



University of Cape Town

Intimate Partner Violence in Pregnant Women Living with HIV in South Africa: Prevalence and Associated Factors.

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Preamble

1. Declaration

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Date: 29 January 2023.....

2. Acknowledgments

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3. Abstract

Introduction: Intimate partner violence (IPV) is a significant public health problem that affects individuals across the world, of all ages and socio-economic backgrounds. In South Africa, the prevalence of IPV among pregnant women is high. This study aims to investigate the prevalence and associated factors of IPV among pregnant women living with HIV (WLHIV) in Cape Town, South Africa.

Methods: We used a cross-sectional design, with data collected through face-to-face interviews at enrolment into a larger study (CareConekta NCT03836625). Using a structured questionnaire, data were collected on sociodemographic characteristics, IPV (measured using the World Health Organisation Violence Against Women questionnaire) and antiretroviral therapy (ART) adherence (using a combined three-item self-reported adherence score where 100 presents perfect adherence).

Results: Among 197 pregnant WLHIV, the prevalence of IPV was 43.2%. The most common form of IPV reported was emotional abuse (30.7%), followed by physical abuse (24.5%) and sexual abuse (10.5%). There was also an overlap in IPV experiences observed amongst participants where 32% of women with any IPV reported both physical and emotional abuse, 4% both emotional and sexual and 13% reported all three forms of IPV. Higher poverty score was identified as a factor associated with an increased risk of experiencing IPV (OR=0.70, 95% CI =0.51-1.55). In this cohort, 20% of women had perfect self-reported adherence and women who did not experience IPV had higher odds of perfect ART adherence compared to those who had experienced any form of IPV (OR= 1.09, 95% CI = 0.47, 2.39).

Conclusion: We found that the prevalence of IPV among pregnant WLHIV Cape Town, South Africa was very high in all three domains and these findings are consistent with existing literature. The high prevalence of IPV among this population highlights the need for interventions to prevent IPV and to support women experiencing IPV in pregnancy. In this analysis the experience of IPV was associated with poor ART adherence. Experiencing IPV adds on to the challenges and the burden of WLHIV and it contributes to a plethora of health challenges and complications. Asking women about IPV experiences during antenatal care could be an important intervention to facilitate support for women experiencing IPV in pregnancy.

List of Abbreviations

AIDS	Acquired immunodeficiency syndrome
ART	Antiretroviral therapy
CHC	Community Health Centre
GBV	Gender-based violence
HIV	Human immunodeficiency virus
IRB	Institutional Review Board
IPV	Intimate partner violence
MOU	Midwife Obstetric Unit
PHC	Primary health care
PMTCT	Prevention of mother-to child transmission
VAW	Violence against women
WHO	World Health Organisation
WLHIV	Women living with HIV

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A. RESEARCH PROTOCOL

1. Background and justification

South Africa is the epicentre of the HIV epidemic with an HIV seropositive population estimated at 7.2million (1)(2). The country has come a long way in the fight against HIV/AIDS and great strides have been made since the first recorded case of HIV in South Africa in 1982(3). Morbidity, mortality, and incidence rates have reduced over the years. For example the overall HIV incidence rate in 2018 was 0.48% which was an improvement from the 2012 incidence rate which was 1.07% (3). However, with all the progress that has been made, the challenge of high rates of gender-based violence (GBV), particularly intimate partner violence (IPV) in South Africa have presented as a challenge affecting the HIV prevalence rates in the country(4)(5)(6)(7). IPV is a term that “describes physical violence, sexual violence, stalking, or psychological harm by a current or former partner or spouse” (8). Sociocultural, political and economic inequalities experienced by women heightens their vulnerability to HIV, as such women bear the brunt of the disease and are disproportionately affected by it (9). As per the 2016 global statistics records, women disproportionately have a higher incidence of HIV compared to men where they constituted 52% of all people living with HIV globally (10), and this is due to a variety of fuelling factors including violence against women and girls (10). Studies have shown that women who experience IPV and gender-based violence are at an increased risk of acquiring HIV (4)(11)(12).

There are causal and consequential interactions between IPV and HIV. IPV can have effects on mental health which may result in behavioural risk factors (e.g., injection drug use) which increases the risk of acquiring HIV (13). Victims of IPV may suffer from mental health issues such as anxiety and depression which may affect the victim’s ability to seek medical treatment or to adhere to treatment (13)(14). Broader consideration is needed of the current and historical social and racial inequality in South Africa where black women are disproportionately affected by both IPV and HIV (15).While there is a lot of literature on intimate partner violence and HIV (16)(17)(18), there is an information gap on the prevalence of intimate partner violence in pregnant women living with HIV (WLHIV) in South Africa. This study aims to quantitatively describe and explain the prevalence of IPV and its causal and consequential interactions with poor antiretroviral treatment (ART) treatment outcomes in pregnant WLHIV in South Africa.

2. Introduction

The world has been fighting the HIV/AIDS pandemic for four decades now. However, even with the global medical advancements brought through widespread research, HIV and the stigma attached to it remains a major public health concern, with an estimated 36.3 million people having died from HIV-related illness to date (19). According to the UNAIDS Global HIV statistics, an estimated 37.7 million people were living with HIV in 2020 (19), with more than two-thirds living in Sub-Saharan Africa (19)(20).

Research has highlighted that, in countries with a high prevalence of HIV, women are disproportionately affected compared to male counterparts (10)(21). For instance, 86% of the countries in Sub-Saharan Africa have HIV incidence rates that are above the global country average and as aforementioned in this region of the world, young women are infected with HIV at disproportionately higher rates than men(21). This distinction is further exemplified by the World Bank statistics which report that, in Sub-Saharan Africa, among young people aged between 15-24 years, women have a two to five times greater chance of being newly infected with HIV compared to men (21).

An important aspect of this disproportionality is the intersection between HIV/AIDS and violence against women and girls (VAWG), particularly IPV (22). Researchers all over the world have and continue to study the association between HIV and IPV, and these studies have begun to highlight the complexities of this intersection and the challenges that arise thereof (22)(23)(24). IPV has been identified as a critical predictor of poor health outcomes for people living with HIV and because women are disproportionately burdened by the experience of IPV, they in turn are also disproportionately by the intersection of HIV and IPV (22)(25). While there is a growing body of research on the intersection of HIV and IPV, little research has been done on the prevalence and other associated factors of intimate partner violence among WLHIV.

This research aims to add to our understanding on the impact and/or effects of IPV among WLHIV in South Africa. This literature review aims to explore and discuss the key issues around intimate partner violence and HIV among pregnant women in South Africa. Specifically, the review aims to: 1) Describe the association between HIV and IPV among WLHIV in South Africa, 2) Describe the impact of PV on HIV treatment outcomes and 3) Establish the predictors and associated factors of IPV among WLHIV. It is not an exhaustive or systematic review but rather aims to provide context on key areas related to the proposed research.

2.1 Background of HIV epidemic in South Africa

Records show that an estimated 7.8 million people were living with HIV in South Africa in 2020 (26) and there is a high HIV prevalence of 20.4% among the general population (27). Furthermore, a third of all new infections in southern Africa are accounted for by South Africa. Women are disproportionately affected by HIV in South Africa and this is evidenced by the fact that women make up 63% of all people living with HIV in South Africa and they account for 64% of all new infections (27).

Research has identified many factors as reasons or possible causes of the disparity in HIV prevalence between men and women in South Africa and these include, poverty, gender inequality/unequal power relations between men and women and GBV (28)(29)(30). This disparity in HIV prevalence by gender begins at a young age with the prevalence of HIV among young girls (15-24 years) in South Africa reported to be four times that of young men (27).

The remarkable progress in the accessibility and availability of antiretroviral therapy (ART) has made HIV a chronic manageable condition, compatible with a near-normal life expectancy for individuals who are ART adherent (31). South Africa currently has the largest ART therapy programme globally (32). By 2018 South Africa had made great progress in encouraging people to get tested for HIV and the country had taken great strides in working towards achieving the UNAIDS 90-90-90 target for 2020(27). In 2018, 90% of the people living with HIV in South Africa were aware of their HIV status, proving that the country had achieved the first of the 90-90-90 target, which was to have 90% of the people with HIV be aware of their status(27). The country is still lagging in increasing access to ART treatment and in having 90% of the people on HIV treatment having a suppressed viral load(27). In 2020 UNAIDS increased the targets to 95-95-95 where the aim is to have “95% of the people with HIV knowing their status, 95% of people with HIV on treatment and 95% of those on treatment have a reduced viral load. As of 2021, 94% of people with HIV knew their status in South Africa, 79% were on treatment and 91% had a suppressed viral load”(27).

Despite having the largest ART therapy programme globally and all the improvements in accessibility and availability of ART through the adoption of the “treat all” policy which provides ART to all HIV-positive people regardless of CD4 count, South Africa remains the epicentre of HIV/AIDS globally as it harbours the largest number of people living with HIV,

worldwide(33)(34). This means the fight against HIV/AIDS in the country is still on-going and a lot of work still needs to be done to reduce the HIV prevalence in the country.

2.2 Background of Intimate Partner Violence in South Africa

South Africa is battling complex sociomedical and socioeconomic issues that are closely related. In addition to being at the centre of the HIV pandemic, the nation is also fighting GBV, an issue that is prevalent, but under reported due to fear and stigma. Therefore, the country is tackling the dual burden of GBV and HIV. (2) The issue of GBV and IPV in South Africa is one of the many reasons driving the high rates of HIV in the country (2). Gender-based violence, with IPV being the most common form of GBV, disproportionately affects women and girls in South Africa such that the country has been labelled by some as “the destination of femicide” (2)(5). Younger women have an increased vulnerability to both gender-based violence and HIV in comparison to men (35).

Extensive research has been conducted to explore the correlation between IPV and HIV and there is no shortage of agreement amongst researchers that IPV is a risk factor for HIV incidence (36). Research has also shown that IPV begets a myriad of poor health consequences such as physical injuries, sexually transmitted infections including HIV, detrimental behavioural consequences like harmful alcohol and substance abuse and mental health issues (13) (36).

The disproportional impact of IPV on women in South Africa is to a greater extent due to gender inequality and patriarchal norms that result in unequal power relations with men having dominance over women (23). Gender power inequalities are entrenched in South African cultures and societies and these inequalities perpetuate toxic masculinity and marginalise and discriminate against women and girls (23). As a result, women are more vulnerable to GBV and IPV and subsequently have a higher vulnerability to HIV infection compared to males. A systematic review that was conducted on 16 countries and included 28 studies showed that women who experienced IPV had 1.2-fold increased risk of HIV infection compared to women who did not experience IPV (24). A study conducted in Tanzania that compared IPV experiences between WLHIV and women not living with HIV found that women reporting IPV were more likely to be living with HIV compared to those with no IPV (37). In a cross-sectional study by Dunkle and Jewkes that assessed the risk of HIV infection in women

attending antenatal clinics in South Africa, findings showed a strong correlation between experience of IPV, high levels of male dominance, and HIV seropositivity (38).

This correlation between IPV and HIV is due to multifaceted causal pathways that link IPV and HIV (39). For example, violence limits the victim's ability to negotiate safer sexual practices (39). Physical force used during a sexual assault such as rape may result in genital trauma which may potentially increase the risk of transmission of HIV compared to when sex is consensual, adding on to the fact that the use of condoms is not common in sexual assault cases (39). Furthermore, research that has shown that male perpetrators of violence are more likely to engage in risky sexual behaviours, which include substance use and multiple and concurrent sexual partners and in turn means men who perpetrate violence are more at risk of acquiring HIV and this increases the risk of survivors of IPV contracting HIV from the perpetrator (39). In addition to these, there are other inter-linked and indirect pathways that link IPV and HIV among women and these include the psychological impact of IPV on the victim which may lead to high risk sexual behaviour and/or substance abuse thus resulting in HIV infection as a consequence of IPV (39). Therefore, there are three main mechanisms through which the increased risk of HIV infection among women experiencing IPV can be explained. The first is through direct transmission due to forced or coerced sexual intercourse, the second is through high risk sexual behaviours that happen as a consequence of IPV and the third one is through the reduced ability of a woman to negotiate safer sexual practices due to the fear birthed by the experiencing violence (40).

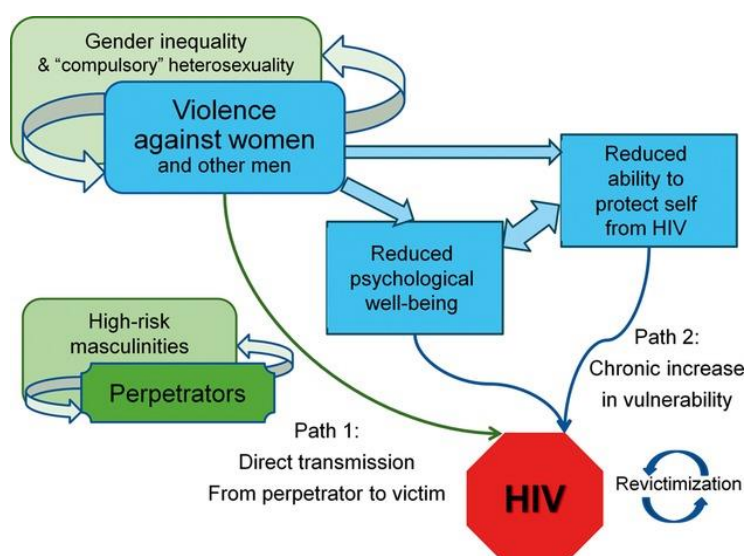


Fig 1: An illustration of the pathways that link GBV and HIV (39).

2.3 Intimate Partner Violence among women living with HIV in South Africa

In South Africa, women make up 63% of the estimated 7.8 million people living with HIV in the country and they account for 64% of new HIV infections (41). Research has indicated that gender-based violence and gender inequality are determinants of HIV risk in women (6). IPV is the second highest burden of disease in South Africa, after HIV/AIDS and it is also a fundamental cause of morbidity and mortality in the country (42). IPV presents in many ways and it includes physical, sexual and emotional abuse from a current or former partner, as well as stalking, controlling behaviours and psychological harm (43). IPV occurs indiscriminately across all religious, cultural and socioeconomic sectors (43)(42). Although both men and women can perpetrate and experience IPV, the global burden of IPV is primarily borne by women. In South Africa 25% to 40% of women have experienced sexual and/or physical IPV in their lifetime (44) (45). The high prevalence of IPV in South Africa is due to various factors that are associated with the increased vulnerability of women experiencing IPV compared to men. These factors include but are not limited to; lower levels of education, cultural and social norms and traditions that shape and influence the use of violence, gender inequalities, poverty, and economic stress. Gender inequality rooted in patriarchy is deemed the main driver of GBV in South Africa and interacts with other factors as listed above (45).

2.4 Intimate Partner Violence in pregnancy

Although extensive research has been conducted on the causal and consequential interactions of IPV and HIV, there is limited research on IPV among pregnant WLHIV and its effect on HIV treatment outcomes in a South African context. In a study by Shamu et al that was conducted in Zimbabwe, it was reported that unplanned pregnancies were considered facilitators of IPV (46). Traditional marriage practices were also reported to play a significant role in the perpetuation of IPV as women reported that their capacity to resist sexual violence was limited due to the fact that tradition expects them to please their partners by not denying them sex, to which sex almost becomes a traditional role that a wife is expected to fulfil (46). The prevalence of IPV amongst pregnant women ranges between 4 and 29% globally (47).

As mentioned above, there is limited data on the prevalence of IPV among pregnant WLHIV in the South African context. A 2016 cross-sectional study conducted by Bernstein et al in

Cape Town, South Africa found that HIV-infected pregnant women in that population bore a significant burden of IPV in its multiple forms (48). A different study done in 2016 by Matseke et al also reported a high prevalence of IPV among HIV-infected pregnant women in South Africa, with 56.3% of the population having reported to have experienced either physical or psychological IPV (49). Both these studies suggest an increased prevalence of IPV amongst HIV-positive pregnant women in South Africa and this highlights a big public health challenge that is being posed at this population in South Africa as well as a great need for more research to be conducted to investigate and address this issue.

2.5 HIV treatment outcomes among pregnant women living with HIV.

The prevalence of IPV among pregnant women varies according to three different factors i.e., the definition used, the socio-cultural context of the population studied and the measurement strategy (50)(51). These factors make it difficult to compare the prevalence rates from different individually reported rates (52). Consequently, the totality of the disease burden is not captured in many of the evidence syntheses reports that are published, due to the difficulties presented by the aforementioned factors (52). However, a systematic review by Rosaro M et al which synthesised worldwide prevalence data reported the worldwide prevalence of psychological, physical and sexual IPV in pregnant women to be 18.7%, 9.2% and 5.5% respectively (52). From this study, Africa had the highest IPV prevalence rate of 16.3% while Europe had the lowest prevalence rate of 2.1% (52). IPV among pregnant WLHIV may act as a barrier to HIV treatment adherence and this may have a negative impact on HIV treatment outcomes including prevention of mother-to-child transmission (PMTCT) (53). The risks of mother-to-child transmission, progression of maternal HIV-related diseases and of drug resistance for both mother and child are significantly increased when there is non-adherence to treatment (54)(55). The adverse child and maternal health outcomes associated with IPV are linked to the Sustainable Development Goal(SDG) 3 which aims to “ensure healthy lives and promote well-being for all at all ages”(56). The adverse maternal outcomes include increased still birth risk, pre-term delivery and low birth weight, perinatal depression, new born small for gestational age , increased risk of HIV and reduced levels of breastfeeding (57). Though research has suggested an association between IPV and HIV, it has neglected the impact of IPV in HIV treatment outcomes in pregnant women and there is limited information regarding this in a South African context where both HIV/AIDS and IPV have a high prevalence.

2.6 IPV and HIV treatment outcomes

Evidence suggests that IPV against women increases the risk of poor treatment outcomes among WLHIV (7)(58). A 2015 systematic review by Hatcher et al found an association between IPV and lower ART use, poor-self reported adherence and lower odds of viral load suppression in women living with HIV (59). Fear induced by intimate partner violence may affect a woman's ability to seek treatment or to adhere to it which will ultimately result in negative HIV treatment outcomes for HIV positive women experiencing IPV (23)(60). Pursuing an HIV diagnosis can potentially result in experiencing intimate partner violence (IPV), which in turn might create obstacles to seeking treatment, impact the ability to access proper care, and ultimately influence treatment adherence (61).

2.7 The demographic and social predictors of IPV among women living with HIV.

Many factors have been found to be associated with IPV among WLHV. A study by Ezechi et al reported the following as predictors of IPV among WLHIV ; having a younger partner, being unemployed and/or poverty, partner alcohol/ substance abuse and disclosure of HIV status (62). The same study showed that denying sex to a partner and engaging in extra-marital affairs were positively associated with IPV while a reduction in discrimination and stigmatisation against WLHIV and HIV prevention methods was shown to reduce the risk of IPV among WLHIV (62). In this study, women with no formal education had higher rates of IPV compared to women with a formal education, suggesting a correlation between education and IPV. However, a study performed by Iliyasu et al had contrasting results where there was no association between IPV and education (63). Exposure to child abuse has been identified by some researchers as a risk factor for IPV, where women who experienced childhood abuse had an increased risk of experiencing IPV in adulthood (64)(65)(66). Studies have also shown a correlation between employment status and intimate IPV, where unemployment, low income and or low socio-economic status have shown to be risk factors of IPV (67). Findings also have consistently shown age to be protective against IPV (68)(67).

Study rationale

Though there has been extensive research on the association of IPV and HIV incidence in women, minimal research focuses on pregnant women. South Africa is currently fighting a dual pandemic of HIV/AIDS and GBV, and to win the fight on both ends, it is important to understand the impact that IPV has on HIV adherence and the implications thereof, as well as to understand the demographic and social predictors of IPV among pregnant women in South Africa. While South Africa has the largest national antiretroviral therapy (ART) globally and

has integrated PMTCT programmes in primary health care (PHC), failure to address the effects of IPV among pregnant WLHIV will result in continued suboptimal adherence to HIV-treatment and which will lead to poor maternal and child health outcomes. Therefore, the aim of this study is to describe the prevalence of IPV among pregnant WLHIV in South Africa and to examine the demographic and social predictors of IPV among pregnant WLHIV, together with the associations between experiencing IPV with adherence to HIV treatment viral load outcomes among pregnant WLHIV in South Africa. The findings of this study may be used in the optimisation and improvement of maternal and child HIV prevention and treatment outcomes.

3. Research Question

What is the prevalence and associated factors of intimate partner violence in pregnant women living with HIV in South Africa?

4. Study aims and objectives

4.1 Study Aim

The aim of this study is to identify and describe the prevalence of intimate partner violence among pregnant WLHIV in Gugulethu, South Africa and its impact on HIV treatment outcomes.

4.2 Objectives

- I. To describe the prevalence of IPV among pregnant WLHIV in the CareConekta study.
- II. To examine the demographic and social predictors of IPV among pregnant WLHIV.
- III. To examine the associations between experiencing IPV with adherence to HIV treatment among pregnant WLHIV.

5. Methodology

5.1 Study design

The data used in this study will be provided by the CareConekta study that was conducted in Gugulethu, Cape Town and has been approved by the University of Cape Town's Faculty of Health Sciences Ethics Committee (HREC REF 659/2018). The CareConekta study has enrolled 200 pregnant WLHIV in Gugulethu and aimed to evaluate the feasibility and acceptability of a smartphone application designed to improve engagement in post-partum HIV care in South Africa among mobile women. The full details of the CareConekta study are described

elsewhere (69). For the purposes of this secondary data analysis, only the enrolment data will be used, and these activities will be described in this protocol.

5.2 Study setting

Participants for this study were enrolled at the Gugulethu Midwife Obstetric Unit, which is at Gugulethu Community Health Centre (CHC), close to Cape Town, South Africa. Gugulethu is a township that is surrounded by informal settlements and there are high levels of poverty in the community. The CHC serves both Gugulethu and the surrounding informal settlement and the approximated population of the people the clinic serves is 350 000 annually (70). The MOU provides antenatal care, including PMTCT services to approximately 4800 women annually with a local antenatal HIV prevalence of approximately 30% (71)(70).

5.3 Study population

All women enrolled in the CareConekta study will be included in this secondary analysis. The eligibility criteria for the CareConekta study were as follows:

Inclusion criteria

- ≥18 years old
- HIV-positive
- Pregnant (≥28 weeks gestation)
- Able to speak and understand isiXhosa and/or English
- Currently own a smartphone that meets the technical requirements of the app
- Willing to opt-in to installation of the app on her personal phone and to mobility tracking
- Able to demonstrate basic smartphone-level literacy
- Willing to be randomized to intervention or control

Exclusion criteria

- Currently enrolled in another research study which may impact on the study outcomes.

5.4 Study Measures

The enrolment interview was conducted face-to-face with a trained interviewer. Questions were asked about participant's number of children, time since first diagnosis, date when ART was initiated, adherence patterns and intimate partner violence experiences. The responses were captured directly into a secure REDcap database. The specific variables that will be used in this secondary analysis are described here.

6. Data Management and Analysis

6.1 Data collection methods

This study will use secondary data that was collected during the CareConekta enrolment visit. The study enrolled 200 pregnant WLHIV between December 2019 and February 2021. All participants provided written consent upon enrolment which described in detail the following: (1) the study aim and procedures, (2) the voluntariness of participating in the study and the participants' right to withdraw from the study at any time, (3) the privacy and confidentiality terms associated with using the app, as well as that of the study data. Recruitment of participants was done by trained study staff who approached pregnant women attending routine antenatal care at the Gugulethu MOU and briefed them about the pilot study. Interested individuals were screened to check if they met the eligibility criteria, after which they completed written informed consent and the enrolment interview, including installation and demonstration of CareConekta and how it functions. An anonymised enrolment data set will be provided for this proposed study and no additional data will be collected.

6.2 Exposure Variables

The exposure variable for this study is IPV which will be analysed as a discrete non-integer variable. To assess the IPV variable, we used the World Health Organisation Violence Against Women (WHO VAW) validated scale (72). This is a 13-item tool which is used to assess a participant's experience with IPV in a 12-month period (48)(73). The tool assesses physical, emotional and sexual violence (73).

6.3 Outcome Variables

Self-reported adherence in the past 30 days: The outcome variable is a measurement of HIV treatment adherence which will be analysed as a categorical non-integer variable. Data for adherence was collected through a self-report questionnaire and a 3-item scale will be used to score the responses. Each of 3 self-report items has different response options and one summary self-report adherence was calculated by averaging the three 0-100 scales as described below:

1. Days taken:

Participants responded to this question: *In the last 30 days, on how many days did you miss at least one dose of any of your HIV medicines? (Appendix A)*

- a. Raw data (days missed) will be transformed to days taken, by subtracting days missed from 30.
- b. Days taken will then transformed to 0–100-point scale by multiplying days taken by 3.33.

2. Rating:

- a. This item has six response options, as listed below. Participants responded to the following question:

In the last 30 days, how good a job did you do at taking your HIV medicines in the way that you were supposed to? (Appendix A)

An appropriate point value will be assigned to each response to transform rating to 0–100 scale, as indicated below:

Very Poor: 0 points

Poor: 20 points

Fair: 40 points

Good: 60 points

Very Good: 80 points

Excellent: 100 points

Frequency:

- a. This item also has six response options, as listed below. Participants responded to the following question: *In the last 30 days how often did you take your HIV medicines in the way that you were supposed to? (Appendix A)*

The frequency will be transformed to 0–100-point scale by assigning an appropriate point value to each response, as indicated below:

Never: 0 points

Rarely: 20 points

Sometimes: 40 points

Usually: 60 points

Almost always: 80 points

Always: 100 points

6.4 Socio-demographics

The socio-demographic variables that were obtained from the responses of the participants on the questionnaire include age, relationship status, employment status, education, pregnancy intention, and partner HIV status.

6.5 Statistical analysis

The analyses for each study objective are summarised in Table 1.

6.6 Univariate Descriptive Analysis

For variables that are normally distributed, the mean and standard deviation will be used to describe the data, while the median, interquartile range and range will be used in the summary statistics for skewed numerical variables. Frequencies and proportions will be used for categorical variables.

6.7 Bivariate Analysis and Regression Analysis

The t-test or Man Whitney U test will be used to compare numeric variables between the groups of women who experienced IPV against those who did not. The Chi-squared test will be used for the categorical variables. A logistic regression model will be used to examine the association between demographic and social predictors of IPV in WLHIV (objective 2) and for examining the association between experiencing IPV and HIV treatment outcome (objective 3). Logistic regression will also be used to examine the association between experiencing IPV and the treatment outcomes of ART adherence and viral suppression.

Table 1: Summary table for the analyses for each study objective.

Objective	Variables/measures	Analysis methods
Objective 1: Prevalence of IPV	Number of pregnant WLHIV who reported IPV.	Frequency and proportion for women experiencing any IPV and each type of IPV.
Objective 2	Number of pregnant WLHIV who reported IPV. -Socio-demographic variables	Summary statistics - Mean and standard deviation for normally distributed variables - Median and IQR for skewed numerical variables. - Frequency and proportion for categorical variables Bivariate analysis - T-test/Man Whitney U-test - Chi-squared test/Fischer's exact test Logistic regression to determine predictors of IPV
Objective 3	Self-reported ART adherence IPV Socio-demographic variables	Bivariate analysis - T-test/Man Whitney U-test - Chi-squared test/ Fischer's exact test logistic regression analysis to determine predictors of HIV treatment outcomes

6.8 Data Management

The data used in this study will be stored in a secure access-controlled REDCap database housed on Vanderbilt University servers. The database will be password protected. For the purposes of this study, the data that will be used has already been collected and abstracted and it is anonymised to maintain confidentiality and it will be stored in a password protected folder.

7. Ethical considerations

Informed consent and enrolment of participants:

Ethical approval for the CareConekta study was provided by the Institutional Review Board (IRB) at Vanderbilt University, the University of California, San Francisco; and the Human Research Ethics Committee of the University of Cape Town South Africa. Written informed consent was obtained from all participants who met the eligibility criteria and agreed to participate in the parent study. Any participants reporting IPV or other psychosocial harms in the CareConekta study were referred to Ilitha Labantu, a local organisation providing support and counselling services. The interviewers flagged people requiring referral and this was reviewed by the study co-ordinator who provided letters, contact details for help lines and

local counselling services, and follow up of referrals. In total, forty-five participants were offered referrals to Ilitha Labantu.

No additional informed consent will be requested for this secondary analysis which will make use of anonymised data collected during the CareConekta study. This study will use secondary data therefore there will be no direct contact with the participants and as such there is very minimal risk posed to the participants and neither will there be a direct benefit to the participants. Only anonymised data will be used for this research, and this reduces the risk for breach of confidentiality. The data provided to the student will only be used for this proposed research.

The findings of this research might help optimise and improve maternal and child health outcomes in the context of HIV and IPV and thus this might present as an indirect benefit to the participants.

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B. MANUSCRIPT

1. Introduction

Intimate partner violence (IPV) is a significant public health issue that affects individuals across the world, including South Africa. IPV is defined as physical, sexual, or psychological harm inflicted by a current or former intimate partner or spouse (74). It is a pervasive issue that affects individuals of all ages, genders, and socio-economic backgrounds and it impacts all aspects of life (74).

According to the World Health Organisation (WHO), “IPV is a leading cause of death and disability among women of reproductive age, and it is associated with a wide range of adverse health outcomes for both women and their children” (74). For pregnant women, IPV can lead to a plethora of negative pregnancy outcomes, including miscarriage, preterm birth, low birth weight, and infant mortality (74)(43)(75). Additionally, IPV can have long-term psychological consequences for both mother and child (74)(75).

In South Africa, IPV against women is a profound and rampant problem, with a very high prevalence of 20.5% for physical violence and 6.2% for sexual violence according to a 2022 report by Statistics South Africa (6)(76)(77). A study conducted in 2013 found that the prevalence of IPV among pregnant women in South Africa ranged from 27 to 48% , with physical violence being the most common form of abuse reported (78). These numbers may be an underestimate. IPV is frequently not reported due to factors such as the stigma attached to experiencing IPV, societal patriarchal norms, and fear of further abuse (79)(37)(80)

While South Africa battles high rates of gender based violence (GBV), including IPV against women and girls, the country is also the epicentre of the HIV epidemic, having the highest prevalence of HIV as well as the largest anti-retroviral therapy (ART) program in the world (6)(81). HIV is a chronic, lifelong condition that requires ongoing medical treatment and support. Approximately 64% of the 7.3million people living with HIV in South Africa are women (82). Pregnant women living with HIV (WLHIV) are at an increased risk of experiencing IPV due to the stigma and discrimination associated with HIV (12). Stigma and discrimination can also make it difficult for women to access health care and support services. (12). According to Centers for Disease Control and Prevention (CDC), “HIV internalized stigma can lead to feelings of shame, fear of disclosure, isolation, and despair. These feelings can keep people from getting tested and treated for HIV” (83).

IPV can have a negative impact on an individual's adherence to HIV treatment (84). Experiencing IPV or the fear of further abuse, may stop victims from accessing HIV care, or disrupt their ability to take their medication (85). Studies have linked IPV to poor ART adherence and low engagement with HIV care, which may subsequently lead to negative health outcomes, mother to child transmission of HIV among pregnant women and development of drug resistance (84)(61)(85).

Much research has been conducted on factors associated with IPV against women and girls globally and there is no lack of agreement among researchers that demographic and socio-economic factors play an important role in the prevalence of IPV in the region (86)(87). Poverty, education level, culture and age are some of the factors that have been associated with higher levels of IPV against women (88)(89)(90). Poverty and low education-level of male partners have also been associated with increased rates of IPV (88)(89)(90).

Despite South Africa being one of the countries with the highest prevalence of IPV, limited research has been conducted on the prevalence of IPV among pregnant WLHIV in the country. This study aimed to investigate the prevalence of IPV and associated factors among pregnant WLHIV in Cape Town, South Africa. Furthermore, this study aimed to explore associations between IPV and self-reported ART adherence in this population.

2. Methods

2.1 Study Setting and Participants

This analysis used secondary data obtained from the CareConekta study (ClinicalTrials.gov NCT03836625), which evaluated the feasibility and acceptability of a mobile application designed to facilitate engagement in HIV care among peripartum women. Using Global Positioning System (GPS), the application was designed to help WLHIV locate nearby clinics in times of mobility (69). The study enrolled pregnant WLHIV who were attending antenatal care (ANC) at the Gugulethu Midwife Obstetric Unit (MOU), situated at the Gugulethu Community Health Centre, in Cape Town, South Africa. The MOU is a public healthcare facility providing free maternity and obstetric services to people in Gugulethu and surrounding areas. Gugulethu is an area with high levels of poverty and HIV. In 2013, the local antenatal HIV seroprevalence was 33% (91).

A total of 200 participants were enrolled for this study. Participants had to be 18 years old and above and in the third trimester of their pregnancy. They had to be able to speak and understand isiXhosa or English and own a smartphone that met the technical requirements of basic application installation including GPS requirements (69). In this analysis we excluded seven participants who withdrew or were withdrawn from the original study and thus the analysis includes data from 193 participants. Only data from the enrolment visit is included. The CareConekta study cohort has been described in detail elsewhere (92).

2.2 Measures

The study participants completed an electronic questionnaire at enrolment which was administered using REDCap by a trained study interviewer who was fluent in English and isiXhosa. Interviews were conducted face-to face or telephonically if required (specifically during the COVID-19 lock-down). The questionnaires collected data on demographic information, ART adherence, and experiences of IPV. The following widely used and validated measures were used in this analysis:

Intimate Partner Violence

The WHO Violence Against Women (VAW) measurement scale was used to assess participants' experience of IPV in the past 12-months. The VAW scale measures violence using three sub-scales of psychological, physical and sexual violence (93)(94)(95). We also created a binary variable for any IPV where women who responded to having experienced at least one form of IPV were considered to have experienced IPV (48).

HIV Treatment Adherence

Self-reported ART adherence in the past 30 days was collected using a 3-item ART adherence scale (96). The three items in the scale were "number of days in the past 30 days that medication was taken", and two Likert-scale items asking, "In the last 30 days, how good a job did you do at taking your HIV medicines in the way that you were supposed to?" and "In the last 30 days how often did you take your HIV medicines in the way that you were supposed to?". Each of the three items were converted to a score out of 100 with a higher score indicating better adherence. A summary self-reported adherence score was calculated by averaging the three 0-100 items (97)(98). We also created a binary adherence variable to distinguish between people with good enough adherence self-reported adherence (summary

score=100) and less than good enough self-reported adherence (summary score <100), as used in previous analyses (97).

Other covariates

Other covariates included were age, pregnancy intention, relationship status and HIV status of the partner. A poverty score was also calculated using data on the participants' type of dwelling, assets, and employment status, as done in previous analyses (99)(100). This score was divided into tertiles to indicate low, medium, and high levels of poverty, where the highest poverty score indicates most poverty and the lowest score indicates least poverty.

2.3 Data Analysis

The data analyses for this study were conducted using R (version 4.2.1). The cohort characteristics were described using frequencies and proportions for categorical variables and median and inter-quartile range (IQR) for numerical data. The chi-squared test was used to analyse the relationship between two categorical variables. The t-test or Mann Whitney U test was used to compare numerical variables between the groups of women who experienced IPV against those who did not.

The prevalence of any IPV and each domain of IPV was described and presented using a Venn diagram to illustrate the overlap of different domains of IPV experienced by the participants.

Logistic regression models were used to analyse the demographic and social predictors of IPV and the association between experiencing IPV and self-reported ART adherence. A p-value threshold of 0.05 and a 95% confidence interval was used in all analyses.

3. RESULTS

3.1 Study Cohort Characteristics

Table 1 shows the sociodemographic characteristics of 193 participants, grouped by experience of any IPV. Overall, women were aged between 18-45 years of age, with a median age of 32 years [IQR 28-36 years]. Most of the participants had completed high school (41%) and almost two thirds were unemployed (61%). Overall, 30% of women reported an unintended pregnancy. Almost all women were married or living with a partner (94%) and most partners were employed (82%). At the time of enrolment, 115 (63%) women knew their partner's HIV status and of these, 58% had partners who were living with HIV.

Table 1: Characteristics of women at enrolment, grouped by experience of any intimate partner violence (IPV). Presented as n (%) unless specified.

Characteristic	Overall, N = 193	n (%)		p-value
		Any IPV, N = 47	No IPV, N = 146	
Age in years – Median [IQR]	32 (28.0, 36.0)	31 (28.0, 32.5)	32 (28.0, 36.0)	0.200
Age group				>0.900
≤25 years	29 (15)	7 (15)	22 (15)	
>25 years	164 (85)	40 (85)	124 (85)	
Educational attainment				0.200
Completed High School	79 (41)	23 (49)	56 (38)	
Did not complete High School	114 (59)	24 (51)	90 (62)	
Current employment				0.600
Employed	76 (39)	17 (36)	59 (40)	
Unemployed	117 (61)	30 (64)	87 (60)	
Poverty category				0.600
Low	62 (32)	18 (38)	44 (30)	
Medium	65 (34)	14 (30)	51 (35)	
High	66 (34)	15 (32)	51 (35)	
Pregnancy Intention				0.300
Intended	135 (70)	30 (64)	105 (72)	
Unintended	58 (30)	17 (36)	41 (28)	
Relationship status				>0.900
Present partner	182 (94)	38 (95)	144 (94)	
Absent/No partner	11 (6)	2 (4)	9 (6)	
Partner employment status				0.300
Employed	149 (82)	39 (87)	110 (80)	
Unemployed	33 (18)	6 (13)	27 (20)	
Knows partner HIV status				0.900
Yes	115 (63)	28 (62)	87 (64)	
No	67 (37)	17 (38)	50 (36)	
Partner HIV status among those who know (n=115)				0.065
Negative	47 (41)	8 (29)	39 (45)	
Positive	67 (58)	19 (68)	48 (55)	
Declined to disclose	1 (1)	1 (4)	0 (0)	

3.2 IPV Prevalence and Association with Sociodemographic Factors

Overall, 24% (n = 47) of women reported experiencing any IPV in the past 12 months (Table 1). From these, 72% (n=34) of women reported emotional abuse, 53% (n=25) reported physical and 38% (n=18) reported sexual violence. There were no statistically significant differences in characteristics by experience of IPV, however there was a difference in

proportions of known partner HIV status. Among the 115 women who knew their partner status, 68% of those who had partners living with HIV experienced IPV compared to 55% among women who did not have partners living with HIV. Of the 47 women who reported any IPV, 15 (32%) reported both physical and emotional, two (4%) reported both emotional and sexual, and six (13%) reported all three domains of IPV as illustrated in figure 1.

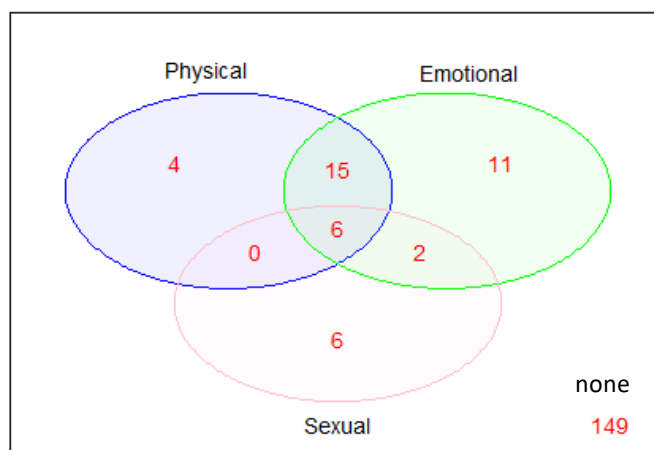


Figure 1: Venn diagram showing the distribution of women who experienced physical, emotional and sexual intimate partner violence.

3.3 Intimate partner violence and socio-demographic factors

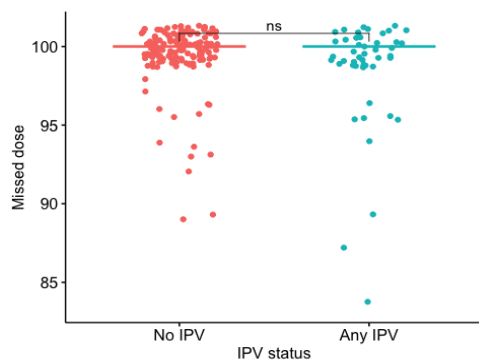
In crude and adjusted logistic regression models there were no statistically significant associations with experience of any IPV (Table 2). Women who were in a relationship at the time of assessment had a slightly higher odds of experiencing IPV compared to those who were not in a relationship (OR = 1.70, 95% CI = 0.41, 11.6). Women who had completed high school education also had lower odds of experiencing IPV (OR = 0.60, 95% CI = 0.30, 1.20) compared to those who did not complete high school. Women with unintended pregnancies had 0.63 times the odds of experiencing IPV compared to those with intended pregnancies (95% CI = 0.31, 1.29). Relative to women with the highest poverty level, women in the lowest tertile had lower odds of experiencing IPV (OR = 0.70, 95% CI = 0.31, 1.55).

Table 2: Logistic regression analyses to examine the demographic and social predictors of intimate partner violence. Presented as crude and adjusted odds ratios (OR)_with 95% confidence intervals (CI).

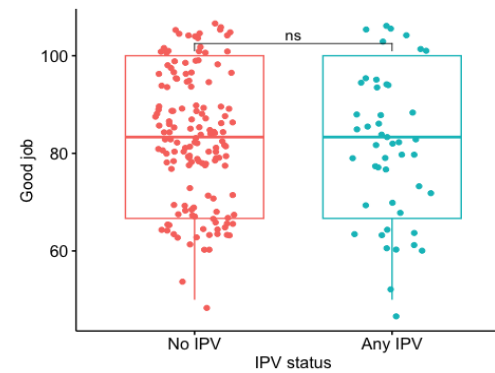
	Crude OR (95%CI)	Adjusted OR (95%CI)
Relationship status		
Not in a relationship	Ref	Ref
In a relationship	1.48 (0.36, 9.93)	1.70 (0.41, 11.6)
Education level		
Did not complete High School	Ref	Ref
Completed High School	0.65 (0.33, 1.26)	0.60 (0.30, 1.20)
Pregnancy intention		
Intended	Ref	Ref
Unintended	0.69 (0.35, 1.49)	0.63 (0.31, 1.29)
Poverty level		
High	Ref	Ref
Low	0.72 (0.32, 1.59)	0.70 (0.31, 1.55)
Medium	1.07 (0.47, 2.47)	1.08 (0.47, 2.51)

3.4 Self-reported adherence and Intimate Partner Violence (IPV)

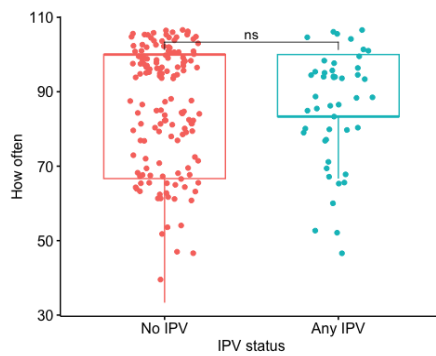
In this cohort only 20% of women (n=39) had perfect self-reported ART adherence and 80% (n=154) had less than good enough adherence as shown in Table 3. The overall mean 3-item score was the same among women who did and did not experience any IPV (mean 89.8). Figure 2 shows that the distribution of each of the items in the 3-item ART adherence scale was very similar among the women who did and did not experienced IPV.



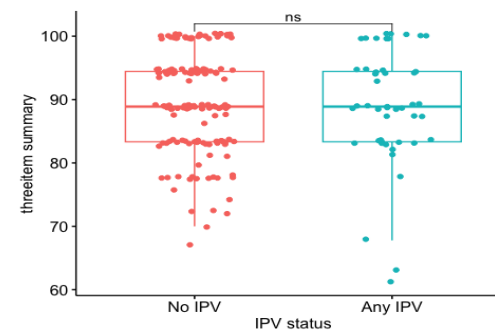
a. Distribution of missed dose item by IPV



b. Distribution of good job item by IPV



c. Distribution of how-often item by IPV



d. Distribution of three-item summary by IPV

Figure 2(a-d): Distribution of the three items and the summary three item-scale by experience of any intimate partner violence (IPV).

ns = non-significant

Table 3: Cohort characteristics grouped by self-reported ART adherence.

Characteristics	Overall N= 193	n (%)		p- value
		Adherent (score=100) N = 39	Non-Adherent (score<100) N = 154	
IPV status				0.800
Any IPV	47 (24)	10 (26)	37 (24)	
No IPV	146 (76)	29 (74)	117 (76%)	
Age group				>0.900
≤25	29 (15)	6 (15)	23 (15)	
>25	164 (85)	33 (85)	31 (85)	
Educational attainment				0.090
Completed High School	79 (41)	19 (49)	60 (39)	
Did not complete High School	114 (59)	20 (51)	94 (61)	
Current employment				0.600
Employed	76 (39)	14 (36)	62 (40)	
Unemployed	117 (61)	25 (64)	92 (60)	
Poverty category				0.062
Low	62 (32)	12 (31)	50 (32)	
Medium	65 (34)	8 (21)	57 (37)	
High	66 (34)	19 (49)	47 (31)	
Pregnancy intention				0.200
Intended	135 (70)	24 (62)	111 (72)	
Unintended	58 (30)	15 (38)	43 (28)	
Relationship status				0.120

Present partner	11 (5.7)	39 (100)	143 (93)	
Absent/ no partner	182 (94)	0	11 (7.1)	
Partner employment status				0.600
Employed	149 (82)	33 (85)	116 (81)	
Unemployed	33 (18)	6 (15)	27 (19)	
Know partner status				0.100
Yes	115 (63)	29 (74)	86 (60)	
No	67 (37)	10 (26)	57 (40)	
Partner HIV status among those who know (n=115)				0.400
Negative	49 (42)	16 (57)	33 (92)	
Positive	68 (58)	15 (52)	53 (62)	

Table 4: Logistics regression analysis for the associations between intimate partner violence (IPV) and perfect self-reported antiretroviral treatment (ART) adherence. Presented as crude and adjusted odds ratios (OR)_with 95% confidence intervals (CI).

	Crude OR (95% CI)	Adjusted OR (95% CI)
IPV Status		
Any IPV	Ref	Ref
No IPV	1.09 (0.47,2.39)	1.13 (0.47, 2.58)
Educational level		
Did not complete High School	Ref	Ref
Completed High School	0.67 (0.33, 1.37)	0.77 (0.37, 1.62)
Pregnancy intention		
Intended	Ref	Ref
Unintended	0.62 (0.30, 1.31)	0.65 (0.30, 1.42)
Poverty level		
High	Ref	Ref
Medium	2.88 (1.19,7.53)	2.85 (1.17, 7.57)
Low	1.68 (0.75,3.93)	1.55 (0.67, 3.68)

Table 4 presents the results from a logistic regression analysis examining the associations between experiencing IPV and having good enough self-reported ART adherence. There was no statistically significant association between experiencing IPV and having good enough ART adherence (OR = 1.09 ,95% CI = 0.47, 2.39). Women in the middle poverty tertile were more likely to report good enough ART adherence compared to those in the highest poverty category (OR 2.88, 95% CI = 1.19, 7.53), and this association remained after adjusting for education and pregnancy intention. Individuals in the lowest poverty tertile also had higher odds of good enough ART adherence (OR =1.68, CI = 0.75, 3.93) compared to individuals with a high poverty score, however this was not statistically significant. There was also no statistically significant association between completing high school reporting good enough adherence to ART treatment (0.67, 95% CI = 0.33, 1.37). Additional logistic regression analysis was conducted where IPV was defined as only sexual and/or physical violence (Appendix B) and the results remained similar to those where emotional violence was included.

4. Discussion

In this study, almost a quarter (24%) of the women in this study reported to have experienced IPV in the last 12 months, and emotional abuse was the most prevalent form of abuse. The overall high prevalence of IPV among pregnant WLHIV observed was consistent with findings from previous studies conducted in sub-Saharan Africa (SSA), which ranged from 18 to 63% (6)(25)(26). Furthermore, the high prevalence of emotional abuse observed in these analyses was also consistent with previous reports in SSA (25)(26)(27). For instance, in a 2019 study conducted in Tanzania, emotional violence was the most reported form of IPV experienced by pregnant WLHIV (25), as was observed in our analysis.

IPV during pregnancy has been associated with a multitude of negative health outcomes and is a barrier to interventions designed to manage HIV outcomes for both mother and child, such as Prevention of Mother-to-Child Transmission of HIV programmes (PMTCT) (26). Though it is difficult to conceptualise emotional violence due to the complexity of its nature (28), the high prevalence of emotional violence has been explained by some researchers as due to perpetrators considering emotional abuse as more acceptable, and some may not even consider it as abuse at all (6). Although we did not observe any association between

pregnancy intention and IPV, this is something that has been reported before in previous studies (48)(101). Our estimate for 30% unintended pregnancy was lower than in other studies which report up to 70% unplanned pregnancy (48)(102). This may be attributable to differences in methods, or the questions used to assess pregnancy intention and the analysis thereof.

In this analysis there were no statistically significant associations with experiencing IPV. This may have been due to the effect size being small or the sample size being too small, resulting in the study being underpowered. Although our analyses did not show any statistically significant associations with IPV, previous studies have reported unintended pregnancy (101), lower educational level, younger age and lower socio-economic status as predictors of IPV among women (103)(104)(105). In contrast to other studies, we observed no association between experiencing IPV and relationship status and this could be due to the lack of variation/lack of nuance in the relationship variable as almost all women were married or cohabiting. This finding was not consistent with previous relevant literature findings which have reported being married as a positive predictor of IPV (104)(106)(107). While not statistically significant, we did observe that having a lower level of education was associated with experiencing IPV, which is consistent with previous studies (104)(107)(108).

Only 21% of women reported good enough ART adherence in the past 30 days. Women who had not experienced any IPV had higher odds of reporting good enough adherence compared to those who did experience IPV. While not statistically significant, this was in line with results reported in previous studies (97)(109)(110). For example, a similar study conducted in Malawi, in 2021, on the relationship between IPV and HIV treatment outcomes, reported that experiencing IPV negatively affected ART adherence among pregnant WLHIV (111). We did observe an association between poverty level and ART adherence; compared to those in the highest poverty tertile, those in the moderate and lowest poverty tertiles had higher odds of good enough adherence. This was also in consistence with previous findings (112)(113).

A systematic review by Nachega et al reported that individuals who were employed were more likely to adhere to ART compared to unemployed individuals (114). While employment was not analysed independently in our study, it was used as part of the variables used to

calculate poverty level, and the results produced were in sync with the results reported by the aforementioned systematic review study.

The differences between our findings and those of previous studies may be due to limitations of this study. Firstly, ART adherence was measured using a self-reported ART adherence questionnaire. Responses may be subject to biases including response bias, social desirability bias, and memory bias which may affect the validity and reliability of the results. Similarly, reporting IPV and abuse is a complex matter and questionnaires may not have fully captured the complexity of the IPV experiences of the participants. This may have been influenced by the stigma attached to IPV, as well as social desirability, which may affect the participants' willingness to disclose their IPV experiences. Secondly, the constraint in understanding smartphones could have influenced a bias in the responses. The data used for this research was from the same cohort as the CareConekta research project which explored smartphone possession and utilisation among pregnant women who are living with HIV(115). In this cohort it was noted that individuals who owned smartphones had achieved a higher level of education and were more likely to be employed when compared to those who did not own smartphones(115). This might have introduced selection bias, as using smartphone literacy as a criterion for inclusion could have left out a significant group of participants who are vulnerable, such as those with limited education and lack of employment (115). Thirdly, the study sample size limited the statistical power to detect small associations. Lastly, all the participants in this study were selected from the Gugulethu MOU. The participants being recruited from one setting may have resulted in limited demographic representation and thus the results may not be generalised to the South African national population.

In conclusion, our study highlights the high prevalence of IPV among pregnant WLHIV and the clear need for effective interventions to address this rampant issue. We also highlight the overlap in the multiple forms of IPV that pregnant WLHIV may experience. Further research is needed to better understand the factors that put WLHIV at risk of experiencing IPV and to develop targeted interventions that aim to reduce the prevalence of IPV amongst pregnant WLHIV and ensure optimum maternal and child outcomes in South Africa.

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B. Appendices

1. Questionnaires

Appendix A: HIV Medicine and Living with HIV Questionnaire

HIV medicine and living with HIV Amachiza we HIV nokuphila nayo	
Do you know the date you first tested HIV positive? Uyawazi umhla wokuqala owazazi ngawo ukuba uphila neHIV?	☐ Yes, complete test date is known ☐ Yes, partial/estimated test date is known ☐ No, test date is not known
When were you first diagnosed with HIV? Wawuxelelwe nini ngeziphumo zakho zovavanyo lwe HIV?	_____
	(Confirm with MCR)
Year of first positive HIV test	_____
	(Confirm with MCR)
Month of first positive HIV test (if known)	☐ January ☐ February ☐ March ☐ April ☐ May ☐ June ☐ July ☐ August ☐ September ☐ October ☐ November ☐ December (Confirm with MCR)
Where were you first diagnosed with HIV? Waxelelwa phi ukuba uphila ne HIV?	☐ In Western Cape [eNtshona koloni/ kodwa kwakweli laseMzantsi Africa] ☐ In South Africa, but not Western Cape [Kwakweli laseMzantsi Africa kodwa ngaphandle kwalapha eNtshona koloni] ☐ Outside of South Africa [Ngaphandle kwaseMzansti Africa]
Province where first diagnosed with HIV	☐ Eastern Cape ☐ Free State ☐ Gauteng ☐ KZN ☐ Limpopo ☐ Mpumalanga ☐ North West ☐ Northern Cape

Country where first diagnosed with HIV	☐ Zimbabwe ☐ Botswana ☐ DRC ☐ Lesotho ☐ Madagascar ☐ Malawi ☐ Mozambique ☐ Namibia ☐ Nigeria ☐ Other
Do you know the date that you first started ART? Uyawazi umhla owaqala ngawo ukutya iART?	☐ Yes, complete ART start date is known ☐ Yes, partial/estimated ART start date is known ☐ No, ART start date is not known
When did you start ART? Uyiqale nini iART?	(Confirm with MCR)
Year started ART	(Confirm with MCR)
Month started ART (if known)	☐ January ☐ February ☐ March ☐ April ☐ May ☐ June ☐ July ☐ August ☐ September ☐ October ☐ November ☐ December (Confirm with MCR)
What is your current ART drug regimen? Lithini igama lamachiza ayiART owatyayo ngoku?	☐ Tenofovir + Lamivudine + Dolutegravir ☐ Tenofovir + Emtricitabine + Efavirenz (Atripla) ☐ Abacavir + Lamivudine + Dolutegravir ☐ Zidovudine + Lamivudine + Dolutegravir ☐ Tenofovir + Zidovudine + Lamivudine/ Emtricitabine + Dolutegravir ☐ Zidovudine + Lamivudine + Dolutegravir ☐ Zidovudine + Lamivudine + Dolutegravir ☐ Tenofovir + emtricitabine + Lopinavir/r ☐ Zidovudine + lamivudine + Lopinavir/r
Have you ever visited a traditional healer (sangoma/inyanga)? Wakhe watyelela isangoma okanye inyanga?	☐ No [Hayi] ☐ Yes [Ewe]
How often do you visit a traditional healer (sangoma/inyanga)? Utyelela ngangakanani eSangomeni okanye kwiNyanga?	☐ Less than once a year [Ngaphantsi kwakanye ngonyaka] ☐ One time per year [Ityeli elinye ngonyaka] ☐ Two times per year [Amatyeli amabini ngonyaka] ☐ More than two times per year [Ngaphezu kwamatyeli amabini ngonyaka]

Have you visited a traditional healer (sangoma/inyanga) since you were diagnosed with HIV? Ubukhe watyelela isangoma okanye inyanga emva kokuba iziphumo zovavanyo lwe-HIV zithe unayo?	☐ No [Hayi] ☐ Yes [Ewe]
Have you visited a traditional healer (sangoma/inyanga) since you learned you were pregnant with this child? Ubukhe watyelela isangoma okanye inyanga emva kokuba uzazi ukuba ukhulelwe?	☐ No [Hayi] ☐ Yes [Ewe]
What was the purpose of your visit or visits with the sangoma/inyanga? Yayisithini injongo yotyelelo lwakho kwisangoma okanye kwinyanga?	_____
Have you ever tested positive for TB? Ubukhe wavavanyelwa iTB kwafunyaniswa ukuba unayo?	☐ No [Hayi] ☐ Yes [Ewe]
Are you currently on TB treatment? Ingaba utya amachiza eTB ngoku?	☐ No [Hayi] ☐ Yes [Ewe]
How likely do you think it is that your baby might be born with HIV? Xa ucinga, mangakanani amathuba okuba umntwana wakho azalwe ene-HIV?	☐ Very likely [Makhulu] ☐ A little likely [Mancinci] ☐ Not at all likely [Awekho]
Why? Kuba kutheni?	_____
Have you taken ART in the last 30 days? Kwenzitsuku ziye-30 zidlulileyo, ukhe wayitya i-ART?	☐ No [Hayi] ☐ Yes [Ewe]
In the past 30 days, have you experienced any of the following: Kwenzitsuku ziye-30 zidlulileyo, ukhe wanazo ezi zilandelayo:	☐ Nausea [Isicaphucaphu sentliziyo] ☐ Vomiting [Ukugabha] ☐ Diarrhoea [Ukuhambisa kwesisu] ☐ Appetite change [Utshintsho emdleni wokutya] ☐ Headache [Intloko ebuhlungu] ☐ Rash [Amaqakuva amancinci] ☐ Fevers [Ubushushu bomzimba (ifiva)] ☐ Other pain [Ezinye iintlungu] ☐ Sweats [Ukubila] ☐ Fatigue [Ukudinwa] ☐ Dizziness [Ukujikelezela yintloko] ☐ Unusual dreaming [Amaphupha angaqhelekanga] ☐ Other (specify) [Ezinye (cacisa)] ☐ None of the above
Specify other side effects	_____
Please rate the severity of the nausea. Nceda uchaze ukuba sikuhlupha isicaphucaphu sentliziyo.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]

Please rate the severity of the vomiting. Nceda uchaze ukuba kukuhlupha kangakanani ukugabha.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the diarrhoea. Nceda uchaze ukuba kukuhlupha kangakanani ukuhambisa kwesisu.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the appetite change. Nceda uchaze ukuba kukuhlupha kangakanani ukungabi namdla wokutya.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the headache. Nceda uchaze ukuba ikuhlupha kangakanani intloko ebuhlungu.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the rash. Nceda uchaze ukuba akuhlupha kangakanani amaqhakuva amancinci.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the fever. Nceda uchaze ukuba kukuhlupha kangakanani ubushushu bomzimba (ifiva).	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the other pain. Nceda uchaze ukuba zikuhlupha kangakanani ezinye iintlungu.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the sweats. Nceda uchaze ukuba kukuhlupha kangakanani ukubila.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the fatigue. Nceda uchaze ukuba kukuhlupha kangakanani ukudinwa.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the dizziness. Nceda uchaze ukuba kukuhlupha kangakanani ukujikelezela yintloko.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
Please rate the severity of the unusual dreaming. Nceda uchaze ukuba akuhlupha kangakanani amaphupha angaqhelekanga.	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]

Please rate the severity of the other side effects (previously specified). Nceda uchaze ukuba ikuhlupha kangakanani imiphumele engeminye (echazwe ngaphambili).	☐ It doesn't bother me [Ayindihluphi] ☐ It bothers me a little [Indihlupha kancinci] ☐ It bothers me [Iyandihlupha] ☐ It bothers me a lot [Iyandihlupha kakhulu]
How many times a day do you take your ART pills? Uzithatha kangaphi ngemini ipilisi zakho ze-ART?	_____ (Times a day)
How many pills do you take each time? Zingaphi ipilisi ozityayo ngexesha?	_____ (Number of pills)
In the last 30 days, on how many days did you miss at least one dose of any of your HIV medicines? Kwezintsuku zi-30 zidlulileyo, zingaphi iimini okhe walibala ngazo ukutya amachiza akho entsholongwana?	_____ (Days)
In the last 30 days, how good a job did you do at taking your HIV medicines in the way that you were supposed to? Kwezintsuku zi-30 zidlulileyo, yeyiphi indlela encomekayo owatye kakuhle ngayo amachiza akho entsholongwane njengohlobo olufanelekileyo?	☐ Very poor [Kakubi kakhulu] ☐ Poor [Kakubi] ☐ Fair [Ndiphakathi] ☐ Good [Kakuhle] ☐ Very good [Kakuhle kakhulu] ☐ Excellent [Kakuhle okugqithisileyo]
In the last 30 days how often did you take your HIV medicines in the way that you were supposed to? Kwezi ntsuku zi-30 zidlulileyo, kukangaphi usitya amachiza akho entsholongwane ngendlela omele kuwatyayo ngayo?	☐ Never [Zange] ☐ Rarely [Akufane] ☐ Sometimes [Ngamanye amaxesha] ☐ Usually [Ngesiqhelo] ☐ Almost always [Malunga lonke ixesha] ☐ Always [Lonke ixesha]

NB: Refer participant for ART adherence counselling based on responses above.

Appendix B: Additional logistic regression using physical and/or sexual IPV only.

Additional analyses are presented here using the outcome definition of any physical or sexual violence. This did not change the results substantially or influence the interpretation of the findings.

Table B5: Logistic regression analyses to examine the demographic and social predictors of intimate partner violence (physical and sexual). Presented as crude and adjusted odds ratios (OR)_with 95% confidence intervals (CI).

	Crude OR (95%CI)	Adjusted OR (95%CI)
Relationship status		
Not in a relationship	Ref	Ref
In a relationship	2.30 (0.42, 42.9)	2.33 (0.42, 43.6)
Education level		
Did not complete High School	Ref	Ref
Completed High School	0.63 (0.43, 1.31)	0.61 (0.29, 1.22)
Pregnancy intention		
Intended	Ref	Ref
Unintended	0.92 (0.39, 2.01)	0.94(0.40, 2.07)
Poverty level		
High	Ref	Ref
Low	1.21 (0.47, 3.13)	1.22 (0.47, 3.17)
Medium	1.54 (0.63,3.86)	1.55 (0.64,3.92)

Table B6: Logistics regression analysis for the associations between intimate partner violence (IPV) - (physical and sexual) and perfect self-reported antiretroviral treatment (ART) adherence . Presented as crude and adjusted odds ratios (OR)_with 95% confidence intervals (CI).

	Crude OR (95% CI)	Adjusted OR (95% CI)
IPV Status		
Any IPV	Ref	Ref
No IPV	1.28 (0.52,3.63)	1.20 (0.47, 3.48)
Educational level		
Did not complete High School	Ref	Ref
Completed High School	0.65(0.42, 1,28)	0.80 (0.41, 1.98)
Pregnancy intention		
Intended	Ref	Ref
Unintended	0.62 (0.30, 1.31)	0.63 (0.30, 1.35)
Poverty level		
High	Ref	Ref
Medium	2.88 (1.19,7.53)	2.85 (1.16, 7.46)
Low	1.68 (0.75,3.93)	1.62 (0.71, 3.83)

2. Ethics approval forms

Appendix C: Ethical approval for the parent study (Careconekta)



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room E53-46 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone (021) 406 6492
Email: sunovsh.eric@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

17 January 2019

HREC REF: 659/2018

Ms T Phillips
Division of Epidemiology & Biostatistics
School of Public Health & Family Medicine
Falmouth Building, FHS

Dear Ms Phillips

PROJECT TITLE: CARECONEKTA: A PILOT STUDY OF A SMARTPHONE APP TO IMPROVE ENGAGEMENT IN POSTPARTUM HIV CARE IN SOUTH AFRICA (Sub-study linked to 227/2017)

Thank you for your response letter dated 18 December 2018, addressing the issues raised by the Human Research Ethics Committee (HREC).

It is a pleasure to inform you that the HREC has formally approved the above-mentioned study, including the following documentation: -

1. Protocol V2.0 dd 18 December 2018
2. Eligibility checklist V2.0 dd 04 December 2018
3. Consent Forms V2.0
4. Revised enrolment and follow-up questionnaires

Approval is granted for one year until the 30 January 2020.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator must obtain appropriate institutional approval, where necessary, before the research may occur.

Yours sincerely

PROFESSOR H BLOCKMAN
HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines.

The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

Appendix D: Ethics approval for this dissertation



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room 45 E-52-E-Floor- Old Main Building
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Website: www.health.uct.ac.za/fhs/research/humanethics/forms

12 May 2022

HREC REF: 273/2022

Dr T Phillips

Division of Epidemiology & Biostatistics
Office 5.42 level 5 Falmouth Building
Email: Tammy.phillips@uct.ac.za
Student: Mkwkud002@myuct.ac.za

Dear Dr Phillips

**PROJECT TITLE : INTIMATE PARTNER VIOLENCE IN PREGNANT WOMEN LIVING WITH HIV
IN SOUTH AFRICA: PREVALENCE AND ASSOCIATED FACTORS- SUB-STUDY LINKED TO
659/2018
(MASTERS CANDIDATE- MISS KUDZAI MKWAKWAMI)**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19. Please refer to guidance letter dated 02 February 2022 on our website:
<http://www.health.uct.ac.za/fhs/research/humanethics/forms>

Approval is granted for one year until the 30 May 2023.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledge that the student: Miss Kudzai Mkwakwami will also be involved in this study.

Please quote the HREC REF 273/2022 in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

Yours sincerely

PROFESSOR M. BLOCKMAN

CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637. Institutional Review Board (IRB) number: IRB00001938 NHREC-registration number: REC-210208-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2020), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code of Federal Regulation Part 312.56 and 312.61.

3. Guidelines for authors for chosen journal.

Original research

Research submissions should have a clear, justified research question.

We strongly encourage you to register your study. Prospective registration is mandatory for any clinical trials. [Acceptable registries for trials](#) include [clinicaltrials.gov](#). We recommend [Prospero](#) for registration of systematic reviews.

All articles should include the following:

- **The article title should include the research question and the study design.** Titles should not declare the results of the study.
- **A structured abstract** (max. 300 words) including all the following where appropriate (please note that for RCTs there is a specific [CONSORT extension for abstracts](#)):
 - **objectives:** clear statement of main study aim and major hypothesis/research question
 - **design:** e.g. prospective, randomised, blinded, case control
 - **setting:** level of care e.g. primary, secondary; number of participating centres. Generalise; don't use the name of a specific centre, but give geographical location if important
 - **participants:** numbers entering and completing the study; sex and ethnic group if appropriate. Clear definitions of selection, entry and exclusion criteria
 - **interventions:** what, how, when and how long (this can be deleted if there were no interventions)
- **interventions:** what, how, when and how long (this can be deleted if there were no interventions)
- **primary and secondary outcome measures:** planned (i.e. in the protocol) and those finally measured (if different, explain why) - for quantitative studies only
- **results:** main results with (for quantitative studies) 95% confidence intervals and, where appropriate, the exact level of statistical significance and the number need to treat/harm. Whenever possible, state absolute rather than relative risks
- **conclusions:** primary conclusions and their implications, suggest areas for further research if appropriate. Do not go beyond the data in the article
- **where applicable, trial registration:** registry and number (for clinical trials and, if available, for observational studies and systematic reviews)
- **Please include a 'Strengths and limitations of this study' section after the abstract.** This section should be no more than 5 bullet points relating specifically to the methods - not the results of the study. This will be published as a summary box after the abstract in the final published article.
- **The original protocol for the study,** as a supplementary file.
- **A funding statement,** preferably worded as follows. Either: 'This work was supported by [name of funder] grant number [xxx]' or 'This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors'. You must ensure that the full, correct details of your funder(s) and any relevant grant numbers are included.
- **A competing interests statement.** See the [BMJ Author Hub](#) for details on what to

- **Articles should list each author's contribution individually at the end;** this section may also include contributors who do not qualify as authors. Please visit the [ICMJE](#) website for more information on authorship.
- **Any checklist and flow diagram for the appropriate reporting statement,** e.g. STROBE (see below).
- **A patient consent form:** any article that contains personal medical information about an identifiable living individual requires the patient's explicit consent before we can publish it. We will need the patient to sign our [consent form](#), which requires the patient to have read the article. This form is available in multiple languages.
- **A data sharing statement,** such as: "Technical appendix, statistical code, and dataset available from the Dryad repository, DOI: [include DOI for dataset here]."
- **Word count,** we recommend your article does not exceed 4000 words, with up to five figures and tables. This is flexible, but exceeding this will impact upon the paper's 'readability'. Authors are encouraged to submit figures and images in colour - there are no colour charges. We require that you upload your figures as separate files rather than embedding them in the manuscript.
- **Supplementary and raw data** can be placed online alongside the article although we prefer raw data to be made publicly available and linked to in a suitable repository (e.g. Dryad, FigShare). We may request that you separate out some material into supplementary data files to make the main manuscript clearer for readers.

We also recommend, but do not insist, that the discussion section is no longer than five paragraphs and follows this overall structure (you do not need to use these as subheadings): a statement of the principal findings; strengths and weaknesses of the study; strengths and weaknesses in relation to other studies, discussing important differences in results; the meaning of the study: possible explanations and implications for clinicians and policymakers; and unanswered questions and future research.

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The manuscript should be presented in the following order:

- Abstract, or a summary for case reports (Note: references should not be included in abstracts or summaries)
- Main text separated under appropriate headings and subheadings using the following hierarchy: BOLD CAPS, bold lower case, Plain text, Italics
- Tables should be in Word format and placed in the main text where the table is first cited. Tables should also be cited in numerical order
- Acknowledgments, Competing Interests, Funding and all other required statements
- References. All references should be cited in the main text in numerical order

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Acronyms and abbreviations should be used sparingly and fully explained when first used. Abbreviations and symbols must be standard. SI units should be used throughout, except for blood pressure values which should be reported in mm Hg.

Whenever possible, drugs should be given their approved generic name. Where a proprietary (brand) name is used, it should begin with a capital letter.

To ensure a consistent approach, submitted articles should not include Trademark or Registered trademark symbols in the main text, tables or figures.

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Depending on the type of reference, we may also include: the publication name, date of publication, volume and page numbers, chapter, DOI, URL, PubMed ID, access date, and any other necessary information.

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- Authors are asked to follow these guidelines when formatting their references:
- References should be cited in numerical order (i.e. 1,2,3) in the text and be listed numerically in the reference list at the end of the article
- The reference list should be included as part of the main text document and not in the footnotes
- References cited in the text should be presented in square brackets [6] or parentheses (6) rather than superscript
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- Reference citations within figures and tables (or their legends/footnotes) should be listed in the

- Reference citations within figures and tables (or their legends/footnotes) should be listed in the reference list
- References in the reference list should include:
 1. author names in any format
 2. article title
 3. DOI or PubMed ID

Example references

Journals:

- **Print journal article:** Koziol-McLain J, Brand D, Morgan D, et al. Measuring injury risk factors: question reliability in a statewide sample. *Inj Prev* 2000;6:148–50.
- **Online only journal article:** Dark P, Dunn G, Chadwick P, et al. The clinical diagnostic accuracy of rapid detection of healthcare-associated bloodstream infection in intensive care using multipathogen real-time PCR technology. *BMJ Open* 2011;1:e000181. doi: 10.1136/bmjopen-2011-000181
- **Supplement article:** Mugosa A, Cizmovic M, Lakovic T, et al. Accelerating progress on effective tobacco tax policies in Montenegro. *Tobacco Control* 2020;29:s293-s299
- **Abstract article:** Bricca A, Swithenbank Z, Scott N, et al. Predictors of recruitment in randomised controlled trials of smoking cessation: meta-regression analyses from the IC-SMOKE systematic review project. Abstract competing for the 'doug altman scholarship'. *BMJ Evidence-Based Medicine* 2019;24:A52-A53.
- **Rapid response to an article:** Krishnamoorthy KM, Dash PK. Novel approach to transseptal puncture. *Heart* Online [Rapid response] 18 September 2001. <http://heart.bmj.com/cgi/eletters/86/5/e11#EL1>

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