevance of theory for understanding IPV during pregnancy among adolescents
Feminist	Strengths: Analysis of power imbalance gender inequalities; emphasis on societal norms. Intersectionality analysis of IPV. Limitations: Overemphasis on gender. limited focus on male perpetrators.	Feminist theory places a special emphasis on the complex power relationships, gendered influences, and how these relationships create and maintain violent incidents involving pregnant adolescents.
Power and control wheel	Strengths: Highlights strategies employed by offenders to dominate and control. The wheel is an educational tool for adolescents and healthcare providers. Limitations: The simplicity of the wheel might not fully capture adolescents' experience of physical IPV during pregnancy. It is not representative of all genders, a static representation of IPV.	The Power and Control Wheel clarifies the complex dynamics of coercion, showing how these strategies appear and continue to be used in pregnant adolescents.
Social learning	Strengths: Offers behavioural perspective on how IPV may mimic. Recognizes the role of modelling behaviours. Limitations: It only focuses on observational learning and does not account for other aspects such as economic and psychological background.	Social learning theory helped understand how adolescents, exposed to violence, may adopt aggressive behaviours as a means of conflict resolution in intimate partner relationships, highlighting the influence of environmental influences.
Trauma bonding	Strengths: It helps to understand the emotional attachment between the victim and the abuser, offers insights into difficulties faced by survivors when attempting to leave an abusive relationship, and provides a good understanding and dynamic of the victim during the trauma recovery process. Limitations: Limited empirical research linking trauma bonding as the primary explanation for physical IPV during pregnancy in adolescents	It explains how adolescents who are subjected to IPV while pregnant frequently form close emotional bonds with their abusive partners, influencing their decisions and actions even in the face of obvious risks.

Walker's cycle of violence	Strengths*:* Offers a comprehensive understanding of the dynamics of physical IPV during adolescent pregnancy by delineating the various stages, such as the phase of tension-building, intense battering, and honeymoon. It assists in the identification of potential catalysts and risk factors for violence during pregnancy. Limitation: It does not account for other cultural, economic, and institutional factors, which might limit its explanatory power.	Walker's cycle of violence offers a framework for understanding recurring patterns of IPV during pregnancy, highlighting the cyclical nature of tension, battering, and honeymoon phases.
Situational and background	Strengths: Consider the broader situational and background factors that influence violence in general. Provide research with situational and background triggers for a better understanding of the situation. Limitation: It might not accurately predict or explain variations in physical IPV during pregnancy among adolescents since background factors vary among individuals and settings.	The study reveals that IPV during adolescent pregnancy is influenced by various factors including environmental stressors, personal history, and societal norms, emphasizing the need to examine both immediate circumstances and underlying life experiences.
Stockholm syndrome	Strength: Explores how adolescents use coping strategies like bonding with their abuser as a survival mechanism in the face of physical IPV during pregnancy, revealing their psychological aspects. Limitation: Adolescents could be misunderstood as being pressured or misled instead of voluntarily participating in violent relationships and contributing to victimization.	Stockholm Syndrome provides insight into the psychological dynamics that sustain abusive relationships, especially during vulnerable life stages like pregnancy, highlighting the role of emotional trauma and power dynamics.
Goode's classical resource theory	Strength: Exposes the effects of interpersonal power dynamics and resource inequities on violence, particularly during adolescent pregnancy. Limitation: Only focusing on economic resources potentially oversimplified other factors, including emotional dependence, societal stigma, or different contextual variations.	The research uses Goode's classical resource theory to explain how resource imbalances, such as education and financial stability, contribute to IPV among adolescents during pregnancy, intensifying stress and conflicts.
Socio-ecological model	Strength: Multifaceted understanding of factors contributing to physical IPV pregnancy. Limitations: The inability to pinpoint specific causal factors makes it challenging to prioritize interventions. Cultural differences in the influence of socio-ecological factors on IPV during adolescent pregnancy may not be adequately considered.	The SEM reveals how individual, interpersonal, community, institutional, and societal factors influence IPV during adolescent pregnancy, highlighting the complex dynamics of this issue.

In order to understand physical IPV during adolescent pregnancy, feminist theory connects with a number of different theories because to its emphasis on gender and power dynamics in relationships (154–156). It supports the Power and Control Wheel's portrayal of abusers' methods for controlling victims by highlighting social gender norms and expectations that worsen power disparities (155,159). In addition, the Social Learning Theory supports the feminist theory's focus on the influence of societal norms by emphasising how adolescents may witness or encounter violence and then adopt such behaviours as a means of resolving conflicts (162). The psychological complexity of attachment to abusers are illustrated by Trauma Bonding Theory (173) and Stockholm Syndrome, which are especially poignant during pregnancy and support the Feminist Theory's power dynamics thesis (177).

Walker's Cycle of Violence further breaks down the stages of abuse (174), emphasising how relationship conflicts can intensify mental and physical violence, supporting the Feminist Theory's claim that pregnant women are more vulnerable (155). Situational and background theories complement feminist theory by highlighting how societal norms, trauma, and early experiences shape a person's susceptibility to violence. They also highlight the influence of external factors and personal experiences (171). Goode's Classical Resource Theory emphasises the stressors such as lack of financial means associated with adolescent pregnancies that might worsen IPV and the lack of resources, which is in line with the feminist theory's thesis on power imbalances (180). These theories are brought together by the SEM, which highlights the multi-level nature of IPV, ranging from individual to societal (157,184). This reinforces the feminist theory's demand for all-encompassing, multi-level solutions (185). Overall, these theories intersect and complement each other in understanding IPV during adolescent pregnancy, emphasizing the intricate interplay between social, psychological, and contextual factors, underscoring the need for multifaceted interventions to tackle this complex issue comprehensively.Indeed, the application of these

diverse theoretical frameworks has specific limits that may impact how results are interpreted, even though they offer a thorough understanding of physical IPV during adolescent pregnancy. First, the fact that these ideas are frequently derived from broad populations or certain contexts may limit their direct relevance to the situations and experiences that pregnant adolescents face. Second, no single theory may adequately capture or explain the complex interplay between psychological, sociocultural, and environmental elements that contribute to physical IPV during adolescent pregnancy. Furthermore, the dynamic nature of relationships and the intrinsic diversity of the adolescent population present hurdles to the development of a universal framework that can be applied to all situations. Furthermore, these theories frequently concentrate on particular facets of IPV, which may ignore the connections and concurrent actions of several variables that contribute to IPV in the lives of pregnant adolescents.

Finally, the lack of empirical studies that explicitly address physical IPV during adolescent pregnancy may limit the breadth and depth of understanding gained from these theories, which could result in preliminary or insufficient findings. Therefore, even though these theoretical frameworks provide insightful information, understanding the complexity and nuance of physical IPV during adolescent pregnancy requires an appreciation of these frameworks' limits.

8.3. A revised conceptual framework for understanding factors associated with the experience of physical IPV during pregnancy by adolescents in SSA based on my findings.

Most studies looked at personal context-related factors that affect IPV during pregnancy. While it is critical to think of IPV as a complex issue influenced by individual, familial, communal, and societal interactions, there is not much research that looks at the risk factors for physical IPV in adolescent pregnancy in SSA. Although our study was not focused on risk and protective factors, discussing some demographic characteristics associated with adolescents experiencing physical IPV during pregnancy is still important. I employed the SEM, the most popular model for comprehending violence (1,185), in acknowledgment that no single element could adequately explain the complexity of why some women are at a higher risk of IPV while others are not (305). Along with a previously described family and individual risk variables, individual and community factors have a considerable and consistent influence on the occurrence of IPV in pregnancy (189).

Physical IPV during pregnancy was positively correlated with various demographic factors in the current study, including place of residence, level of education, socioeconomic status, and marital status. As shown by other research among adult women (306,307), adolescents who describe the existence of groups in their community that legitimize IPV or who report a lack of social support for victims, as shown by our systematic review, are more likely to have an elevated risk of IPV in pregnancy. According to a qualitative study conducted in Nepal that supports this conclusion, women were more likely to tolerate and accept the IPV situation (308) in a society where violence is accepted. Regarding individual-related factors, the findings across the three research papers included in this thesis confirmed that violence increases IPV. Factors related to the individual domain include marital status and employment status. Being currently in a relationship and employed was associated with

adolescents with physical IPV during pregnancy experience. Marital and employment status appear then to be the strongest factors in the logistic regression model. The results could, however, be attributed to the limited sample size, the overlapping effects, or other factors that need additional examination. Our research supports the idea that substantial determinants at the individual and community levels are present in an ecological model of physical IPV during adolescent pregnancy. However, the WHO and CDC have placed an even greater focus on the interaction of personal, interpersonal, social, and communal factors that affect the risk of IPV victimization during pregnancy among women in reproductive health in general (1,309).

While the social-ecological model provides a comprehensive framework for understanding IPV, it is crucial to acknowledge and address certain critiques to ensure a nuanced and inclusive analysis. One significant critique of the social-ecological model is its tendency towards functionalism, which may oversimplify the dynamics of power and oppression within intimate relationships. By viewing all factors within the model as equal and calculable, there is a risk of overlooking systemic inequalities such as patriarchy or racism, which can profoundly impact individuals' experiences of IPV.

Feminist theories offer a valuable perspective in highlighting the role of systems of power and oppression in shaping IPV dynamics. These theories emphasize the need to consider broader societal structures that perpetuate gender inequality and violence against marginalized groups. Incorporating feminist principles into the social-ecological model involves recognizing and challenging power imbalances, interrogating societal norms that contribute to violence, and centering the voices and experiences of marginalized individuals within research and interventions.

Therefore, while adopting the social-ecological model as a framework for prevention and intervention in IPV is valuable, it is essential to integrate feminist critiques and principles

into the analysis. This integration allows for a more nuanced understanding of the complexities of IPV, acknowledging the intersections of gender, race, class, and other social identities that influence individuals' vulnerabilities and experiences of violence. By embracing an intersectional and feminist approach, we can develop more effective and inclusive strategies to prevent and address IPV within diverse communities.

9. CHAPTER NINE: STUDY LIMITATIONS, POLICY RECOMMENDATIONS

This thesis contributes to the evidence base on IPV during adolescent pregnancy in SSA. While it offers important insights and highlights the urgency of addressing this issue, I acknowledge the limitations and the need for additional research to build upon our findings. An important strength of my PhD thesis is the comprehensive methodology I employed. I combined a systematic review of existing literature with an analysis of DHS data from eight countries in SSA. This approach allowed me to use data from the DHS to support or dispute findings from the systematic review.

Moreover, this study addresses a critical gap in the literature by focusing on physical IPV during pregnancy among adolescents in SSA. The results section of this thesis examines three papers individually, each contributing to the understanding of IPV during pregnancy among adolescents. However, it's important to note that each paper also has its limitations, which are discussed in detail in the results section.In this section, I outline major practical difficulties during the analysis and overall research for the thesis, along with the limitations of the results.

9.1.1. Systematic review limitations

The systematic review provides a synthesis of existing research on IPV during adolescent pregnancy SSA. It offers insights into an important, but understudied area and highlights on adolescents experiences, which can inform interventions and policies tailored to their needs. The review includes research from multiple SSA countries, providing a regional perspective on IPV during adolescent pregnancy. However, the lack of representativeness from more SSA countries limits the generalisability of the findings.

A significant limitation is the relatively small number of studies included – nine studies from 5 countries. This limited pool of studies do not fully capture the diversity of experiences across SSA, and the findings are not fully generalisable. In addition, the small sample sizes of

pregnant adolescents who faced IPV in most studies also affects the generalizability of the findings, adding to the fact that the review only includes peer-reviewed articles published in English. This excludes relevant studies in other languages or grey literature sources. This could introduce publication and language bias. Furthermore, the review notes that some of the included quantitative studies had low-quality scores that could affect the reliability of the findings from these studies. The review focuses on the prevalence, severity, and health outcomes of physical IPV during adolescent pregnancy, with less attention on protective factors and interventions. Future research could explore these areas more comprehensively. Despite these limitations, the systematic review provides a valuable foundation for future research and policy development to address IPV during adolescent pregnancy in SSA. It highlights the need for more comprehensive, high-quality studies to understand the dynamics better and develop effective interventions.

Despite the fact that there are only a few included articles, it is significant to note that this represents the status of the literature on IPV during pregnancy among adolescents in SSA at this time. This restriction is due to several reasons that include the specific nature of the topic and the lack of high-quality studies. I ran a rigorous and in-depth search across numerous databases, and I believe the papers included in the evaluation consists of all currently available research. To ensure that the included studies are high quality, I have conducted a careful assessment of the quality of included studies.

Additionally, I have attempted to not make unjustified claims and have carefully described the consequences of the research in the discussion part of the study. The main strength of my study is the rigour of the systematic approach taken and the clarity of the reporting. This helps to reduce the limitations of few included articles. The method section in chapter four thoroughly explains my study's methodological strengths and weaknesses.

9.1.2. Limitation of the DHS analysis of the prevalence, severity, and health outcomes associated with physical IPV during pregnancy among adolescents

Despite the complexity of this issue and the increasing number of adolescents experiencing IPV during pregnancy, the primary available data source to further inform us of this issue in SSA countries remains the DHS. Despite the alarming rates of IPV during pregnancy among adolescents in SSA, there has been a dearth of research on this topic.

My research is among the first to rigorously analyse the prevalence, severity, and health outcomes of physical IPV during pregnancy among adolescents, highlighting an urgent public health issue. For these reasons, the results of our study underscore the pressing need for evidence-based policies and interventions to address physical IPV during adolescent pregnancy. By highlighting the interplay between early pregnancy, EBF and pregnancy termination, my study offers valuable insights that can inform the development of targeted interventions to improve the well-being of adolescents in SSA.

Although the DHS is the only reliable and important available source of data for the analysis of adolescents' experiences of IPV during pregnancy, it still does not provide specific information to explore IPV dynamics including all the different types of IPV such as sexual and psychological during pregnancy. Moreover, the data cannot help us comprehend the context of IPV during pregnancy for each country. There is a need for qualitative work to explore the perceptions of pregnant adolescents and IPV, as well as contextual factors. There are limitations to DHS data and the rigour by which it can explain complex issues, especially when conducting a comparative analysis across ages.

Finally, the DHS data analysis employed a cross-sectional design, limiting our ability to establish causality or examine the temporal relationships between variables. Longitudinal studies would provide more robust evidence on the consequences of physical IPV during

adolescent pregnancy. While our study provides valuable insights into specific SSA countries, the generalizability of our findings to the entire region may be limited due to cultural, social, and economic variations. Further research should consider these contextual factors.

The DHS has shown a number of difficulties related to EBF and pregnancy termination. According to my research, pregnancy termination—abortion, stillbirth, or miscarriage—is common in many SSA locations for reasons that the DHS was unable to ascertain. Additionally, the DHS disclosed differences in EBF rates, indicating that although breastfeeding has many advantages, a significant proportion of babies globally are not breastfed for the full six months as recommended by the WHO. The socioeconomic factors that largely contribute to the low rates of EBF have also been made clear by these surveys, highlighting the necessity of focused interventions and supportive policies to support and encourage this essential infant feeding practice.

Our research demonstrates that being pregnant does not prevent physical IPV from happening. Compared to earlier research conducted in SSA, the prevalence estimates of physical IPV during pregnancy in this study are lower, probably because adolescent pregnancy is decreasing (68,310). Additionally, some African studies included adults and adolescents, making it challenging to discern information and experiences exclusive to adolescents (68,73,311). Various methodologies employed in previous studies might have influenced the increased disclosure or the actual rise in reported cases of IPV during pregnancy, potentially contributing to the higher prevalence observed in those studies. There is a need to improve participant privacy and organise a secure environment for boosting the disclosure rate when collecting data on delicate topics like IPV (213). Since SSA has one of the highest rates of physical IPV, social and community norms may promote the idea that the community is not obligated to get involved in family matters. These factors may also

contribute to the high rates of physical IPV observed in this study. However, I hope my study will influence policy development and intervention strategies to improve the lives of adolescents in the region.

9.2. POLICY IMPLICATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

A growing body of research suggests that IPV during pregnancy can lead to poor maternal and newborn outcomes in predominantly adult women (23,312–314). Adolescents for instances are still not taken seriously, even though maternal pregnancy difficulties, such as pregnancy termination and improper breastfeeding, are linked to unfavourable outcomes. Direct, mental health, behavioural, and biological effects are just a few theories on how IPV may affect adverse maternal and newborn outcomes (315). All of these processes offer opportunities for medical professionals to take action. The first step in treating physical IPV during adolescent pregnancy is to screen for it, and healthcare professionals must be trained to spot and manage it.

Policymakers should prioritize the development and implementation of tailored interventions that address IPV during pregnancy among adolescents in SSA. These programs should encompass comprehensive sexual and reproductive health education, life skills training, and awareness campaigns tailored to the needs of adolescents (316,317). For instance, health systems in SSA should integrate IPV screening and management protocols into routine antenatal care services. Training healthcare providers to recognize signs of IPV and provide appropriate support and referrals for adolescents experiencing violence during pregnancy is crucial (318). Healthcare practitioners should participate in training programs to improve their capacity to identify IPV symptoms, deliver appropriate care, and provide resources for intervention and support. Governments should evaluate and reinforce IPV-

related legal frameworks to protect adolescents adequately. Providing prompt justice for victims may entail amending the law, toughening the offenders' punishment, and expediting the legal system. Interventions within the community are crucial in treating physical IPV during pregnancy. Programmes that challenge negative gender norms, facilitate healthy relationships, and offer safe spaces for adolescents to seek help and advice should be supported by policies (319).

Healthy relationships across the lifetime should be the focus of initiatives to successfully stop the start of IPV even before pregnancy, with a particular emphasis on children and adolescents (16). Programmes and policies must be created that are sensitive to the at-risk groups and based on cultural considerations. To address IPV in diverse communities, it is crucial to discover ways to incorporate a variety of professional viewpoints as well as enhanced community involvement. Law enforcement, nurses, doctors, social workers, advocacy organizations, and partnerships between academia and the community are a few examples of these views, but they are not the only ones. Comprehensive, coordinated policies and processes that make the most of available community resources are needed for effective responses to IPV. Given the link between insufficient educational possibilities and physical IPV among pregnant adolescents, policymakers should work to increase young girls' access to high-quality education. This includes programmes to lower school dropout rates, offer alternatives to traditional education, and establish welcoming learning environments that give females the power to decide for themselves what they want to do with their lives (320). Policies and programmes should emphasize strategies for economically empowering adolescent girls and young women. This covers options for revenue generation, vocational training, and skill development. Financial independence can give individuals' greater control and options, lessening their susceptibility to IPV. Healthcare professionals greatly aid the identification and support of adolescents experiencing IPV during pregnancy.

Adding to that, future research should prioritize longitudinal studies to investigate the long-term consequences of IPV during pregnancy among adolescents in SSA. These studies would provide valuable insights into the trajectories of health outcomes and the intergenerational impact of violence (321). Research should also explore protective factors that buffer against IPV during pregnancy among adolescents. Understanding resilience factors, such as social support networks, community engagement, and empowerment strategies, is essential for developing effective interventions (322,323). More qualitative and contextual studies are needed to deepen our understanding of the socio-cultural determinants and contextual nuances influencing IPV during pregnancy among adolescents. This includes research that explores community attitudes, gender norms, and structural factors contributing to violence (324). This research can shed light on the complex dynamics of abusive relationships, coping mechanisms, and resilience-building elements. The analysis must take an intersectional stance, which considers how aspects like age, gender, social class, and cultural background interact to affect how adolescents experience physical IPV during pregnancy. This strategy can assist in adjusting interventions for particular subgroups.

In terms of interventions, comprehensive reviews of physical IPV prevention and intervention programs aimed at adolescents should be carried out. Evaluating the efficacy of these programs is essential to develop evidence-based policies and ensure that resources are deployed efficiently. The broader health effects of physical IPV in adolescent pregnant women also requires further exploration. This covers research on the impact on neonatal and paediatric health and studies on mental and reproductive health. The research community should do this to evaluate the effects of policy modifications and interventions meant to address IPV among adolescents in general. Over time, this may assist in adjusting and improving policy strategies.

9.3. CONCLUSION

In conclusion, this thesis has delved into the profoundly complex and pervasive issue of physical IPV during pregnancy among adolescents in SSA. It has been an endeavour to shed light on this important public health issue that affects the lives of many young women in the SSA region. This research has uncovered insights into the prevalence, severity, and health implications of physical IPV during pregnancy among adolescents in SSA through a systematic review of existing literature and a detailed analysis of DHS data. The findings of this thesis have highlighted the urgent need for targeted interventions and evidence-based policies to address IPV among this vulnerable group. The prevalence and severity of physical IPV during pregnancy are alarmingly high, underscoring the pressing nature of this issue. Adolescents in SSA face complex challenges, including limited access to education, economic dependence, and deeply entrenched cultural norms contributing to their vulnerability.

Moreover, this research has exposed the profound health consequences of physical IPV during pregnancy, with links to severe injuries, inadequate breastfeeding practices, and pregnancy termination. These outcomes not only impact the individual health and well-being of adolescents but also perpetuate intergenerational cycles of violence and inequality. In light of these findings, the policy implications and recommendations put forth in this thesis emphasize the importance of comprehensive IPV prevention programs, educational initiatives, economic empowerment strategies, healthcare provider training, legal reforms, and community engagement efforts. These policy measures aim to create an environment where adolescents are empowered to make informed choices, access support when needed, and ultimately lead lives free from violence. Furthermore, this research has underscored the need for future studies that adopt longitudinal, qualitative, and intersectional approaches to understand better the complexities surrounding IPV during adolescent pregnancy. Evaluative

research on the effectiveness of interventions and policy changes is essential to refine strategies over time and ensure resources are allocated effectively.

In sum, this thesis contributes to the growing knowledge of IPV during pregnancy among adolescents in SSA. I hope the insights generated through this research will spur action, prompting governments, organisations, and communities to prioritize the well-being and empowerment of adolescents. By working collectively towards a future where adolescents are free from IPV we can foster a more just and equitable society for generations to come.

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Appendix A for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

Appendix B: DHS Institutional Research Board (IRB) for public usage and ethical approval

Jan 22, 2020

Caroline Adjimi
London School of Hygiene and Tropical Medicine
United Kingdom
Phone: +447471960295
Email: caroline.adjimi-nyemgah@lshtm.ac.uk
Request Date: 01/22/2020

Dear Caroline Adjimi:

This is to confirm that you are approved to use the following Survey Datasets for your registered research paper titled: ""Prevalence, Risk factors, and Health Outcomes of Intimate Partner Violence During Pregnancy"":

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo, Congo Democratic Republic, Cote d'Ivoire, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Nigeria (Ondo State), Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe

For restricted surveys, you must also request special permission from the Implementing Agencies. If approved, the restricted datasets will be provided to you by FTP.

To access the datasets, please login at: https://www.dhsprogram.com/data/dataset_admin/login_main.cfm. The user name is the registered email address, and the password is the one selected during registration.

The IRB-approved procedures for DHS public-use datasets do not in any way allow respondents, households, or sample communities to be identified. There are no names of individuals or household addresses in the data files. The geographic identifiers only go down to the regional level (where regions are typically very large geographical areas encompassing several states/provinces). Each enumeration area (Primary Sampling Unit) has a PSU number in the data file, but the PSU numbers do not have any labels to indicate their names or locations. In surveys that collect GIS coordinates in the field, the coordinates are only for the enumeration area (EA) as a whole, and not for individual households, and the measured coordinates are randomly displaced within a large geographic area so that specific enumeration areas cannot be identified.

The DHS Data may be used only for the purpose of statistical reporting and analysis, and only for your registered research. To use the data for another purpose, a new research project must be registered. All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey. Please reference the complete terms of use at: https://dhsprogram.com/Data/terms-of-use.cfm.

The data must not be passed on to other researchers without the written consent of DHS. However, if you have coresearchers registered in your account for this research paper, you are authorized to share the data with them. All data users are required to submit an electronic copy (pdf) of any reports/publications resulting from using the DHS data files to: references@dhsprogram.com.

Sincerely,

[redacted]

Bridgette Wellington
Data Archivist
The Demographic and Health Surveys (DHS) Program

530 Gaither Road, Suite 500, Rockville, MD 20850 USA +1.301.407.6500 +1.301.407.6501 fax icf.com

Appendix C: London School of Hygiene and Tropical Medicine (LSHTM) ethics approval statementfor using the DHS data for secondary data analysis .

London School of Hygiene & Tropical Medicine
Keppel Street, London WC1E 7HT
United Kingdom
Switchboard: +44 (0)20 7636 8636

www.lshtm.ac.uk

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Observational / Interventions Research Ethics Committee

Miss Caroline Adjimi
LSHTM

18 August 2020

Dear Caroline

Submission Title: Physical Intimate Partner Violence During Pregnancy Among Adolescents and Young Women In Sub-Saharan Africa

LSHTM Ethics Ref: 22612

Thank you for responding to the Observational Committee Chair's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

Approval is dependent on local ethical approval having been received, where relevant.

Approved documents

The final list of documents reviewed and approved is as follows:

Document Type	File Name	Date	Version
Covering Letter	DHS AuthLetter_137859	20/01/2020	Last
Local Approval	DHS AuthLetter_137859	20/01/2020	last
Investigator CV	CURRUCULUM VITAE (June 13th)	13/06/2020	Last
Protocol / Proposal	Upgrading document For QUANT	27/07/2020	Revised
Covering Letter	Ethics Amendment letter	29/07/2020	current

After ethical review

The Chief Investigator (CI) or delegate is responsible for informing the ethics committee of any subsequent changes to the application. These must be submitted to the committee for review using an Amendment form. Amendments must not be initiated before receipt of written favourable opinion from the committee.

The CI or delegate is also required to notify the ethics committee of any protocol violations and/or Suspected Unexpected Serious Adverse Reactions (SUSARs) which occur during the project by submitting a Serious Adverse Event form.

An annual report should be submitted to the committee using an Annual Report form on the anniversary of the approval of the study during the lifetime of the study

At the end of the study, the CI or delegate must notify the committee using the End of Study form.

All aforementioned forms are available on the ethics online applications website and can only be submitted to the committee via the website at: http://leo.lshtm.ac.uk.

Further information is available at: www.lshtm.ac.uk/ethics.

Yours sincerely,

[redacted]

Professor Jimmy Whitworth
Chair

ethics@lshtm.ac.uk
http://www.lshtm.ac.uk/ethics/

Appendix D: Search terms

#	Search terms	Hits
1	domestic violence/ or spouse abuse/ or intimate partner violence/ or physical abuse/ or rape/sex offenses/ or rape/(intimate partner violence or IPV or spouse abuse or dating violence).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (sexual abuse or physical abuse or gender-based violence or gender based-abuse or emotional abuse or emotional violence).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	49950
2	pregnancy/ or gravidity/ or pregnancy in adolescence/ or exp pregnancy outcome/ or pregnancy, high-risk/ or pregnancy maintenance/ or pregnancy, unplanned/ or pregnancy, unwanted/(pregnan* or obstetric* or labor or maternity).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (abortion* or fetus mortality or fetal mortality or miscarriage*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] exp Abortion, Induced/ exp Abortion, Threatened/ or exp Abortion, Spontaneous/	1139020
3	1 and 2	4809
4	(sub-saharan africa or subsaharan africa or africa south of the sahara).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] exp "africa south of the sahara"/ or exp africa, central/ or exp africa, eastern/ or exp africa, southern/ or exp africa, western/	228830
5	3 and 4	549
6	(adolescen* or teen or teens or teenager* or young wom?n or under-age* or underrage).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] adolescent/ or young adult/exp adolescent behavior/ or exp underage drinking/youth*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2624461
7	5 and 6	354