AIDS and Behavior (2020) 24:1342–1357
https://doi.org/10.1007/s10461-019-02743-x

SUBSTANTIVE REVIEW

Intimate Partner Violence and Pre-exposure Prophylaxis (PrEP): A Rapid Review of Current Evidence for Women's HIV Prevention

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Published online: 27 November 2019

Abstract

Pre-exposure prophylaxis (PrEP) is a valued component of HIV prevention and increasing attention is focusing on women's PrEP use. Common HIV prevention options (e.g., condoms) remain underused and fail to consider the context of intimate partner violence (IPV). PrEP presents an opportunity to expand viable options for women. A systematic rapid review using key word searches of PubMed and proceedings from six national and international conferences related to HIV, women's health, or interpersonal violence identified nine studies which met set inclusion criteria. Studies were coded using a structured abstraction form and summarized according to relevant themes. IPV was found to have implications on women's interest and willingness to use PrEP, partner interference or interruptions in PrEP use, and adherence. Findings indicate a dearth of research on women's PrEP use and IPV and highlight the urgency for research, public heath practice, and policy attention around the HIV risk context and needs of women who experience IPV.

Keywords Pre-exposure prophylaxis (PrEP) · HIV prevention · Intimate partner violence · Women · Review

Introduction

Extensive research highlights the complex relationship between IPV and HIV among women worldwide [1, 2] and underscores the importance of interpersonal context when addressing HIV prevention. Despite advances in treatment and prevention, HIV continues to be a significant health issue for women around the world. Globally, an estimated 18.2 million women are living with HIV, accounting for 52% of all adults living with HIV [3]. Women 15 years of age and older represent 48% of new HIV infections among adults globally [3]. Women's risk for heterosexual HIV infection is significantly influenced by male partner's HIV risk factors (e.g., injection drug use, sex with both men and women, or sexual partner concurrency) [2, 4].

Global estimates of lifetime and annual rates of intimate partner violence indicate that more than one in three women have ever experienced some form of physical and/or sexual violence by a male intimate partner [5]. Intimate partner violence (IPV), defined as physical, sexual, and emotional abuse and controlling behaviors by a current or former intimate partner [6], is associated with serious physical and mental health outcomes among women. Increased levels of depression, posttraumatic stress, and thoughts or attempts of suicide [7–10]; alcohol and drug abuse [11, 12]; unintended pregnancy and unsafe abortions [13]; and feelings of powerlessness, social isolation, and economic dependence [14, 15] are connected to women's experience of IPV.

Substantial research has addressed the intersection of IPV and HIV among women across a range of geographic settings, including in South Africa, India, Brazil, and United States [1, 2, 16–20]. The relationship between IPV and HIV is complex and involves multiple pathways. Direct pathways, including forced or coerced sex with risky partner, and indirect pathways of limited self-efficacy to enact behaviors to reduce HIV, increase risk among women who experience IPV [18, 20–25]. Further, acceptability and use of existing HIV prevention methods is difficult for women who are

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unable to negotiate safe sex, such as those in abusive and controlling relationships. Current (e.g., male and female condoms) and experimental (e.g., vaginal microbicides) HIV prevention options often fail to consider the context of violent intimate relationships as the strategies are highly dependent on partner interest and cooperation in prevention [26–28].

Pre-exposure prophylaxis (PrEP), a daily oral emtricitabine–tenofovir (Truvada) medication, is a promising biobehavioral HIV prevention method being used to reduce HIV incidence [29–31]. PrEP, a fixed-dose combination of tenofovir disoproxil fumarate (TDF) and emtricitabine (FTC), was approved by the FDA in 2012 [30], and was then recommended in 2015 by the World Health Organization as a biobehavioral prevention method to reduce HIV incidence among people who are uninfected but at high risk for HIV acquisition [32]. The emergence of PrEP presents a new opportunity for a woman-controlled prevention strategy [33–35], and has several advantages over other options for women experiencing IPV, including autonomous or covert use and not needing to be used at time of sexual activity [36]. While research on PrEP use among women is very limited, national estimates in the United States indicate that women represent only 7% of PrEP users [37].

Violence in an intimate relationship has been found to place constraint on the acceptability, uptake, and use of HIV prevention methods including condoms and vaginal microbicides [38–43]. Violence or fear of violence has frequently been found across a range of country settings to limit a woman's ability and self-efficacy to request or negotiate condom use [38, 39, 43] and acceptability of microbicides [40, 42] or other female-initiated products (e.g., oral PrEP, vaginal ring, diaphragms) [44]. Decker and colleagues [39] found that women in the United States with recent IPV (previous 3 months) were more likely to report involuntary condom non-use (AOR 1.87; 95% CI 1.51–2.33) and fears of requesting condoms (AOR 4.15; 95% CI 2.73–6.30) compared to women not disclosing recent IPV. Other studies report the varied acceptability of vaginal microbicides among women with a history of partner violence [40–42]. Women were interested in vaginal microbicides over female condoms in one study in the United States [41], whereas another [42] found U.S. women's microbicide acceptability scores were negatively related to having either physical or sexual violence experience ($p < 0.03$). Additionally, vaginal gels may create added lubrication, causing concerns by women that their partner would be able to tell when they were used [40, 42].

While there is a growing recognition of the value of PrEP as a component of HIV prevention and increasing research focusing on women's use of PrEP globally, there is a substantial gap in the literature that explicitly examines the intersection of PrEP acceptability and IPV among women. The purpose of this systematic rapid review is to identify and synthesize existing research focused on PrEP acceptability and use among women in violent intimate relationships.

Methods

Search Strategy

A rapid systematic review process was used to identify peer-reviewed published articles through systematic searches conducted in PubMed. Rapid reviews have emerged as valuable approach to provide actionable and relevant evidence in a timely manner [45]. A type of knowledge synthesis where systematic review processes are accelerated and methods are streamlined to complete the review more quickly [45], a rapid review is an appropriate level of review for this topic in order to inform research and practice recommendations rapidly. Relevant literature was identified using the following terms: ('pre-exposure prophylaxis' OR 'preexposure prophylaxis' OR 'PrEP' OR 'PREP') AND ('women' OR 'female') AND ('intimate partner violence' OR 'domestic violence' OR 'gender-based violence' OR 'marital violence' OR 'spousal abuse' OR 'spousal violence' OR 'violence against women'). The keywords used in the search were selected based on a review of relevant literature and identification of terms used in previous literature reviews within the field broadly (e.g., [33, 46]). Both approved (daily oral TDF/FTC) and experimental (vaginal microbicide gel or ring) PrEP delivery methods were included to better understand the extent of research on this topic. The process, including search, review, and coding, were all conducted by the lead author (TLO), who has considerable experience and multiple publications in this literature review approach. The search was initially conducted in January 2018, and then updated in November 2018 and January 2019. All publications dates were considered for inclusion. A Public Health Information-ist at the University of Pittsburgh Health Sciences Library System provided input and guidance regarding the search strategy.

In addition to the published articles, the search included a review of available abstracts (in English) from six national and international conferences related to HIV, women's health, or interpersonal violence. Conference abstracts play an important role in research dissemination [47], and as PrEP is a growing research area, they provide a valuable opportunity to access current research. Using available online conference abstract systems, the abstracts were searched using keywords [e.g., ('intimate partner violence' OR 'domestic violence') AND ('pre-exposure prophylaxis' OR 'preexposure prophylaxis' OR 'PrEP' OR 'PREP')] across the following six conferences: International AIDS Conference; Conference on HIV Pathogenesis, Treatment,

and Prevention; Conference on Retroviruses and Opportunistic Infections; International Workshop on HIV & Women; Society for Advancement of Violence and Injury Research National Conference; and National Conference on Health and Domestic Violence. Conferences were reviewed back to 2015 to allow approximately 3 years between conference presentation and publication in peer-reviewed literature and represented 15 separate conference events. Studies reporting original data on PrEP and IPV among women were included in the review.

DistillerSR, a systematic review management software, was used throughout the review process [48]. The lead author conducted the review through an initial title and abstract screening to ensure selected studies broadly reflected inclusion and exclusion criteria. Full text documents of articles and abstracts meeting inclusion criteria were then obtained and reviewed for final eligibility.

Inclusion Criteria

Articles and conference abstracts that were included had to meet the following criteria: (1) focused on both PrEP and IPV experiences among women, (2) presented primary data, (3) peer-reviewed, and (4) written in English language. Studies that did not report data findings (e.g., literature review, commentary) were excluded.

Data Extraction and Analysis

The final set of articles and conference abstracts were reviewed by one coder (TLO). Descriptive information was abstracted by the reviewer from each study on setting and context, study design and objectives, recruitment process, sample characteristics, PrEP and IPV indicators assessed, and reported key findings around the intersection of IPV and PrEP among women. The reviewer used summary tables to compare variables of interest and associated outcomes across studies. A conference abstract and article reporting the same results were considered a single study and only the article was included in the analysis. The reviewer resolved any inclusion verification and coding concerns in collaboration with another author (JGB).

Results

The systematic rapid-review search yielded 55 records eligible for preliminary screening; of those, 19 articles and 3 conference abstracts were excluded from the full-text screening. Thirty-three underwent full-text screening and nine were deemed eligible for review inclusion. Articles and conference abstracts excluded did not focus on women, IPV, PrEP for HIV prevention (e.g., focused on emergency or disaster preparedness, discussed HIV prevention but not PrEP specifically), or did not include primary data collection (e.g., literature review, commentary). Figure 1 displays the flowchart of the rapid review process.

Descriptive Characteristics

The included studies contained quantitative (n = 4; 44%), qualitative (n = 4; 44%), and mixed-methods (n = 1; 11%) designs, the majority of which were cross-sectional (n = 7; 77%). Samples ranged across studies and included 26 [49] to 1785 women participating in a prospective cohort clinical trial [50]. Four studies were conducted in the United States and other study settings included work in Kenya, South Africa, Tanzania, and Uganda; three were conducted at multiple sites.

Almost an equal number of studies focused on hypothetical PrEP use and actual PrEP use. Four studies examined potential PrEP use through such things as awareness of, interest in, or willingness or intentions to use PrEP, and all of these were conducted in the United States. For example, several studies focused on interest or willingness to use PrEP [49, 51–53]. One study also explored perceived barriers to PrEP use among women reporting IPV experience in the previous 6 months [49]. Five studies involved actual PrEP use, all conducted in non-U.S. settings, and examined things around accessing PrEP, experience using, and adherence or interruption in PrEP use. Three of these studies were associated with larger clinical trials (i.e., Partners PrEP [50]; VOICE, MTN-003 [54]; MTN-020/ASPIRE trial [55]). Two were part of demonstration projects, including one which sought to assess the feasibility and acceptability of integrating gender-based violence screening and support into HIV counselling for adolescent girls and young women accessing oral PrEP in South Africa and Tanzania [56].

Different types of IPV (e.g., physical, sexual, psychological, economic) were explored across studies included in this review. For example, two studies specifically examined physical and sexual IPV [52, 53], one focused on sexual IPV (i.e., forced sex) [49], and one explored a history of controlling or violent partner behaviors [55]. Assessment of the timing of abuse also varied across studies. For example, four studies examined recent (e.g., previous 6 or 12 months, since last study visit) experience of partner violence [49, 50, 52, 57] and four focused on any IPV experience throughout participants' lifetime [51, 54–56]. One study assessed both recent and lifetime IPV experience [53]. Despite this variation, findings suggest that a history of IPV was common among the women sampled. Thirty-two percent of women aged 16 to 24 years accessing oral PrEP in an open-label PrEP demonstration project in South Africa and Tanzania reported lifetime experience of violence [56]. And over half (57%) of a sample of women in the United States who

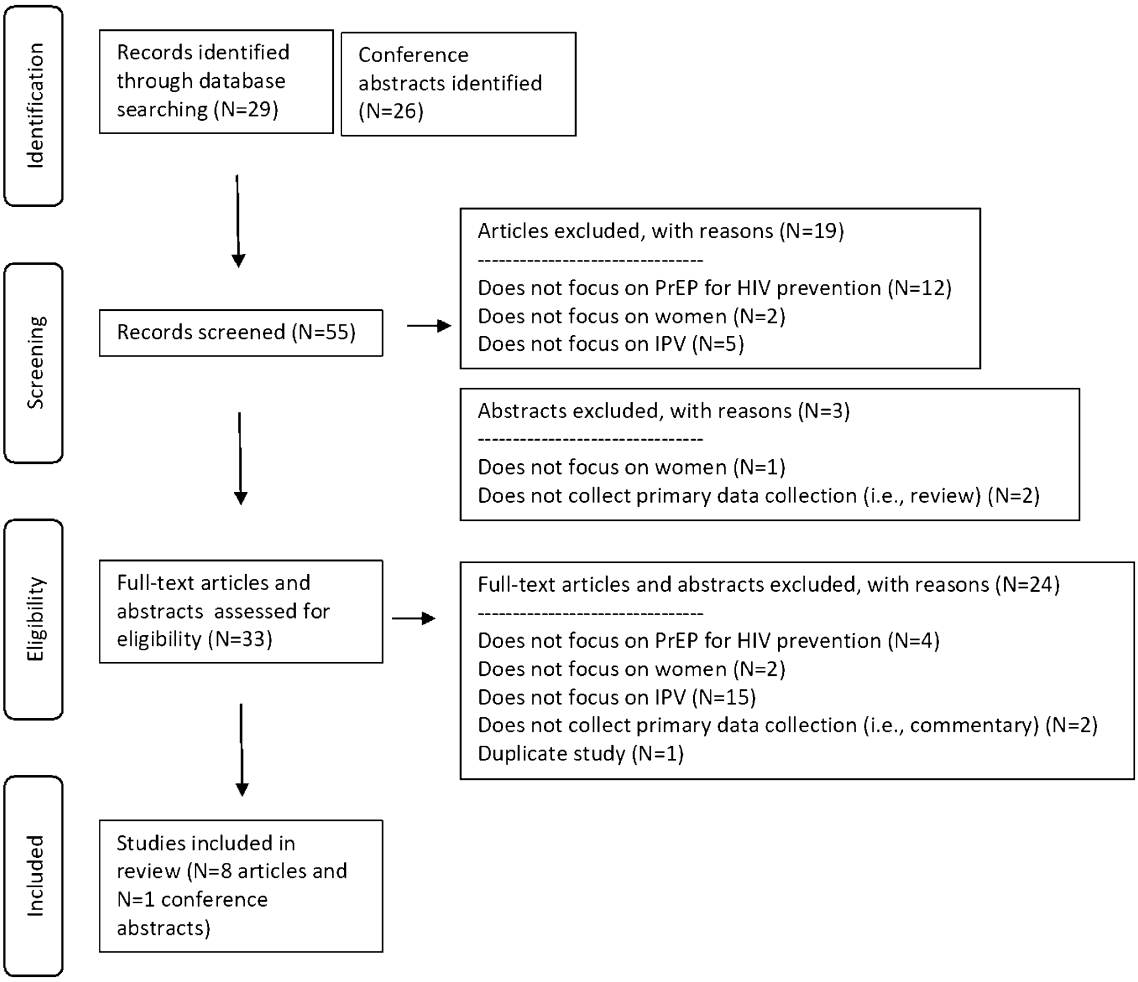

Fig. 1 Flowchart of rapid review process

reported IPV within the previous 6 months were currently in violent relationships [49].

The PrEP constructs that were assessed varied by study and primarily focused on factors across categories of: (1) awareness of and willingness to use PrEP (e.g., knowledge, interest, intention to use) and (2) PrEP use experience (e.g., interruption in PrEP use, adherence). When focusing on women's awareness and interest in using PrEP, Willie et al. [53] found that among 109 women surveyed through an online participant recruitment tool in the United States, PrEP awareness was moderate (12%), but participants were interested in using PrEP (25%). Additionally, a study involving in-depth interviews with 26 women in the United States report that approximately half of participants expressed interest in taking PrEP, while others reported ambivalence or not being interested in taking PrEP [49]. Among those studies focusing on PrEP use experience, Hartmann et al. [55] report that women in South Africa described either categories of feeling fearful or empowered when using the dapivirine vaginal ring. Furthermore, a study in Uganda and Kenya around recent and/or past exposure to IPV and PrEP adherence found that PrEP pill count was high among participants (mean = 95.3%) [50].

Intersection of IPV and PrEP Among Women

Results from the studies included in this review highlight the complex relationship between IPV and women's PrEP-related outcomes. While some of the studies conclude that IPV experience might encourage the use of PrEP [52], others report that fear of violence would prevent PrEP use [49]. Other research focused on PrEP use experience found that IPV was associated with PrEP adherence through interruption in use [50, 57]. Specific details about the studies and associated findings are further discussed below and are grouped by: (1) awareness of and willingness to use PrEP and (2) PrEP use experience. Table 1 provides an overview of each study and key characteristics including participants, IPV and PrEP measures and outcomes, and key findings around the intersection of IPV and PrEP.

Table 1 Peer-reviewed articles and conference abstracts on IPV and PrEP among women ($N=9$)

Author (year), objective	Study details	Participants	IPV and PrEP outcomes	Intersection of IPV and PrEP
Awareness of and willingness to use PrEP				
Braksmajer et al. (2018) [49] To explore *barriers to PrEP use among women experiencing IPV*, and identify concerns that might be addressed with PrEP education and counseling	Cross-sectional; in-depth interviews. Flyer and social media recruitment from IPV shelter, county STD clinic, local non-profit PrEP provider, and emergency department in United States. PrEP (acceptability, feasibility) and IPV (forced sex; previous 6 months) assessed.	26 women; average age 40 years. A majority identified as African-American/Black (81%) followed by White (8%), multiracial (8%), and Native American (4%). A majority (54%) had not finished high school, received public assistance (100%), and had Medicaid insurance (81%). All participants were in a relationship with a primary male partner during the past 6 months.	57% (n = 15) of women were currently in abusive relationships (physically hurt, insulted, threatened with harm, or screamed at). Many participants reported childhood sexual abuse, sexual assault, or prior violent relationships. Approximately half of participants expressed interest in taking PrEP. Others reported ambivalence or not being interested in taking PrEP.	A third of women described potential partner interference as a barrier to PrEP use. Most women reported they would not use PrEP covertly, and many feared increased violence if their partner were to discover covert use. Some women prioritized coping with IPV over HIV prevention, which combined with low risk perception, resulted in decreased willingness to use PrEP. Fear of side effects and long-term health consequences also impacted women's PrEP decision-making.
Willie et al. (2018) [52] To examine the association between social network characteristics and multiple outcomes along the PrEP care continuum and examine how *IPV experiences modify the association between social network characteristics and outcomes of PrEP care continuum*	Cross-sectional; self-administered online or in-person survey. Online and community flyer recruitment from Craigslist, Facebook, beauty salons, and community health clinics in Connecticut, United States. Women experiencing IPV were oversampled. PrEP (awareness, interest, intentions, and perceived PrEP candidacy) and IPV (physical, sexual; past 6-months) assessed.	191 women; 18 to 35 years of age. Most identified as non-Hispanic white (43%). A majority were currently employed (60%) and had an annual income of 30,000 USD or more (57%). 91% were currently in a relationship.	Current physical and/or sexual IPV (within the past 6 months) was reported by 44% (n = 85) of women. A quarter (24%) of participants were aware of PrEP and over a third were interested in learning more about PrEP (37%) and intended to use PrEP (34%); 2% reported using PrEP previously.	Women experiencing IPV reported high PrEP interest (44% vs. 20%), intentions (42% vs. 28%), and perceived candidacy (47% vs. 26%) compared to women not experiencing IPV. Further, women experiencing IPV reported less support of potential PrEP use across their network (10.48 vs. 13.48, t = 2.33, $p=0.02$). IPV modified the effect of social network characteristics on PrEP interest and intentions. A higher percentage of PrEP-aware alters was associated with lower PrEP interest (B = − 0.04, SE = 0.01, $p=0.02$) and PrEP intentions (B = − 0.05, SE = 0.02, $p=0.01$) among women experiencing IPV.

Table 1 (continued)

Author (year), objective	Study details	Participants	IPV and PrEP outcomes	Intersection of IPV and PrEP
Willie et al. (2017) [51] To examine the association between *lifetime and past-year physical, sexual, and psychological IPV experiences on PrEP-related outcomes*	Cross-sectional; online survey. Participants were recruited across the United States through Mechanical Turk (MTurk), an online participant recruitment tool. PrEP (awareness, interest, and perceived coercion) and IPV (physical, sexual, and psychological; lifetime, past-year) assessed.	210 participants (n = 109 women, n = 101 men); average age 35.4 years. A majority identified as White (76%), followed by Hispanic (9%), Black (5%), and other (9%). More than half had finished college or attended graduate school (60%). 73% were in a romantic relationship.	Past-year IPV experiences included physical (31.2%), sexual (19.5%), and psychological (68.8%) violence. Lifetime IPV experiences included physical (46.7%), sexual (17.1%), and psychological (78.6%) violence. Among women, PrEP awareness was moderate (12.8%), but participants were interested in using PrEP (25.7%). Almost a quarter (21.7%) believed their current/most recent partner would prevent them from using PrEP.	Past-year physical IPV (AOR 4.53; 95% CI 1.85–11.11, $p < 0.001$) was associated with interest in using PrEP. Past-year sexual IPV (AOR 3.01; 95% CI 1.10–8.27, $p < 0.05$) was associated with PrEP coercion. Lifetime sexual (AOR 3.69; 95% CI 1.62–8.40, $p < 0.001$) and psychological (AOR 4.70; 95% CI 1.01–21.89, $p < 0.05$) IPV was associated with PrEP coercion. No significant associations were found between any forms of lifetime and past-year IPV and PrEP awareness. No gender differences were observed among lifetime or recent IPV and PrEP awareness, interest, and perceived PrEP coercion ($ps > 0.5$).
Willie et al. (2017) [53] To describe the prevalence and associations of *IPV, reproductive coercion experiences, and PrEP acceptability* among urban-dwelling low-income young Black women and examine *birth control sabotage and pregnancy coercion as mediators* of the association between IPV and PrEP acceptability	Cross-sectional; self-administered electronic survey that lasted 20–30 min. Women recruited through direct and flyer recruitment from youth education and employment programs (n = 2), WIC programs (n = 3), and health care and insurance community-based organization (n = 1) in an urban city in the United States. PrEP (willingness to use) and IPV (physical and sexual; lifetime) assessed.	147 Black women; average age 21.28 years. A majority had not finished high school (52%) and had an average household income of 13,496 USD. 61% of participants reported dating one person and 4% were dating more than one person; 31% were single and 5% were married.	More than one in two (52%) of women reported ever experiencing physical or sexual IPV. Those who reported IPV were more likely to report birth control sabotage ($p < 0.01$) and pregnancy coercion ($p < 0.01$). Over three-quarters (77%) of participants were willing to use PrEP.	IPV was indirectly related to PrEP acceptability through birth control sabotage (indirect effect = 0.08; $p < 0.05$). Results suggest that women with IPV experiences were more willing to use PrEP given their experience of birth control sabotage. Pregnancy coercion was not found to have a significant indirect effect from IPV to PrEP acceptability.

Table 1 (continued)

Author (year), objective	Study details	Participants	IPV and PrEP outcomes	Intersection of IPV and PrEP
PrEP use experience				
Cabral et al. (2018) [57] *Partners demonstration project* To examine whether there is an association between *IPV and self-reported interruptions in PrEP use*	Prospective cohort; baseline questionnaire and quarterly interview-administered follow-up assessments up to 24 months at 4 sites in Uganda and Kenya. Direct recruitment of HIV-negative partners in high-risk HIV serodiscordant heterosexual relationships. PrEP (interruption) and IPV (verbal, physical, economic; past 3-months) assessed.	1013 participants (n = 334 women, n = 679 men); approximately half of participants were aged 29 years or younger (55% of women, 47% of men). Almost all couples (95%) reported being married; over 97% living together and median length of partnership was approximately 5 years for couples with an HIV-negative woman.	53 follow-up visits included reports of IPV by 49 participants, which included verbal abuse (50%), physical (25%), and economic (22%) IPV. 53% of reports were made by women; most physical abuse reports were made by women, while verbal abuse reports were made by women and men at similar rates. 24.5% (n = 249) participants reported PrEP interruption (deliberate decision to take a break from PrEP), with a median length of 28 days; 65% of reports were from men.	IPV was associated with PrEP interruption (adjusted OR 2.6, 95% CI 1.2–6.0, $p = 0.02$) among HIV-negative participants in a known serodiscordant partnership.
Colombini et al. (2018) [56] *EMPOWER study* Assess *the feasibility and acceptability of integrating gender-based violence screening and support into HIV counselling* for adolescent girls and young women accessing oral PrEP in an open-label PrEP demonstration project	Cross-sectional; in-depth interviews (n = 39 participant; n = 13 clinical staff) and counselling session observations (n = 10). Counselling session observations were only conducted in South Africa; in-depth interviews were administered in both South Africa and Tanzania. Recruitment methods not described. PrEP access and exposure to gender-based violence (GBV) were assessed.	431 women enrolled in the study; participants were 16–24 years of age. All women were HIV-negative.	32% (n = 141) reported lifetime experiences of violence. Women who reported abuse described that it was reassuring and helpful to talk to counsellors who were friendly and non-judgmental.	Challenges when screening for GBV reported by clinical staff counsellors included initial discomfort asking about violence, facilitating disclosure of suspected cases, length of time taken to complete the sessions, and offering help when participants did not want any referrals.

Table 1 (continued)

Author (year), objective	Study details	Participants	IPV and PrEP outcomes	Intersection of IPV and PrEP
Hartmann et al. (2018) [55] *MTN-020/ASPIRE trial* To explore how *dapivirine vaginal ring use and partnership dynamics* interacted	Cross-sectional; in-depth interviews. Purposive sampling across three groups: former ASPIRE (MTN-020) participants who reported partner-related challenges (i.e., "social harms") during trial participation, those who did not, and male partners of ASPIRE participants. Interviews were conducted at a single ASPIRE site in Johannesburg, South Africa. PrEP (use of dapivirine vaginal ring) and IPV (history of controlling or violent partner behaviors, relationship between partner behaviors and ring use) assessed.	42 participants (n = 14 social harm (SH) women, n = 14 non-SH women, and n = 14 male partners); average age 30 years (SH), 32.1 years (non-SH), and 36.8 years (male partners). Almost all women had a current sexual partner. A majority of women were still with their ASPIRE partner; this was less common among SH women (55% vs. 70%).	Lifetime experience of partner violence was described by all SH women and the majority of non-SH women; psychological violence was the most common form experienced by all women. Women reported physical violence (50%; n = 7), sexual violence (35%; n = 5), and economic violence (14%; n = 2). Three ways in which study/dapivirine ring use was related to violence was described: it exacerbated pre-existing violence, it served as a new mechanism for perpetrating violence, and it decreased violence. Triggers to violence experiences included spending time away from home (i.e., at the clinic), being tested and disclosing to partners a need for STI treatment, or using a product that a male partner was not aware of/disapproved of.	Two categories of feelings and actions toward ring use and violence emerged: felt fearful or empowered. Women who feared their partners' reactions reported actions of discontinuing ring use, tactics to retreat from or avoid ring-related conflict, or removing the ring when with partners. Women who felt empowered by ring use described a sense of power linked to the protection the ring was perceived to provide in risky relationships.

Table 1 (continued)

Author (year), objective	Study details	Participants	IPV and PrEP outcomes	Intersection of IPV and PrEP
Hartmann et al. (2016) [54] *VOICE, MTN-003 trial* To explore the broader context of *gender-based violence through participants' discussions of rape* and to examine how this reflects on the context of *gender inequality and intersection with PrEP product use*	Cross-sectional; in-depth interviews and focus group discussions. Data collection modalities pre-assigned based on participant group. Direct recruitment by study staff and varied by participant group (n = 4). Women were randomly pre-selected parent study participants, male partners were recruited from parent study participants who had provided permission for partners to be contacted, community members advisory board members recruited from existing board, and community stakeholders identified by study staff in Johannesburg, South Africa. PrEP (experience with product) and IPV (anything about violence or violent behaviors, including actual experiences or discussion of potential risk, in relation to anyone) was assessed.	164 participants (n = 102 women, n = 22 male partners, n = 17 advisory board members, n = 23 community stakeholders); average age 26.8 years. A majority of women had completed secondary school or more (68%) and earned an income (57%). All were married or had a primary partner.	Rape was frequently mentioned across participant group; one fifth of discussions among female participants, half of discussions among advisory board, and two-thirds discussions with community stakeholders. Male partners were the only group to not specifically mention rape. Two themes emerged around rape: it was used as an expression of women's overall vulnerability to HIV and to legitimize the use of female-initiated HIV prevention technologies. Participants discussions highlighted several ways women perceive and explain the role of PrEP including protecting them against sexual violence victimization and assuaging social and male partner criticisms of women's sexuality.	A "gender accommodating" view was dominant in the data where participants rationalized the need to increase women's sexual agency in order to protect themselves against HIV in a way that did not suggest they were behaving improperly or immorally. A 'gender transformative' view that sees PrEP as empowering women to prevent HIV was not present in the discussions.

Table 1 (continued)

Author (year), objective	Study details	Participants	IPV and PrEP outcomes	Intersection of IPV and PrEP
Roberts et al. (2016) [50] *Partners PrEP trial* To examine whether *recent and/or past exposure to IPV is associated with low PrEP adherence among* HIV uninfected women participating in a clinical trial of PrEP	Prospective cohort; baseline questionnaire, interview-administered follow-up assessments and PrEP pill count (monthly), plasma tenofovir concentration (months 1, 3, and quarterly thereafter), and in-depth interviews. Recruitment methods not described. Interviews were only collected at a single study site in Uganda; all other methods assessed in Kenya. PrEP (adherence, experience taking) and IPV (physical, verbal, economic; since last study visit) assessed.	1785 women; average age 33.2 years. An average of 5.6 years of school had been completed and over two thirds (69%) had earned income in the past 3 months. Almost all participants (99%) were married; relationship duration average was 12.9 years.	16.1% of women reported IPV at 437 visits (0.7% total visits). Most women reported multiple types of IPV; verbal IPV was the most common (reported at 376 visits), followed by physical (235 visits) and economic (212 visits). Pill count coverage was high among women regardless of IPV experience (mean = 95.3%).	Women were more likely (50%) to have low PrEP adherence at visits with IPV in past 3 months compared to visits with no IPV to date, regardless of measuring by pill count (aRR 1.49; 95% CI 1.17–1.89, $p = 0.001$) or plasma tenofovir (aRR 1.51; 95% CI 1.06–2.15, $p = 0.02$). The effect of recent (past 3 months) verbal (aRR 1.65; 95% CI 1.17–2.33, $p = 0.005$) and economic IPV (aRR 1.48; 95% CI 1.14–1.92, $p = 0.003$) was associated with pill count coverage. Frequency of IPV since last study visit was higher for verbal IPV (mean 4.1 episodes) than for physical IPV (mean 1.7 episodes), however, the risk of low adherence increased with increasing frequency of recent physical IPV (aRR 1.09 for each additional episode within the reporting period; 95% CI 1.04–1.14, $p < 0.001$) and verbal IPV (aRR 1.02 for each additional episode; 95% CI 1.02–1.03, $p < 0.001$). IPV was raised during interviews around adherence challenges and included themes of: stress, leaving home without study drug, and partner throws away or threatens to take study drugs.

Awareness of and Willingness to Use PrEP

Four studies addressed hypothetical PrEP use and found that awareness of and willingness to use PrEP were connected to women's IPV experience. While exploring the impact of IPV on PrEP interest among women and men recruited through an online participant tool in the United States, Willie and colleagues [53] found that past-year physical IPV was associated with participants being interested in using PrEP (AOR 4.53; 95% CI 1.85–11.11, $p < 0.001$). Another study focused on willingness to use PrEP among urban-dwelling, low-income young Black women in the United States found that IPV was indirectly related to PrEP acceptability through reproductive coercion (i.e., partner uses power and control to influence reproductive health outcomes) (indirect effect = 0.08; $p < 0.05$) [51]. They found that women who were willing to use PrEP were more likely to report birth control sabotage (i.e., direct interference with use of contraception), compared to those not willing or indecisive about PrEP [51]. Pregnancy coercion (i.e., verbal pressure and threats to promote pregnancy), however, was not found to have a significant indirect effect from IPV to PrEP acceptability.

Willie and colleagues [52] examined how IPV experiences modify the association between participants' social network characteristics and PrEP awareness, interest, intentions, and perceived candidacy among women recruited through online and community flyers in the United States. They found that compared to women with no recent IPV experience (past 6 months), women experiencing recent IPV had the highest prevalence of PrEP interest (44.7% vs. 30.2%; $p = 0.03$), intentions (42.4% vs. 28.3%; $p = 0.04$), and perceived candidacy (47.1% vs. 26.4%; $p = 0.003$). However, women experiencing recent IPV reported smaller social networks and less support of potential PrEP use across their network, compared to women without recent IPV experiences. The authors report that the findings suggest that IPV modified the effect of social network characteristics on PrEP interest and intentions. Among women experiencing IPV, a higher percentage of PrEP-aware alters (i.e., individuals participant perceived to be close to) was associated with lower PrEP interest ($p = 0.02$) and intentions to use ($p = 0.001$) [52].

Braksmajer et al.'s interviews [49] among women in violent intimate relationships in the United States found that a third of participants described potential partner interference as a barrier to PrEP use, that most women would not use PrEP covertly, and that many feared increased violence if their partner were to discover covert use. Similarly, IPV experience was found to influence perceived PrEP coercion, or believing that your current or most recent partner would prevent you from using PrEP if you were using it, among women and men in the United States [53]. In particular, when examining whether type and timing of IPV impacted perceived PrEP coercion differently, Willie et al. [53] found that lifetime sexual (AOR 3.69; 95% CI 1.62–8.40, $p < 0.001$) and psychological IPV (AOR 4.70; 95% CI 1.01–21.89, $p < 0.05$), and past-year sexual IPV (AOR 3.01; 95% CI 1.10–8.27, $p < 0.05$) were positively associated with perceived PrEP coercion among the entire sample.

PrEP Use Experience

Five studies found that women's experiences using PrEP, including interruptions in PrEP use and adherence, were related to IPV experience. An open-label PrEP demonstration project in South Africa and Tanzania examined the feasibility of integrating gender-based violence screening and support among young women (16–24 years) accessing PrEP [56]. While women who disclosed IPV reported it was helpful and reassuring to talk with counsellors who were friendly and non-judgmental, clinical staff described initial discomfort asking about violence and facilitating disclosure of suspected cases, and concerns about length of time to complete sessions and offering help to those who refuse referrals. Additional description of PrEP outcomes and IPV screening were not provided in the conference abstract.

Hartmann et al.'s interviews [55] focused on experience using the dapivirine vaginal ring among women who reported social harms during trial participation in South Africa (i.e., reported a partner-related social harm or adverse event, withdrew from the trial for partner-related reasons, or had any other documented partner-related opposition to the trial/product) and their male partners. They found that the use of the PrEP vaginal ring/study participation was linked to IPV through exacerbating pre-existing violence due to such things as women spending time away from home (i.e., at the clinic), STI testing and disclosing to partner the need for treatment, and using a product that a partner disapproved or was not aware of. Women also described that the vaginal ring became a new mechanism for partners to perpetrate violence and used it to humiliate (e.g., it smelled and turned him off of sex) and accuse of distrust. One male partner reported that his partner's study participation led him to stop perpetrating violence due to a concern that study staff would be able to identify signs of abuse. Feeling either fearful or empowered also emerged towards vaginal ring use and violence. Women who feared their partner's reactions reported discontinuing ring use, tactics to retreat from or avoid ring-related conflict, or removing the ring when with partners. Women who felt empowered by ring use described a sense of power linked to the protection the ring was perceived to provide in risky relationships [55].

Hartmann et al.'s [54] interviews and focus group discussions with multiple participant groups examined PrEP use and potential socio-cultural barriers and facilitators to PrEP

among women in South Africa. The authors report that rape was frequently mentioned and was used as an expression of women's vulnerability to HIV and to also support use of female-initiated HIV prevention technologies like PrEP. For example, a "gender accommodating" view was found to be a dominant theme where participants rationalized the need to increase women's sexual agency in order to protect themselves against HIV in a way that did not suggest they were behaving improperly or immorally.

A PrEP demonstration project in Uganda and Kenya among HIV-negative partners in high-risk HIV serodiscordant heterosexual relationships examined the association between IPV and self-reported interruptions in PrEP use (i.e., deliberate decision to stop using PrEP) [57]. Experience of verbal, physical, or economic IPV within the previous 3 months was significantly associated with interruption in oral PrEP use (AOR 2.6; 95% CI 1.2–6.0, $p = -0.002$). Roberts and colleagues [50] found that women were more likely (50%) to have low PrEP adherence at visits where recent IPV (past 3 months) was reported, compared to visits with no IPV to date. This association was found regardless of measuring adherence by pill count (aRR 1.49; 95% CI 1.17–1.89, $p = 0.001$) or by plasma tenofovir (aRR 1.51; 95% CI 1.06–2.15, $p = 0.02$). However, this association was not found to continue for more than 3 months after the violence, with the authors suggesting that the effects of IPV on PrEP adherence may be, "acute and time-limited" through factors such as stress, being forced to leave the home, or a partner trying to take or throw away pills as described by women in qualitative interviews [50].

Discussion

Results from this systematic rapid review highlight the paucity of studies focused on IPV and PrEP among women; we found only eight empirically based published articles and one conference abstract exploring the intersection of IPV and PrEP among women. This systematic rapid review expands previous work by Young and McDaid, Koechlin et al., and Bailey et al., which primarily focused on acceptability, values, and preferences of PrEP broadly [33, 46] or among women specifically [58], and extends it to explore the particular impact of IPV experience on women's PrEP-related outcomes. Existing commentaries also underscore the relevance and importance of additional work addressing PrEP for women in abusive and controlling relationships (e.g., [34, 36, 59–61]).

Our findings illustrate that while existing evidence is relatively limited in scope, IPV has implications on women's PrEP acceptability and use. In particular, the studies reviewed demonstrate that IPV has been shown to impact women's interest and willingness to use PrEP; perceived PrEP coercion or partner interference; interruptions in PrEP use; and PrEP adherence. Other studies exploring women's PrEP outcomes, while not explicitly focused on the impact of IPV, provide additional insight around the potential implications of these complex issues. For example, Rubtsova et al. [35] found that young women who experience several HIV risk factors, including IPV, may be likely PrEP candidates. Specifically, they report that young women 20 to 29 years with lifetime IPV experience were three times more likely to report potential PrEP uptake than those who did not disclose IPV (aOR 3.22; $p < 0.001$ vs. aOR 1.92; $p < 0.01$). Garfinkel et al. [62] found however, that among women seeking care at a family planning clinic, PrEP acceptability was significantly lower among women with a history of IPV relative to women without an abuse history (57% vs. 62%, AOR 0.71; 95% CI 0.59–0.85, $p < 0.001$) and suggest that women may not connect IPV experiences with increased HIV risk.

This review identifies important gaps in current literature and areas in need of research and publication attention. In addition to limited research in this area, there are conflicting results. An expanded understanding of the ways that IPV-related experiences (e.g., reproductive coercion) may influence women's needs for expanded HIV prevention options is necessary. For example, women that reported willingness to use PrEP were more likely to have birth control sabotage experience compared to women not willing or indecisive about PrEP (indirect effect from IPV to PrEP acceptability = 0.08; $p < 0.05$) [51]. Little is known about how type and timing of partner violence may also impact women's PrEP decision-making and product use experience. For example, Willie et al. [53] report that only certain types and timing of IPV were associated with participants' interest in using PrEP, as well as their perceived PrEP coercion. In particular, interest in using PrEP was significantly associated with past-year physical IPV, and lifetime and past-year sexual IPV and lifetime psychological IPV were associated with believing a partner would attempt to control their use of PrEP. Furthermore, risk of low PrEP adherence was found to increase with each increasing frequency of recent physical (aRR 1.09 for each additional episode within the reporting period; 95% CI 1.04–1.14, $p < 0.001$) and verbal IPV (aRR 1.02 for each additional episode; 95% CI 1.02–1.03, $p < 0.001$) [50].

Further work to expand our understanding of the unique barriers and facilitators to PrEP decision-making and engagement in PrEP care among women in abusive and controlling intimate relationships is also critical. Evidence of barriers/facilitators to women's use of other current and experimental HIV prevention strategies (e.g., male and female condoms, microbicides) include such things as cost [63, 64], ease of use (e.g., insertion/extraction) [65–67], male partners (e.g., beliefs, preferences) [28, 68], violence or fear of violence [38], and stigma [58, 64, 69]. PrEP has the potential to expand HIV prevention options for women

in violent relationships and research exploring the associated considerations regarding PrEP discussion, delivery, and care that reflects the context of IPV is crucial [36]. Young and McDaid recommend that future research should broaden the examination of PrEP acceptability to include perceptions and management of risk and the impact of broader social structural factors on the potential uptake and sustained effectiveness of PrEP (e.g., social stigma, social pressures regarding sexual relationships, mistrust of medical settings, financial barriers) [46]. For example, results from this review suggest that women with IPV experience may be concerned about or report a partner interfering with their PrEP use [50, 51]. Future investigation should include an examination of factors such as how IPV may impact women's PrEP decision-making and adherence concerns, fears associated with partners, or underestimated need for HIV prevention.

Implications for Future Research and Practice

An improved understanding of the intersection of IPV and PrEP is essential for intervention development, practice, and policy to appropriately incorporate the HIV risk context and needs of women who experience IPV. The high rates of IPV and persistent HIV incidence among women emphasize the urgency for a woman-centered HIV prevention option, yet the current CDC PrEP eligibility guidelines do not address IPV experience. Expanded PrEP eligibility criteria and a coordinated health care response through screening guidelines or protocols that encourage discussion of HIV worry and prevention to IPV screening or when women report IPV in women's health care settings are key opportunities for reducing the rates of HIV among women worldwide.

Further research is critical for development of PrEP interventions that appropriately address the context of IPV; values women's decision-making and control; and supports women's health and safety through provider protocols and appropriate safety planning resources. Only one known study has explicitly explored the associated considerations regarding PrEP delivery and implementation of care that reflects the context of IPV [49]. Additional research is needed to inform a woman-centered PrEP intervention that takes into account the context of IPV [70]. For example, questions remain around what messaging is appropriate to help women understand and explain their need for PrEP, where and by whom should PrEP be discussed and distributed, how should medication be packaged and identified on medical and health insurance records, and a potential need for additional services to support medication adherence and safety within an abusive relationship. Staff from a domestic violence organization described that safety planning with clients regarding PrEP use may need to take place and the frequent medical visits recommended might present a barrier for some women [71]. Additional investigation into appropriate resources and safety planning protocols provided by PrEP providers to women in violent relationships is critical to support safety and well-being.

Additional work is also needed to understand appropriate settings for discussing PrEP. Women's health care settings, such as OB/GYN practitioners and family planning clinics, may provide an important setting for discussing IPV and PrEP [72]. Sexual and reproductive health care settings are often women's source of usual care [73], where women seek care regularly and for a variety of services (e.g., contraception, STI testing and treatment, pregnancy-related services, cancer screening, referrals) [74], and identified as a comfortable setting to discuss PrEP and sexual health behavior [62, 69]. Moreover, family planning clinics often provide services to un- or under-insured women who may not be seeking healthcare elsewhere [73, 74].

Limitations

A systematic rapid review process was used to identify and summarize existing research in a timely manner, yet there are limitations to this approach that should be noted [75]. While we consider our search to be comprehensive and conducted in collaboration with a health sciences librarian with expertise in systematic reviews, we may have missed relevant studies due to search terms and one database used. In addition, a single reviewer was responsible for the search, review, and coding. However, this reviewer has considerable experience and multiple publications involving a similar literature review approach. Given this is a growing research area, conference abstracts provide valuable information on current research, yet, they present an abbreviated summary of the work and details on results are often limited. Accordingly, we made as few assumptions regarding meaning as possible when reviewing abstracts, which resulted in missing data. Finally, the use of qualitative methods to summarize key findings limits applications of results, but until more studies demonstrate PrEP outcomes for women who experience IPV, this is an appropriate step to inform future research and practice.

Conclusions

Consistently high rates of IPV and the persistent HIV incidence rates among women emphasize the urgency for a woman-centered HIV prevention option that's feasible within abusive and controlling relationships. Common HIV prevention options, such as condoms, remain underused and fail to consider the co-occurring and intersecting issues of IPV and HIV and role of relationship dynamics on women's health. PrEP presents an opportunity to expand HIV prevention strategies for women in abusive and controlling intimate

relationships. This systematic rapid review explored the impact of IPV on women's PrEP acceptability and use and found a death of research. While the review findings provide a foundation for developing an enhanced understanding of the considerations of IPV for women's PrEP delivery and care, additional research and practice attention is needed. Further research attention is critical for development of public health practice that appropriately addresses the context of IPV and role of relationship dynamics through PrEP screening and care that recognizes the impact of violence in women's lives; values women's decision-making and control; and supports women's health and safety through provider protocols and appropriate safety planning resources.

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