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# AIDS

## Intimate partner violence and engagement in HIV care and treatment among women: A systematic review and meta-analysis --Manuscript Draft--

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<b>Abstract:</b>	<p><b>Objective:</b> We aimed to estimate the odds of engagement in HIV care and treatment among HIV-positive women reporting intimate partner violence (IPV).</p> <p><b>Design:</b> We systematically reviewed the literature on the association between IPV and engagement in care. Data sources included searches of electronic databases (PubMed, Web of Science, CINAHL, and PsychInfo), hand searches, and citation tracking.</p> <p><b>Methods:</b> Two reviewers screened 757 full-text papers, extracted data, and independently appraised study quality. Included studies were peer-reviewed and assessed IPV alongside engagement in care outcomes: antiretroviral treatment (ART) use; self-reported ART adherence; viral suppression; retention in HIV care. Odds ratios (OR) were pooled using random effects meta-analysis.</p> <p><b>Results:</b> Thirteen cross-sectional studies among HIV-positive women were included. Measurement of IPV varied, with most studies defining a 'case' as any history of physical and/or sexual IPV. Meta-analysis of five studies showed IPV to be significantly associated with lower ART use (OR=0.79, 95%CI 0.64-0.97). IPV was associated with poorer self-reported ART adherence in seven studies (OR=0.48, 95%CI 0.30-0.75) and lower odds of viral load suppression in seven studies (OR=0.64, 95%CI 0.46-0.90). Lack of longitudinal data and measurement considerations should temper interpretation of these results.</p> <p><b>Conclusions:</b> IPV is associated with lower ART use, half the odds of self-reported ART adherence, and significantly worsened viral suppression among women. To ensure the health of HIV-positive women, it is essential for clinical programs to address conditions that impact engagement in care and treatment. IPV is one such condition, and its</p>

association with declines in ART use and adherence requires urgent attention.

Dear AIDS,

Thank you for provisional acceptance of our paper:

Manuscript reference number: AIDS-D-15-00422R1

Title: Intimate partner violence and engagement in HIV care and treatment among women: A systematic review and meta-analysis

Article type: Original paper (Epidemiology / Social)

We have edited the paper to fit the journal word limit, and have ensured that all journal instructions have been followed.

Thanks for this opportunity to publish with AIDS journal.

Sincerely,

Abigail M Hatcher  
Senior Researcher  
Wits Reproductive Health and HIV Institute  
University of the Witwatersrand

## Intimate partner violence and engagement in HIV care and treatment among women: A systematic review and meta-analysis

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**Running Head:** Meta-analysis of partner violence & adherence

**Word Count:** 3446 (excluding references and cover sheet)

**Key Words:** ART adherence, intimate partner violence, engagement in care, meta-analysis

### Abstract

**Objective:** We aimed to estimate the odds of engagement in HIV care and treatment among HIV-positive women reporting intimate partner violence (IPV).

**Design:** We systematically reviewed the literature on the association between IPV and engagement in care. Data sources included searches of electronic databases (PubMed, Web of Science, CINAHL, and PsychInfo), hand searches, and citation tracking.

**Methods:** Two reviewers screened 757 full-text papers, extracted data, and independently appraised study quality. Included studies were peer-reviewed and assessed IPV alongside engagement in care outcomes: antiretroviral treatment (ART) use; self-reported ART adherence; viral suppression; retention in HIV care. Odds ratios (OR) were pooled using random effects meta-analysis.

**Results:** Thirteen cross-sectional studies among HIV-positive women were included. Measurement of IPV varied, with most studies defining a 'case' as any history of physical and/or sexual IPV. Meta-analysis of five studies showed IPV to be significantly associated with lower ART use (OR=0.79, 95%CI 0.64-0.97). IPV was associated with poorer self-reported ART adherence in seven studies (OR=0.48, 95%CI 0.30-0.75) and lower odds of viral load suppression in seven studies (OR=0.64, 95%CI 0.46-0.90). Lack of longitudinal data and measurement considerations should temper interpretation of these results.

**Conclusions:** IPV is associated with lower ART use, half the odds of self-reported ART adherence, and significantly worsened viral suppression among women. To ensure the health of HIV-positive women, it is essential for clinical programs to address conditions that impact engagement in care and treatment. IPV is one such condition, and its association with declines in ART use and adherence requires urgent attention.



# **Intimate partner violence and engagement in HIV care and treatment among women: A systematic review and meta-analysis**

**Running Head:** Meta-analysis of partner violence & adherence

**Word Count:** 3496 (excluding references and cover sheet)

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## Introduction

Advances in HIV care and treatment have led to remarkable health gains among those living with HIV. Yet, many HIV-positive patients remain out of care, fail to take up treatment, or are non-adherent to antiretroviral therapy (ART). Such challenges with engagement in HIV are common among females [1, 2], and are responsible for a considerable proportion of morbidity and mortality among HIV-positive women [3, 4].

There are a number of reasons for poor engagement in HIV care, among which intimate partner violence (IPV) has received increasing attention. IPV is defined as any behavior within an intimate relationship that causes physical, psychological or sexual harm [5], and global prevalence among is estimated to be 30% [6]. IPV has been associated with HIV infection in cross-sectional [7] and prospective studies [8, 9]. A meta-analysis of data from 28 studies showed that multiple forms of IPV are associated with incident HIV infection in women [10]. Research points to direct links between IPV and HIV infection, via forced sex, as well as indirect links, via heightened HIV risk among IPV perpetrators and a reduced ability for women in violent relationships to negotiate condom use [11-13].

Despite this emerging literature around HIV acquisition, less is known about the influence of IPV for those already living with HIV. Evidence suggests that women living with HIV have a high likelihood of relationship violence. Clinical samples from resource-rich settings estimate that 68-95% of HIV-positive women experience IPV in their lifetime [14-18]. In resource-constrained settings, HIV-positive women are twice as likely as HIV-negative counterparts to report lifetime violence from a partner [19]. HIV diagnosis, in itself, can trigger relationship conflict and violence [17, 20-22]. Importantly, HIV testing, regardless of the serostatus outcome, can lead to violence [23, 24], suggesting that even this first step in accessing care and treatment may pose an IPV risk.

IPV leads to declines in HIV-related health, with studies finding an association between IPV and virologic failure [25, 26], lower CD-4 counts [25], higher incidence of opportunistic infection [26, 27], marked increase in episodic diseases (e.g. pneumonia, bronchitis, sinusitis) [27], and greater risk of mortality [28]. Negative effects on engagement in care and treatment may be a leading reason for IPV being associated with poor health outcomes for HIV-infected women.

Several plausible mechanisms could drive the relationship between IPV and HIV-related engagement in care. Fear of new or continued IPV leads women to avoid disclosure of their status to male partners [29-31], which in turn has a significant impact on treatment adherence [32-34]. When women are fearful of violence from their partners, they may be more likely to default on medications or may have other health priorities, such as physical safety, that trump adherence [35]. Qualitative studies have explored how fear and experience of IPV influence women's decisions to take up and stay retained in HIV services [35-37]. Given the well-established links between IPV and mental health [38-43], it is possible that poor mental health is the main explanation for how IPV impacts on ART adherence [44-47]. Alternately, feelings of denial and shame may preclude abused women's abilities to seek care openly [48], or partner control may inhibit access to medical care [49].

Despite health risks associated with IPV among HIV-infected persons, IPV remains an understudied factor in the literature around HIV care and treatment [50]. Evidence on the association between IPV and adherence has yet to be reviewed systematically. This study examined the relationships between IPV and engagement in HIV care and treatment (ie. ART



uptake, ART adherence measured through self-report or by viral loads, and retention in HIV care) through a systematic review and meta-analysis.

## **Methods**

A systematic review and meta-analyses were conducted on studies measuring an association between IPV and ART use, ART adherence (self-reported), ART adherence (viral suppression), and retention in HIV. The aim was to determine the extent to which IPV is related to engagement in HIV care and treatment among women.

### ***Selection criteria***

This review follows PRISMA reporting guidelines for systematic reviews (see Text S1) [51]. Studies were eligible for inclusion if they: 1) included adult women living with HIV; 2) presented primary, quantitative data in a peer-reviewed manuscript based on cross-sectional, case control, or longitudinal data; and 3) measured the predictor of interest (IPV) and at least one outcome of interest. No restrictions were placed on study setting or population.

### ***Search strategy***

Electronic searches were conducted using the following databases: PubMed, Web of Science, CINAHL, and PsychoInfo. Articles in English or French were included if they had been published in peer-reviewed journals before or up to January 2015. Search terms and a full search strategy can be found in Text S2.

### ***Study selection***

Using the “online search” function of EndNote [52], all titles and abstracts matching the search terms were imported. Two authors (AMH, EMS) independently reviewed all identified study titles and abstracts. Papers were retained if at least one search term for predictor or outcome concept was found. Abstracts that did not meet all inclusion criteria were excluded and reason for exclusion noted. Exclusion criteria included publication factors and population characteristics (Figure 1).

The same authors (AMH, EMS) independently screened full papers of all included abstracts. Full papers with discrepancy about inclusion were reviewed by a third author (HS) to reach consensus. Exclusion reasons were noted. No additional study was identified by searching the reference lists of included articles.

### ***Data extraction***

Data were extracted on study design, setting, population, sample size, measures used to investigate IPV, and measures used to assess engagement in HIV care. As meta-analysis required data from among women only and in dichotomous outcomes, authors of several papers (n=7) were contacted directly via email and asked to abstract 2x2 tables in Excel: numbers of women reporting IPV vs. not and reporting engagement in care vs. not. Authors of all seven papers requiring additional information were willing and able to provide these data.

### ***Quality appraisal***

A quality appraisal was conducted on all included studies using an adapted Critical Appraisal Skills Programme (CASP) quality appraisal tool (Text S3) [53]. The quality appraisal form includes 15 questions about study quality for which papers received a numeric score representing the extent to which they met the criteria: 0 (non responsive), 1 (partially responsive), or 2 (fully responsive).

### ***Data analysis***

Meta-analyses were conducted separately for dichotomous engagement in care outcomes. Dichotomous outcomes were deemed appropriate since key outcomes of interest were either inherently dichotomous (i.e. current ART use) or represented non-normally distributed continuous data (i.e. adherence, viral suppression). An assessment was made by the authorship team to ensure that “clinical heterogeneity” was acceptable to lend each outcome to meta-analysis [54].

Quantitative outcomes were extracted into an Excel table. This included details on overall IPV prevalence in the study, cases and non-cases among women with IPV and without IPV, and correlation coefficients. Pooled unadjusted odds ratio (OR) estimates (with corresponding 95% confidence intervals) were calculated using random effects meta-analysis in STATA [55]. No adjustment was made for potential confounders, given that few studies reported covariate data. Heterogeneity among studies was estimated using the  $I^2$  statistic, with significant heterogeneity detected at the  $p < 0.05$  level. Sensitivity analysis for publication bias was undertaken through visual inspection of funnel plots [56] and Egger’s test statistic (with small-study effects being detectable at a conservative  $p < 0.10$  level) [57]. To aid comparison with other systematic reviews, the self-reported adherence outcome was transformed to a standardized mean difference [58].

### **Results**

Our search strategy identified 621 unique records, of which 554 were excluded during abstract screening (Figure 1). Full texts were obtained for 75 papers, of which 62 were excluded upon further screening. A total of thirteen studies measured the association between IPV and at least one of the primary outcomes: ART uptake, ART adherence (self-report), ART adherence (viral suppression), and retention in HIV care.

#### ***Key features of included papers***

Table 1 presents the key characteristics and outcomes of the thirteen included studies [25, 59-70]. Most studies ( $n=11$ ) were conducted in the United States and sample sizes across all studies were relatively small, with a median of 234 participants. All thirteen studies were cross-sectional. Most studies ( $n=12$ ) were conducted among the general HIV-infected population, with Kalokhe et al. conducting their study among high-risk crack/cocaine users.

#### ***Measures of Intimate Partner Violence***

Measures of IPV were based on self-reports across all thirteen studies. As shown in Table 1, several studies used brief, unvalidated screening tools to assess violence [59, 62-64]. Validated instruments included the Severity of Violence Against Women Scale [25, 66], the Conflict Tactics Scale [61], the Slapped, Threatened, and Throw instrument [60], and the Women’s Experience of Battering (WEB) scale [25, 67-69]. Ryerson Espino bolstered the WEB scale to include dimensions of forced sex and fears around physical safety [68]. Siemieniuk trained clinic researchers to conduct a standardized screening using a single introductory question about any

domestic abuse, after which women were considered to have IPV if they spoke in a semi-structured way about violence as an adult within a current or past partner. [71].

Eleven studies used lifetime experience of IPV as the exposure of interest, whereas two analyzed IPV in the past 12 months [59, 66]. Although several other papers included measures of recent violence (past 12 months [61, 68]; past 5 months [63]), the authors did not conduct analysis using the “recent violence” data.

### ***Ethical considerations***

Quality scores are reported in Table 1. All studies reported informed consent procedures and ethical review. However, Siemieniuk and Schafer were the only authors to detail specific steps taken by clinicians when women disclosed IPV [25, 65].

### ***Current ART use***

Five studies measured ***current ART use***. Three studies used self-report of a single question (“are you currently on ART?”) to assess ART use at time of interview [60, 63, 67]. Two assessed current ART use via clinical data routinely collected in the HIV clinic [59, 65].

No individual studies found a statistically significant relationship between IPV and current ART use among women. Siemieniuk found that participants who experienced IPV were more likely to report ART non-use, but this association did not reach statistical significance ( $p=0.069$ ) [65]. Kalokhe found lower current ART use among 343 male and female cocaine users who had ever experienced IPV ( $p=0.001$ ), but this relation [60]. Ramachandran found that men and women reporting a history of IPV were less likely to be using ART (66%) than non-abused counterparts (93%,  $p=0.04$ ), but data were not available among women only [63]. Illangesekare found no significant association between experience of lifetime IPV and ART use in a sample of 196 HIV-infected women (risk ratio [RR]=0.73, 95% confidence interval [CI] 0.39–1.42) [59]. Blank found no significant relationship between lifetime IPV and ART use (RR=1.01, 95% CI 0.88–1.16) [67].

### ***ART adherence measured by Self-report***

Six studies included self-reported measures of ***ART adherence***. Two used the AIDS Clinical Trials Group Questionnaire, which measures good adherence as greater than 90% in the past 3-days and 30-days [61, 68]. Trimble used an adaptation of the Morisky Medication Adherence Scale [66], in which good adherence was defined as scores of 7 or higher. Participants in Malow’s study noted the percentage of time they took medicine as prescribed, with good adherence defined as 95% or greater [62]. Blank used the Case Adherence Index (CAI), dichotomized into poor adherence ( $\leq 10$ ) or good adherence ( $> 10$ ) [67]. Rose asked the patient’s physician to rate on a scale of 0-10 how adherent they believed the patient to be, with good adherence assessed as  $\geq 9$  [64].

Of the seven studies that assessed ART adherence using self-report, three found significant outcomes among women. Trimble found that mean adherence scores on the MMAS were significantly lower among women who reported IPV ( $M=5.49$ ,  $SD=2.06$ ) than among those without ( $M=6.57$ ,  $SD=1.57$ ,  $p<0.001$ ) [66]. Using a dichotomous outcome, this translated to lower odds of good adherence among women reporting IPV (OR=0.28, 95% CI 0.17-0.47). Rose found poorer adherence among women with IPV as measured by the continuous outcome of physician-reported scale ( $r=-0.38$ ,  $p<0.05$ ) [64]. As a dichotomous outcome, women with IPV

had lower odds of good adherence (OR=0.15, 95%CI 0.03-0.70). Blank et al. found self-reported adherence was significantly worse among women who reported IPV (RR=0.74, 95%CI 0.72–0.88) [67]. Lopez found that among women, “extreme IPV” (e.g. use of a weapon) was associated with decreased adherence as a continuous variable ( $r=-0.26$ ,  $p=0.026$ ) [61]. When using “any IPV” as the exposure of interest, Lopez did not find a significant difference (OR=0.45, 95%CI 0.15-1.29). Ryerson Espino did not find a significant association, with a similar proportion of women reporting good adherence with (36.1%) and without IPV (40.0%) [68]. Malow did not find a significant direct association between IPV and non-adherence, but when using structural equation modeling, did find that partner conflict led to depression, which in turn was related to non-adherence [62].

### ***ART adherence measured by Viral Load***

Seven studies assessed adherence using patient medical records of ***viral load suppression***. Dichotomized outcomes for viral load suppression used the clinically-relevant cut-off at the time of study: 500 copies/mL [65], 400 copies/mL [59] and 200 copies/mL [64, 67-70].

Of the seven studies measuring viral load suppression, three found a significant association with IPV. Siemieniuk found that women experiencing IPV were more likely to have viral loads greater than 500 copies/mL than IPV-negative counterparts ( $p=0.027$ ) [65]. Rose et al. also found a significant association, with the frequency of IPV related to increased HIV viral load ( $r=0.44$ ,  $p<0.01$ ) [64]. Espino found viral load suppression significantly lower among women reporting IPV (76.4%) than their counterparts (93.3%,  $X^2=4.01$   $p<0.05$ ) [68]. Illangesekare found no significant association between viral load of >400 copies/mL among those with IPV (59.6%) or without IPV (61.8%) [59]. Odds ratios reported in Blank, Schafer, and Sullivan were non-significant ((OR=1.05, 95%CI 0.65-1.70); (OR=1.14, 95%CI 0.42-3.07); (OR=0.72, 95%CI 0.47-1.10), respectively).

### ***Retention in HIV care***

Five studies measured ***retention in HIV care***. Blackstock and Blank defined retention by any self-reported HIV medical care in the past 6 months [67, 70]. Kalokhe used self-report and asked participants “In the past 12 months have you gone to a doctor or clinic for HIV care?” [60]. Siemieniuk used patient medical records and defined poor retention in care as ever having had an interruption in clinical care greater than 365 days [65]. Schafer classified patients as having a high clinic no show rate (NSR  $\geq 33\%$  missed visits) and low NSR ( $<33\%$  missed visits) [25]. Because these retention measures have important conceptual differences, they were deemed too heterogeneous to lend this outcome to meta-analysis.

Siemieniuk found that interruptions in clinical care were more common among women with a history of IPV (20.4% vs 11.9%,  $p=0.032$ ) [65]. Kalokhe found that IPV positive participants were more likely to be out of care in the past 12 months (29.4 vs 18.8%,  $p=0.01$ ) [60]. Neither Blackstock nor Blank found a significant relationship between IPV and any self-reported medical care in the past 6 months (OR=0.92 (0.68-1.24)) [67]. Schafer found no significant relationship between IPV and a high no show rate among women (OR=1.11 (0.27-4.60)) [25].

### ***Meta-analysis of engagement in care outcomes***

Meta-analysis suggests that IPV is associated significantly with lower odds of current ART use (Fig. 2; OR=0.79, 95%CI 0.64-0.97). However, since the extant literature shows heterogeneity ( $I^2=68.9\%$ ,  $p=0.012$ ), this finding should be interpreted cautiously.

The meta-analytical association suggests that IPV is associated with lower odds of self-reported adherence (Fig. 3; OR=0.48, 95% CI 0.30-0.75). Self-reported adherence also shows significant heterogeneity ( $I^2=56.0\%$ ,  $p=0.044$ ). To compare this outcome to other studies, the odds ratio was transformed into an effect size (standardized mean difference  $d=-0.404$ ).

There is a significant meta-analytic association between IPV and worsened viral load suppression (Fig. 4; OR=0.64, 95% CI 0.46-0.90), with acceptable level of agreement across studies ( $I^2=41.2\%$ ,  $p=0.116$ ).

All meta-analyses were visually inspected for potential publication bias through funnel plots and Egger's test for small-study effects. There was no evidence of publication bias for current ART use (Fig. S1;  $P=0.486$ ), self-reported adherence (Fig. S2;  $P=0.859$ ), or viral suppression (Fig. S3;  $P=0.176$ ).

## Discussion

Uptake and adherence to ART is a key pathway through which IPV may negatively influence HIV-related health of women globally. Meta-analysis suggests that IPV reduces the odds of ART adherence among women, a finding that is consistent when adherence is measured by self-report (OR=0.48, 95% CI 0.30-0.75) or viral load suppression (OR=0.64 95% CI 0.46-0.90). Adherence offers a potential explanation for why IPV has been linked to worsened clinical outcomes among HIV-positive women [25-28]. The meta-analytic effect size suggests that IPV exhibits a greater magnitude of association with ART adherence ( $d=-0.404$ ) than other conditions such as depression, substance use, stigma, financial constraints, or pill burden [72].

The causal pathway between IPV and engagement in HIV care and treatment is supported by related trauma literature. Mugavero *et al.* found that each additional episode of lifetime trauma was related to non-adherence even when controlling for depression, substance use, and race [73]. Cohen *et al.* found that a history of any type of physical or sexual abuse (including in childhood) increased the odds of women declining HAART when medically eligible [74]. These and other studies [73-80] were excluded from this systematic review because they analyzed IPV alongside other forms of violence (eg. childhood sexual abuse, non-partner violence). While such an approach may be useful conceptually, it will be crucial for future studies to prioritize clear and consistent measurement of IPV as a stand-alone construct.

The current evidence base on IPV and HIV care has several important gaps. Nearly all studies were conducted in the United States, limiting translation to other settings globally. This geographic skew, though consistent with broader IPV literature [81, 82], warrants urgent attention since both HIV and IPV prevalence are high in regions such as sub-Saharan Africa [83, 84]. The few sub-Saharan African studies that do examine IPV among HIV-positive patients draw from couples who jointly take part in research and may come from relationships that are distinct from 'normal' HIV-positive patients [85, 86].

Measures for retention in HIV care were too disparate to be analyzed systematically. This shortcoming is suggestive of weaknesses in conceptualization of HIV care retention, which continues to lack a 'gold standard' measurement method [87]. We also found a lack of harmonization regarding the measurement of IPV, with comprehensive, validated measures employed in only three studies [60, 61, 66]. Since behaviourally-specific assessment of IPV helps elucidate the connections between violence and health outcomes [88], future research should employ comprehensive measures of IPV [89].

Another gap relates to the clinical nature of responding to violence disclosure in the research setting. Only two authors detailed specific steps taken by clinicians when women disclosed IPV [25, 65]. This represents a significant oversight given the well-established guidance around how to conduct IPV research in a clinically meaningful and ethically responsible way [90, 91].

A final research gap is the extant focus on the ‘general population’ of HIV-positive patients. It is possible that the association between violence and HIV-related outcomes may be distinct among other special populations (eg. adolescents, pregnant women, men who have sex with men, sex workers) and these sub-groups deserve attention in future research.

### ***Limitations***

There are several limitations of the current systematic review that should inform interpretation of findings. We focused the systematic review on HIV-positive women, but such a conceptualization should be followed by future work to understand IPV towards HIV-positive men. Literature included [60, 61, 63] and excluded [92-95] from this review illustrates that HIV-positive men experience challenges to engagement in care on par or in excess to those of women.

Papers selected for final review have important limitations around comparability, given the variety of populations and sampling strategies used across the studies. There were no longitudinal studies included in this review, which suggests that meta-analytic findings can be viewed as a correlation but that IPV and engagement in care may not be causally related. Databases used may have inadvertently limited the search, although we attempted to compensate for this shortcoming by reviewing all citations included in the final set of full papers assessed (n=67). Interrater reliability was not formally assessed with regards to the selection of articles, but a third colleague was consulted to review any discrepancies in the inclusion/exclusion process.

### ***Conclusion***

In order to ensure HIV-related health among women, it is essential to address conditions that impact their ability to uptake and stay engaged in care and treatment. IPV is one such condition, and its association with declines in ART adherence requires urgent attention. Policy makers and programmers are beginning to recognize the central role that violence plays in the lives of women living with HIV [96, 97]. Yet, despite calls for violence screening and intervention within HIV care and treatment programs, few HIV clinics have IPV-specific protocols in place [98]. HIV care and treatment programs can draw upon existing guidelines for screening and responding to IPV in the health sector [91, 99], or can look to a growing number of specialist programs that address IPV alongside HIV [100-103]. To ensure that women benefit from medical advances, future studies should develop and test interventions to address IPV within HIV clinical care.

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AMH, JMT, NC, and HS conceived of and designed the systematic review. AMH, EMS, and HS reviewed abstracts and full papers. AMH and EMS abstracted the data. AMH performed meta-analysis. AMH, EMS, JMT, NC, and HS revised the manuscript. All authors contributed to interpretation of results and the final version of the manuscript.

**Conflicts of interest**

We declare no conflicts of interest.

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Table 1. Characteristics of included papers (n=13)

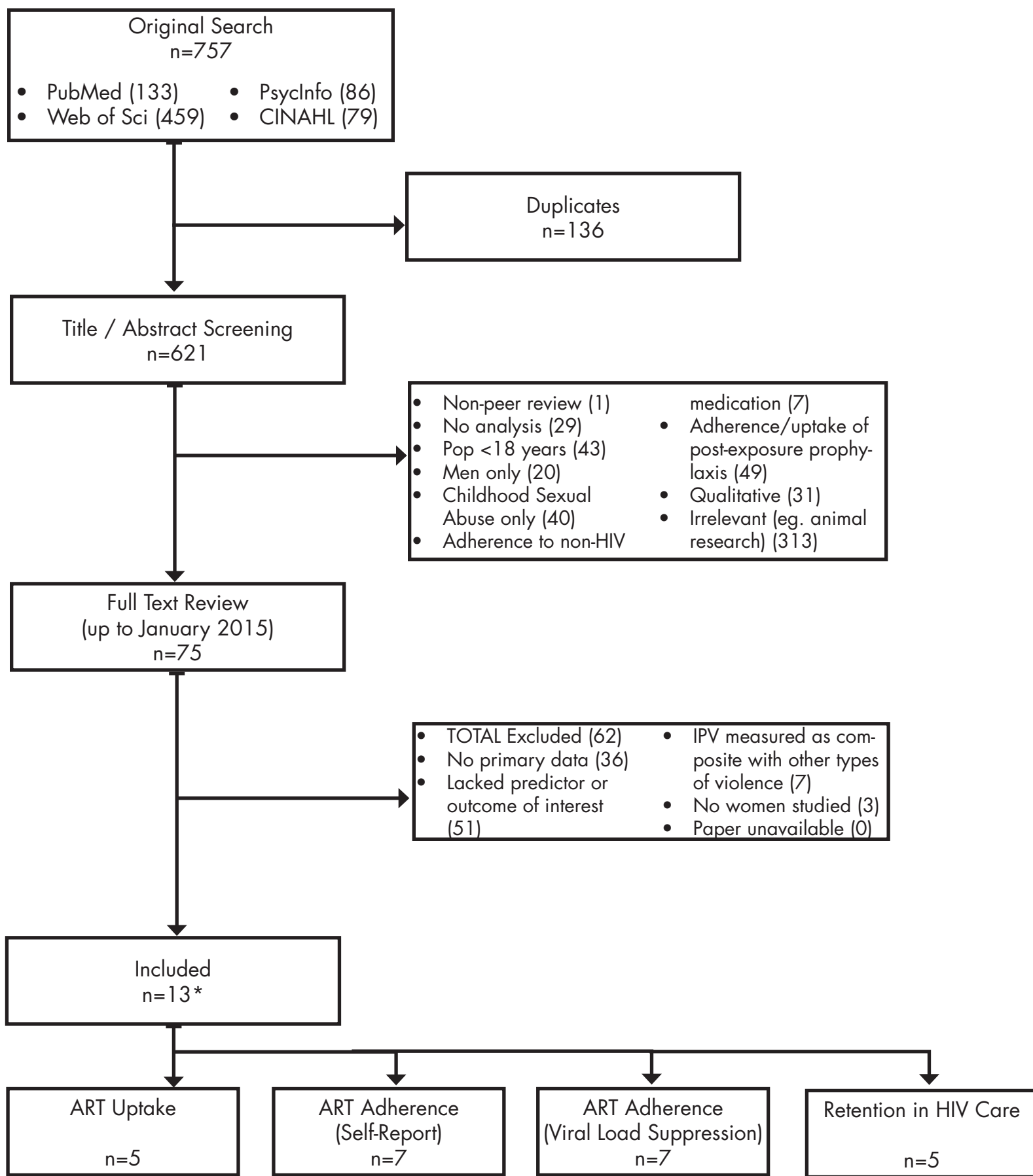
Author	Year	Sample size (women)	Population group	Type of study	Violence Measure	Outcome of interest	Country	CASP Quality Appraisal	Type of IPV Measure
Blackstock	2015	748	Women only	Cross-sectional	10 item Women's Experience of Battering (WEB) Scale	Retention (medical records)	United States	20	Ever, Physical and Psychological
Blank*	2015	587	Women only	Cross-sectional	10 item (WEB) Scale	Uptake (medical records), Adherence (self-report and viral suppression), Retention (medical records)	United States	20	Ever, Physical and Psychological
Illangasekare	2012	196	Women only	Cross-sectional	3 items from the Partner Violence Screen	Uptake (medical records), Adherence (viral suppression)	United States	16	Past 12 months, Asked at 1 timepoint, Physical, Psychological
Kalokhe*	2012	175	Women & Men (Crack/cocaine users, total 343)	Cross-sectional	5 items from the Slapped, Threatened, and Throw (STaT) instrument	Uptake (self-report), Retention (medical records)	United States	18	Ever, Physical, Sexual, Psychological
Lopez*	2010	94	Women & Men (total 190)	Cross-sectional	17 item Conflict Tactics Scale	Adherence (self-report)	United States	20	Ever, Past 12 months, Physical, Sexual, Psychological
Malow*	2013	166	Women & Men (total 194)	Cross-sectional	4 items from (unnamed) partner relationship scale	Adherence (self-report)	Haiti	20	Ever, Physical, Psychological

Ramachandran	2010	18	Women & Men (total 56)	Cross-sectional	3 items of Abuse Assessment Screen	Uptake (self-report)	United States	14	Ever, Past 5 months, Physical, Sexual, Psychological
Rose*	2010	40	Women only	Cross-sectional	1 item from Traumatic Life Events Questionnaire	Adherence (self-report and viral suppression)	United States	15	Ever, Physical
Ryerson Espino*	2015	102	Women only	Cross-sectional	10 item (WEB) Scale plus 6 additional items on forced sex and fear	Adherence (viral suppression)	United States	22	Ever, Past 12 months, Asked at multiple timepoints, Physical, Sexual, Psychological
Schafer	2012	64	Women only	Cross-sectional	46 item Severity of Violence Against Women Scale (SVAWS) instrument and 10 item WEB Scale	Adherence (viral suppression), Retention (medical records)	United States	20	Ever, Physical, Sexual, Psychological
Siemieniuk	2013	339	Women only	Cross-sectional	Rich single-item screening question, assessed by interviewer as physical abuse,sexual abuse, emotional abuse, isolation, neglect, intimidation, and/or financial abuse	Uptake (medical records), Adherence (viral suppression), Retention (medical records)	United States	22	Ever, Physical, Sexual, Psychological
Sullivan*	2015	564	Women only	Cross-sectional	10 item WEB Scale	Adherence (viral suppression)	United States	22	Ever, Physical, Psychological
Trimble	2013	272	Women only	Cross-sectional	46 item SVAWS instrument	Adherence (self-report)	United States	21	Past 12 months, Physical, Sexual

\* Authors contacted for raw data on outcomes of interest.



Figure 1 Flowchart of primary study selection



\* 5 studies examined more than one outcome

Figure 2 Meta-analysis of the association between IPV and current ART Use

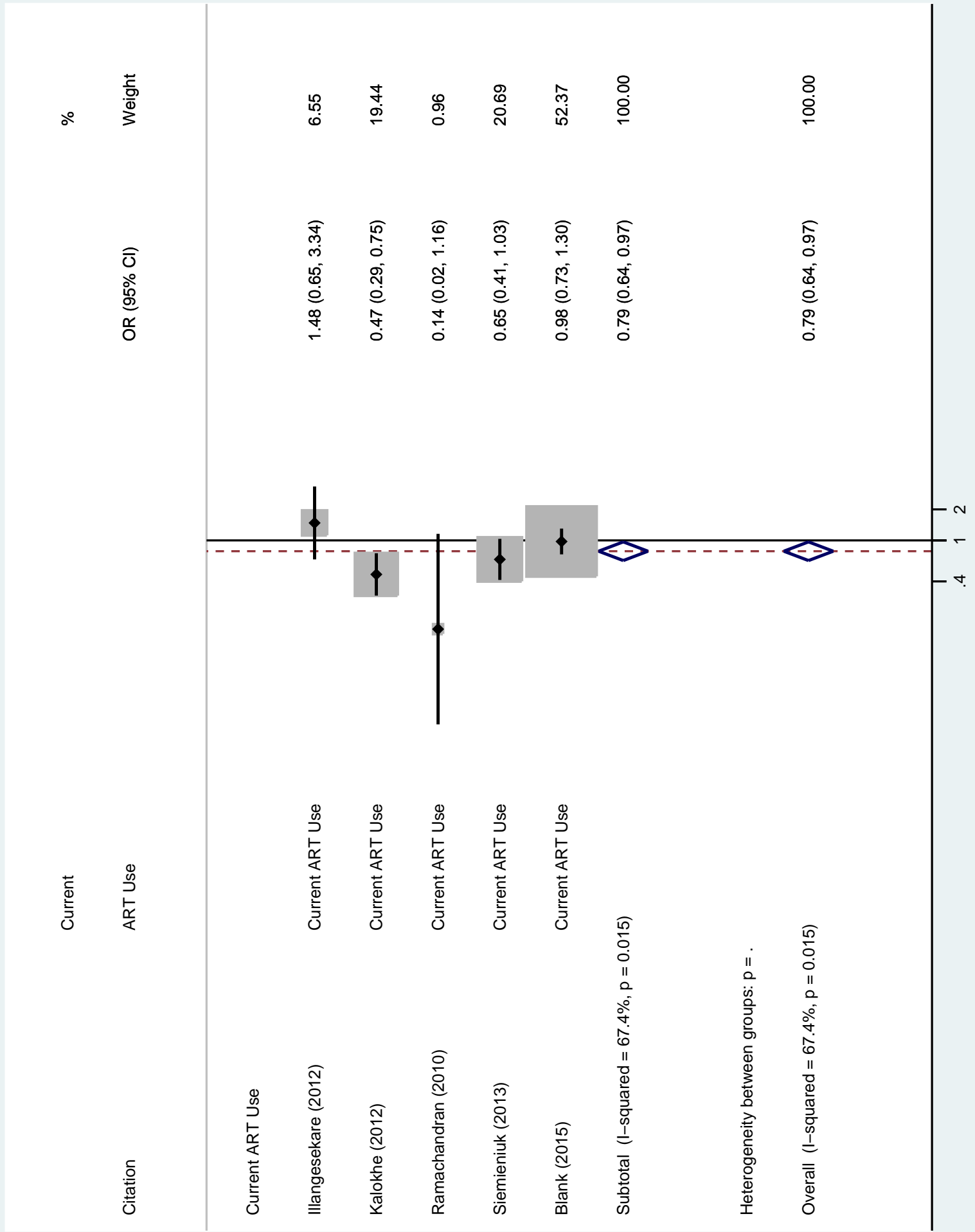


Figure 3 Meta-analysis of the association between IPV and self-reported ART adherence

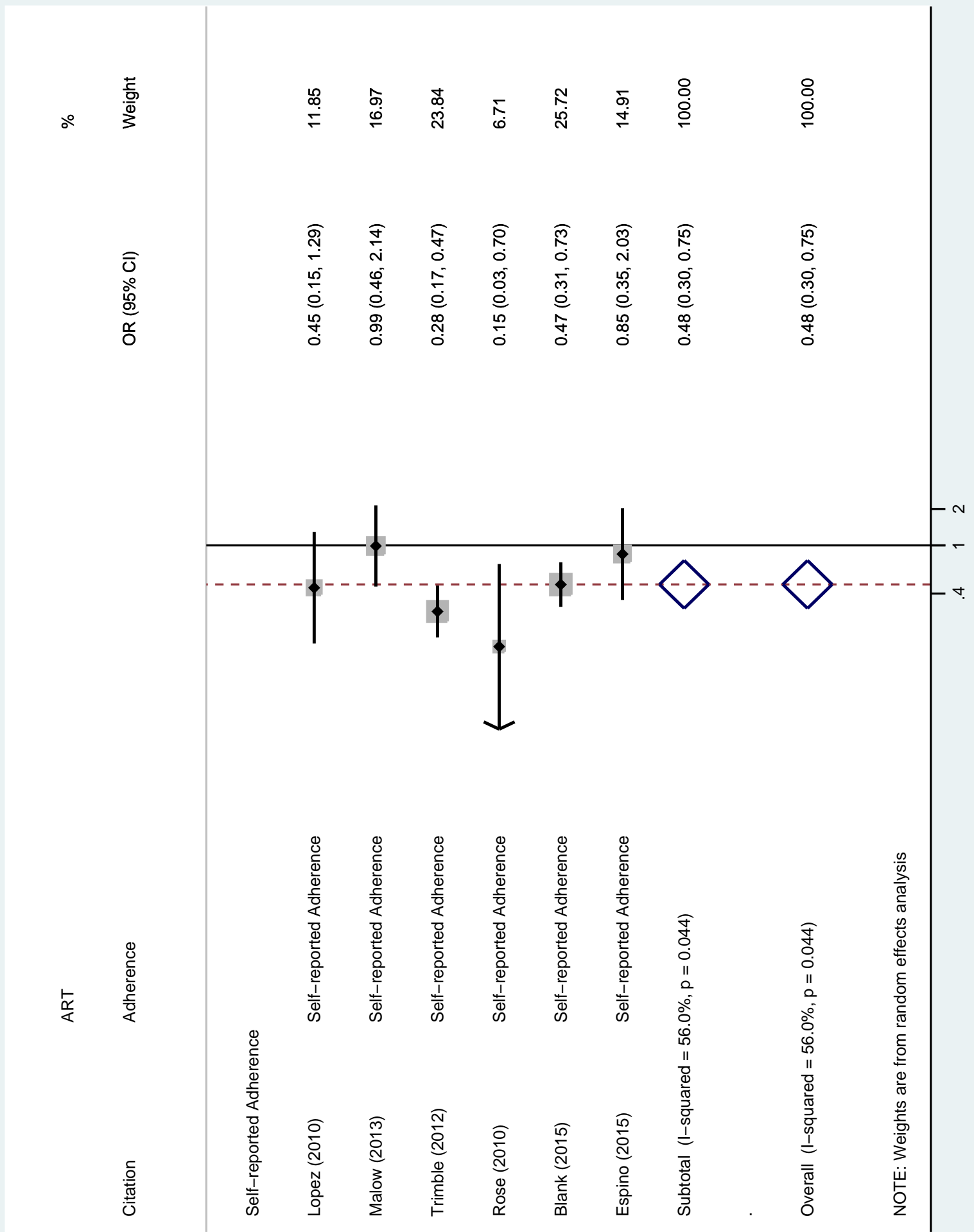
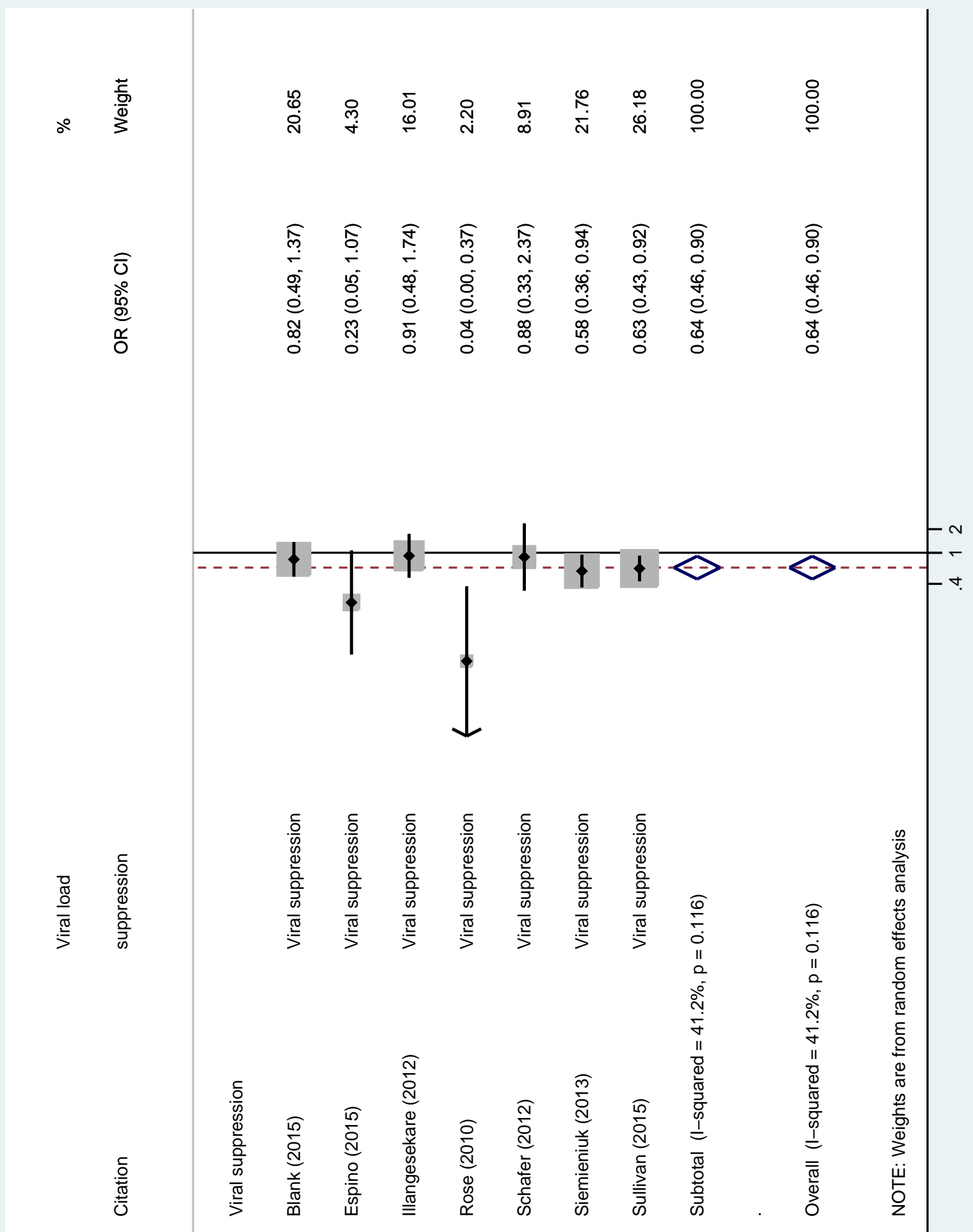


Figure 4 Meta-analysis of the association between IPV and viral load suppression



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Figure S1 Funnel plot of current ART use studies

[Click here to download Supplemental Data File \(.doc, .tif, pdf, etc.\): Fig S1 ART use funnel.eps](#)

Figure S2 Funnel plot of self-reported ART adherence studies

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Figure S3 Funnel plot of viral suppression studies

[Click here to download Supplemental Data File \(.doc, .tif, pdf, etc.\): Fig S3 Viral load funnel.eps](#)

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