

https://dspace.org/

Epidemiology of Intimate Partner Violence Among Adolescent Girls and Young Women Accessing HIV Pre-Exposure Prophylaxis in South Africa, 2019–2022

Seboko, Nare

2025
University of the Witwatersrand, Johannesburg
https://hdl.handle.net/10539/49768

Seboko, Nare. (2025). Epidemiology of Intimate Partner Violence Among Adolescent Girls and Young Women Accessing HIV Pre-Exposure Prophylaxis in South Africa, 2019–2022 [Master's dissertation, University of the Witwatersrand, Johannesburg]. WIReDSpace. https://hdl.handle.net/10539/49768

Downloaded from a DSpace repository. https://dspace.org/

EPIDEMIOLOGY OF INTIMATE PARTNER VIOLENCE AMONG ADOLESCENT GIRLS AND YOUNG WOMEN ACCESSING HIV PRE-EXPOSURE PROPHYLAXIS IN SOUTH AFRICA, 2019-2022

A Research Report

presented to

UNIVERSITY OF THE WITWATERSRAND



FACULTY OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

In partial fulfilment
of the requirements for the
degree of
Master of Science in Epidemiology (Infectious Disease Epidemiology)
By

SEBOKO, NARE TERTIA

Student Number – 301831

Supervisors:

Dr. Catherine Martin and Ms. Relebogile Mapuroma

OCTOBER 2025

Declaration

I, **Nare Seboko** (student number 301831) declare that this research report is my own, unaided work. It is being submitted for the degree of Master of Science in Epidemiology (Infectious Disease Epidemiology) at the University of Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination at any other university.

I hereby declare the following:

1. I am aware that plagiarism (the use of someone's work without their permission and/or without acknowledging the original source) is wrong.
2. I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
3. I have followed the required conventions in referencing the thoughts and ideas of others.
4. I understand that the University of the Witwatersrand may take disciplinary action against me if there is belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in writing.
5. I have included as an appendix a report from Turnitin™ software indicating the level of plagiarism in my research document.



Date : 13 October 2025

Dedication

This research report is dedicated to mama, Manhleng Gloria Makwena Seboko née Komape, my ultimate role model.

Abstract

Background: Eradicating all types of violence against girls and women is one of the United Nations Sustainable Development Goals targets (1). Yet, not much research has focused on intimate partner violence (IPV) among this demographic in South Africa (SA). This is despite IPV being a known significant contributor to morbidity and mortality among adolescent girls and young women (AGYW) globally (2,3). In addition to a substantial burden of IPV, AGYW face an intersecting vulnerability to HIV (4). Identifying the prevalence and factors associated with IPV among AGYW accessing HIV pre-exposure prophylaxis (PrEP) is critical for informing the development of protective strategies. Understanding these factors may provide insight on effective interventions to support and care for AGYW affected by IPV, while also promoting the initiation and sustained use of HIV PrEP.

Methods: A cross-sectional study analysed data from 1811 AGYW aged 15-24 years who accessed HIV pre-exposure prophylaxis (PrEP) at 12 study sites in SA. Past three months prevalence and patterns (self-reported experience of emotional, physical, financial and/or sexual IPV) data were collected using a standardized interviewer-administered questionnaire adapted from the World Health Organization Study on Women's health and Domestic Violence Against Women. Frequencies and proportions were used to summarise the prevalence of the various forms of IPV. Logistic regression was used to identify factors associated with any IPV.

Results: The overall prevalence of any IPV among AGYW was 9.2% (N=1811). Emotional, physical, financial and sexual IPV had a prevalence of 5.5%, 4.1%, 3.9% and 2.2% among AGYW respectively. Completing tertiary education or more (Adjusted odds ratio (AOR) 1.79, 95% confidence interval (CI) 1.02-3.14), drug use (AOR 1.96, 95% CI 1.08-3.55), sex under the influence of alcohol or drugs (AOR 1.93, 95% CI 1.28-2.90), PrEP use stigma (AOR 1.47, 95% CI 1.02-2.10), depression symptoms (AOR 1.85, 95% CI 1.28-2.66), not having vaginal sex (AOR 0.11, 95% CI 0.01-0.79), transactional sex (AOR 2.19, 95% CI 1.21-3.98), social

support structure (AOR 0.71, 95% CI 0.50-1.02) living in urban informal areas (AOR 2.45, 95% CI 1.59-3.76) or living in rural areas (AOR 2.12, 95% CI 1.19-3.78) and living in City of Tshwane district in Gauteng province (AOR 1.75, 95% CI 1.14-2.68) or Nelson Mandela Bay district in the Eastern Cape province (AOR 0.21, 95% CI 0.10-0.44) were all significantly associated with IPV.

Conclusion: IPV proves to be a growing health concern among AGYW. In this study, emotional IPV was identified as the most prevalent type among AGYW. There is a potential intersecting need for interventions which address mental health, substance use, PrEP use stigma, transactional sex and IPV among AGYW. Interventions require collaboration between communities, health and legal departments to provide easily attainable, confidential and reliable services that address IPV and support AGYW. This study identifies key factors for developing targeted IPV interventions. It should be seen as one of the initial stages of a process that will require substantial further research on AGYW's experience of IPV to find evidence of its impact on their health outcomes.

Acknowledgements

I would like to acknowledge and sincerely thank my supervisors, Dr. Catherine Martin and Ms. Relebogile Mapuroma, for their unwavering guidance, support and encouragement given to me to complete this research report.

I would like to thank Dr. Glory Chidumwa for his guidance with data analysis.

I would like to thank Wits RHI for the data and supporting resources provided for this research report to be undertaken.

I would like to acknowledge and thank my mentor Professor Norman Nyazema.

Thank you to my forever classmates and friends Professor Mmaditšhaba Rapatsa-Malatji and Ms. Pearl Lentsoane for your advice.

Thank you to Dr. Rebecca Berhanu for your encouragement.

To Magata, Kgopotso, Mmane Koena and the rest of my family, I would like to extent my heartfelt gratitude for your constant love and shield.

To my friends - Priscilla Lamola, Matilda De Freitas, Diale Masehla, Dr. Lamisa Naushin, Josephine Mmadi, Matamela Raphunga, Lilian Muchai, Zodwa Mabawa, Mahlatse Kekana, Muhluri Rikhotso, Mpolokeng Moeng, Tendani Thivhafuni, We Read Book Club and my colleagues at Donald Fraser Hospital, I cannot thank you enough for holding my hand through this journey, the laughs and always reminding me that I can.

Contents

Declaration II

Dedication III

Abstract IV

Acknowledgements VI

Contents VII

List of figures X

List of tables X

Abbreviations XI

1 Introduction 1

1.1 Background 1

1.2 Problem statement 2

1.3 Justification 3

1.4 Research question 3

1.5 Aim 4

1.6 Objectives 4

2 Literature review 5

2.1 Prevalence of IPV 5

2.2 Factors associated with IPV 8

2.2.1 Individual factors 9

2.2.2 Interpersonal factors 14

2.2.3 Community factors 16

2.3 Conceptual framework 17
3 Methods 19
3.1 Description of primary study 19
3.2 Study design 20
3.3 Study site 20
3.4 Study population 21
3.5 Data collection of the primary study 21
3.6 Measurement of variables 22
3.7 Data management 30
3.8 Data analysis 30
4 Results 34
4.1 Characteristics of the study sample 34
4.2 Prevalence of IPV 39
4.3 Patterns of IPV 44
4.4 Factors associated with IPV 44
5 Discussion 52
5.1 Prevalence of IPV 52
5.2 Patterns of IPV 53
5.3 Factors associated with IPV 56
5.3.1 Individual factors 56
5.3.2 Interpersonal factors 61
5.3.3 Community factors 62

6 Conclusion 64
7 Recommendations 64
8 Strengths 66
9 Limitations 66
10 Ethical considerations 67
11 References 68
12 Appendices 92

List of figures

Figure 2.1: Conceptual framework indicating factors associated with IPV among AGYW initiated on PrEP in South Africa. 18

List of tables

Table 3.1 Study outcome variable measurement and coding. 23

Table 3.2 Study explanatory variables measurement and coding 26

Table 4.1 Characteristics of the adolescent girls and young women participants accessing PrEP broken down by each potential explanatory variable. 37

Table 4.2 Prevalence of intimate partner violence (IPV) among adolescent girls and young women. 42

Table 4.3 Patterns of IPV 44

Table 4.4 Bivariate (unadjusted) and multivariate (adjusted) logistic regression analysis to evaluate association between IPV and each potential explanatory variable among AGYW. ..45

Table 4.5 Bivariate (unadjusted) and final multivariate (adjusted) logistic regression model results predicting factors associated with any IPV among AGYW..... 50

Abbreviations

AGYW- Adolescent girls and young women

ART- Anti-retroviral treatment

AUDIT- Alcohol use disorder identification test

CI- Confidence Interval

DOH- Department of Health

FTC- Emtricitabine

GBV- Gender Based Violence

HIV- Human Immunodeficiency Virus

HCW- Health Care Worker

IPV- Intimate Partner Violence

OR- Odds Ratio

PHC- Primary Health Care

PrEP- Pre-exposure Prophylaxis

SA- South Africa

SADHS- South Africa Demographic and Health Survey

SDG- Sustainable Development Goal

SES- Socio-economic Status

SRH- Sexual and Reproductive Health

SSA- Sub-Saharan Africa

STI- Sexually Transmitted Infection

TDF- Tenofovir Disoproxil Fumarate

WHO- World Health Organization

1 Introduction

1.1 Background

Intimate partner violence (IPV) is an international health concern due to its negative impact on health outcomes and quality of life (3,5). By definition, IPV is violence against an intimate partner, which is identified by one and/or a combination of controlling behaviour, verbal, sexual, emotional, financial and physical harm (6). An intimate partner could be either a past or current romantic partner (3,7,8). IPV is often characterised by oppressive behaviour that threatens freedom, food security, and the right to equality of a person (6,9). This makes it an important human rights issue (3,10). Outcomes of IPV include deteriorating mental health such as depression and anxiety, as well as negative reproductive health outcomes such as unintended pregnancies, unsafe abortions, and Sexually Transmitted Infections (STIs) including Human Immunodeficiency Virus (HIV) (5). According to World Health Organization (WHO), IPV is the most recurrent type of violence experienced by women of all ages (11). Globally, the IPV burden is estimated around 20-30% among all women (3,11). In 2018, the Sub-Saharan Africa (SSA) region had an IPV prevalence of 33%, 6% higher than the global estimate (3,11). Most studies agree that IPV among adolescent girls and young women (AGYW) is a growing health concern (3,6,11–14). AGYW aged 15-24 years have a prevalence of IPV that ranges between 24-26% globally (15). The prevalence of IPV among women who are 18 years and above in South Africa (SA) is 20.5% and among those aged 18-24 years is 17.6% (16). In 2017, SA recorded a femicide rate of 4.6 per 100,000 women, with IPV identified as the leading cause (7). In May 2024, President Cyril Ramaphosa recognised violence against women as a crisis by announcing the establishment of a National Council On Gender Based Violence and Femicide to coordinate the fight against it (17). AGYW in SA and globally have been reported to experience higher rates of physical and/or sexual IPV in the past 12 months than any other age group (3,15,16). Patterns of IPV in this study refers to the prevalence of different types of

IPV. Among AGYW aged 18-24 years in SA, physical IPV has been reported as the most prevalent (17.6%), followed by emotional IPV (14.1%) and sexual IPV (5.2%) (16). In addition to a substantial burden of IPV, AGYW face an intersecting vulnerability to HIV (4). A 2004 cross-sectional South African study found that 40.2% of women newly diagnosed with HIV had experienced physical and sexual IPV (18). In 2022, AGYW globally accounted for 4000 new HIV infections each week and around 78% of the infections took place in SSA (4,19,20). SA is one of the countries with the highest HIV prevalence (13%) in the world (21). To combat this, in 2016, amongst other HIV preventive measures, National Standard Treatment Guidelines provided for the roll-out and use of oral pre-exposure prophylaxis (PrEP) (20,22). Oral PrEP is a combination of two drugs named emtricitabine and tenofovir disoproxil fumarate compounded together to make one pill used for prevention of HIV infection (22). The use of oral PrEP is highly effective against HIV infection when taken consistently (4,22–26). This offered an opportunity to lower the high HIV incidence rates among AGYW and other groups who are identified or consider themselves at a greater risk for HIV infection (27). To date, among the whole population of SA, the estimated cumulative initiations of oral PrEP in 2024 are equal to 1,322,867 (28). In addition to being associated with HIV, IPV has also been associated with low adherence to Anti-Retroviral Therapy (ART) and oral HIV PrEP (29–33). Although there are PrEP initiations among AGYW, its access and effective use in SA has been a challenge due to factors such as IPV (34–37).

1.2 Problem statement

Despite the several interventions devised to combat IPV in SA, it manages to manifest itself in other clinical and societal issues such as HIV incidence rates (9,38–40). Studies on IPV prevalence among AGYW in SA are scanty and national surveys often exclude those aged 15-17 years (16). In 2016, the lifetime prevalence of any IPV among young women aged 18-24 years in SA was 23.4%, while the prevalence of any type of IPV in the last 12 months among

AGYW in 2016 was 15.1% (16,41–44). Additionally, AGYW are known to have the highest incidence of HIV compared to any other women of reproductive age in the country (21,45,46). There are several studies that reveal there is a link between IPV and new HIV infections (4,23,24). HIV prevention programmes in SA are doing well in implementing and integrating oral PrEP into comprehensive services in health facilities (47). However, IPV affects its uptake and ongoing effective use (31,48). To our knowledge, there is paucity in literature on IPV prevalence, patterns and associations amongst South African AGYW aged 15-24 years accessing PrEP within routine primary health care settings in SA.

1.3 Justification

A focus on AGYW PrEP users is essential to quantify IPV among this population in SA. Identifying factors associated with IPV will inform evidence-based strategies that allow more focused and integrated IPV and HIV prevention strategies, including the introduction and implementation of new HIV prevention interventions, such as injectable PrEP, into sexual and reproductive health (SRH) services (49). It will also help devise strategies to better support AGYW that are affected by IPV while simultaneously encouraging PrEP initiation and effective use. It will further aid the relevant South African authorities such as the Department of Health and its implementing partners to devise early intervention strategies that would mitigate poor health outcomes associated with IPV among AGYW later in their lives.

1.4 Research question

What is the prevalence, patterns and factors associated with intimate partner violence among adolescent girls and young women aged between 15-24 years who accessed oral pre-exposure prophylaxis for the prevention of HIV between 2019- 2022 in SA?

1.5 Aim

To assess the prevalence, patterns and factors associated with intimate partner violence among adolescent girls and young women aged between 15-24 years accessing oral pre-exposure prophylaxis for prevention of HIV between 2019-2022 in SA.

1.6 Objectives

1. To determine the prevalence of intimate partner violence among adolescent girls and young women accessing oral pre-exposure prophylaxis for prevention of HIV in SA between 2019-2022.
2. To determine the patterns of intimate partner violence among adolescent girls and young women accessing oral pre-exposure prophylaxis for prevention of HIV in SA between 2019-2022.
3. To investigate factors associated with intimate partner violence among adolescent girls and young women accessing oral pre-exposure prophylaxis for prevention of HIV in SA between 2019-2022.

2 Literature review

In this chapter, literature reporting lifetime IPV and past 12 months IPV is reviewed. Lifetime IPV among ever-partnered AGYW aged 15 years and older, refers to having experienced IPV at least once in their lifetime, while past 12 months IPV refers to the experience of IPV in the preceding 12 months (8). Distinguishing these two helps study the trends of and changes of IPV over time. Unless specified, the definition of IPV in this literature review is physical and/or sexual abuse by a partner (21).

2.1 Prevalence of IPV

Globally, women face the highest burden of IPV with men being dominant perpetrators (6,8,50)**.** The WHO 2018 global estimates from 332 studies and 159 countries, revealed that approximately 27% of girls and women aged 15-49 years have encountered either sexual or/and physical IPV in their lifetime worldwide (3,8,51). Although still considerably high, the estimate decreased by 3% from the estimates that were published by WHO in 2013 (11,52). Among women in 2018, the prevalence of past 12 months IPV was 13% (3,11). From the same estimates, AGYW aged 15-24 years had the highest recent IPV prevalence at 16%, 3% higher than the 2018 global estimate for recent IPV among women aged 15-49 years (3,15).

A study published in 2024 revealed that the global lifetime prevalence of IPV in AGYW aged 15-19 years is 24% and that of 20-24 year olds is a little higher at 26% (3,11,15)**.** Although 1-3% less than the global estimate among girls and women aged 15-59 years, is still considerably high (3,11,15). It has however, decreased when compared with the 2013 WHO population survey estimates of IPV (11,52).

These studies reported that globally, past 12 months IPV was more prevalent among AGYW from economically underdeveloped and developing countries than in the developed countries (3,8,15,51). Although the estimates are different, the global trend of exhibiting higher lifetime

percentages of IPV compared to recent ones remains uniform among wider group of girls and women aged 15-49 years and AGYW aged 15-24 years (3,11,15). This would be expected when including a wider age range, as they have had longer period in which to experience the IPV.

In 2018, the SSA SDG region documented a lifetime IPV prevalence of 33% among women aged 15-49, which was 6% higher than the WHO global estimates and placing itself among the top five SDG regions with the highest lifetime IPV prevalence (11). SSA further had a past 12 months IPV prevalence of 20% among women aged 15-49 years making it one of the highest among all the SDG regions (11). Among AGYW aged 15-19 years, SSA SDG Southern countries had the second lowest lifetime IPV prevalence of 25% (15). Higher than SSA SDG Western (21%), and lower than Eastern (31%) and Central countries (40%) (15).These estimates indicated that 25% lifetime prevalence of IPV amongst AGYW aged 15-19 years in Southern SSA were similar to the global estimates i.e. 24% (3,11,15). In addition, the global 2018 recent IPV prevalence of 16% among AGYW aged 15-19 years was 2% lower than the Southern SSA estimate of 18% (3,15). These indicate that Southern SSA lifetime and recent IPV prevalence was higher than global IPV prevalence (3,13).

Reported in the 2016 South Africa Demographic and Health Survey (SADHS) key note report, 21.5% of women aged 18-49 years who have ever been in a relationship have encountered lifetime physical and/or sexual IPV (16). Although not completely comparable because of its lack of data among adolescent girls aged 15-17 years , this estimate was about six percent lower than the WHO global estimate of women aged 15-49 years of 27% (3,10,11,16). In total, 10.3% of women aged 18-49 years reported having been sexually or physically abused by a partner within the past 12 months, which is about three percent lower the global estimates (3,16). These women were more likely to face physical violence (20.6%) more than any other type of IPV in their lifetime (16). Emotional violence was experienced by 17.1% of women, and sexual violence was experienced by 6.2% of women (16). However, in the past 12 months, a

prevalence of emotional, physical and sexual IPV was reported at 10.2%, 9.1% and 2.9% respectively (16).

South African estimates of IPV experience is close to global estimates (3,31). AGYW aged 18-24 years in SA had a lifetime physical and/ or sexual IPV prevalence of 18.3% in 2016 (16). Although also not completely comparable because of SADHS' lack of data among adolescent girls aged 15-17 years, South African estimates are 6 to 8% lower than the 2018 global estimates among 15-24 year olds (3,16). AGYW in SA were more likely to experience physical, followed by emotional and sexual IPV, with a lifetime prevalence reported at 17.6%, 14.1% and 5.2% respectively (16). Looking at the past 12 months experience, AGYW in SA aged 18-24 years had IPV prevalence of 11.6% (16) .This was about 4.4% less than the global estimates (3,16). AGYW in SA had a 10.3%, 8.8% and 3.2% of physical, emotional and sexual IPV respectively (16).

In 2016, the highest lifetime prevalence of sexual and/physical IPV among women aged 18 years and older in SA was found in Eastern Cape province at around 31.8% and the lowest was in Kwa-Zulu Natal province at 14.1% (10,16). Compared to a cross sectional study based on 1999 census data, the lifetime prevalence of IPV in the Eastern Cape province (26.8%) has increased, thus not following the global decreasing trends (12). Regarding estimates of IPV experience in the past 12 months, the Eastern Cape province also had the highest prevalence of sexual and/ physical IPV (13.0%) among women aged 18 years and above, whilst the lowest prevalence was reported from Limpopo province at 4.1% (16).

The Eastern Cape province has both the highest lifetime and recent prevalence of physical IPV in SA (10). Most of the South African provinces have a recent physical IPV prevalence of less than 10%, while the Eastern Cape is the only province that falls within the reported global

range of 10-16%. (3,10,11). This marks it as a South African "province of concern" with regard to physical violence.

The highest lifetime prevalence of sexual IPV among women aged 18 years and older in SA was found in the North West province, at around 11.8% and the lowest is in Kwa-Zulu Natal province at 3.1% (10,16). Meanwhile, for past 12 months sexual IPV, the prevalence of IPV among women aged 18 years and above ranges between 0.7% in Western Cape province and about 4.9% in North West province (10). North West province has the highest lifetime and recent prevalence of sexual IPV in SA (10,16). Most of the provinces in SA have a recent sexual IPV prevalence of less than 3% while North West province surpasses this, marking it as a South African "province of concern" on sexual violence (3,10,11).

Prevalence of lifetime emotional IPV among women aged 18 years and older in SA was 14.1% in 2016 (16). The highest lifetime prevalence of emotional IPV in SA was found in North West province (27.5%) and the lowest was in Gauteng province (12.5%). Prevalence of past 12 months emotional IPV among women aged 18 and above was 8.8% (16). Meanwhile, the prevalence of emotional IPV was the highest in North West province (12.8%) and the lowest in Limpopo province (5.5%) (16). This marks North West as a "province of concern" for emotional IPV.

A study review of financial IPV found that not only does it have the least legislative action, there is not a standard measurement scale in SSA (53). A study that was conducted in SA found a 5.3% prevalence of financial IPV among young people in 2022 (43).

2.2 Factors associated with IPV

In this chapter, literature about factors associated with IPV are outlined. These factors are described under the categories of individual, interpersonal and community factors. This chapter

will also outline factors that are associated with different types of IPV. Unless specified, IPV refers to physical and/or sexual violence.

2.2.1 Individual factors

HIV

There are approximately 7.8 million people living with HIV in SA (21). AGYW in SA carry a substantial burden of this epidemic, with an HIV prevalence roughly double that of their male counterparts (21).The prevalence of HIV among AGYW aged 15-19 years in 2022 was 5.6% and among those aged 20-24 years was 8%; both higher than males of the same age (3% and 4% respectively) (21). Some factors that contribute to the HIV epidemic among AGYW are violence, poverty and gender norms (54). A meta-analysis of 28 studies reported that IPV was associated with a 1,2-fold higher risk of HIV infection (5,44,55). IPV is among the social factors that contribute to AGYW's heightened vulnerability to HIV compared to other demographics (5). This includes challenges negotiating use of HIV prevention methods such as condoms or PrEP for fear of immediate physical harm, being accused of cheating or being sexually abused (5,44,55). A study conducted in the rural province of Mpumalanga among AGYW in SA who had experienced emotional IPV indicated that it increased their risk of HIV acquisition because of the strong correlation with HIV risk factors such as condomless sex, transactional sex and substance abuse (44). Controlling behaviour in partners raises the vulnerability of AGYW to HIV due to the partner not giving AGYW a safe space to discuss and stick to desired monogamy and free-will to use preventive measures (36,56). Studies suggest that women experience an increased risk of IPV when testing positive for HIV and that many hide their status for fear of conflict and abuse (33,36). This highlights IPV and HIV infection's bidirectional relationship (11,40,41).

HIV PrEP use

PrEP is an HIV preventive intervention that is over 90% effective when used as prescribed (22,26). Oral PrEP, a fixed-dose combination of tenofovir disoproxil fumarate and emtricitabine, is recommended and available through the public healthcare system in South Africa, and offered as part of comprehensive sexual and reproductive health services (22,49,57,58). Its safety and effectiveness in preventing HIV acquisition is advantageous in the context of IPV because unlike condoms, it can be used without a partner's knowledge (59). Studies suggest that women's motivation to use PrEP effectively is influenced by IPV experiences (59,60). Studies report that 40-75% of AGYW in sub-Saharan Africa self-reported to have stopped taking PrEP within three to six months of initiation and the discontinuation rate was higher than in other regions of the world (34,47,61). Fear of IPV has been reported as one of the drivers of PrEP discontinuation among AGYW in East and Southern Africa (37,62). Women who experience IPV are three times less likely to report using and adhering to PrEP than women who have not experienced IPV, due to fear of being abused if their partner found out that they were using PrEP (31,63). In addition to IPV experience influencing discontinuation of PrEP use, it also negatively influences general acceptability of its use and the use of other HIV prevention methods (64).

Secondary education

Adolescence and young womanhood are an important time for laying groundwork for one's future health (65). It has been firmly established that IPV has negative health consequences for women (5,8,45). IPV has been associated with poor health effects regardless of whether the violence has happened once, is ongoing or has ceased (2,3,6,31). Secondary education is often obtained at this crucial time and most studies agree that having enrolled in and attaining it has a protective effect against IPV (15,66–69). There is inconsistency in exactly at what level

education is protective against IPV in SSA countries however, its association is indisputable (69,70).

Employment

Although this study did not include SA, Mossie et al highlight employment status as an important determinant of IPV in SSA countries (66). They state that in addition to being a woman with higher than secondary school level, having money of their own is associated with lower odds of IPV (36,66). This is reiterated by a study by Jewkes et al which was conducted in SA (68). Women who are more likely to be financially independent may be able to take protective behavioural strategies such as moving out of a shared home (46,66–68,70). They further attribute these women's lower odds of IPV to having social connections such as being involved in community activities and therefore having support (66–68). Contradictory to what the other studies report, one study reported that AGYW who earn more than their partners and have higher than secondary school education are more vulnerable to experiencing IPV compared to when partners earn equally or significantly less (67). This is especially true in heterosexual relationships where the woman is working and the man is not (67). It is hypothesised to be due to their partners feeling threatened by the women's "success" and therefore tending to act violently to exert their superiority (70). In addition, their independence may jeopardise established gender roles in SSA that say "a man is a provider and must be the one financially supporting a woman" (67).

Age

There is conflicting literature on whether being older is protective against IPV (46,66). Mossie et al reported that young women aged 25-34 years showed a trend of a higher prevalence of lifetime IPV experience than AGYW aged 15-24 years (66). They attributed the association to older women being more likely to have several more socioemotional problems (66). In 2016,

the estimated prevalence of women who had ever experienced physical IPV in their lifetime was higher among those over the age of 24 years in SA, except for women aged 65 years and older (10). That was explained by women aged 24 years and more having lived longer than woman aged less than 24 years therefore have had more chance to have experienced IPV (10). It is however interesting that young women aged 18-24 years in SA reported more recent physical IPV experience compared to anyone over 24 years (10). Stöckl et al however, stipulate that there is a decline of IPV as women age (46,69). One of their plausible reasons for this is that early-married couples are more prone to experiencing relationship stressors such as unintended pregnancies, unemployment, financial problems, which can easily result in IPV (46). Their other plausible reason is that the decrease of IPV is consistent with the broader pattern of declining criminal conduct as perpetrators and victims age (46). Among AGYW in Mozambique, Thailand, Brazil, Ethiopia, Bangladesh, Peru, Serbia and Montenegro, Republic of Tanzania, Samoa, Japan and Namibia, adolescent girls have a higher odds of recent IPV experience compared to young women (69,71). The authors suggest this is because of inexperience in relationships that may make it difficult for adolescent girls to know how to deal with complicated relationship issues thereby increasing their risk of IPV (71–73).

Mental health status

Women who have depression symptoms tend to experience emotional IPV more than those who do not, this further highlights IPV as an important health concern (45,74,75). The likelihood of mental health illnesses is nearly as twice as high in women who have suffered IPV (76). There is a bidirectional relationship between experience of IPV and mental health (77). IPV can cause and worsen mental worsen health problems such as depression (78). Mental health problems further increase the risk of experiencing IPV(79). Emotional abuse through swearing, humiliation and shame that may cause mental problems which could result in

academic underachievement and economic insecurity in AGYW which are factors associated with experiencing further IPV(80).

Substance use

The risk of experiencing IPV is twice as high among AGYW who use and abuse substances (8,72,73,81). Excessive drinking in adolescent and young people has been linked to using violence to try resolve relationship issues (72,73). There is an interconnected relationship between IPV, substance use and HIV infection (36,82). A cohort study conducted in Mpumalanga province of SA reported that frequent use of alcohol and transactional sex was associated with emotional IPV among AGYW (44). These two factors are also associated with high vulnerability to HIV infection (44). It has already been established that IPV can lead to future negative health outcomes for AGYW, and this can put them on a path to substance abuse as a coping mechanism (5,45,65). Emotional IPV is associated with habitual alcohol drinking which in turn is an HIV risk factor (44).

Condom use

IPV is associated with an increased odds of condomless sex among AGYW (44). There are several studies that have reported an association between HIV infection with IPV; the emphasis is on the women not being able to express their desire for safe sex for fear of physical, emotional and sexual violence (5,52,83). Condom use in relationships is often a gendered power issue where whoever can exert more control is the sole/main decision maker (84). Some AGYW opt for oral HIV PrEP for prevention because of its advantages in the context of IPV; unlike condoms, it is not partner-dependent and one can take it without their partner's knowledge and participation (59,60). Emotional abuse may cause AGYW to lose confidence in themselves and therefore unable to have any meaningful discussions with their partners on important topics such as such as condom use (44).

PrEP use related stigma

A study in two regions of the United States areas established that women who encounter emotional IPV feel ashamed to accept the introduction to use PrEP or approach health care professionals to ask about or for it (85). Among AGYW in SA and Kenya who had started on PrEP, disclosure of its use increased support from family or friends and had an association with increasing adherence (86). However, in some AGYW it increased judgement from friends, family or partners because of PrEP use stigma (86,87). Both the users and family or friends know that PrEP medicine can appear similar to HIV treatment which on its own has stigma (86,87). PrEP use stigma is associated with IPV(85,88). A few studies found that some choose to not disclose PrEP use because disclosing may result in arguments or breakup rooted in stigma and eventually verbal and emotional IPV against them (86,89).

2.2.2 Interpersonal factors

Transactional sex

Transactional sex among AGYW has been linked with a higher odds of encountering sexual and/or physical IPV; this may be caused by partners expecting to get "payment" after the exchange of money or gifts (44,90–92). AGYW in SA often resort to transactional sex because of systemic factors such as poverty and psychosocial factors such cupidity (92). These factors can drive one to find a coping mechanism such substance abuse due to personal and social norms that criticize women for engaging in transactional sex (92). IPV is associated with substance abuse in AGYW and they may further turn to transactional sex to fund and sustain their addiction (18) . This in addition, is a known determinant for HIV infection and other STIs (18).

Partner age

Age disparate relations encourage power imbalance and ultimately association with a higher vulnerability to IPV among AGYW (70,93). It is believed that an older partner may not be easy to talk to and out of frustration from not understanding their partner, may result to IPV towards the younger partner, particularly sexual IPV (70,93). In peri-urban areas in SA, AGYW with partners that are five years and older have a higher odds of experiencing IPV (92). Stöckl et al reported that partners who are aged 24 years or more are less likely to commit IPV compared to younger partners (67). Male partners who had completed primary school education were less likely to commit IPV against women from age 15 years and above (66,67). This literature ultimately makes partner age an important factor to investigate for the association with IPV among AGYW taking HIV PrEP.

Multiple intimate partners

In peri-urban areas of SA, having more than one sexual partner was found to be associated with an increased risk of IPV encounter (81,92).This was attributed to the sexual risk taking where for example one has unprotected sex with multiple people thereby increasing chance of being abused by multiple partners (92).

Social support structure

Having social support structure is linked with a lower odds of women encountering IPV (94). Sere et al found that IPV is more of a community problem than an individual one, and therefore having existing family and/or friends, not only helps as a coping mechanism after IPV experience but protects against its recurrence (94,95). A Tanzanian study among pregnant women reported that a women having a member of their family as someone they can rely on for support at least once a month reduced their risk of IPV (95). This reinforces that strong

family and friendship bonds are protective against IPV experience or its recurrence at least (95).

2.2.3 Community factors

Type of residential area

Among AGYW, staying in an urban area has shown to be protective against IPV as compared to peri-urban and rural areas if one is of high socio-economic status (SES) (45). However, it is not protective if one is of low SES (45). AGYW who reside in urban areas and of low SES, have a higher risk of IPV experience compared to those who are of high SES (45). Among women aged 18 years and over in SA, physical lifetime IPV manifests itself more in women who stay in non-urban areas than in urban areas (10). This is consistent with the WHO 2018 global estimates that report that IPV is more prevalent in underdeveloped and developing countries (3,11,15).

Collective efficacy

Collective efficacy is defined as community members' mutual trust and readiness to step in and act in the interest of common good (96). In SA, communities that have high collective efficacy are linked to reduced rates of IPV among AGYW; this may be due to residents being more likely to intervene, call for help or access legal representatives such as the police when they witness a violent act towards a woman (96). Some communities approve of physical IPV towards wives and/or girlfriends and this in turn makes it difficult for these women to accept that it is detrimental to their own being (51). These women who are part of those communities are interestingly more open to talk about their IPV experience than those who are from communities or families that do not approve IPV (51). Compared to other provinces SA, Mpumalanga reported a lower incidence of physical IPV, and this was found to be because of their communal trust and preparedness of the residents to collectively do good (97).

Most research done among AGYW accessing PrEP in SA to date has focused on implementation progress, facilitators and barriers to its effective use (25,48,89,98,99). As a result, there is limited information on prevalence, patterns and associations of IPV from among AGYW who use PrEP. This is why this study focuses on this demographic.

2.3 Conceptual framework

Figure 1 shows a socio-ecological model, supported by existing literature, with three interconnected layers of influence on IPV among HIV negative AGYW which was adapted from a similar paper conducted in nine countries (46,100,101). This model was originally developed by a psychologist named Urie Bronfenbrenner in the 1970's demonstrating that social and environmental surroundings can influence an individual's development (102). This model was chosen because often interpersonal factors have a direct effect on individual factors which are also influenced by set systems and norms in their community that affect one's risk of IPV (101). It ultimately suggests that there are a variety of factors acting at different levels which are responsible for IPV experience. In the framework, the community level factors are the type of residential area one lives in and community collective efficacy (51,96). Interpersonal factors are transactional sex, number of intimate partners, partner's age, and whether one has a social support system (18,71,91,92,94). Lastly, individual factors are age, level of education completed, economic status, mental health status, use of alcohol and/or drugs and condom use during coitus (5,43,45,46,56,66,86).

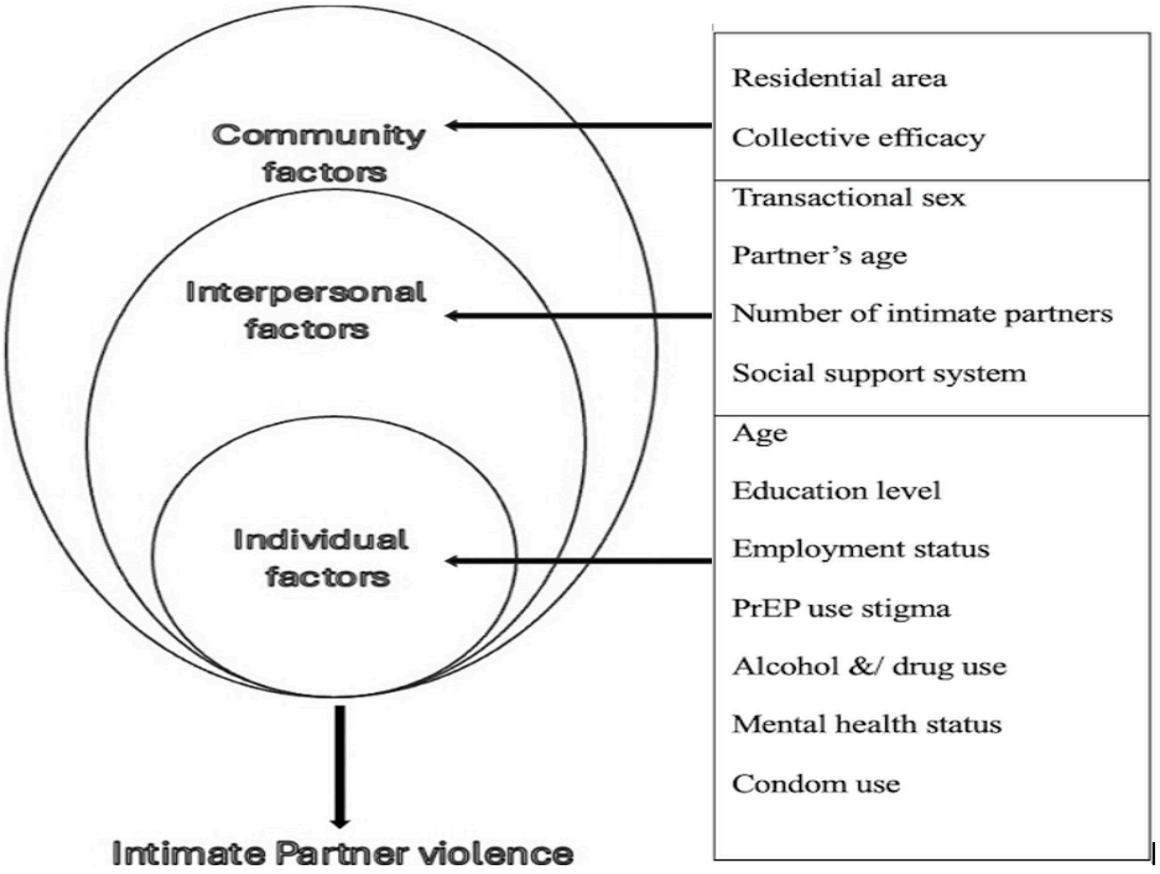

Figure 2.1: Conceptual framework indicating factors associated with IPV among AGYW initiated on PrEP in South Africa.

3 Methods

3.1 Description of primary study

Project PrEP is a multi-component implementation science study which has evaluated and informed the introduction and integration of PrEP within real-world public healthcare settings in SA. It draws data from routine monitoring and evaluation, quantitative surveys and qualitative data collected among service users and health care providers in targeted South African Department of Health (DOH) facilities. The project is funded by Unitaid, and begun in 2018. Aiming to represent diverse populations and settings, this project was implemented in four clusters based in Gauteng, Kwa-Zulu Natal and Eastern Cape provinces. The objectives of Project PrEP were to increase oral PrEP accessibility among AGYW aged 15-24 years and evaluate models for the effective integration of oral PrEP within primary care health services. The project aimed to identify the structural, health systems, community and individual-level barriers and facilitators to access, uptake and continued use of PrEP (43,103–106). The title of the primary study was "The introduction of PrEP into comprehensive sexual and reproductive health services for AGYW (aged 15-24) in SA: An implementation study". The study aimed to generate data that would inform the introduction of oral PrEP within comprehensive HIV prevention services in SA (43,103,106). Phase 1 of the study focused on the introduction of oral PrEP and was implemented from 01/12/2018 to 31/10/2022. Participating sites offered comprehensive services such as STI screening, diagnosis and treatment, HIV testing, contraception, oral PrEP with referrals and linkage to other services where necessary. Through a multi-pronged service delivery model, the project developed and implemented approaches to demand creation, uptake, and continuation of PrEP through integrated reproductive, HIV prevention and sexual health services. Findings from the project, including data on PrEP use among AGYW and men, have been published elsewhere, as have findings on the mental health needs of adolescent and young adults, and the approaches to STI screening and management

(103–106). Within the primary study, there was a nested longitudinal cohort study that collected linked clinical and survey data from 1896 AGYW and 540 adolescent boys and young men who had been initiated on daily oral PrEP. This study draws on baseline data collected at one time point from the nested cohort study among AGYW aged 15-24 years making the current study cross-sectional (43,103,104).

3.2 Study design

This a secondary cross-sectional study analysing baseline data collected from the Project PrEP implementation study nested cohort among AGYW.

3.3 Study site

The study was undertaken in 12 study sites (rural, urban, and peri-urban) among four districts of SA, namely, - City of Tshwane in Gauteng province, eThekwini in Kwa-Zulu Natal province, OR Tambo and Nelson Mandela Bay in the Eastern Cape province with at least two sites per district. Eight sites were primary health care (PHC) facilities while four were mobile clinics. Participating sites were chosen based on the region's burden of HIV, population density, availability of sexual reproductive health (SRH) services, client volume at PHC facility and proximity to high schools and higher learning facilities. In Gauteng, the participating sites were Maria Rantho, Phedisong 1 and a linked mobile clinic which are peri-urban primary healthcare facilities under the city of Tshwane. In Kwa-Zulu Natal, the participating sites were Lancers Road, Pinetown clinics and a linked mobile clinic which are urban primary healthcare facilities under eThekwini district. In the Eastern Cape, the participating sites were linked mobile clinics in Gqeberha and Mthatha, Motherwell, Ikamvelihle, Ngangelizwe and Standford Terrace clinics which are a combination of rural and peri-urban primary health facilities in districts of Nelson Mandela Bay and OR Tambo.

3.4 Study population

The participants met the inclusion criterion of partaking in the AGYW cohort study if they were: 1) adolescent girls and young women aged 15-24 years; 2) HIV negative; 3) initiated on HIV oral PrEP (Tenofovir + Emtricitabine) and accessing services at any of the 12 project PrEP sites in SA; 4) able to speak and/or understand any official South African official language and 5) willing and able to provide informed consent or a combination of their consent and assent from a parent or legal guardian if they were a minor (≤18 years). If minors showed they understood the study's specifications, they gave their own consent; if not, their parents' formal approval and consent was sought and given in addition to the adolescent's assent. The study population consistent of 1896 AGYW and data were collected from January 2019 to October 2022. Participants were excluded from enrolment if they: 1)Had a psychological/psychiatric disorder that would overrule the informed consent process or otherwise contraindicate participation in the study activities; 2) were less than 15 and older than 24 years old at the time of enrolment; and 3) were not female (43,103–105) .

3.5 Data collection of the primary study

In the primary study, during recruitment, fieldworkers thoroughly explained the study specifications to potential participants and allowed them to ask questions regarding the study. Questionnaires were interviewer-administered by fieldworkers fluent in English and the commonly spoken local language/s of the area. They invited every third AGYW attending services at the site to participate in the study, after which participants provided their informed consent and were enrolled. Using a standardised survey, fieldworkers held face-to-face baseline interviews with participants while directly recording answers on electronic tablets using REDcap® software. Participants were informed of their right to withdraw from participating in the study at any time without negative consequences. The survey lasted about 45 minutes. The electronic tablets were passcode-secured for data safekeeping. On each question,

participants were given an option to not answer if they did not want to. The questionnaire asked among many others, information on demographic, social, and health behaviour of the participants.

3.6 Measurement of variables

The outcome of interest: Intimate partner violence

The outcome variable used in this study was intimate partner violence (IPV). The definition of IPV in this study was a participant having had experienced one or/and a combination of emotional, physical, sexual and financial violence by an intimate partner. Experience of IPV in the preceding three months coupled with how many times the participant had encountered a specific form of IPV was assessed at baseline by AGYW's self-report. Emotional, physical and sexual IPV were assessed using 15 items adapted from the WHO Multi-Country Study on Women's Health and Domestic Violence Against Women Core Questionnaire (107). Financial IPV was measured using an instrument used in previous studies that were conducted in SA (108). A combination of emotional, physical, sexual and financial violence questions and their answers were used to create a binary variable used to assess any IPV experience among participants (107). A prefix of "any" in this study refers to any of the four types of IPV assessed. All questions are presented on Table 4.1. The table details how each form of IPV is measured and categorized. Each of these individual measures were used to create a variable to measure any IPV experience. The responses used to create the binary IPV variable were as shown: IPV (No= 0) if the answer was "never" to all questions asked on specific forms of violence by a partner and IPV(Yes=1) if the answer was "Once or twice, few times or many times" to any question classified as an act of any form of violence by a partner (8). See Table 4.1 for specific acts of describing sexual, emotional, physical and financial IPV.

Table 3.1 Study outcome variable measurement and coding.

Outcome variable : Intimate partner violence				
	Primary dataset		**Secondary dataset**	
	Code	**Categories**	**Code**	**Categories**
Exposure to physical IPV To create a binary variable that will be used in the analysis, any participant that answered "Never" to the questions below was coded "0" and labelled "No" and any participant that answered "Once or twice", "Few times" or "Many times" were coded "1" and labelled "Yes" to ever experiencing physical IPV in the past three months.				
In the past three months, how many times has your partner slapped you? ?(107) In the past three months, how many times has your partner punched you with a fist or something that could hurt you? In the past three months, how many times has your partner kicked you? In the past three months, how many times has your partner hit you? In the past three months, how many times has your partner pushed you? In the past three months, how many times has your partner threaten or attack you with a knife or any weapon?(107)	1 2 3 4	Never Once or twice Few times Many times	0 1	Never **-No** Many times, few times, once or twice -**Yes**
Exposure to sexual IPV To create a binary variable that will be used in the analysis, any participant that answered "Never" to the questions below was coded "0" and labelled "No" and any participant that answered "Once or twice", "Few times" or "Many times" were coded "1" and labelled "Yes" to ever experiencing sexual IPV in the past three months.				
In the past three months, how many times has your partner physically forced you to have sexual intercourse when you did not want to? In the past three months, how many times has your partner physically forced you to perform any other sexual act when you did not want to? In the past three months, how many times has your partner threaten or intimidate you when you did not want to have sexual intercourse or perform any other sexual act?(107)	1 2 3 4	Never Once or twice Few times Many times	0 1	Never **-No** Many times, few times, once or twice -**Yes**

Exposure to emotional IPV To create a binary variable that will be used in the analysis, any participant that answered "Never" to the questions below was coded "0" and labelled "No" and any participant that answered "Once or twice", "Few times" or "Many times" were coded "1" and labelled "Yes" to ever experiencing emotional IPV in the past three months.				
In the past three months, how many times has your partner belittled or humiliated you by words or actions that made you feel bad about yourself in front of other people? In the past three months, how many times has your partner yelled at you or broke things intentionally around you? In the past three months, how many times has your partner threaten to hurt you or someone close to you? In the past three months, how many times has your partner hurt people you care about, or damaged things of importance to you, as a way of hurting you?(107)	1 2 3 4	Never Once or twice Few times Many times	0 1	Never **-No** Many times, few times, once or twice **-Yes**
Exposure to financial IPV To create a binary variable that will be used in the analysis, any participant that answered "Never" to the questions below was coded "0" and labelled "No" and any participant that answered "Once or twice", "Few times" or "Many times" were coded "1" and labelled "Yes" to ever experiencing financial IPV in the past three months.				
In the past three months, how many times has your partner taken your earnings against your will? In the past three months, how many times has your partner spent money meant for household essentials on alcohol, tobacco or buying things for themselves knowing you had no other money? In the past three months, how many times has your partner stopped you from getting a job, going to work, trading or earning money?(108)	1 2 3 4	Never Once or twice Few times Many times	0 1	Never **-No** Many times, few times, once or twice **-Yes**

Explanatory variables of interest

Explanatory variable selection for exploring factors associated with IPV was guided by the conceptual framework presented in Figure 2.1 and prior literature. The explanatory variables chosen for analysing factors associated with IPV were: age, in school, highest level of education, employment status, transactional sex, PrEP use stigma, alcohol use, partaking in sex under the influence of alcohol, binge drinking, use of drugs, depression symptoms, use of a condom during vaginal sex, use of a condom during anal sex, partner's age difference, number of intimate partners, social support structure, residential area and district. Table 4.2 outlines how explanatory variables were coded/recoded and measured during data analysis.

Table 3.2 Study explanatory variables measurement and coding

Explanatory variables		
Variable name	**Type**	**Measurement and coding**
Age in years	Categorical & Ordinal	This variable was measured in years using the participants' reported age at last birthday. It was categorised into 15-17, 18-20 and 21-24 years.
In school	Binary	This variable was categorised into "No" and "Yes" .
Highest level of education completed	Categorical & Ordinal	This variable was categorised into "Primary or less", "Secondary" and "Tertiary or more".
Employment status	Binary	Employment was determined by asking participants their hours of work. Those that were "Unemployed" were categorised as "No". Those that have "At least 40 hours of self-employment /employment " or "Less than 40 hours of self-employment/employment" were categorised as "Yes".
PrEP use stigma	Binary	This variable was determined by participants' responses from four variables i.e.: (1) "I feel ashamed using PrEP"; (2) "I feel embarrassed using PrEP"; (3) "I feel judged using PrEP"; (4) "I feel I am at risk of physical IPV if I tell him/her that I use PrEP". The variable was categorised into "No" for those who do not agree with any statement and into "Yes" for those who have agreed to at least one of the statements.
Alcohol use	Binary	Using an adaptation of the Alcohol use disorder identification test (AUDIT) used in previous studies, this variable was determined by asking participants 'How often did you have a drink containing alcohol in the past three months?". The participants had an option to choose from : (1) Never; (2) Monthly; (3) Two to four times a month; (4) Two to three times a week; (5) Four or more times a week. The variable was categorised "No" for those reporting "Never" (option 1) and "Yes" for participants reporting "Monthly (option 2), Two to four times a month (option 3), Two to three times a week (option 4) or Four or more times a week (option 5)". (109).
Drug use	Binary	This variable was determined by asking participants if in the past three months, they have drugs such as used marijuana, ecstasy, whoonga, sugars, etc. This variable was categorised into "No" and "Yes"
Binge drank	Binary	Using an adaptation of the AUDIT test previously used in other studies, this variable was determined by asking a participant if in the past three months how often they had

		four or more drinks containing alcohol on a single occasion (or within two hours) and they could choose from: (1) Never had more than four drinks; (2) Once a month or less; (3) Two to four times a month; (4) Two to three times a week; (5) Four or more times a week; (6)(109) . The variable was categorised into "No" for those that chose option (1) and "Yes" for those who chose option (2)-(6).
Sex under the influence of alcohol or drugs	Binary	This variable was categorised into "No" and "Yes"
Depression symptoms	Categorical	Using the Patient Health Questionnaire-9 (PHQ-9), this variable was determined by combining nine variables that ask depression symptom questions reported by participants then adding them together to get a score that will be used to determine depression symptoms in participants (110). These are symptoms a participant has been feeling in the past two weeks (110). The screening questions were have you : (1) Had little pleasure or interest in doing things; (2)Been feeling down, depressed or hopeless; (3) Had trouble falling or staying asleep or sleeping too much; (4) Feeling tired or having little energy; (5) Been having poor appetite or overeating; (6) Feeling bad about yourself; (7) Trouble concentrating on things , such as reading a newspaper or watching television; (8) Moving or speaking so slowly that other people could have noticed ? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual; (9) Thoughts that you would better off dead or of hurting yourself in some way(110). Responses were scored based on how frequently each symptom appeared. (0) for "Not all" ; (1) for "Several days"; (2) for "More than half the days"; (3) "Nearly every day" (110). The scores were added together to give a total score that would determine the state of depression symptoms per participant. None to minimal symptoms ranged from 0-4, mild from 5-9, moderate from 10-14, moderately severe from 15-19 and severe from 20-27. Anything from mild (≥5) was considered as a participant having depression symptoms. In the analysis, the variable was categorised into "No" for those who have a score less than 5 or none of the depression symptoms and "Yes" for those that have a score equal or greater to five of the depression symptoms (110).

Use of condom during vaginal sex	Categorical	This variable was determined by asking participants if they have consistent condom use. They had three options namely: (1) “No” ; (2) “Yes” and (3) “I do not have vaginal sex”.
Use of condom during anal sex	Categorical	This variable was determined by asking participants if they have consistent condom use. They had three options namely: (1) “No” ; (2) “Yes” and (3) “I do not have anal sex”.
Transactional sex	Binary	Transactional sex was determined by asking participants if in the past three months they have had sex with anyone because they provided them with or AGYW expected that they would provide her with any of the following : (1) Food; (2) Clothes, shoes and accessories; (3) Cosmetics; (4) Cell phone; (5) Items for AGYW’s child(ren) or family such as clothes, food & school fees; (6) Transport, tickets or money for transport; (7) AGYW’s own school fees or residence fees; (8) Somewhere to stay; (9) Cash (111). Participants who answered “No” to all items mentioned were categorised as “No” and those that answered “Yes” for any item were categorised as “Yes”.
Partner’s age difference	Categorical	This variable was determined by asking participants how old their partners were. The responses were categorised into : (1) “The same age or younger “ ; (2) “More than five years older” ; “(3) “Unknown”; (4) “No partner”.
Number of intimate partners	Ordinal & Categorical	This variable was determine by asking participants the total number of intimate partners. The response numbers were categorised into : (1) “No partner”; (2) “One partner” and (3) “More than one partner”.
Social support structure	Binary	This variable was determined by combing two variables that asked (a) “In general, do you feel supported by the elders in your life”? and (b) “In general, do you feel supported by your close friends?”. Participants were asked to choose from three options for each variable : (1) “Almost never supported”; (2) “Sometimes supported” and (3) “ Very well supported”. Those that chose option (1) and (2) for both variables were categorised into “No” and those that chose option (3) were categorised into “Yes”.
Residential area	Categorical	This variable was determined by categorised responses, i.e. “Urban formal” ,“Urban informal” and ”Rural”.

District	Categorical	This variable was determined by categorised responses, i.e. “Mthatha”; “Gqeberha”; eThekwini and ”Tshwane”.

3.7 Data management

De-identified data were exported from REDcap® into STATA™ version 18.0 software and stored in a passcode-secured online cloud for safekeeping (112) .

3.8 Data analysis

STATA™ 18.0 software was used for establishing a data dictionary by coding/recoding responses and ultimately data analysis. The recoded variables and responses are outlined on Table 4.1 and 4.2. A frequency table was used to present the characteristics of participants. Prevalence and patterns of IPV were established by calculation.

In the primary study, there were 1896 interviews conducted of AGYW. The same number was enrolled in the study from January 2019 to October 2022. Due to incomplete baseline surveys (69), duplicates (52), participant whose birth date was not recorded (1) and those over 24 years (2), some data were excluded. Making the sample to be analysed reduced to 1811.

To replace unavoidable missing values for the explanatory variables contributing to the "depression symptoms score" variable, a mean value was computed and used to fill them. If missing values were less than 5% of the total sample, they were ignored.

Description of the study population

To describe the study population, its characteristics were outlined using calculated frequencies and percentages of each explanatory variable. The percentages were computed by a division of frequencies by the sample size. The variables described were: age, race, currently in school, highest level of education, employment status, PrEP use stigma, alcohol use, drug use, binge drank alcohol, engaging in sex under the influence of alcohol, depression symptoms, consistent use of condoms during vaginal sex, consistent use of condoms during anal sex, transactional sex, partner's age difference, number of intimate partners, social support structure, residential area and district outlining the percentages. The mean age was computed by adding all the

participant ages in years together then dividing the sum by the total number of values in the set.

Prevalence of IPV

Dividing the total number of participants who experienced any IPV by the sample population and then multiplying by 100, determined prevalence.

Patterns of IPV

To determine the patterns of IPV, prevalence of variables that describe specific type of IPV namely: financial, emotional, sexual and physical IPV were calculated similarly to how prevalence of any IPV was established.

To describe the difference in association between any IPV and each categorical explanatory variable category, Pearson chi-square tests were used. This was done ignoring any possible confounding effects. The description of participant experience of any IPV was then outlined for each possible explanatory variable with their categories then results were used to create a two-dimensional table.

Dividing the number of participants with any IPV experience by the total number of participants then multiplying by 100 in each category determined any IPV prevalence in each category of a variable.

Similarly, dividing the number of individuals with specific IPV experience by the total number of participants who experienced any type of IPV then multiplied by 100 determined the prevalence of specific IPV.

Unweighted frequencies for specific type of IPV in the last three months were calculated in the same manner; namely: financial, emotional, sexual and physical IPV were outlined in a table.

Factors associated with IPV

In this section "any IPV" refers to the experience of one and/or a combination of physical, emotional, financial and sexual IPV. The association between any IPV and explanatory variables was determined through analysis of the data using logistic regression as the outcome variable was binary.

Step 1: Separate logistic bivariate models were used to evaluate association between any IPV and each explanatory variable before the computation of a core model. These models computed crude odds ratios.

Step 2: Priori confounders were determined in the analysis by using the 10% rule.

Potential confounders according to literature were age, education level completed, employment status, drug use, alcohol use and residential area. The measure of association between any IPV and the explanatory variables with and without adjusting for possible confounders was determined. If the adjustment of a confounding variable had equal or more than 10% change, then there was confounding and the influence of the said confounder was not ignored. If the adjustment of a confounding variable had less than 10% change, the was no confounding and the influence of the said variable was ignored. Confounders that could not be ignored were fixed into the core model to control while not changing the relationship between any IPV and other explanatory variables (113). The decision to use 10% as a cut-off was made based on existing literature on techniques for choosing variables and controlling for significant confounders in regression analysis (113).

Step 3: Using backward stepwise selection, a multivariable logistic regression model was computed. Selected explanatory variables whose confounder level-adjusted association with any IPV were significant at p-values less than 0.10 were contained in the core model. The liberal threshold of p-values less than 0.10 was informed by existing literature on strategies for

variable selection (113). This was to avoid excluding variables that may have borderline statistical significance but are potentially important based on prior literature and adjusting for important confounders in regression analysis (113). This approach aligns with explanatory modelling strategies in epidemiological research (114).

Step 4: Explanatory variables selected in Step 3 using the 0.10 p-value cutoff were used to generate the most parsimonious model of any IPV among AGYW and it computed adjusted odds ratios. Priori confounders were included in all models. The results of the final model with statistically significant p-values were outlined on a table outlining crude/unadjusted odds ratios and adjusted odds ratios with confidence interval of 95% and significance level set to 5% showing factors that are associated with any IPV.

Step 5: Stratified analysis was used to check for potential effect modification of age in relation to education level completed as an exposure to IPV. This was done by identifying the overall effect of education level on IPV using combined Mantel-Haenszel odds ratio and checking for homogeneity across all education level completed strata (115).

4 Results

This section outlines the descriptive characteristics of participants in the study sub-divided into individual, interpersonal and community factors (Table 4.1). The prevalence and patterns of any intimate partner violence (IPV) are presented in Table 4.2 and 4.3 respectively. Lastly, the results of determining factors associated with IPV among AGYW computed by bivariate logistic regression are presented in Table 4.4. The final model results computed by stepwise backward selection are presented in Table 4.5. In these results, unless specified, any IPV is regarded an experience of one or a combination of sexual, financial, physical and emotional abuse by an intimate partner.

4.1 Characteristics of the study sample

Table 4.1 represents the characteristics of the population, using frequencies and percentages. The percentages are computed by a division of frequencies by the sample size. The table presents the explanatory variables namely: age, currently in school, highest level of education completed, employment status, PrEP use stigma, alcohol use, drug use, binge drank alcohol, engaging in sex under the influence of alcohol, depression symptoms, consistent use of condoms during vaginal sex, consistent use of condoms during anal sex, transactional sex, partner's age difference, number of intimate partners, social support structure, residential area and district outlining the percentages. It outlines the individual, interpersonal and community characteristics of the study population. The characteristics are reported among 1811 AGYW aged 15-24 years from four South African districts.

Age

The mean age of the study population is 19.5 years. The highest proportion of participants are between the ages of 18-20 years at 41.9% (n= 758), followed by those aged 21-24 years at 37.0% (n=670) and the lowest proportion were aged between 15-17 years at 21.2% (n=383).

Race

Overall, 98.9% (n= 1790) of the study population's race was Black while 1.2% (n= 21) was either Coloured, Asian or White.

In school

A majority 74.2% (n=1340) of the participants were currently in school, while 25.8% (n=466) of the participants were currently not in school.

Education level completed

Out of all the AGYW, the proportion of having secondary school complete was the highest at 46.6% (n=837), followed by those who had completed primary school or less at 38.4% (n=689) and 15.0% (n=269) of the participants had their tertiary qualification completed.

Employment status

Only 6.6% (n=118) of the study participants were employed.

PrEP use stigma

Out of all the participants, 32.3% (n= 584) had perceived stigma for taking oral HIV PrEP and a majority of the participants at 67.8% (n=1227) did not have perceived stigma for taking oral HIV PrEP.

Alcohol use

Almost half of the participants at 43.5% (n=787) reported using alcohol, while in the past three months, 32.0% (n=588) of participants binge drank. Among the participants, 18.6% (n=333) of them engaged in sex under the influence of alcohol in the last three months.

Drug use

A majority 94.6% (n=1713) of the participants had not used drugs in the past three months while a minority 5.4% (n=98) of the participants had.

Depression symptoms

Most participants did not have any depression symptoms in the past two weeks at 62.7% (n=1135) while 37.3% (n= 676) did.

Consistent condom use

The inconsistent use of condoms during vaginal sex was 80.1% (n=1433). The consistent use of condoms during vaginal sex was reported to be 14.1% (n=253).

The inconsistent use of condoms during anal sex was 5.6% (n=99) and the consistent use of condoms during anal sex was at 1.0% (n=18).

Transactional sex

For interpersonal factors, less than 5.0% (n=77) of the participants declared having had transactional sex in the last three months.

Partner age difference

The age difference between the AGYW and their partners ranges from -6 to 28 years with a majority of participants having a partner who is younger or the same age at 75.8% (n= 1373).

Number of intimate partners

The mean of total number of partners among the participants is 1.1 with a minimum of 0 and maximum of 6. Most participants 91.9% (n=1665) reported having had one partner, followed by 6.74%(n=122) of those that had more than one partner and the lowest proportion was of participants who had no partner at all at 1.33% (n=24).

Social support system

Of all the participants, 52% (n=941) reported having general support from their friends and family while 48% (n=870) did not.

Type of residential area

On community factors, 43.0% (n=776) of the participants live in an urban formal area of SA, while 41,4% (n=746) live in urban informal and lastly 15.6% (n=282) live in a rural area.

District

Most participants 31.5% (n=570) lived in City of Tshwane, followed by 30.8% (n=558) living in OR Tambo district, 20.8% (n=373) that lived in eThekwini district and the least was 16.9% (n=306) of participants that lived in Nelson Mandela Bay district.

Table 4.1 Characteristics of the adolescent girls and young women participants accessing PrEP broken down by each potential explanatory variable.

Variable	N b	%
Total	1811	100
INDIVIDUAL FACTORS		
Mean age in years 19.5 years		
Age group in years 15-17 18- 20 21-24	 383 758 670	 21.2 41.9 37.0
Race Black Other	 1790 21	 98.9 1.16
In school [b] No Yes	 466 1340	 25.8 74.2
Highest level of education completed [b] Primary or less Secondary Tertiary	 689 837 269	 38.4 46.6 15.0
Employment status [b] No Yes	 1666 118	 93.4 6.61
PrEP use stigma		

No	1227	67.8
Yes	584	32.3
Used alcohol [a]		
No	1024	56.5
Yes	787	43.5
Used drugs [a]		
No	1713	94.6
Yes	98	5.41
Binge drank alcohol [a]		
No	1223	67.5
Yes	588	32.5
Sex under the influence of alcohol or drugs [ab]		
No	1457	81.4
Yes	333	18.6
Depression symptoms [c]		
No	1135	62.7
Yes	676	37.3
Use of condom during vaginal sex [b]		
No	1433	80.0
Yes	253	14.1
Do not have vaginal sex	106	5.9
Use of condom during anal sex [b]		
No	99	5.6
Yes	18	1.0
Do not have anal sex	1662	93.4
INTERPERSONAL FACTORS		
Transactional sex [a]		
No	1632	95.5
Yes	77	4.5
Missing	102	0.00
Partner's age difference [b]		
The same age or younger	1373	75.8
≥5 years older	379	20.9
Unknown	30	1.7
No partner	29	1.6
Number of intimate partners [b]		
No partner	24	1.3
One partner	1665	91.9
More than one partner	122	6.7
Social support structure		
No	870	48.0
Yes	941	52.0
COMMUNITY FACTORS		
Residential area [b]		
Urban formal	776	43.0
Urban informal	746	41.4
Rural	282	15.6
District		
OR Tambo	558	30.8

Nelson Mandela Bay	306	16.9
eThekwini	377	20.8
City of Tshwane	570	31.5

[a] In the last three months.
[c] In the last two weeks.
[b] Aggregates do not all equal to the total (N) due to non-response and/ or missing values.

4.2 Prevalence of IPV

Table 4.2 outlines the prevalence of IPV disaggregated by each categorical explanatory variable. Dividing the total number of participants who experienced any IPV by the sample population and then multiplying by 100, determined prevalence in each category.

Among all the participants, the prevalence of any IPV in the last three months was 9.2% (n=166).

Age

The prevalence of any IPV was greater in participants aged 18-20 and 21-24 both at 10.0% (n=76 and n=67 respectively) than in those aged 15-17 years at 6.01% (n=23).

In school

Participants who were not in school had a 10.3% (n=48) prevalence of any IPV which is almost 2% higher than those who were in school at 8.8% (n=118).

Level of education completed

Those that completed primary school or less had the lowest prevalence of any IPV at 8.1% (n=56), closely followed by those that completed secondary school at 8.5% (n=71) and the highest prevalence than the two was in participants who completed tertiary education at 14.1% (n=38).

Employment status

Participants who were employed had a higher prevalence of any IPV at 10.2% (n=12) compared to those who were not at 9.2% (n=153).

PrEP use stigma

Participants that reported having PrEP use stigma had any IPV prevalence of 11.5% (n=67) and those that did not report having PrEP use stigma had any IPV prevalence of 8.1% (n=99).

Alcohol use

Those that used alcohol had a prevalence of any IPV that is about two times (12.3%, n=97) that of those that did not use alcohol at 6.7% (n=69).

Drug use

Among the participants, 22.5% (n=22) of those who used drugs in the last three months experienced any IPV compared to 8.4% (n=144) among those who did not use drugs.

Binge drinking

Participants who binge drank alcohol in the past three months had a 11.4% (n=67) prevalence of any IPV. Those that had not binge drank had any IPV prevalence of 8.1% (n=99).

Sex under the influence of alcohol

Any IPV prevalence is higher at 18.0% (n=60) in participants who engaged in having sex under the influence of alcohol or drugs compared to those who did not at 7.3% (n=106).

Depression symptoms

Those that had depression symptoms had a higher prevalence of any IPV at 13.3% (n=90) compared to those that did not have depression symptoms at 6.7% (n=76).

Consistent condom use

Those who did not use condoms during vaginal sex had higher IPV prevalence of 9.8% (n=141) than to those that used condoms during vaginal sex at 8.7% (n=22). Participants that reported to not have had any vaginal sex reported IPV prevalence of 1.9% (n=2).

Participants who did not use condoms during anal sex had higher an IPV prevalence of 12.0% (n=12) than those that did use condoms during anal sex at 5.6% (n=1). Participants that reported to not have had any anal sex reported any IPV prevalence of 9.0% (n=150).

Transactional sex

At 24.7% (n=19) participants who engaged in transactional sex had any IPV prevalence of about three times higher than those who did not engage in it (8.3%, n=136).

Partner age difference

Participants who had a partner that was five years or older than them had any IPV prevalence of 11.9% (n=45) and those that had partners of the same age or younger had a prevalence of 8.7% (n=120).

Number of intimate partners

Prevalence of any IPV is 8.3% (n=138) amongst participants who had one partner and 6.7% (n=27) amongst those that had more than one partner.

Social support structure

For participants that have no social support structure, the prevalence of any IPV was 11.0% (n=96) and among those that had social support structure it was 7.4% (n=70).

Type of residential area

Participants who lived in the rural areas had a prevalence of any IPV of 9.9% (n=28), succeeded closely by urban informal area dwellers at 9.4% (n=70) and those who lived in urban formal areas at 8.8% (n=68).

District

Participants living in City of Tshwane district had the highest prevalence of any IPV at 13.0% (n=74) compared to those that lived in OR Tambo which had a prevalence of 9.3% (n=52), eThekwini at 8.0% (n=30) and Nelson Mandela Bay district at 3.3% (10).

Table 4.2 Prevalence of intimate partner violence (IPV) among adolescent girls and young women.

Variable	Intimate partner violence (IPV)		
	Yes Nb (%)	No Nb (%)	Total Nb (%)
Total	166 (9.2)	1645 (90.8)	1811(100)
INDIVIDUAL FACTORS			
Age group in years 15-17 18-20 21-24	 23 (6.0) 76 (10.0) 67 (10.0)	 360 (94.0) 682 (90.0) 603 (90.0)	 383 (100) 758 (100) 670 (100)
In school b No Yes	 48 (10.3) 118 (8.8)	 418 (89.7) 1222 (91.2)	 466 (100) 1340 (100)
Highest level of education completed [b] Primary or less Secondary Tertiary or more	 56 (8.1) 71 (8.5) 38 (14.1)	 633 (91.9) 766 (91.5) 231 (85.9)	 689 (100) 837 (100) 269 (100)
Employment [b] No Yes	 153 (9.2) 12 (10.2)	 1513 (90.8) 106 (89.8)	 1666(100) 118 (100)
PrEP use stigma No Yes	 99 (8.1) 67 (11.5)	 1128 (91.9) 517 (88.5)	 1227 (100) 584 (100)
Used alcohol [a] No Yes	 69 (6.7) 97 (12.3)	 955 (93.3) 690 (87.7)	 1024 (100) 787 (100)
Used drugs [a] No	 144 (8.4)	 1569 (91.6)	 1713 (100)

Yes	22 (22.5)	76 (77.5)	98 (100)
Binge drank alcohol [a]			
No	99 (8.1)	1124 (91.9)	1223 (100)
Yes	67 (11.4)	521 (88.6)	588 (100)
Sex under the influence of alcohol or drugs [a b]			
No	106 (7.3)	1351 (92.7)	1457 (100)
Yes	60 (18.0)	273 (82.0)	333 (100)
Depression symptoms [c]			
No	76 (6.7)	1059 (93.3)	1135 (100)
Yes	90 (13.3)	586 (86.7)	676 (100)
Use of condom during vaginal sex [b]			
No	141 (9.8)	1292 (90.2)	1433 (100)
Yes	22 (8.7)	231 (91.3)	253 (100)
Do not have vaginal sex	2 (1.9)	104 (98.1)	106 (100)
Use of condom during anal sex [b]			
No	12 (12.1)	87 (87.9)	99 (100)
Yes	1 (5.6)	17 (94.4)	18 (100)
Do not have anal sex	150 (9.0)	1512 (91.0)	1662 (100)
INTERPERSONAL FACTORS			
Transactional sex [a b]			
No	136 (8.3)	1496 (91.7)	1632 (100)
Yes	19 (24.7)	58 (75.3)	77 (100)
Partner's age difference			
The same age or younger	120 (8.7)	1253 (91.3)	1373 (100)
≥5 years older	45 (11.9)	334 (88.1)	379 (100)
Unknown	0 (0.0)	30 (100)	30 (100)
No partner	1 (3.5)	28 (96.5)	29 (100)
Number of intimate partners [a]			
No partner	1 (4.2)	23 (95.8)	24 (100)
One partner	138 (8.3)	1527 (91.7)	1665 (100)
More than one partner	27 (6.7)	95 (93.3)	122 (100)
Social support structure			
No	96 (11.0)	774 (89.0)	870 (100)
Yes	70 (7.4)	871 (92.6)	941 (100)
COMMUNITY FACTORS			
Residential area [b]			
Urban formal	68 (8.8)	708 (91.2)	776 (100)
Urban informal	70 (9.4)	676 (90.6)	746 (100)
Rural	28 (9.9)	254 (90.1)	282 (100)
District			
OR Tambo	52 (9.3)	506 (90.7)	558 (100)
Nelson Mandela Bay	10 (3.3)	296 (96.7)	306 (100)
eThekwini	30 (8.0)	347 (92.0)	377 (100)
City of Tshwane	74 (13.0)	496 (87.0)	570 (100)

[a] In the last three months.
[c] In the last two weeks.
[b] Aggregates do not all equal to the total (N) due to non-response and/ or missing values.

4.3 Patterns of IPV

Table 4.3 reports the patterns of IPV by reporting the prevalence of specific types of IPV among the study participants. Almost 10% (n=166) of the participants reported having experienced any IPV in the last three months. With regards to the specific type of IPV from high to low prevalence, 5.5% (n=100) participants experienced emotional IPV, 4.1% (n=75) experienced physical IPV, 3.9% (n= 70) experienced financial IPV, and lastly 2.2% (n=40) experienced sexual IPV.

Table 4.3 Patterns of IPV

Type of IPV	N	%
Total	1811	100
Any IPV [a]		
No	1645	90.8
Yes	166	9.2
Emotional IPV [a]		
No	1711	94.5
Yes	100	5.5
Physical IPV [a]		
No	1736	95.9
Yes	75	4.1
Financial IPV [a]		
No	1741	96.1
Yes	70	3.9
Sexual IPV [a]		
No	1771	97.8
Yes	40	2.2

[a] In the last three months.

4.4 Factors associated with IPV

In this section "any IPV" refers to the experience of one and/or a combination of physical, emotional, financial and sexual IPV.

This segment of results outlines factors associated with any IPV among AGYW accessing PrEP. Age group and education level completed were retained in all the models as they were identified as confounders.

Bivariate logistic regression models were computed to determine crude odd ratios outlined on Table 4.4. This table further indicates confounder-adjusted association with any IPV and all selected explanatory variables detailing adjusted odds ratios.

In the crude/unadjusted bivariate analysis that included each explanatory variable, at 5% level, age group, having completed tertiary or higher, PrEP use stigma, alcohol use, drug use, binge drank alcohol, sex under the influence of alcohol, depression symptoms, not having vaginal sex, transactional sex, social support and living in Tshwane or OR Tambo district were significant and indicated association with IPV.

In the analysis adjusting for the identified confounders education level and age, the explanatory variables significantly associated with IPV at p-value less than 0.10 were PrEP use stigma, alcohol use, drug use, sex under the influence of alcohol, depression symptoms, not having vaginal sex, transactional sex, social support, type of residential area and district. These ten explanatory variables were used to compute a parsimonious model that determines factors associated with IPV outlined on Table 4.5.

Variables discarded due to their p-values being greater than 0.10 were employment, in school, binge drank alcohol, use of condoms during anal sex, partner's age difference and number of partners.

Table 4.4 Bivariate (unadjusted) and multivariate (adjusted) logistic regression analysis to evaluate association between IPV and each potential explanatory variable among AGYW.

	Unadjusted Analysis	Adjusted Analysis
Variable	Crude Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio (95% Confidence Interval)
INDIVIDUAL FACTORS		
Age group in years 15-17 18-20 21-24	 1.00 1.74 (1.08-2.83)** 1.74 (1.06-2.84)**	 1.00 1.54 (0.84-2.83) 1.28 (0.64-2.54)
In school No	 1.00	 1.00

Yes	0.84 (0.59-1.20)	0.86 (0.56-1.34)
Highest level of education completed		
Primary or less	1.00	1.00
Secondary	1.05 (0.73-1.51)	0.73 (0.45-1.20)
Tertiary or more	1.86 (1.20-2.89)****	1.82 (1.02-2.10)**
Employment		
No	1.00	1.00
Yes	1.12 (0.60-2.08)	1.03 (0.51-2.10)
PrEP use stigma		
No	1.00	1.00
Yes	1.48 (1.06-2.05)**	1.44 (1.00-2.08)**
Alcohol use [a]		
No	1.00	1.00
Yes	1.95 (1.41-2.69)****	1.55 (0.93-2.59)*
Drug use [a]		
No	1.00	1.00
Yes	3.15 (1.90-5.22)****	1.75 (0.94-3.23)**
Binge drank alcohol [a]		
No	1.00	1.00
Yes	1.46 (1.05-2.02)**	0.72 (0.42-1.23)
Sex under the influence of alcohol or drugs [a]		
No	1.00	1.00
Yes	2.80 (1.99-3.94)****	1.81 (1.16-2.83)**
Depression symptoms [c]		
No	1.00	1.00
Yes	2.14 (1.55-2.95)****	1.84 (1.28-2.66)****
Use of condom during vaginal sex		
No	1.00	1.00
Yes	0.87 (0.54-1.40)	0.98 (0.58-1.66)
Do not have vaginal sex	0.18 (0.04-0.72)***	0.12 (0.02-0.87)**
Use of condom during anal sex		
No	1.00	1.00
Yes	0.42 (0.05-3.4)	0.59 (0.06-6.00)
Do not have anal sex	0.70 (0.40-1.23)	0.80 (0.39-1.64)
INTERPERSONAL FACTORS		
Transactional sex [a]		
No	1.00	1.00
Yes	3.60 (2.09-6.23)****	2.00 (1.07-3.71)**
Partner's age difference		
The same age or younger	1.00	1.00
≥5 years older	1.41 (0.98-2.02)	0.94 (0.62-1.44)
Unknown	Empty	0
No partner	0.37 (0.05-2.76)	4.74e-06(0)
Number of intimate partners [a]		

No partner	1.00	1.00
One partner	2.08 (0.28-15.5)	7.40e-06(0)
More than one partner	6.54 (0.84-50.6)	0.00(0)
Social support structure		
No	1.00	1.00
Yes	0.65 (0.47-0.89)****	0.71 (0.50-1.02)*
COMMUNITY FACTORS		
Residential area		
Urban formal	1.00	1.00
Urban informal	1.08 (0.76)	2.55 (1.63-3.98)****
Rural	1.15 (0.72-1.82)	2.43 (1.28-4.61)***
District		
OR Tambo	1.00	1.00
Nelson Mandela Bay	0.33 (0.16-0.66)****	0.23 (0.10-0.53)****
eThekwini	0.84 (0.53-1.35)	1.39 (0.75-2.57)
City of Tshwane	1.45 (1.00-2.11)**	2.19 (1.26-3.81)***

Adjusted for age group and highest education level completed.
[a] In the last three months.
[c] In the last two weeks.
*p< 0.10
**p < 0.05
***p < 0.01
****p < 0.001

Table 4.5 below was computed by backward stepwise logistic regression model. This table, similar to Table 4.4, outlines crude and adjusted odds ratios of explanatory variables that were used to generate the most parsimonious model of factors associated any IPV among AGYW. This table outlines the results of the final model that was computed using ten variables that had p-values less or equal to 0.10 outlined on Table 4.4.

Explanatory variables whose education level completed and age-adjusted association with IPV were significant at p-value less than 0.10 during backward elimination were regarded statistically significant and therefore retained in the final model. In the final multivariate logistic regression model, adjusting for age and highest of education level completed, highest education level completed, used drugs, sex under the influence of alcohol, depression symptoms, PrEP use stigma, not having vaginal sex, transactional sex, social support, type of residential area and living in Nelson Mandela Bay or City of Tshwane districts were significantly associated with any experience of IPV, whereas age group was not significantly associated with IPV. Table 4.5

presents results found in the bivariate unadjusted analysis and multivariable final model after backward elimination.

Age

In the final adjusted analysis, although not significant, the odds of experiencing IPV among AGYW who were aged 18-20 years was 1.54 times the odds of experiencing IPV among those aged 15-17 years. The odds of experiencing IPV among AGYW who were aged 21-24 years were 1.34 times the odds of IPV among those who were aged 15-19 years.

Highest level of education completed

The odds of experiencing IPV among AGYW who had completed tertiary education level was 1.79 times the odds of IPV among AGYW who had completed primary or less education level. This was statistically significant. While the odds of IPV among AGYW who had completed secondary education level was 0.79 times the odds of IPV among those that had completed primary education level or less, although not statistically significant. Age was not found to be an effect modifier of education level effect of IPV. The combined Mantel-Haenszel odds ratio was used to determine the adjusted estimate of education level's effect on IPV, averaging across all strata. The combined odds ratio's confidence interval was 0.66 to 1.46 which included 1.0 meaning the effect was not statistically significant. Furthermore, the test of homogeneity across education level completed strata indicated that the odds of IPV are similar.

Drug use

The odds of IPV among AGYW who used drugs was 1.96 times the odds of IPV amongst AGYW who did not use drugs and this was statistically significant.

Sex under the influence of alcohol

The odds of IPV among AGYW who had sex under the influence of alcohol was 1.93 times the odds of IPV amongst those who did not have sex under the influence of alcohol. This was statistically significant.

Depression symptoms

The odds of IPV among AGYW who had depression symptoms was 1.85 times the odds of IPV in those that did not have depression symptoms and this result was statistically significant.

PrEP use stigma

The odds of IPV among AGYW who had PrEP use stigma was 1.47 times the odds of IPV amongst AGYW who did have PrEP use stigma and this was statistically significant.

Consistent use of condoms

The odds of IPV among AGYW who used condoms consistently during vaginal sex was 0.94 times the odds of IPV among AGYW who did not consistently use condoms during vaginal sex. This was however, not statistically significant. While the odds of IPV among AGYW who reported to not have had vaginal sex was 0.11 times the odds of AGYW who did not consistently use condoms during vagina sex. This was statistically significant.

Transactional sex

The odds of IPV among AGYW who partook in transactional sex was 2.19 times the odds of IPV among AGYW who did not partake in transactional sex. This was statistically significant.

Social support structure

The odds of IPV among AGYW who had a social support structure was 0.72 times the odds of IPV among AGYW who did not have social support structure. This was statistically significant.

Type of residential area

The odds of IPV among AGYW who lived in urban informal areas was 2.45 times the odds of IPV among AGYW who lived in urban formal areas and this was statistically significant. While the odds of IPV among AGYW who lived in rural areas was 2.12 times the odds of IPV among AGYW who lived in urban formal areas. This was statistically significant .

District

The odds of IPV among AGYW who lived in Nelson Mandela Bay district was 0.21 times the odds of IPV among AGYW who lived in OR Tambo. This was statistically significant. While the odds of IPV among AGYW who lived in eThekwini was 1.7 times the odds of IPV among AGYW who lived in OR Tambo. It was however, not significant. The odds of IPV among AGYW who lived in City of Tshwane district was 1.75 times the odds of IPV among AGYW who lived in OR Tambo district. This was statistically significant.

Table 4.5 Bivariate (unadjusted) and final multivariate (adjusted) logistic regression model results predicting factors associated with any IPV among AGYW.

	Unadjusted Analysis	Adjusted Analysis
Variable	Crude Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio (95% Confidence Interval)
INDIVIDUAL FACTORS		
Age group in years 15-17 18- 20 21-24	 1.00 1.74 (1.08-2.83)** 1.74 (1.06-2.84)**	 1.00 1.54 (0.85-2.79) 1.34 (0.69-2.59)
Highest level of education completed Primary or less Secondary Tertiary or more	 1.00 1.05 (0.73-1.51) 1.86 (1.20-2.89)****	 1.00 0.79 (0.49-1.29) 1.79 (1.02-3.14)**
Used drugs [a] No Yes	 1.00 3.15 (1.90-5.22)****	 1.00 1.96 (1.08-3.55) **
Sex under the influence of alcohol or drugs [a] No Yes	 1.00 2.80 (1.99-3.94)****	 1.00 1.93 (1.29-2.90) ****
Depression symptoms [c]		

No	1.00	1.00
Yes	2.14 (1.55-2.95)****	1.85 (1.28-2.66) ****
PrEP use stigma		
No	1.00	1.00
Yes	1.48 (1.06-2.05) **	1.47 (1.02-2.10) **
Use of condom during vaginal sex		
No	1.00	1.00
Yes	0.87 (0.55-1.40)	0.94 (0.56-1.55)
Do not have vaginal sex	0.18 (0.04-0.72)***	0.11 (0.01-0.79) **
INTERPERSONAL FACTORS		
Transactional sex [a]		
No	1.00	1.00
Yes	3.60 (2.09-6.23)****	2.19 (1.21-3.98) ****
Social support structure		
No	1.00	1.00
Yes	0.65 (0.47-0.89) **	0.72 (0.50-1.03)*
COMMUNITY FACTORS		
Residential area		
Urban formal	1.00	1.00
Urban informal	1.08 (0.76)	2.45 (1.60-3.76) ****
Rural	1.15 (0.72-1.82)	2.12 (1.19-4-3.78) **
District		
OR Tambo	1.00	1.00
Nelson Mandela Bay	0.33 (0.16-0.66)****	0.21 (0.10-0.44) ****
eThekwini	0.84 (0.53-1.35)	1.67 (0.92-3.02)
Tshwane	1.45 (1.00-2.11)**	1.75 (1.14-2.68) ***

Adjusted for age group and highest education level completed.
[a] In the last three months.
[c] In the last two weeks.
*p< 0.10
**p < 0.05
***p < 0.01
****p < 0.001

5 Discussion

The aim of this study was to assess the prevalence, patterns and factors associated with IPV among adolescent girls and young women aged 15-24 years accessing oral PrEP for the prevention of HIV between 2019-2022 in SA. The results reveal that the prevalence of any IPV in the past three months was 9.2%. The prevalence of emotional IPV was found to be 5.5%, physical IPV 4.1%, financial IPV 3.9% and sexual IPV 2.2%. Having completed tertiary education or higher, used drugs, had sex under the influence of alcohol and/or drugs, having depression symptoms, experiencing PrEP use stigma, not having vaginal sex, having transactional sex, having a social support structure, the type of residential area and residential district were found to be significantly associated with IPV in this study. Age group was not found to be associated with IPV.

5.1 Prevalence of IPV

The prevalence of any IPV in the past three months (9.2%) found in this study is lower than reported among AGYW aged 18-24 years in the 2016 SADHS in the past 12 months (15.1%) (16). This study's prevalence of any IPV is also lower than the 19.5% prevalence found by Selin et al among young women aged 13-20 years and the 24-26% global prevalence reported among AGYW aged 15-19 years (15,41). Comparing with above mentioned previous literature, the reasons for the lower prevalence in this study could be due to:1)This study uses reports of recent IPV experience in the last three months, others in the last six months and others in the last 12 months and that may explain the difference because when looking at a much shorter period of time, one is likely to find lower prevalence rates, 2)The methodological differences of the studies. The SADHS for example, has used stratified two-stage sampling that may have increased representativeness of AGYW while this study used convenience sampling that is specific among AGWY accessing PrEP and this may explain the divergent estimates, 3) Different age groups of young women participated in the different studies which makes it

challenging to completely compare, 4) social desirability bias where participants under-report IPV in healthcare settings because of the sensitive nature of abuse and being embarrassed to admit its experience and 5)These studies have different data collection objectives (16,41,72,73). Even though the prevalence in this study is lower than in prior literature, the finding is important because it may indicate a true reflection of IPV being lower among AGYW accessing PrEP due to successful IPV awareness and interventions in the population this study was conducted in (116).

5.2 Patterns of IPV

Amongst AGYW accessing PrEP in SA in this study, the prevalence of specific types of IPV, i.e. emotional, physical, financial and sexual IPV were reported in descending order indicating patterns of IPV.

Emotional IPV

Emotional IPV ranked the highest with a prevalence of 5.5%. This is an unexpected finding because physical IPV has been previously reported the highest among this demographic in SA (16,117). This deviation is however, consistent with previous studies conducted among AGYW aged 15-22 years in Nairobi, Kenya and Maputo, Mozambique (71,117,118). Emotional IPV may be more prevalent in this study because substantial work of awareness against IPV has been done in SA that encourage victims to speak out (116). This work include policies and laws that protect and support victims (116,119,120). Jewkes argues that emotional IPV is broader than any other type of IPV because it comes in a variety of forms which manifests differently among different cultural groups (118). Another possible explanation backed by one study is that emotional IPV is relatively normalised in SA as compared to other forms which may further explain why it ranks higher than any other type of IPV in this study (121,122). Emotional IPV being the highest in this study is alarming because it is often tied to AGYW

being disparaged by their partners which ends up in decline in their health status and suicidal ideation (118).

Physical IPV

Emotional IPV is succeeded by the prevalence of physical IPV at 4.1% and although lower than the prevalence reported in Nairobi in a similar population, it mimics its position of being the second highest type of IPV (117). This prevalence is lower than that reported by a similar study in SA among AGYW of the same age (13.1%) and by the 2016 SADHS (10.3%) (16,45). Physical IPV not being the highest type of violence experienced by AGYW is unexpected because the 2016 SADHS and other studies say it is (16,72,123). An explanation for this may be that the disclosure of physical IPV may be hindered by fear of judgement by interviewers and AGYW's perception of IPV experience being shameful, especially in a health facility setting (124). Some AGYW may not report their experience due being conditioned to view abuse as normal because existing in African patriarchal family structures normalise physical IPV (125). It reinforces women's inferiority to men and acceptance towards violent forms of discipline and enforcing gender norms that are physically harmful to women (125). AGYW who voluntarily take HIV PrEP can be perceived as being health aware and in control of their livelihood compared to general AGYW population such as the ones in the SADHS (16,99). They may be privy to general information about physical IPV due to their health seeking behaviour and have overall autonomy that may increases their ability to be assertive thereby reducing their vulnerability to IPV (99). This difference in prevalence may further be explained by the difference in the reporting period, i.e. three months while Mthembu et al report a lifetime prevalence (45). Lifetime prevalence is likely to be higher due to a longer period of exposure to physical IPV.

Financial IPV

Financial and sexual IPV had the lowest prevalence, reported at 3,9% and 2.2% respectively. This is consistent with previous literature (122,126). The explanation for these two types of IPV having the lowest prevalence may be that AGYW either do not realise it is happening to them or they do but they choose do not report them (126). They may choose to not report due to societal norms and desirability bias (126). There is a paucity of literature on financial IPV among AGYW in SA. Haifley et al attribute it to a lack of reporting and a standard measurement tool to determine whether one experiences it (126). A 2021 published study conducted in North West province in SA reported that women aged 35-55 years have a 13.2% prevalence of financial IPV. This makes the prevalence in this study (3.9%) much lower compared to it. This, however, might be because the age groups of the populations are different and this study from North West province report on a longer period, i.e. 12 months (127). The prevalence of just under four percent reported in this study indicates that it may be smaller than in previous studies and under-reported, but it still exists. We postulate that may be because older women are more likely to be generating financial income than AGYW. Younger AGYW are typically still in school in SA and therefore may not yet be financially dependent on a partner, as they may still be dependent on parents or other primary caregivers. Financial dependence on a partner or contributing less than 50% towards household expenses has been linked to increased experience of financial IPV among AGYW (127,128).

Sexual IPV

Although often included when violence against young women is researched, sexual IPV being the least common form violence among AGYW in this study at 2.2% is consistent with previous literature such as the 2016 SADHS (16,117). We hypothesize that due to the subject's sensitive nature, the report of its experience in AGYW may have been less frequent. This study also only asked about violence in the last three months which may also account the low prevalence.

5.3 Factors associated with IPV

In the final model controlling for age and highest level of education completed, factors that were significantly associated with IPV in this study were : having completed tertiary education, drug use, sex under the influence of alcohol, depression symptoms, PrEP use stigma, not having vaginal sex, transactional sex, type of residential area and district where one resides. Not having vaginal sex and having social support structure were protective against IPV experience, while the rest of the variables were associated with higher odds of experiencing any IPV.

5.3.1 Individual factors

Age

Although not statistically significant, there is a relationship between age and any IPV however, the association of age with IPV was not linear. Being aged 18-20 years showed a higher association with IPV, followed by those aged 21-24 years and the lowest odds were among those aged 15-17 years. The youngest group having the lowest prevalence of IPV may be explained by the fact that many of them are still transitioning into adulthood and have low relationship exposure compared to the older groups because as young women age, they are more likely to engage in more romantic partnerships and thus have greater opportunity to encounter IPV. Younger AGYW may also not truthfully disclose engaging in sexual activities in healthcare settings due to feeling uncomfortable, this may hinder them from ultimately reporting their IPV experience (129). While 18-20 year olds may be beginning to have serious partners for the first time and not knowing how to navigate conflict and therefore resulting in arguments and ultimately experiencing IPV. This age group (18-20 years) is typically still in high school/university and less than 7% of participants in this study was employed. They may be in relationships where there is economic power imbalance that may hinder their autonomy and resources to leave an abusive relationship (53). The oldest group (21-24 years) of AGYW may be able to communicate with their partners better due to maturity tied to age and

experience in relationships. The non-linear relationship between age and IPV may explain why the association is not significant. Like in this study, there is conflicting literature on whether being older among AGYW is protective from IPV(16,46,66).

Highest level of education completed

Aligning with previous research, the highest level of education completed in this study is associated with IPV among AGYW (15,66). Interestingly, the relationship is not linear. Albeit not being significant, having completed secondary school is protective against IPV. Completing secondary school being protective may be explained by targeted education fostering awareness against IPV and encouraged proactive measures to avoid it as compared to those who only completed primary school or less whom may have not been targeted for education on IPV due to age. The result not being significant may be explained by conflicting literature on what level of education completed is protective against IPV (69–71). Having completed tertiary education or higher is associated with higher odds of IPV experience in this study and this result is significant. Although AGYW who completed tertiary education or higher may have the same awareness as those who completed high school, studies show that they are more targeted for IPV because of likelihood of being employed and earning an income (51). There has been evidence found that women who are employed and especially have more money than their partners are at an increased risk of IPV due the partners feeling threatened by AGYW's "success" (67,130). This may explain the higher odds of experiencing IPV one has completed tertiary education or higher. The unexpected direction of association of education level completed and IPV prompted a stratified analysis by age to see whether IPV risk varies by age strata. This study found that effect modification by age was not significant and it does not seem to affect IPV's association with highest level of education completed.

Drug use

Drug use association with IPV is statistically significant in this study. This may be because most drugs impair judgment leading to arguments and ultimately experiencing IPV from partners (131). More so when there is desperation to buy drugs to curb cravings. This finding confirms previous literature that indicates that in drug-using couples, partners tend to incite IPV on women due to conflicts involving their poor control of drug supplies (132). In these couples, men have been reported to pressure women into raising money to buy drugs, and if they could not, women were physically violated (131,132). Even when women manage to raise the funds, they may experience IPV due to being blamed for societal shame their partners experience for how the woman elicited the funds (131,132). The shame may also be brought about by the partner's inferiority complex as it is a societal norm for the man to be the provider (131,132). This finding highlights the gender inequality in these kind relationships, as women report more abuse from their partners and not vice versa in SA (131).

Sex under the influence of alcohol and/or drugs

In this study, having sex under the influence of alcohol and/or drugs significantly doubled the odds of IPV among AGYW. This finding mimics that of previous studies that acknowledge the role of substance use in increasing IPV experience among AGYW (41,109). As discussed in prior literature, a possible pathway for this association may be that the consumption of alcohol affects how couples communicate which each other (109). In addition to alcohol heightening emotions of AGYW and thereby increasing conflict, partners may turned to IPV to try to resolve their problems (109). Another possible pathway is that AGYW who engage in transactional sex for food security reasons may turn to alcohol as a coping mechanism, further increasing their vulnerability to IPV (82,109). Another pathway that aligns with previous literature may be that because the participants are young, they may have challenges in effective communication and conflict resolution (73). Societal norms such as "a woman knowing their

place" have also been reported to being a catalyst for AGYW who consume alcohol's experience of IPV (109). This is backed by studies that were conducted in SA that revealed that women experience IPV for consuming alcohol and frequenting venues that sell alcohol (109,133). They reported that their partners believed that they must be conscious of their position as women and not act like a man by frequenting bars and shebeens as it embarrasses them (109,133).

Depression symptoms

In the final multivariable model, having depression symptoms with a (PHQ-9 of ≥5) is significantly associated with IPV. This is in line with previous global and SSA literature (77,134,135). Although not clear how, there is a possible bi-directional pathway between depression symptoms and IPV among AGYW (45,77). Depression symptoms among AGYW often stems from unhealed childhood trauma and repeatedly experiencing violence (134,136). IPV experience is known to exacerbate depression symptoms that already exist (77,137). It is hypothesised that repeated IPV or any other violence experience may make it difficult for available support and treatments for depression to reach their expected therapeutic effect among AGYW (137). This may result in a continuous cycle of IPV and depression. On the other hand, a possible pathway is depression being a risk factor for experiencing IPV (76). When left untreated, depression is known cause of cognitive misinterpretation about risk (76). This may may predispose AGYW to choose partners who could be violent (138–140). Further, depression is a risk factor for loss of self-sufficiency and esteem (138). This may result in AGYW entering in relationships that were not necessarily chosen by themselves but that "happen to them". If this agency to choose was given to a violent potential partner, AGYW may find themselves experiencing IPV and not having the confidence to leave. Depression is known to impair one's quality of life, for example, AGYW may be unable work and ultimately not be able to contribute to household income due to depression (140). This may frustrate the

partner into IPV. This phenomenon is explained by the "family stress framework" (141). This framework demonstrates that financial difficulties reduce couples' coping mechanisms and heighten up an atmosphere that is conducive to violence (141). It explains that financial stress tends to use up the psychological resources needed to exercise self-control over violent acts (141). Due to its self-deprecating effects on AGYW, ultimately depression can impair a one's capacity to respond to IPV by reporting it or leaving an abusive relationship thereby continuing its cycle (77). This is especially true for women residing in communities with low collective efficacy were IPV is normalised (96).

PrEP use stigma

AGYW having PrEP use stigma is associated with IPV in this study. Several studies highlight IPV as a barrier to HIV PrEP initiation and successful use but fail to directly associate IPV with AGYW PrEP use stigma (35,85,89,142). AGYW who have PrEP use stigma were reported to seek approval from their partners who equally stigmatise PrEP use to initiate or continue using PrEP (142). Despite knowing of its effectiveness and access, their stigma enforce their believe that people who take PrEP are promiscuous or are cheaters (142). The connection of AGYW PrEP use stigma associated with IPV may be through them being scared of being violated by their partner if they found out they used it. Research shows that AGYW who experience IPV often lose agency to take decisions about their own lives due to fear of continuous violence from their partners (77). They often let their partners make decisions on their behalf. Due to their loss of self-confidence and self-reliance, AGYW may hold opinions of their abusive partners such as being against the use PrEP even though it has proven to be a safe and effective protective measure against HIV (77). It could also be that AGYW actually understand the effectiveness of PrEP but the lack of support from their abusive partners may increase their own stigma (77,86,142).

Use of condoms during vaginal sex

Although not significant, the use of condoms during vaginal sex is protective against IPV in this study. While not having vaginal sex at all was significantly protective against IPV among AGYW. A possible pathway may be that AGYW who have more agency in their relationship are able to discuss condom use and therefore less likely to experience IPV (84). This is supported by studies that were conducted in SA that reported that AGYW's ability to negotiate and initiate condom use successfully is determined by their level of power in the relationship (84,143). Often when a woman is experiencing IPV, they would have less power in the relationship and therefore even if they wanted to use condoms, may not have the courage to bring it up for fear of being victimised. AGYW in SA reported that their partners got angry after the suggestion of condom use (84). This phenomenon is an abusive behaviour and may be characterised as sexual and/ or emotional IPV because it is elicits sexual coercion, controlling and manipulating behaviour (5,84). The use of condoms during vaginal sex being protective of IPV does not mean there is causation but rather a correlation.

5.3.2 Interpersonal factors

Transactional sex

Aligning with previous research, AGYW engaging in transactional sex had significantly higher odds of experiencing IPV in this study (90,91). Transactional sex may be putting AGYW at risk because of the power imbalance in these relationships, and the vulnerability of young women engaging in such (92). Previous studies have found that poverty stricken South African women turn to transactional sex for financial relieve (43,92). Echoing its association with IPV, a previous study found that AGYW engaging in transactional sex face more risk of encountering physical and/ or sexual IPV and this is because of partners expecting to get "payment" in the form of sex after giving them money or gifts (91,92). This may be caused by the power imbalance in these relationships. As literature says, these partners may use IPV to

enforce dominance and gendered control over AGYW's sexuality (111). This highlights an important societal norm issue about how men view AGYW who have transactional sex and why they feel the need to have sexual power over them when they knowingly and willingly engaged. The strong statistical association between transactional sex and IPV may be explained by a societal norm pathway of expecting a man to provide (92). Men may resort to violence as a result of their incapacity to fulfil the demands of being a provider and thereby feeling embarrassed and punishing their partner for engaging in transactional sex with other men to sustain their needs.

Social support structure

Social support structure is associated with IPV in this study. This is in line with previous literature that having a support structure is protective against IPV(144). Women use support structure as a coping mechanism after experiencing IPV and this often helps with their physical and mental well-being (94). A study among adolescents reported that a strong support structure improved mental health status (145). Although many studies marked IPV as decreasing mental health well-being and ultimately losing one's agency, social support improving it proves that it can urge AGYW to ask for help when experiencing IPV (139).

5.3.3 Community factors

Type of residential area

The type of residential area one lived in was significantly associated with IPV in this study. Living in urban informal areas put AGYW at a significantly higher odds of experiencing IPV than AGYW who lived in formal urban areas. AGYW living in rural areas were significantly more likely to experience IPV than those in urban formal areas. This is in line with what a previous studies among AGYW reported (45,82,146). This may be explained by the higher levels of food insecurity in urban informal and rural areas compared to formal areas (147).

Studies have shown that household food insecurity may increase conflict in relationships and partners resorting to IPV on AGYW to take out their frustrations (82,146). Rural areas in SSA are known to be patriarchal and uphold gender norms that are abusive to women and this may explain the higher odds of IPV (148).

District

In this study, living in Nelson Mandela Bay district was protective against IPV compared to living in OR Tambo district in the Eastern Cape province. While living in eThekwini in Kwa-Zulu Natal was associated with higher odds of IPV, it was not a significant finding. However, living in City of Tshwane significantly increased the odds of IPV compared to living in OR Tambo district in the Eastern Cape. In a study among a similar population, Mthembu et al reported that living in Gauteng increased the odds of IPV, followed by Kwa-Zulu Natal then lastly Eastern Cape was protective against IPV, and this is in line with this study's findings (45). Granted they only looked at physical IPV and they used provinces instead of districts to distinguish between IPV in different areas of SA. These results highlight that there may be broader contextual factors that may be at play and further research may be needed to fully explore these dynamics.

In conclusion, the factors identified above interact with each other in different pathways to heighten AGYW's vulnerability to IPV (136,149). The pathways may cause a cascade effect and are not always straightforward. For example, experiencing IPV is a risk factor for depression symptoms and vice versa which may lead AGYW to substance use to alleviate the symptoms of depression or the abuse itself (77,137). Substance abuse may distort one's reality and then they are ultimately not able to participate adequately in their day-to-day routine and/or in the workforce (150). AGYW may end up not being able to sustain themselves and/or their addiction financially and resorting to transactional sex which this study has also reported as a risk factor for IPV (92).

6 Conclusion

The results of this study highlight that IPV research needs to be prioritised among AGYW. This is especially true for emotional IPV as it is more prevalent than physical, financial and sexual IPV respectively. This finding highlights the need for increased attention to the often-overlooked emotional dimension of IPV, which may result in adverse mental health outcomes and reduced health-seeking behaviour (80). Many AGYW reported having experienced different forms of IPV, highlighting that specific forms of violence rarely occur in isolation. The findings of this study highlight the interconnected risk factors of IPV among AGYW accessing HIV prevention services that include mental health challenges, substance use, PrEP use stigma and transactional sex. This study also identified community risk factors which are :- living in urban informal and rural areas having higher odds of experiencing of IPV compared to urban areas and prevalence estimates ranging widely across different districts of SA. Suggesting the need for area-specific interventions. This study further identifies that having social support structure is protective against IPV, suggesting that it may be important to target fostering healthy relationships in communities. These finding suggests that IPV among AGYW is shaped by complex interaction of individual, interpersonal and community factors, and interventions should be multidimensional to be effective. This study enhanced the knowledge on the magnitude of IPV among AGYW accessing PrEP and associated factors that need to be addressed holistically. Using information from this study, collaborative context specific IPV interventions targeting AGYW can be developed by communities and different departments of government in SA.

7 Recommendations

Addressing IPV requires sensitizing and raising awareness about it in communities including among children. This will let AGYW know of their rights, responsibilities towards their community members, what to do if they find themselves experiencing IPV and where to seek

support. Reducing the prevalence of any IPV among AGYW warrants a multi-layered, integrated interventions and community-level approaches that centre awareness focusing on access to mental health care service, healthy relationship dynamics and substance use. In addition to comprehensive SRH services that include IPV screening, primary health care institutions could introduce robust follow-up services and referral networks to address IPV. This requires collaboration between health, education, and legal departments to provide attainable, confidential and reliable services. An integrated, quick and effective response from different government departments to support victims continuously and hold perpetrators accountable is needed. This includes but is not limited to: ensuring quality medical evidence and support by continuously trained health care workers, prompt response by South African Police Service and legal protection for the affected by IPV from Department of Justice. This is to guarantee that AGYW who have experienced IPV continue to receive emotional and legal support beyond emergency medical care. Upholding IPV laws that support holding perpetrators accountable may help curb the problem. The association between transactional sex and IPV identified by this study requires economic interventions such as job creation for AGYW to alleviate the need for transactional sex. Social support structure being protective of IPV experience should encourage fostering healthy relationships in communities that will not only improve relationships between romantic partners, but between family members and friends who may serve as a social support structure during and after AGYW's experience of IPV. Fostering healthy relationships could be achieved by community collaboration in problem solving, IPV awareness campaigns and creation of future actions. This may build AGYW trust in existing community systems that aim to reduce and prevent recurrence of experience of IPV while offering access to remedial interventions. There is a necessity to continuously advocate for healthy relationships in rural and urban-informal area communities that challenge gender powered relations that hold up violence against AGYW. This study should be seen as one of the initial stages of a process that

will require substantial further research on AGYW's experience of IPV, especially emotional IPV, particularly to find evidence of its impact on their health outcomes.

8 Strengths

The strength of this research is that it contributes to quantifying and determining factors associated with IPV among AGYW that will be useful in a broader societal effort to reduce it among all women. Comparison of the findings of this study with 2016 SADHS report highlight that adolescent girls aged 15-17 years are often excluded in IPV national surveys conducted in SA. This study however, included AGYW aged 15-24 years which demonstrated a broader picture of their experience with IPV. The diversity in geographical areas in this study provides insight on how regional prevalence of IPV vary and this insight could provide further data on the contextual factors that may be leveraged for IPV prevention efforts. This study is unique in that it was undertaken among a population of AGYW who were accessing PrEP. Another strength is the inclusion of variables such as PrEP use stigma, sex under the influence of alcohol and/or drugs, transactional sex and consistent use of condoms during vaginal sex, which are not routinely collected in demographic health surveys. Moreover, the identification of risk factors such as sex under the influence of alcohol, drug use, PrEP use stigma, depression symptoms and transactional sex for IPV found in this study are modifiable.

9 Limitations

This study is not void of limitations. It is a cross-sectional study so causality could not be determined. The data collected for this study were from AGYW accessing oral HIV PrEP living in three out of nine South African provinces that were not randomly selected. The extent to which we may make any inferences about AGYW in general is limited by these sample characteristics. There is possible social-desirability bias due to self-reporting sensitive matters such as sexual behaviour and violence. This may have over/underestimated association between explanatory

variables and IPV. The primary study was based on a convenient and not random sample and that may have introduced selection bias.

10 Ethical considerations

The primary study has ethical clearance from the Witwatersrand University Human Research Ethics Committee (M180860). Prior to beginning the research, permission to use Project PrEP data was sought and given from the principal investigator of the primary study. This study has ethical clearance certificate (M240431) from Witwatersrand Human Research Ethics Committee (Medical). Participant anonymity and confidentiality was maintained during and after the research process. Only de-identified data was used.

11 References

1. United Nations. The Sustainable Development Goals Report 2023: Special Edition [Internet]. New York, USA; 2023 Jul [cited 2025 Feb 2]. Available from: https://unstats.un.org/sdgs/report/2023/

2. Gordon C. Intimate partner violence is everyone's problem, but how should we approach it in a clinical setting? South African Medical Journal. 2016 Sep 10;106(10):962.

3. Sardinha L, Maheu-Giroux M, Stöckl H, Meyer SR, García-Moreno C. Global, regional, and national prevalence estimates of physical or sexual, or both, intimate partner violence against women in 2018. The Lancet [Internet]. 2022 Feb [cited 2024 Jun 5];399(10327):803–13. Available from: https://who.canto.global/b/QR99R

4. Lewis L, Kharsany ABM, Humphries H, Maughan-Brown B, Beckett S, Govender K, et al. HIV incidence and associated risk factors in adolescent girls and young women in South Africa: A population-based cohort study. PLoS One. 2022 Dec 21;17(12):e0279289.

5. Abdool Karim Q, Baxter C. The dual burden of gender-based violence and HIV in adolescent girls and young in South Africa. South African Medical Journal. 2016 Dec 1;106(12):1151.

6. World Health Organization. Understanding and addressing violence against women: Intimate partner violence. Geneva: World Health Organization; 2012.

7. Abrahams Naeemah, Mhlongo Shibe, Dekel Bianca, Chirwa Esnat, Ketelo Asiphe, Lombard Carl, et al. Decrease in femicide in South Africa: three national

studies across 18 years. South African Medical Research Council [Internet]. 2022 Oct [cited 2023 Sep 22]; Available from: https://www.samrc.ac.za/sites/default/files/attachments/2022-09/DecreaseFemicideSouthAfricaResearchBrief.pdf

8. World Health Organisation (WHO). Violence against women prevalence estimates, 2018: global, regional and national prevalence estimates for intimate partner violence against women and global and regional prevalence estimates for non-partner sexual violence against women. Executive summary. Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO. [Internet]. WHO, on behalf of the United Nations Inter-Agency Working Group on Violence Against Women Estimation & Data. Geneva; 2021 [cited 2024 Jun 5]. Available from: https://who.canto.global/b/QR99R

9. Hatcher AM, Weiser SD, Cohen CR, Hagey J, Weke E, Burger R, et al. Food Insecurity and Intimate Partner Violence Among HIV-Positive Individuals in Rural Kenya. Am J Prev Med. 2021 Apr;60(4):563–8.

10. Maluleke R (Statistician General), National Department of Health (NDOH), South African Medical Research Council (SAMRC), ICF. South Africa Demographic and Health Survey 2016:Key Indicators [Internet]. Pretoria; 2017 May [cited 2023 Oct 24]. Available from: https://www.statssa.gov.za/publications/Report%2003-00-09/Report%2003-00-092016.pdf

11. World Health Organization on behalf of the United Nations Inter-Agency Working Group on Violence Against Women Estimation and Data (UNICEF, U., UNODC, UNSD, UNWomen), Violence against women prevalence estimates

2018. Global, regional and national prevalence estimates for intimate partner violence against women and global and regional prevalence estimates for non-partner sexual violence against women. Geneva: World Health Organization; 2021.

12. Jewkes R, Penn-Kekana L, Levin J, Ratsaka M, Schrieber M. Prevalence of emotional, physical and sexual abuse of women in three South African provinces. S Afr Med J. 2001 May;91(5):421–8.

13. Okafor CN, Barnett W, Zar HJ, Nhapi R, Koen N, Shoptaw S, et al. Associations of Emotional, Physical, or Sexual Intimate Partner Violence and Depression Symptoms Among South African Women in a Prospective Cohort Study. J Interpers Violence. 2021 May 30;36(9–10):NP5060–83.

14. Decker MR, Latimore AD, Yasutake S, Haviland M, Ahmed S, Blum RW, et al. Gender-Based Violence Against Adolescent and Young Adult Women in Low- and Middle-Income Countries. Journal of Adolescent Health. 2015 Feb;56(2):188–96.

15. Sardinha L, Yüksel-Kaptanoğlu I, Maheu-Giroux M, García-Moreno C. Intimate partner violence against adolescent girls: regional and national prevalence estimates and associated country-level factors. Lancet Child Adolesc Health. 2024 Sep;8(9):636–46.

16. National Department of Health (NDoH) SSA (Stats SSAMRC (SAMRC), and I. South Africa Demographic and Health Survey 2016 [Internet]. Pretoria, South Africa, and Rockville, Maryland, USA; 2019 Jan [cited 2024 Nov 11]. Available from: https://dhsprogram.com/pubs/pdf/FR337/FR337.pdf

17. President of the Republic of South Africa. Act No. 09 of 2024: National Council on Gender-Based Violence and Femicide Act, 2024 [Internet]. Cape Town: Government Gazette; May 27, 2024. Available from: https://www.gov.za/sites/default/files/gcis_document/202405/50712natcouncilgender-basedviolencefemicideact92024.pdf

18. Dunkle KL, Jewkes RK, Brown HC, Gray GE, McIntryre JA, Harlow SD. Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. The Lancet. 2004 May;363(9419):1415–21.

19. Simbayi L, Zuma K, Zungu N, Moyo S, Marinda E, Jooste S, et al. South African National HIV Prevalence, Incidence, Behaviour and Communication Survey (2017) [Internet]. Cape Town; 2019 [cited 2024 Jun 6]. Available from: https://hsrc.ac.za/uploads/pageContent/10779/SABSSM%20V.pdf

20. UNAIDS Joint United Nations Programme on HIV/AIDS. UNAIDS data 2023 [Internet]. 20 Avenue Appia 1211 Geneva 27 Switzerland; 2023 [cited 2024 Jul 21]. Available from: https://www.unaids.org/sites/default/files/media_asset/data-book-2023_en.pdf

21. Human Sciences Research Council (HSRC). SABSSM VI highlights progress and ongoing disparities in South Africa's HIV epidemic [Internet]. Pretoria; 2023 Nov [cited 2024 Jun 3]. Available from: https://hsrc.ac.za/special-projects/sabssm-survey-series/sabssmvi-media-pack-november-2023/

22. Bekker LG, Brown B, Joseph-Davey D, Gill K, Moorhouse M, Delany-Moretlwe S, et al. Southern African guidelines on the safe, easy and effective use of pre-exposure prophylaxis: 2020. South Afr J HIV Med. 2020 Dec 10;21(1).

23. George G, Beckett S, Reddy T, Govender K, Cawood C, Khanyile D, et al. Determining HIV risk for Adolescent Girls and Young Women (AGYW) in relationships with “Blessers” and age-disparate partners: a cross-sectional survey in four districts in South Africa. BMC Public Health. 2022 Dec 14;22(1):973.

24. Abdool Karim Q, Sibeko S, Baxter C. Preventing HIV Infection in Women: A Global Health Imperative. Clinical Infectious Diseases. 2010 May 15;50(s3):S122–9.

25. Velloza J, Poovan N, Ndlovu N, Khoza N, Morton JF, Omony J, et al. Adaptive HIV pre-exposure prophylaxis adherence interventions for young South African women: Study protocol for a sequential multiple assignment randomized trial. PLoS One. 2022 Apr 13;17(4):e0266665.

26. Velloza J, Khoza N, Scorgie F, Chitukuta M, Mutero P, Mutiti K, et al. The influence of HIV-related stigma on PrEP disclosure and adherence among adolescent girls and young women in HPTN 082: a qualitative study. J Int AIDS Soc. 2020 Mar 6;23(3).

27. Bekker LG, Rebe K, Venter F, Maartens G, Moorhouse M, Conradie F, et al. Southern African guidelines on the safe use of pre-exposure prophylaxis in persons at risk of acquiring HIV-1 infection. South Afr J HIV Med. 2016 Mar 9;17(1).

28. PrEP Watch. South Africa: A snapshot of PrEP scale-up, registration and resources for South Africa. In: PrEP Watch [Internet]. New York; 2024 May [cited 2023 Oct 24]. Available from: https://www.prepwatch.org/countries/south-africa/

29. Thomas D, Nakabugo L, Nambi F, Kibuuka J, Muwonge TR, Feutz E, et al. Intimate Partner Violence and Adherence to PrEP and ART Among Ugandan HIV

Serodifferent Couples. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2024 Apr 1;95(4):347–54.

30. Stubbs A, Szoeke C. The Effect of Intimate Partner Violence on the Physical Health and Health-Related Behaviors of Women: A Systematic Review of the Literature. Trauma Violence Abuse. 2022 Oct 5;23(4):1157–72.

31. Roberts ST, Haberer J, Celum C, Mugo N, Ware NC, Cohen CR, et al. Intimate Partner Violence and Adherence to HIV Pre-exposure Prophylaxis (PrEP) in African Women in HIV Serodiscordant Relationships: A Prospective Cohort Study. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2016 Nov 1;73(3):313–22.

32. Kouyoumdjian FG, Calzavara LM, Bondy SJ, O'Campo P, Serwadda D, Nalugoda F, et al. Intimate partner violence is associated with incident HIV infection in women in Uganda. AIDS. 2013 May 15;27(8):1331–8.

33. Durevall D, Lindskog A. Intimate partner violence and HIV in ten sub-Saharan African countries: what do the Demographic and Health Surveys tell us? Lancet Glob Health. 2015 Jan;3(1):e34–43.

34. Zhang J, Li C, Xu J, Hu Z, Rutstein SE, Tucker JD, et al. Discontinuation, suboptimal adherence, and reinitiation of oral HIV pre-exposure prophylaxis: a global systematic review and meta-analysis. Lancet HIV. 2022 Apr;9(4):e254–68.

35. Hartmann M, Otticha S, Agot K, Minnis AM, Montgomery ET, Roberts ST. Tu'Washindi na PrEP: Working With Young Women and Service Providers to Design an Intervention for PrEP Uptake and Adherence in the Context of Gender-Based Violence. AIDS Education and Prevention. 2021 Apr;33(2):103–19.

36. Jewkes RK, Dunkle K, Nduna M, Shai N. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: a cohort study. The Lancet. 2010 Jul;376(9734):41–8.

37. Reddy K, Palanee-Phillips T, Heffron R. Awareness of Heightened Sexual and Behavioral Vulnerability as a Trigger for PrEP Resumption Among Adolescent Girls and Young Women in East and Southern Africa. Curr HIV/AIDS Rep. 2023 Dec 5;20(6):333–44.

38. Bernstein M, Phillips T, Zerbe A, McIntyre JA, Brittain K, Petro G, et al. Intimate partner violence experienced by HIV-infected pregnant women in South Africa: a cross-sectional study. BMJ Open. 2016 Aug 16;6(8):e011999.

39. Sullivan Tami. The Intersection of Intimate Partner Violence and HIV: Detection, Disclosure, Discussion, and Implications for Treatment Adherence.

40. Yonga AM, Kiss L, Onarheim KH. A systematic review of the effects of intimate partner violence on HIV-positive pregnant women in sub-Saharan Africa. BMC Public Health. 2022 Feb 3;22(1):220.

41. Selin A, DeLong SM, Julien A, MacPhail C, Twine R, Hughes JP, et al. Prevalence and Associations, by Age Group, of IPV Among AGYW in Rural South Africa. Sage Open. 2019 Jan 18;9(1):215824401983001.

42. Kuo C, LoVette A, Slingers N, Mathews C. Predictors of Resilience Among Adolescent Girls and Young Women Who Have Experienced Intimate Partner Violence and Sexual Violence in South Africa. J Interpers Violence. 2022 Aug 8;37(15–16):NP13425–45.

43. Gordon KJ, Martin CE, Kutywayo A, Cox LA, Nongena P, Mullick S. Mental Health Needs of Adolescent and Young Adult PrEP Users in South Africa: Implications for Sexual and Reproductive Health Programming. Journal of Adolescent Health. 2023 Dec;73(6):S73–80.

44. Leddy AM, Selin A, Lippman SA, Kimaru LJ, Twine R, Gómez-Olivé X, et al. Emotional Violence is Associated with Increased HIV Risk Behavior Among South African Adolescent Girls and Young Women in the HPTN 068 Cohort. AIDS Behav. 2022 Jun 20;26(6):1863–70.

45. Mthembu J, Mabaso M, Reis S, Zuma K, Zungu N. Prevalence and factors associated with intimate partner violence among the adolescent girls and young women in South Africa: findings the 2017 population based cross-sectional survey. BMC Public Health. 2021 Dec 16;21(1):1160.

46. Stöckl H, March L, Pallitto C, Garcia-Moreno C. Intimate partner violence among adolescents and young women: prevalence and associated factors in nine countries: a cross-sectional study. BMC Public Health. 2014 Dec 25;14(1):751.

47. Beesham I, Joseph Davey DL, Beksinska M, Bosman S, Smit J, Mansoor LE. Daily Oral Pre-exposure Prophylaxis (PrEP) Continuation Among Women from Durban, South Africa, Who Initiated PrEP as Standard of Care for HIV Prevention in a Clinical Trial. AIDS Behav. 2022 Aug 5;26(8):2623–31.

48. Munthali RJ, Stangl AL, Baron D, Barré I, Harvey S, Ramskin L, et al. Prevalence and Risk Factors of PrEP Use Stigma Among Adolescent Girls and Young Women in Johannesburg, South Africa and Mwanza, Tanzania Participating in the EMPOWER Trial. AIDS Behav. 2022 Dec 1;26(12):3950–62.

49. Wara N, Pike C, Rousseau E, Macdonald P, Mapukata P, Leonard B, et al. PrEP preferences and early acceptability of injectable cabotegravir among pregnant and lactating people in Cape Town, South Africa: findings from the PrEPared to Choose study. J Int AIDS Soc. 2025 Jul 2;28(S2).

50. Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts CH. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. The Lancet. 2006 Oct;368(9543):1260–9.

51. Wado YD, Mutua MK, Mohiddin A, Ijadunola MY, Faye C, Coll CVN, et al. Intimate partner violence against adolescents and young women in sub-Saharan Africa: who is most vulnerable? Reprod Health. 2021 Jun 17;18(S1):119.

52. World Health Organisation (WHO), Claudia García-Moreno, Christina Pallitto W Karen Devries, Heidi Stöckl, Charlotte Watts, Naeemah Abrahams. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violencen [Internet]. Geneva; 2013 [cited 2024 Jun 8]. Available from: https://iris.who.int/bitstream/handle/10665/85239/9789241564625_eng.pdf

53. Chinelo Nduka VOATDO. Economic Abuse as a Form of Intimate Partner Violence in Sub-Saharan Africa: A Review of the Literature. Journal of Community Medicine and Primary Health Care. 2023 Dec;(VOL. 35 NO 3).

54. Muula AS. HIV Infection and AIDS Among Young Women in South Africa. Croat Med J. 2008 Jun;49(3):423–35.

55. Li Y, Marshall CM, Rees HC, Nunez A, Ezeanolue EE, Ehiri JE. Intimate partner violence and HIV infection among women: a systematic review and meta-analysis. J Int AIDS Soc. 2014 Jan 13;17(1).

56. Jewkes R, Morrell R. Gender and sexuality: emerging perspectives from the heterosexual epidemic in South Africa and implications for HIV risk and prevention. J Int AIDS Soc. 2010 Jan;13(1):6–6.

57. World Health Organisation (WHO). WHO Implementation Tool for Pre-exposure Prophylaxis (PrEP) of HIV Infection. Geneva; 2017 Jul.

58. Karim SSA, Baxter C. HIV pre-exposure prophylaxis implementation in Africa: some early lessons. Lancet Glob Health. 2021 Dec;9(12):e1634–5.

59. O'Malley TL, Hawk ME, Egan JE, Krier SE, Burke JG. Intimate Partner Violence and Pre-exposure Prophylaxis (PrEP): A Rapid Review of Current Evidence for Women's HIV Prevention. AIDS Behav. 2020 May 27;24(5):1342–57.

60. Jewkes RK, Levin JB, Penn-Kekana LA. Gender inequalities, intimate partner violence and HIV preventive practices: findings of a South African cross-sectional study. Soc Sci Med. 2003 Jan;56(1):125–34.

61. Beauchamp G, Donnell D, Hosek S, Anderson PL, Chan KCG, Dye BJ, et al. Trust in the provider and accurate self-reported PrEP adherence among adolescent girls and young women in South Africa and Zimbabwe: HPTN 082 study. BMC Womens Health. 2023 May 19;23(1):276.

62. Pintye J, O'Malley G, Kinuthia J, Abuna F, Escudero JN, Mugambi M, et al. Influences on Early Discontinuation and Persistence of Daily Oral PrEP Use Among Kenyan Adolescent Girls and Young Women: A Qualitative Evaluation

From a PrEP Implementation Program. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2021 Apr 1;86(4):e83–9.

63. Rubtsova A, Wingood G, Dunkle K, Camp C, DiClemente R. Young Adult Women and Correlates of Potential Adoption of Pre-exposure Prophylaxis (PrEP): Results of a National Survey. Curr HIV Res. 2014 Mar 31;11(7):543–8.

64. Decker MR, Miller E, McCauley HL, Tancredi DJ, Anderson H, Levenson RR, et al. Recent partner violence and sexual and drug-related STI/HIV risk among adolescent and young adult women attending family planning clinics. Sex Transm Infect. 2014 Mar;90(2):145–9.

65. Sawyer SM, Afifi RA, Bearinger LH, Blakemore SJ, Dick B, Ezeh AC, et al. Adolescence: a foundation for future health. The Lancet. 2012 Apr;379(9826):1630–40.

66. Mossie TB, Mekonnen Fenta H, Tadesse M, Tadele A. Mapping the disparities in intimate partner violence prevalence and determinants across Sub-Saharan Africa. Front Public Health. 2023 Jun 28;11.

67. Stöckl H, Hassan A, Ranganathan M, M. Hatcher A. Economic empowerment and intimate partner violence: a secondary data analysis of the cross-sectional Demographic Health Surveys in Sub-Saharan Africa. BMC Womens Health. 2021 Dec 12;21(1):241.

68. Jewkes R, Levin J, Penn-Kekana L. Risk factors for domestic violence: findings from a South African cross-sectional study. Soc Sci Med. 2002 Nov;55(9):1603–17.

69. Abramsky T, Watts CH, Garcia-Moreno C, Devries K, Kiss L, Ellsberg M, et al. What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. BMC Public Health. 2011 Dec 16;11(1):109.

70. Maguele MS, Taylor M, Khuzwayo N. Evidence of sociocultural factors influencing intimate partner violence among young women in sub-Saharan Africa: a scoping review. BMJ Open. 2020 Dec 7;10(12):e040641.

71. Maguele MS, Tlou B, Taylor M, Khuzwayo N. Risk factors associated with high prevalence of intimate partner violence amongst school-going young women (aged 15–24years) in Maputo, Mozambique. PLoS One. 2020 Dec 9;15(12):e0243304.

72. Russell M, Cupp PK, Jewkes RK, Gevers A, Mathews C, LeFleur-Bellerose C, et al. Intimate Partner Violence Among Adolescents in Cape Town, South Africa. Prevention Science. 2014 Jun 8;15(3):283–95.

73. Shamu S, Gevers A, Mahlangu BP, Jama Shai PN, Chirwa ED, Jewkes RK. Prevalence and risk factors for intimate partner violence among Grade 8 learners in urban South Africa: baseline analysis from the Skhokho Supporting Success cluster randomised controlled trial. Int Health. 2015 Dec 5;ihv068.

74. Naeemah Abrahams, Shibe Mhlongo, Bianca Dekel, Esnat Chirwa, Asiphe Ketelo, Carl Lombard, et al. Decrease in femicide in South Africa : Three national studies across 18 years.

75. Benebo FO, Schumann B, Vaezghasemi M. Intimate partner violence against women in Nigeria: a multilevel study investigating the effect of women's status and community norms. BMC Womens Health. 2018 Dec 9;18(1):136.

76. Devries KM, Mak JY, Bacchus LJ, Child JC, Falder G, Petzold M, et al. Intimate Partner Violence and Incident Depressive Symptoms and Suicide Attempts: A Systematic Review of Longitudinal Studies. PLoS Med. 2013 May 7;10(5):e1001439.

77. Mannell J, Seyed-Raeisy I, Burgess R, Campbell C. The implications of community responses to intimate partner violence in Rwanda. PLoS One. 2018 May 2;13(5):e0196584.

78. Peltzer K, Pengpid S, McFarlane J, Banyini M. Mental health consequences of intimate partner violence in Vhembe district, South Africa. Gen Hosp Psychiatry. 2013 Sep;35(5):545–50.

79. Haight SC, Gallis JA, Chung EO, Baranov V, Bibi A, Frost A, et al. Stressful life events, intimate partner violence, and perceived stress in the postpartum period: longitudinal findings in rural Pakistan. Soc Psychiatry Psychiatr Epidemiol. 2022 Nov 1;57(11):2193–205.

80. Klencakova LE, Pentaraki M, McManus C. Murder of women by an intimate partner (i.e. a current or ex-husband/boyfriend, same sex partner or a rejected would be lover). Trauma Violence Abuse. 2023 Apr 11;24(2):1172–87.

81. Decker MR, Peitzmeier S, Olumide A, Acharya R, Ojengbede O, Covarrubias L, et al. Prevalence and Health Impact of Intimate Partner Violence and Non-partner Sexual Violence Among Female Adolescents Aged 15–19 Years in Vulnerable Urban Environments: A Multi-Country Study. Journal of Adolescent Health. 2014 Dec;55(6):S58–67.

82. Gibbs A, Jewkes R, Willan S, Washington L. Associations between poverty, mental health and substance use, gender power, and intimate partner violence

amongst young (18-30) women and men in urban informal settlements in South Africa: A cross-sectional study and structural equation model. PLoS One. 2018 Oct 3;13(10):e0204956.

83. World Health Organization (WHO). Violence against women [Internet]. Geneva; 2024 Mar [cited 2024 Jun 8]. Available from: https://www.who.int/news-room/fact-sheets/detail/violence-against-women

84. Duby Z, Bergh K, Jonas K, Reddy T, Bunce B, Fowler C, et al. "Men Rule… this is the Normal Thing. We Normalise it and it's Wrong": Gendered Power in Decision-Making Around Sex and Condom Use in Heterosexual Relationships Amongst Adolescents and Young People in South Africa. AIDS Behav. 2023 Jun 28;27(6):2015–29.

85. Sharpless L, Kershaw T, Hatcher A, Alexander KA, Katague M, Phillips K, et al. IPV, PrEP, and Medical Mistrust. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2022 Jul 1;90(3):283–90.

86. Rousseau E, Wu L, Heffron R, Baeten JM, Celum CL, Travill D, et al. Association of sexual relationship power with PrEP persistence and other sexual health outcomes among adolescent and young women in Kenya and South Africa. Frontiers in Reproductive Health. 2023 May 30;5.

87. Makhakhe NF, Sliep Y, Meyer-Weitz A. "Whatever is in the ARVs, is Also in the PrEP" Challenges Associated With Oral Pre-exposure Prophylaxis Use Among Female Sex Workers in South Africa. Front Public Health. 2022 Jun 17;10.

88. Sharpless L, Kershaw T, Hatcher A, Alexander KA, Katague M, Phillips K, et al. IPV, PrEP, and Medical Mistrust. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2022 Jul 1;90(3):283–90.

89. Alashek Wiam, Masara Elgares. Challenges to PrEP use in adolescent girls young women in Sub-Saharan Africa: a systematic review of qualitative studies. 2024 Jun 12;

90. Zembe YZ, Townsend L, Thorson A, Silberschmidt M, Ekstrom AM. Intimate Partner Violence, Relationship Power Inequity and the Role of Sexual and Social Risk Factors in the Production of Violence among Young Women Who Have Multiple Sexual Partners in a Peri-Urban Setting in South Africa. PLoS One. 2015 Nov 23;10(11):e0139430.

91. Townsend L, Jewkes R, Mathews C, Johnston LG, Flisher AJ, Zembe Y, et al. HIV Risk Behaviours and their Relationship to Intimate Partner Violence (IPV) Among Men Who Have Multiple Female Sexual Partners in Cape Town, South Africa. AIDS Behav. 2011 Jan 9;15(1):132–41.

92. Zembe YZ, Townsend L, Thorson A, Silberschmidt M, Ekstrom AM. Intimate Partner Violence, Relationship Power Inequity and the Role of Sexual and Social Risk Factors in the Production of Violence among Young Women Who Have Multiple Sexual Partners in a Peri-Urban Setting in South Africa. PLoS One. 2015 Nov 23;10(11):e0139430.

93. Nydegger LA, DiFranceisco W, Quinn K, Dickson-Gomez J. Gender Norms and Age-Disparate Sexual Relationships as Predictors of Intimate Partner Violence, Sexual Violence, and Risky Sex among Adolescent Gang Members. Journal of Urban Health. 2017 Apr 18;94(2):266–75.

94. Sere Y, Roman N V., Ruiter RAC. Coping With the Experiences of Intimate Partner Violence Among South African Women: Systematic Review and Meta-Synthesis. Front Psychiatry. 2021 May 26;12.

95. Sigalla GN, Rasch V, Gammeltoft T, Meyrowitsch DW, Rogathi J, Manongi R, et al. Social support and intimate partner violence during pregnancy among women attending antenatal care in Moshi Municipality, Northern Tanzania. BMC Public Health. 2017 Dec 9;17(1):240.

96. Leddy AM, Lippman SA, Neilands TB, Twine R, Ahern J, Gómez-Olivé FX, et al. Community collective efficacy is associated with reduced physical intimate partner violence (IPV) incidence in the rural province of Mpumalanga, South Africa: findings from HPTN 068. J Epidemiol Community Health (1978). 2019 Feb;73(2):176–81.

97. Bolarinwa OA, Tessema ZT, Okyere J, Ahinkorah BO, Seidu AA. Spatial distribution and predictors of lifetime experience of intimate partner violence among women in South Africa. PLOS Global Public Health. 2023 Jan 24;3(1):e0000920.

98. Ahmed N, Pike C, Bekker LG. Scaling up pre-exposure prophylaxis in sub-Saharan Africa. Curr Opin Infect Dis. 2019 Feb;32(1):24–30.

99. Ahmed N, Pike C, Bekker LG. Adolescent girls and young women's PrEP-user journey during an implementation science study in South Africa and Kenya. Curr Opin Infect Dis. 2019 Feb;32(1):24–30.

100. Golden SD, Earp JAL. Social Ecological Approaches to Individuals and Their Contexts. Health Education & Behavior. 2012 Jun 20;39(3):364–72.

101. Salazar LF, Bradley ELP, Younge SN, Daluga NA, Crosby RA, Lang DL, et al. Applying ecological perspectives to adolescent sexual health in the United States: rhetoric or reality? Health Educ Res. 2010 Aug 1;25(4):552–62.

102. Bronfenbrenner U. Developmental Research, Public Policy, and the Ecology of Childhood. 1973;

103. Mullick S, Cox LA, Martin CE, Fipaza Z, Ncube S. Comparing the Integration of Syndromic versus Etiological Management of Sexually Transmitted Infections Into HIV Pre-Exposure Prophylaxis Services for Adolescent Girls and Young Women, in South Africa. Journal of Adolescent Health. 2023 Dec;73(6):S67–72.

104. Martin CE, Cox LA, Nongena P, Butler V, Ncube S, Sawry S, et al. Patterns of HIV Pre-exposure Prophylaxis use Among Adolescent Girls and Young Women Accessing Routine Sexual and Reproductive Health services in South Africa. Journal of Adolescent Health. 2023 Dec;73(6):S81–91.

105. Butler V, Kutywayo A, Martin CE, Pleaner M, Mojapele M V., Ncube S, et al. Implementing Differentiated and Integrated HIV Prevention Services for Adolescent Girls and Young Women: Experiences From Oral PrEP Rollout in Primary Care Services in South Africa. Journal of Adolescent Health. 2023 Dec;73(6):S58–66.

106. Briedenhann E, Rosenberg P, Sheobalak N, Pleaner M, Martin CE, Mullick S. Eita! Reaching Communities and Young People to Drive Demand for Oral Pre-Exposure Prophylaxis in South Africa. Journal of Adolescent Health. 2023 Dec;73(6):S50–7.

107. World Health Organization. WHO multi-country study on women's health and domestic violence against women: summary report of initial results on prevalence, health outcomes and women's responses. [Internet]. Geneva; 2005 [cited 2024 Sep 19]. Available from:

https://iris.who.int/bitstream/handle/10665/43310/9241593512_eng.pdf?sequence=1

108. Gibbs A, Dunkle K, Jewkes R. Emotional and economic intimate partner violence as key drivers of depression and suicidal ideation: A cross-sectional study among young women in informal settlements in South Africa. PLoS One. 2018 Apr 16;13(4):e0194885.

109. Gibbs A, Mkhwanazi S, Ramsoomar L, Willan S, Jewkes R. Couples, alcohol use and experience of intimate partner violence among young women in urban informal settlements in Durban, South Africa: A mixed methods study. Soc Sci Med. 2024 Sep;356:117144.

110. Spitzer RL. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. JAMA. 1999 Nov 10;282(18):1737.

111. Dunkle KL, Jewkes RK, Brown HC, Gray GE, McIntryre JA, Harlow SD. Transactional sex among women in Soweto, South Africa: prevalence, risk factors and association with HIV infection. Soc Sci Med. 2004 Oct;59(8):1581–92.

112. StataCorp. Stata Statistical Software: Release 18. TX: StataCorp LLC; 2023.

113. Bursac Z, Gauss CH, Williams DK, Hosmer DW. Purposeful selection of variables in logistic regression. Source Code Biol Med. 2008 Dec 16;3(1):17.

114. Chubb MC, Jacobsen KH. Mathematical modeling and the epidemiological research process. Eur J Epidemiol. 2010 Jan 27;25(1):13–9.

115. Mantel N, Mocarelli P, Marocchi A, Brambilla P, Baretta R. Stratified analysis of multivariate clinical data: Application of a mantel-haenszel approach. Stat Med. 1983 Apr 12;2(2):259–66.

116. South African Government. 16 Days of Activism 2023 [Internet]. Pretoria; 2023 [cited 2024 Jun 15]. Available from: https://www.gov.za/16DaysOfActivism2023

117. Orindi BO, Maina BW, Muuo SW, Birdthistle I, Carter DJ, Floyd S, et al. Experiences of violence among adolescent girls and young women in Nairobi's informal settlements prior to scale-up of the DREAMS Partnership: Prevalence, severity and predictors. PLoS One. 2020 Apr 22;15(4):e0231737.

118. Jewkes R. Emotional abuse: a neglected dimension of partner violence. The Lancet. 2010 Sep;376(9744):851–2.

119. South African Government. Domestic Violence Act ,1998 (Act no.116 of 1998) [Internet]. Cape Town: Republic of South Africa Government Gazette; 1998 Dec [cited 2024 May 23]. Available from: https://www.gov.za/documents/domestic-violence-act

120. South African Government. Domestic Violence Amendment Act 14 of 2021 [Internet]. Cape Town; 2022 Jan [cited 2024 Jun 15]. Available from: https://www.gov.za/sites/default/files/gcis_document/202203/45824gen788.pdf

121. Stern E, Gibbs A, Willan S, Dunkle K, Jewkes R. 'When you talk to someone in a bad way or always put her under pressure, it is actually worse than beating her': Conceptions and experiences of emotional intimate partner violence in Rwanda and South Africa. PLoS One. 2019 Nov 14;14(11):e0225121.

122. Gibbs A, Dunkle K, Willan S, Jama-Shai N, Washington L, Jewkes R. Are women's experiences of emotional and economic intimate partner violence associated with HIV-risk behaviour? A cross-sectional analysis of young women in informal settlements in South Africa. AIDS Care. 2019 Jun 3;31(6):667–74.

123. Zungu NP. PZ, PW, DN, SR, AN, NI, MB, ID, MT, MM, RT, ZK and TST. The First South African National Gender-based Violence Study: A Baseline Survey on Victimisation and Perpetration. Human Sciences Research Council [Internet]. 2024 [cited 2025 Sep 19]; Available from: https://hsrc.ac.za/wp-content/uploads/2024/11/Executive-Summary-Final-16-November-2024-1.pdf

124. Heron RL, Eisma MC. Barriers and facilitators of disclosing domestic violence to the healthcare service: A systematic review of qualitative research. Health Soc Care Community. 2021 May 13;29(3):612–30.

125. Namy S, Carlson C, O'Hara K, Nakuti J, Bukuluki P, Lwanyaaga J, et al. Towards a feminist understanding of intersecting violence against women and children in the family. Soc Sci Med. 2017 Jul;184:40–8.

126. Haifley ChristaK. Economic Abuse: A Literature Review of a Salient yet Overlooked Form of Intimate Partner Violence. Theory in Action, vol 14, no 2, pp 82-91. 2021;

127. Ranganathan M, Knight L, Abramsky T, Muvhango L, Polzer Ngwato T, Mbobelatsi M, et al. Associations Between Women's Economic and Social Empowerment and Intimate Partner Violence: Findings From a Microfinance Plus Program in Rural North West Province, South Africa. J Interpers Violence. 2021 Aug 27;36(15–16):7747–75.

128. Ikuteyijo OO, Zepro N, Akinyemi AI, Probst-Hensch N, Merten S. Socio-Economic Factors Influencing Intimate Partner Violence Among Adolescents and Young Women in Sub-Saharan Africa: A Scoping Review. Public Health Rev. 2025 Jan 3;45.

129. Liddon N, Pampati S, Steiner RJ, Hensel DJ, Tsung-chieh Fu, Beckmeyer J, et al. Truth Be Told: Adolescents' Disclosure of Sexual Activity to Healthcare Providers. Journal of Adolescent Health. 2021 Mar;68(3):623–5.

130. Abramsky T, Lees S, Stöckl H, Harvey S, Kapinga I, Ranganathan M, et al. Women's income and risk of intimate partner violence: secondary findings from the MAISHA cluster randomised trial in North-Western Tanzania. BMC Public Health. 2019 Dec 14;19(1):1108.

131. Watt MH, Guidera KE, Hobkirk AL, Skinner D, Meade CS. Intimate partner violence among men and women who use methamphetamine: A mixed-methods study in South Africa. Drug Alcohol Rev. 2017 Jan;36(1):97–106.

132. Radcliffe P, Gadd D, Henderson J, Love B, Stephens-Lewis D, Johnson A, et al. What Role Does Substance Use Play in Intimate Partner Violence? A Narrative Analysis of In-Depth Interviews With Men in Substance Use Treatment and Their Current or Former Female Partner. J Interpers Violence. 2021 Nov 3;36(21–22):10285–313.

133. Watt MH, Aunon FM, Skinner D, Sikkema KJ, MacFarlane JC, Pieterse D, et al. Alcohol-Serving Venues in South Africa as Sites of Risk and Potential Protection for Violence Against Women. Subst Use Misuse. 2012 Sep 18;47(12):1271–80.

134. Jörns-Presentati A, Napp AK, Dessauvagie AS, Stein DJ, Jonker D, Breet E, et al. The prevalence of mental health problems in sub-Saharan adolescents: A systematic review. PLoS One. 2021 May 14;16(5):e0251689.

135. Bach J, Louw D. Depression and exposure to violence among Venda and Northern Sotho adolescents in South Africa. Afr J Psychiatry (Johannesbg). 2010 Apr 6;13(1).

136. Hsiao C, Fry D, Ward CL, Ganz G, Casey T, Zheng X, et al. Violence against children in South Africa: the cost of inaction to society and the economy. BMJ Glob Health. 2018 Jan 5;3(1):e000573.

137. Young-Wolff KC, McCaw B. Intimate Partner Violence and Psychological Distress: Opportunities for Prevention and Early Intervention Among Emerging Adult Women. J Womens Health. 2019 Aug;28(8):1013–4.

138. Orava TA, McLeod PJ, Sharpe D. Perceptions of control, depressive symptomatology, and self-esteem of women in transition from abusive relationships. J Fam Violence. 1996 Jun;11(2):167–86.

139. Devries KM, Mak JY, Bacchus LJ, Child JC, Falder G, Petzold M, et al. Intimate Partner Violence and Incident Depressive Symptoms and Suicide Attempts: A Systematic Review of Longitudinal Studies. PLoS Med. 2013 May 7;10(5):e1001439.

140. Yatham S, Sivathasan S, Yoon R, da Silva TL, Ravindran A V. Depression, anxiety, and post-traumatic stress disorder among youth in low and middle income countries: A review of prevalence and treatment interventions. Asian J Psychiatr. 2018 Dec;38:78–91.

141. Lucero J, Lim S, Santiago A. Changes in economic hardship and intimate partner violence: a family stress framework. J Fam Econ Issues. 2016;37, no. 3,:395-406.

142. Rousseau E, Katz AWK, O'Rourke S, Bekker LG, Delany-Moretlwe S, Bukusi E, et al. Adolescent girls and young women's PrEP-user journey during an implementation science study in South Africa and Kenya. PLoS One. 2021 Oct 14;16(10):e0258542.

143. Dunkle KL, Jewkes R, Nduna M, Jama N, Levin J, Sikweyiya Y, et al. Transactional sex with casual and main partners among young South African men in the rural Eastern Cape: Prevalence, predictors, and associations with gender-based violence. Soc Sci Med. 2007 Sep;65(6):1235–48.

144. Emily M. Wright. The Relationship Between Social Support and Intimate Partner Violence in Neighborhood Context. SAGE Publications [Internet]. 2015 Dec [cited 2025 Mar 16];1333–59. Available from: https://0-journals-sagepub-com.innopac.wits.ac.za/doi/epub/10.1177/0011128712466890

145. Cheng Y, Li X, Lou C, Sonenstein FL, Kalamar A, Jejeebhoy S, et al. The Association Between Social Support and Mental Health Among Vulnerable Adolescents in Five Cities: Findings From the Study of the Well-Being of Adolescents in Vulnerable Environments. Journal of Adolescent Health. 2014 Dec;55(6):S31–8.

146. Jewkes R, Chirwa E, Alangea DO, Addo-Lartey A, Christofides N, Dunkle K, et al. Pooled analysis of the association between food insecurity and violence against women: Evidence from low- and middle-income settings. J Glob Health. 2023 Mar 10;13:04021.

147. van den Berg L, Walsh CM. Household food insecurity in South Africa from 1999 to 2021: a metrics perspective. Public Health Nutr. 2023 Nov 29;26(11):2183–99.

148. Nabaggala MS, Reddy T, Manda S. Effects of rural–urban residence and education on intimate partner violence among women in Sub-Saharan Africa: a meta-analysis of health survey data. BMC Womens Health. 2021 Apr 13;21(1):149.

149. Jörns-Presentati A, Napp AK, Dessauvagie AS, Stein DJ, Jonker D, Breet E, et al. The prevalence of mental health problems in sub-Saharan adolescents: A systematic review. PLoS One. 2021 May 14;16(5):e0251689.

150. Rawat H, Petzer SL, Gurayah T. The Effects of Substance Abuse on the Roles and Occupations of Women with Substance Use Disorders. South African Journal of Occupational Therapy. 2021 Apr 19;51(1):54.

12 Appendices

Appendix 1: Plagiarism declaration report



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I SEBOKO NARE (Student number: 301831) am a student registered for the degree of MSc in Epidemiology (Infectious Disease Epidemiology) in the academic year 2025.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: _____ Date: 25 March 2025

1

Appendix 2: Data use permission

DATA SHARING AGREEMENT

WITS RHI (Implementation Science)
a Division of Wits Health Consortium (Pty) Ltd
31 Princess of Wales Terrace, Parktown, Johannesburg
(hereinafter "**the Data Provider**")

and

University of Witwatersrand, Johannesburg
Acting through its Faculty of Health Sciences,
School of Public Health
27 St Andrews Rd, Parktown, Johannesburg, 2193
(hereinafter "**the Data Recipient**")

WHEREAS:

1. The Data Provider collected certain Data (as defined below) under the **Unitaid** funded Project entitled "***Project PrEP- Phase 1***".

2. The Data Provider hereby transfers the Data to the Data Recipient for purposes of assisting with the **Msc Research project** entitled "***Prevalence and Factors Associated with Intimate Partner Violence Among Adolescent Girls and Young Women Initiated on HIV Pre-Exposure Prophylaxis in South Africa, 2019-2022,***" by Ms **Nare Seboko;**

3. The transfer of the Data will be done in accordance with the terms and conditions of this Data Transfer Agreement (hereinafter referred to as the "Agreement").

THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. DEFINITIONS

In this Agreement, unless the context otherwise indicates, the following words will have the following meanings:

1.1 **"the/this Agreement"** shall mean this Agreement together with any Annexures hereto;

1.2 **"Commencement Date"** shall mean the date on which this Agreement commenced, namely **01 October 2023**;

1.3 **"Controller"** shall mean the entity that alone or jointly with others determines the purposes and means of the Processing of Personal Data;

1.4 "**Data"** shall mean the Data to be transferred from the Data Provider to the Data Recipient as described and detailed in **Annexure A**;

1

1.5 **"Parties"** shall mean the parties to this Agreement, namely Wits RHI (Implementation science), a division of Wits Health Consortium (Pty) Ltd and University of Witwatersrand; and the term "Party" shall refer to either of them;

1.6 **"POPIA"** means Protection of Personal Information Act, 4 of 2013, its amendments and Regulations thereto;

1.7 **"Personal Data"** means information relating to an identifiable, living, natural person, and where it is applicable, an identifiable, existing juristic person. Key-coded data are considered Personal Data even if the holder of that data does not have access to the key that links the data to the identity of an individual;

1.8 **"Processing"** (or its conjugates) shall mean any operation or set of operations, which is performed upon Personal Data, whether or not by automatic means, such as collection, recording, organization, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, blocking, erasure or destruction.

1.9 "**Processor**" means the person who is responsible for processing personal data on behalf of the Data Controller;

1.10 **"the Project"** shall mean the project entitled "***Prevalence and Factors Associated with Intimate Partner Violence Among Adolescent Girls and Young Women Initiated on HIV Pre-Exposure Prophylaxis in South Africa, 2019-2022***" as per the Project Description attached hereto as **Annexure B**;

1.11 **"Study Data"** shall mean the limited data and results produced in the execution of the Project and more specifically the Project Description attached hereto as **Annexure B**;

1.12 Words importing the singular shall include the plural and *vice versa*, and words importing the masculine gender shall include females. The head notes to the clauses to this Agreement are inserted for reference purposes only and shall not affect the interpretation of any of the provisions to which they relate.

2. TRANSFER AND USE OF DATA

2.1 Subject to the terms and conditions of this Agreement, Data Provider grants the Data Recipient the nonexclusive right to use the Data solely for purposes of the Project for the duration of this Agreement. This Agreement will terminate on ~~completion of the Project~~ **31 December 2026**.

LM

2.2 Notwithstanding the abovementioned, either Party may cancel this Agreement with thirty (30) days' prior written notice. On termination of this Agreement, the Data Recipient will

immediately discontinue use of the Data and will return all copies of same to the Data Provider or alternatively, and on the Data Provider's written instruction, destroy all copies of the Data.

2.3 Each Party shall pay its own costs incurred in the performance of this Agreement. Any given expense or cost can only be committed in writing by the Party responsible for the cost in question. Inno case can one Party commit an expense on behalf of another Party, without prior written consent.

2.4 Data Provider retains ownership of the Data and retains all rights to distribute the Data to other parties. Data Provider warrants its authority to provide the Data to the Data Recipient.

2.5 The Data Provider will transfer the Data as is without any warranties, express or implied, including without limitation, any warranty of fitness for a particular purpose. This Agreement does not grant any rights, license or other proprietary interest to the Data Recipient in the Data save as provided for in this Agreement.

2.6 Data Recipient will use the Data only for purposes of the Project. If the Data Recipient seeks to use Data for other purposes, the Data Recipient will obtain written consent from Data Provider, either by an amendment to this Agreement or a new agreement, before such use.

2.7 The Data Recipient is not authorised to transfer the Data (including Study Data) to any third-party without the prior written consent of the Data Provider.

2.8 The Data Recipient acknowledges its obligation to comply with the substantive provisions of the POPIA and that violation of the provisions pertaining to POPIA may subject it to the applicable legal penalties.

2.9. As a condition of participating in this Project and in accordance with Unitaid's Guidelines, all Parties involved agree that co-authorship on any publication arising from this shall be per the Unitaid requirements.

3. CONTROLLER STATUS

3.1 To the extent that any Study Data or samples contain Personal Data when collected for purposes of this Agreement, Data Provider is the Controller of Personal Data. Data Recipient is neither a controller nor a processor of Personal Data.

3.2 Further, nothing in this Agreement is intended to affect Data Provider's Processing of Personal Data of subjects unrelated to this Agreement. Data Provider will not provide Data Recipient any patient identifiable information, nor will it provide any encryption key that could be used to re-identify the patient from any Study data provided to Data Recipient.

4. COMPLIANCE

Each party will comply with all applicable Regulations governing the Processing of Personal data in relation to the performance of its obligations under this Agreement, including without limitation laws, regulations and rules related to the privacy of personal information including the European Union General Data Protection Regulation, where applicable, and the Protection of Personal Information Act as well as the Regulations thereto.

5. RIGHTS OF SUBJECTS

The parties agree that, as between them, Data Provider is best able to manage requests from subjects for access, amendment, transfer, restriction, or deletion of Personal Data. In the ordinary course, Data Recipient does not process sufficient information to link Study Data to an identified individual who makes a request for access, amendment, transfer, or deletion of Personal Data. In the event that the Data Recipient receives a request from a subject for such access, amendment, transfer, restriction, or deletion, the Data Recipient shall forward the request to Data Provider. In the event that the Data Provider receives a request from a subject that affects the data disclosed to the Data Recipient or the Data Recipient's ability to use or process such data, Data Provider shall promptly, and no later than five (5) business days notify Data Recipient. Data Provider acknowledges that in order to maintain the integrity of results from the Study, the ability to amend, restrict, or delete data disclosed to Data Recipient may be limited, in accordance with applicable Regulations.

6. SUBJECT WITHDRAWAL

Data Provider acknowledges that subjects may withdraw their informed consent to the Processing of Personal Data at any time. Data Provider shall promptly notify Data Recipient of any such withdrawal upon which the Data Recipient will immediately discontinue use of the subject's Personal Data.

7. CROSS-BORDER DATA TRANSFERS

In the event that it is necessary for either Data Provider or Data Recipient to transfer Personal Data across national borders to the other party, Data Provider agrees to ensure the lawful export of Personal Data to the Data Recipient, which may be outlined in a separate agreement governing such transfer.

8. SAFEGUARDS

8.1 Data Provider will maintain a comprehensive privacy and security program designed to ensure that Personal Data will be used only in accordance with this Agreement or as required by applicable Regulations, including the appointment of a Data Protection Officer. Data Provider will apply adequate, commercially reasonable technical, physical, and administrative safeguards to protect the Personal Data.

8.2 Such safeguards shall be appropriate to the nature of the information to prevent any breach of security leading to the accidental or unlawful destruction, loss, alteration, unauthorized disclosure of, or access to Personal Data or any other unauthorized or unlawful use, access, alteration, loss, or disclosure of Personal Data relating to this Agreement (collectively, "Security Breach"). Data Provider will also implement appropriate internal policies, procedures, or protocols to minimize the risk of the occurrence of a Security Breach.

8.3 Once the Data has been transferred to the Data Recipient, the Data Recipient shall, in line with all applicable legislation and regulations, maintain a comprehensive privacy and security program to ensure the safekeeping and integrity of the Data.

9. SECURITY BREACH

9.1 Data Recipient shall notify Data Provider within twenty-four (24) hours of discovery of a potential or actual Security Breach. In the course of notification, Data Recipientwill provide feasible, sufficient information for Data Provider to assess the Security Breach. Data Provider will determine, in consultation with Data Recipient, if notification to data subjects and/or government authorities is required by applicable Regulations. Where Data Provider determines that notification is required by applicable Regulations, Data Recipient shall be responsible for all costs and expenses associated with the provision of such notifications. Data Recipientwill also take immediate steps to consult with Data Provider in good faith in the development of remediation efforts to rectify or mitigate the Security Breach.

9.2 Data Recipient will undertake remediation efforts at its sole expense or will reimburse Data Provider for Data Provider's reasonable expenses incurred in connection with Data Provider-performed remediation efforts. In addition to any method of notice described in this Agreement, notice to Data Provider of any Security Breach shall also be reported to Dr Catherine Martin; Telephone: +27 11 358 5200 or Email cmartin@wrhi.ac.za and to Alfred Farrell (Chief Executive Officer of the Data Provider) Telephone: +27 11 274 9200 or Email: ceo@witshealth.co.za.

10. PERSONNEL OBLIGATIONS

The parties shall ensure that their respective personnel engaged in the Processing of Personal Data are informed of the confidential nature of the Personal Data, have received appropriate training on their responsibilities, and have executed written confidentiality agreements or are otherwise subject to professional obligations of confidentiality. The parties shall ensure that access to Personal Data is limited to those personnel who perform services in accordance with the Agreement.

11. RECORDS / DATA PROCESSING REGISTER

Data Recipient shall maintain a written record of all Processing activities that are carried out under this Agreement. Such record shall contain, at a minimum, (i) the name and contact details of any processors; (ii) the name and contact details of the processors' data protection

officers; (iii) the categories of Processing that are carried out; (iv) transfers to third countries or international organizations and documentation of the suitable safeguards that are employed; and (v) a general description of the administrative, technical, and physical security measures that have been taken to safeguard the Personal Data. Data Recipient shall provide Data Provider with a copy of such records upon request.

12. GOVERNMENT INSPECTIONS

Data Recipient agrees to promptly, and in no case later than five (5) business days, notify Data Recipient of any inspection or audit by a government authority concerning compliance with applicable Regulations governing the Processing of Personal Data to the extent related to this Agreement.

13. DATA PROTECTION IMPACT ASSESSMENT

Data Recipient shall develop and maintain a data protection impact assessment regarding the Processing of Personal Data under this Agreement. Data Provider shall cooperate with and assist Data Recipient in the development of the data protection impact assessment and/or with prior consultations with government authorities that may be required.

15. NOTICES

Notices under this Agreement will be given by personal delivery, certified mail, or recognized overnight courier service to the person designated below:

If to Data Recipient:
University of the Witwatersrand, Johannesburg
27 St Andrews Rd, Parktown,
Johannesburg, 2193

With a copy to:
Seboko Nare
82 Roma Street
Zone 3
Seshego
0742

If to Data Provider:
Wits Health Consortium (Pty) Ltd
31 Princess of Wales Terrace
Parktown
Johannesburg

2193
ceo@witshealth.co.za

16. GENERAL

16.1 In no event shall Data Provider be liable for any use by the Data Recipient of Data or Results or for any loss, claim, damage, or liability, of any kind or nature, that may arise from or in connection with this Agreement or Data Recipient's use, handling, or storage of Data. Data Recipient agrees to indemnify and hold harmless Data Provider, its trustees, officers, employees, students, volunteers and agents from all liability, loss, or damage they may suffer as a result of claims, demands, costs or judgments against Data Provider arising out of the use, handling or storage of Data by Data Recipient.

16.2 This Agreement does not constitute, grant nor confer any license under any patents or other proprietary interests of one party to the other, except as explicitly stated in this Agreement.

16.3 This Agreement may be amended by written agreement between the Parties.

DATA PROVIDER:

By: _____
(signature)

Name: Jéan du Randt
Title: Chief Financial Officer

Date: 27 February 2024

DATA RECIPIENT:

By: Lynn Morris (Mar 3, 2024 15:01 GMT+2)
(signature)

Name: Lynn Morris
Title: DVC Research

Date: Mar 3, 2024

Appendix 3: HREC approval certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Ms N Seboko

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M240431

NAME: (Principal Investigator)	Ms N Seboko	**DEGREE:** MSc
DEPARTMENT:	School of Public Health Division of Epidemiology and Biostatistics Medical School	
TITLE:	*Epidemiology of intimate partner violence amongst adolescent girls and young women accessing HIV pre-exposure prophylaxis in South Africa, 2019-2022*	
DATE CONSIDERED:	19 April 2024	
DECISION:	Approved unconditionally	
CONDITIONS:	Sub-study under M20/04/45	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office <Nicoleen.Potgieter@wits.ac.za>	
SUPERVISORS:	Ms R Mapuroma and Dr C Martin	
APPROVED BY:	Ms M van Niekerk, Co-Chairperson, HREC (Medical)	

DATE OF APPROVAL: 5 June 2024 **EXPIRY DATE:** 4 June 2029

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report** in the format available at https://wits.ac.za/research/researcher-support/research-ethics/ethics-committees/. This report is due annually, for the duration of the Clearance Certificate, beginning on the first anniversary of Date of Approval above. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator

06/06/2024
Date

Appendix 4: Turnitin plagiarism report

Nare Research report version 11 tntn.docx

ORIGINALITY REPORT

9%	6%	8%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Witwatersrand Student Paper	1%
2	Mihalec-Adkins, Brittany Paige. "Advancing Empirical Understanding of Parents' Experiences and Well-Being in State-Mandated Child Protective Interventions.", Purdue University, 2023 Publication	<1%
3	Martin, Catherine. "Predictors of Early Sexual Debut Amongst Youth in the Inner City of Johannesburg, South Africa", University of the Witwatersrand, Johannesburg (South Africa), 2025 Publication	<1%
4	www.science.gov Internet Source	<1%
5	journals.plos.org Internet Source	<1%
6	www.mdpi.com Internet Source	<1%

104	Internet Source	<1%
105	eprints.whiterose.ac.uk Internet Source	<1%
106	journals.lww.com Internet Source	<1%
107	openaccess.city.ac.uk Internet Source	<1%
108	reproductive-health-journal.biomedcentral.com Internet Source	<1%
109	vital.seals.ac.za:8080 Internet Source	<1%
110	www.medrxiv.org Internet Source	<1%
111	www.mrc.ac.za Internet Source	<1%
112	www.unaids.org Internet Source	<1%

Exclude quotes	On	Exclude matches	< 8 words
Exclude bibliography	On		



Dr Catherine E. Martin
31 March 2025



Relebogile Mapuroma
31 March 2025