

# Incidence and Predictors of Loss to Follow-Up Among Pregnant and Lactating Mothers Living with HIV and Enrolled in HIV Care Clinic in Ethiopia: A Systematic Review and Meta-Analysis

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## Research

**Keywords:** Loss to Follow-Up, Pregnant and Lactating Mothers, a Systematic Review and Meta-analysis

**Posted Date:** July 27th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-721419/v1>

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# Abstract

## Background

Mother-to-Child Transmission of HIV accounts for more than 90% of all pediatric HIV infections. Ethiopia has recently adopted lifelong antiretroviral therapy (ART) for all HIV-positive pregnant and breastfeeding women (Option B+ strategy), regardless of CD4 count or clinical stage. Therefore, the aim of this systematic review and meta-analysis was to estimate the pooled incidence and predictors of loss to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia.

## Method

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline was followed. All observational published studies were retrieved using relevant search terms in PubMed, Google Scholar, Cochrane Library, Scopus, African Journals Online, CINAHL, and Ethiopian's university research repository online library. STATA 11 software was used to analyze the data. The Cochrane Q and I<sup>2</sup> tests were used to assess the heterogeneity of studies. The pooled estimated prevalence and odds ratios with 95% confidence intervals were computed by a random-effects model.

**Result:** The pooled magnitude of loss to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia was 14.28% (95%CI: 10.12-18.44). Poor/fair antiretroviral treatment adherence (Adjusted odds ratio (AOR) = 3.68; 95% CI: 2.89–4.69), who does not know their CD4 level (AOR = 3.68; 95% CI: 2.40–5.63), disclosure of HIV status to partner (AOR = 2.69; 95% CI: 2.08–3.48), experienced drug side effect (AOR =7.91; 95% CI: 2.94–21.33), residing in the rural area (AOR =2.66; 95% CI: 2.34–3.03), and no education (AOR =4.28; 95% CI: 3.62–5.00) were the significant predictors of loss to follow up.

## Conclusion

The magnitude of loss to follow-up among pregnant and lactating mothers was high in Ethiopia. Thus, counseling, strengthening the linkage and referral system, establishing appropriate tracing mechanisms, and determining CD4 level is crucial to decrease loss to follow-up among pregnant and lactating mothers living with HIV.

## Background

Worldwide, in 2017, the number of new pediatric HIV infections was reduced from 270,000 in 2009 to 160,000, and more than 90% of these children were infected through mother-to-child transmission (MTCT). Without any intervention, the risk of MTCT is 15–30% during pregnancy and delivery, and 5–20% during breastfeeding contributing for an overall transmission rate of 20–45% [1]. The use of combined antiretroviral therapy (ART) and elective caesarean section has reduced MTCT rates to less

than 2% in non-breastfeeding populations. Among breastfeeding populations, studies have demonstrated that timely antiretroviral therapy (ART) can reduce Mother To Child Transmission (MTCT) of HIV to 5% or less [2, 3].

The World Health Organization (WHO) guideline on ART recommends three options to prevent MTCT transmission of HIV infection; Options A, B, and B+. The latest approach, Option B+ PMTCT program, emphasizes the provision of universal, lifelong ART for all HIV-infected women regardless of CD4 count and WHO clinical staging [4]. Moreover, the WHO developed guidelines recommending a 'treat-all' approach, meaning all people diagnosed with HIV should be offered immediate treatment. This has increased the number of women of reproductive age who are receiving ART, regardless of whether they are pregnant or not[4]. However, poor uptake of Prevention of Mother-to-Child Transmission (PMTCT) of HIV services, Loss to Follow-Up (LTFU), and poor adherence to drugs are still a major challenge to achieving virtual elimination of MTCT of HIV especially in Sub-Saharan Africa[4]. Reducing LTFU among mothers initiated on lifelong ART for PMTCT is therefore a crucial step towards the elimination of MTCT of HIV.

The literature shows that high attrition within PMTCT programs could be more of LTFU than of mortality. Cumulative losses in sub-Saharan African PMTCT programs are estimated to range from 20–28% during antenatal care, up to 70% at four months postpartum, and close to 81% at six months after birth[5, 6].

Many countries are moving towards national coverage of services for PMTCT; however, most children born to women with HIV are not being systematically monitored and followed up during the postpartum period and are thus missing out on life-saving services. The follow-up of known HIV exposed children is not only necessary to identify infants with HIV and to ensure the timely initiation of treatment and care, but to also avoid postpartum HIV transmission and improve overall infant health outcomes. The process of ensuring that all exposed infants and children suspected of being infected with HIV receive an HIV test, and if infected, receive care and treatment, provides an important opportunity for health systems to deliver comprehensive interventions for women and children [7].

One study showed that infants and children starting on antiretroviral therapy (ART) when they were already severely immunodeficient, never regained normal levels of immune functioning even after five years of treatment[8]. Another study showed that such infants and children are more likely to die than those children who received treatment at an earlier stage[9]. Very few children under the age of one are currently being diagnosed and subsequently receiving treatment.

The PMTCT service also ensures the administration of short-course antiretroviral treatment to those identified as HIV positive and their exposed infants [10], provision of continuous posttest counseling and support for exclusive breastfeeding for 6 months, continuous follow-up of mother-child pairs through routine health services including the provision of cotrimoxazole prophylaxis for opportunistic infections for mother and baby [11], and referral to community-based psychosocial support and home-based care services [12]. The United Nations launched the global plan towards the elimination of new HIV infections

among children by 2015 and keeping their mothers alive. The plan focuses on reaching pregnant women living with HIV and their children from the time of pregnancy until the mothers stop breastfeeding [13].

Follow-up of PMTCT is a key factor in realizing this goal since it ensures retention of PMTCT clients and adherence to PMTCT interventions. The quality and effectiveness of PMTCT services should be assessed on the basis of the number of mother-child pairs who are receiving consistent follow-up and antiretroviral treatment, and the number of confirmed HIV negative children born to HIV positive women [14].

In Ethiopia, the Option B+ program was implemented since 2013 as part of its national policy for preventing new HIV infections among children and to improve maternal survival [15]. Under Option B+, all HIV-infected pregnant women will receive universal ART and will continue the treatment for the rest of their life[16], and have the advantages of simplification of ART protection against MTCT in future pregnancies, continuing the prevention benefits against sexual transmission to serodiscordant partners, avoiding “stop start-stop” approach of antiretroviral drugs, and minimize the opportunity of LTFU [17].

Before the implementation of the Option B+ PMTCT program, Ethiopia is one of the top 20 countries, where one child infected with HIV out of three children born to women living with HIV. The proportion of pregnant women living with HIV who received antiretroviral medicines for the prevention of mother-to-child transmission has increased from a baseline of 37% in 2009 to 77% in 2014 and increased to 80% in 2017, an estimated 1.4 million infectious among children age 0–14 years was decreased from 2010 to 2017 [18, 19]. This indicates a major success for the Option B+ strategy, and how it enables pregnant women to get antiretroviral therapy.

However, loss to Follow-Up (LTFU), poor adherence to drugs, and poor uptake of prevention of Mother-to-Child Transmission (PMTCT) of HIV services are still a major challenge for the successful implementation of the Option B+ program in Ethiopia, where the prevalence of HIV is high particularly among reproductive age populations[20, 21].

Moreover, LTFU with the Option B+ decreases women’s access to HIV care and treatment, which leads to the advanced stage of HIV, facilitates the vertical transmission of HIV to the newborn, increases maternal HIV/AIDS-related morbidity and mortality, and facilitates the development of drug resistance[20, 22]. Even though the Option B+ program has been implemented for the last 7 years, there are no studies and/or documented reports on the incidence of LTFU, and its predictors among pregnant and lactating women on lifelong ART in Ethiopia. Therefore, the aim of this systematic review and meta-analysis was to estimate the pooled prevalence and predictors of loss to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia and associated factors.

## Methods

This systematic review and meta-analysis were conducted to estimate the pooled prevalence and predictors of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV

care clinics in Ethiopia and associated factors. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist guideline[23] (Additional file 1).

### Search strategy

First, the PROSPERO database and database of abstracts of reviews of effects (DARE) (<http://www.library.UCSF.edu>) were searched to check whether published or ongoing projects exist related to the topic. International Online databases PubMed, EMBASE, Science Direct Cochrane library, HINARI, Google Scholar, CINHALL, SCOPUS, African Journals, and WHO's Global Health Library were used. Different MeSH terms and search engines included "loss to follow-up" OR "PMTCT" OR "loss to follow-up during pregnancy" OR "option B+ discontinuation," OR "PMTCT service dropout," AND "among postpartum women living with HIV/AIDS," OR "among pregnant women living with HIV/AIDS" or "among breastfeeding mothers living with HIV/AIDS" AND related in Ethiopia. Searching terms were based on adapted PICO principles to search through the above-listed databases to access the relevant articles. For unpublished studies, the official website of Ethiopian's University research repository online library (University of Gondar and Addis Ababa University) were used.

### Inclusion and exclusion criteria

#### Inclusion criteria

Studies will be included if they fulfill the following eligibility criteria:

- Study designs: All comparative epidemiological studies (cross-sectional, case-control & cohort)
- Study settings: studies conducted in Ethiopia
- Participants: pregnant and/or breastfeeding women living with HIV
- Outcome Measures: loss to follow-up HIV care/Option B<sup>+</sup>/ PMTCT services and determinant factors
- Publication Status: All published and unpublished studies
- Data were published: All dates
- Language of Articles: English language only

#### Exclusion Criteria

- Studies available only as abstract with unclear outcomes, commentaries, editorials, and reviews were excluded. Additionally, qualitative studies and studies conducted in non-English languages will be excluded.

#### Quality assessment

After collecting the findings from all databases, the articles were exported to a Microsoft Excel spreadsheet. The authors (AAA) independently extracted the data, reviewing the screened and eligible articles. The methodological quality of each study (sampling strategy, response rate, and

representativeness of the study), comparability, and outcome were checked using the NOS tool. Newcastle-Ottawa Quality Assessment Scale (NOS) for cross-sectional cohort case-control studies was used to assess the methodological quality of a study, and to determine the extent to which a study has addressed the possibility of bias in its design, conduct and analysis. All included articles scored (NOS) 7 and more can be considered as “good” studies with low risk.

#### Operational definition

- Loss To Follow Up: women who started a lifelong ART and were not seen within 3 months of the last documented visit under Option B+ PMTCT, and not recorded as 'dead' or 'transferred-out' on patient PMTCT logbook or medical cards [24-26].
- Lifelong ART: this is an approach recommended by the World Health Organization to prevent mother-to-child HIV transmission in which all HIV-positive pregnant and lactating women are initiated on antiretroviral therapy (ART) for life regardless of CD4 count or the World Health Organization staging.

## Data extraction

Microsoft Excel (2016), and Stata version 11.0 (Stata Corporation, College Station, Texas, USA) software were used for data entry and analysis, respectively. During data extraction; the name of the author, sample size, publication year, study design, prevalence, response rate, population outcome, study site, and different contributing factors were included. Moreover, the incidence of loss to follow-up among pregnant and lactating women with 95%CI and associated factors were collected.

#### Statistical analysis

To obtain the pooled incidence of loss to follow-up among pregnant and lactating women, a meta-analysis using the random effects DerSimonian and Laird model was performed due to anticipated heterogeneity[27]. Cochran's Q chi-square statistics and  $I^2$  statistical test was conducted to assess the random variations between primary studies[28]. In this study, heterogeneity was interpreted as  $I^2$  value of 0% = no heterogeneity, 25% = low, 50% = moderate, and 75% = high[29]. In the case of high heterogeneity, subgroup analysis and sensitivity analyses were run to identify possible moderators of this heterogeneity. Potential publication bias was assessed by visually inspecting funnel plots and objectively using the Egger bias test[30]. To account for any publication bias, we used the trim-and-fill method, based on the assumption that the effect sizes of the studies are normally distributed around the center of a funnel plot. The meta-analysis was performed using the Stata version 11.0 (Stata Corporation, College Station, Texas, USA) software. Finally, for all analyses,  $P < 0.05$  was considered statistically significant.

## Result

### Characteristics of the included studies

Studies of 434 were retrieved from PubMed, Scopus, HINARI, Google Scholar, African Journals, WHO's Global Health Library, and other gray and online repositories accessing articles regarding the prevalence and determinant factors of cervical cancer screening in Ethiopia. After duplicates were expunged, 268 studies remained. Out of the remaining articles, 106 articles were excluded after review of their abstracts and titles. Therefore, 62 full-text articles were assessed and assessed for inclusion criteria, which resulted in the further exclusion of 54 articles primarily due to inaccessibility of full text and outcome of interest were not reported. As a result, 8 studies were met the inclusion criteria to undergo the final systematic review and meta-analysis (Fig. 1).

### Study characteristics

Different factors such as poor/fair antiretroviral treatment adherence, knowing baseline CD4 level, disclosure of HIV status to partners, experienced drug side effects, residing in rural areas, and educational level were included in this study. Eight studies with a total of 5,854 study participants were included in this review. All included articles were facility-based study settings. Regarding the study area, four of the studies were conducted in Amhara region, three in Oromia, and one in Tigray region (Table 1).

### The Magnitude of loss to follow-up in HIV care

The pooled magnitude of loss to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia is presented with a forest plot (Fig. 2). Therefore, the national estimated magnitude of loss to follow-up in Ethiopia was 14.28% (95% CI: 10.12–18.44,  $I^2 = 91.9\%$ ,  $P < 0.001$ ).

### Publication bias

The funnel plot was assessed for asymmetry distribution of prevalence of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia by visual inspection (Fig. 3). Egger's regression test showed a P value of 0.869 with no evidence of publication bias.

### Sensitivity analysis

This systematic review and meta-analysis showed that the point estimate of its omitted analysis lies within the confidence interval of the combined analysis. Therefore, the trim-and-fill analysis was not further computed (Fig. 4).

### Subgroup analysis

Subgroup analysis was employed with evidence of heterogeneity. In this study, the Cochrane  $I^2$  statistic was 91.9%,  $P < 0.001$ , which showed evidence of marked heterogeneity. Therefore, subgroup analysis was done using the study region and sample size. As a result, the prevalence of loss to follow-up among

pregnant and lactating mothers living with HIV and enrolled in HIV care clinics was highest in Amhara 14.8%, whereas 14.48% in the study conducted with a sample size > 334(Figs. 5 and 6).

#### Determinants of lost to follow-up in Ethiopia

##### Relationship between women's educational level and lost to follow-up

The risk of LTFU among women who had no education was 4.28 times (OR = 4.28, 95% CI: 3.62–5.00) higher than women who had secondary and above education level. In this meta-analysis, the included studies were characterized by the existence of no heterogeneity ( $I^2 = 0.0\%$ ,  $P = 0.826$ ) (Fig. 7).

##### Relationship between women's residency and lost to follow-up

Likewise, the loss to follow-up among women who were residing in rural areas was 2.66 times higher than women who were residing in urban areas (OR = 2.66, 95% C: 2.34–3.03). The included studies were characterized by the existence of no heterogeneity ( $I^2 = 0.0\%$ ,  $P = 0.503$ ) (Fig. 8).

##### Relationship between experienced drug side effects and lost to follow-up

The loss to follow-up among women who experienced antiretroviral drug side effects was 7.91 times higher than women who don't experience antiretroviral drug side effects (OR = 7.91, 95% CI: 2.94–21.33). The included studies were characterized by the existence of high heterogeneity ( $I^2 = 96.4\%$ ,  $P < 0.001$ ) (Fig. 9).

##### Relationship between disclosure of HIV status to partners and lost to follow-up

The risk of loss to follow-up among women who did not disclose their status to their sexual partners was 2.69 times higher than women's disclose their status (OR = 2.69, 95% CI: 2.08–3.48). In this Meta-analysis and systematic review, the included studies were characterized by the existence of high heterogeneity ( $I^2 = 94.8\%$ ,  $P < 0.001$ ) (Fig. 10).

##### Relationship between poor treatment adherences and lost to follow-up

The risk of loss to follow-up among pregnant and lactating women who were on ART and had Poor/fair antiretroviral treatment adherence was 2.69 times higher than women who had good adherence (OR = 3.68; 95% CI: 2.89–4.69). In this Meta-analysis and systematic review, the included studies were characterized by the existence of moderate heterogeneity ( $I^2 = 77.4\%$ ,  $P = 0.012$ ) (Fig. 11).

##### Relationship between knowing baseline CD4 level and lost to follow-up

The risk of loss to follow-up among women who do not know their baseline CD4 level was 3.68 times higher than women who know their status (OR = 3.68; 95% CI: 2.40–5.63). In this Meta-analysis and systematic review, the included studies were characterized by the existence of high heterogeneity ( $I^2 = 97.5\%$ ,  $P < 0.001$ ) (Fig. 12).



## Discussion

The risk of MTCT is 15–30% during pregnancy and delivery, and 5–20% during breastfeeding, contributing to an overall transmission rate of 20–45%[38]. The World Health Organization (WHO) guideline on ART recommends three options to prevent MTCT transmission of HIV infection—Options A, B, and B+. The latest approach, Option B+ PMTCT program, emphasizes on the provision of universal, lifelong ART for all HIV-infected women regardless of CD4 count and the WHO clinical staging [39]. Moreover, WHO developed guidelines recommending a ‘treat-all’ approach, meaning all people diagnosed with HIV should be offered immediate treatment. This has increased the number of women of pregnant and lactating mothers for their life, for their infants in the womb and newborns[40].

In this review, eight studies comprising a total of 5,854 participants were analyzed to estimate the best available evidence for the prevalence and factors associated with loss to follow-up among pregnant and lactating mothers living with HIV and enrolled in the HIV care clinics in Ethiopia. Accordingly, the pooled prevalence of loss to follow-up among pregnant and enrolled in HIV care clinics in Ethiopia was 14.28% (95% CI: 10.12–18.44). The result is lower than the study findings in rural Uganda 37% [41], Kenya [42] 31.5%, and Malawi [43] 19%. The possible reason might be Ethiopia has been implementing the Option B+ approach as a part of its national policy for preventing new HIV infection of newborns and to improve maternal health. Moreover, all pregnant and lactating women receive universal ART throughout their life which avoids a stop-start-stop approach of antiretroviral drugs and minimizes the opportunity of loss to follow-up[42]. However, the result is higher than studies conducted in Papua, New Guinea[44] 10.2%, and England[45] 12.5%. The possible reason for this variation could be due to differences in the socio-demographic and economic status of the study participants as well as the countries’ health policy variations like the institutional framework to promote ART adherence, which could have largely succeeded in implementing successful programs to loss to follow-up.

The study also identified different predictors of loss to follow-up from the program among pregnant and lactating mothers. This research revealed that women’s level of education is an implication in loss to follow-up of HIV care. The risk of loss to follow-up among pregnant and lactating mothers with no education was higher than women who had attended secondary and above education. The result is consistent with previous studies of systematic reviews in low and middle-income countries (LMICs)[46], and Uganda [42]. The possible reason might be each additional year in school increases the likelihood of retaining the program. Apparently, higher education levels contribute to better health literacy, self-care and greater access to information about the program.

Women experienced antiretroviral drug side effects were another determinant factor for loss to follow-up. Losses to follow-up among women who experienced antiretroviral drug side effects were higher than a woman who doesn’t experience antiretroviral drug side effects. The result is in line with studies in Malawi[47], and Nigeria[48].

Moreover, consistent with findings in Tanzania[25], Uganda [46], and Malawi[46], the risk of LTFU among women residing in rural was higher as compared to women residing in urban. This might be explained as the distance from home to hospital, particularly in rural areas where women cannot easily get transport services due to physical barriers, forces women to walk long distances, may force them to miss appointments leading to poor adherence to ART.

In the current study, the loss to follow-up among pregnant and lactating women who were on ART and had poor/fair antiretroviral treatment adherence was higher than women who had good adherence. This finding was consistent with the findings of studies conducted in Malawi [49], among pregnant, poor adherence affects the level of follow-up due to fail to follow as per schedule.

The risk of loss to follow-up among women who do not know their baseline CD4 level was higher than women who know their CD4 status. This was consistent with studies conducted in South Africa[50] and Tanzania[51]. This might be related to the feeling of healthiness, fear of side effects of ART treatment, afraid to disclose their HIV status, stigma, and discrimination related to the disease.

HIV disclosure status is the other predictor of loss to follow-up. The risk of loss to follow-up among women who did not disclose their status to their sexual partners was higher than women who disclose their status. The result is supported by studies done in Uganda [52], Indonesia [53], Sub-Saharan Africa [54], and Tanzania[46]. This might be related to the stigma associated with the disease, fear of negative consequences from their partners, and perceiving to preserve family stability.

## **Conclusion**

The magnitude of loss to follow-up among pregnant and lactating mothers was high in Ethiopia. Rural residency, being uneducated, not disclosing their HIV status, not knowing the baseline CD4 count, experienced ART drug side effects, and poor/fair level of ART adherence were significantly associated with LTFU.

Thus, to decrease LTFU, it is better to integrate preventive health education not only for pregnant women and their partners but also for the general public. This will help to raise awareness and openness in discussing HIV infection and PMTCT interventions and to lessen the stigma and fear surrounding HIV infection. Provision of continuous training for PMTCT providers and community workers is also needed to ensure quality services in PMTCT programs including CD4 count determining and managing drug side effects. Lack of HIV results from disclosure to male partners by HIV-positive pregnant and lactating mothers compounded by low male partner involvement in PMTCT programs is bringing about an increase in loss to follow-up in PMTCT programs and strategies such as extending clinic hours to accommodate men and incorporating them in PMTCT is crucial.

## **Abbreviations**

AIDS: Acquired Immuno-deficiency syndrome

ART: Antiretroviral therapy

HIV: Human immunodeficiency virus

LTFU: Loss to follow-up

MTCT: Mother-to-Child Transmission

PMTCT: Prevention of Mother-to-Child Transmission

## Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contributions

This research was conducted, analyzed, and approved by Asteray Assmie Ayenew

Competing interests

The author declared that I have no financial and nonfinancial competing interests

Funding

No funding was obtained for this study

Acknowledgment

Not Applicable

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## Tables

Table 1; Descriptive summary of studies included in this systematic review and meta-analysis.

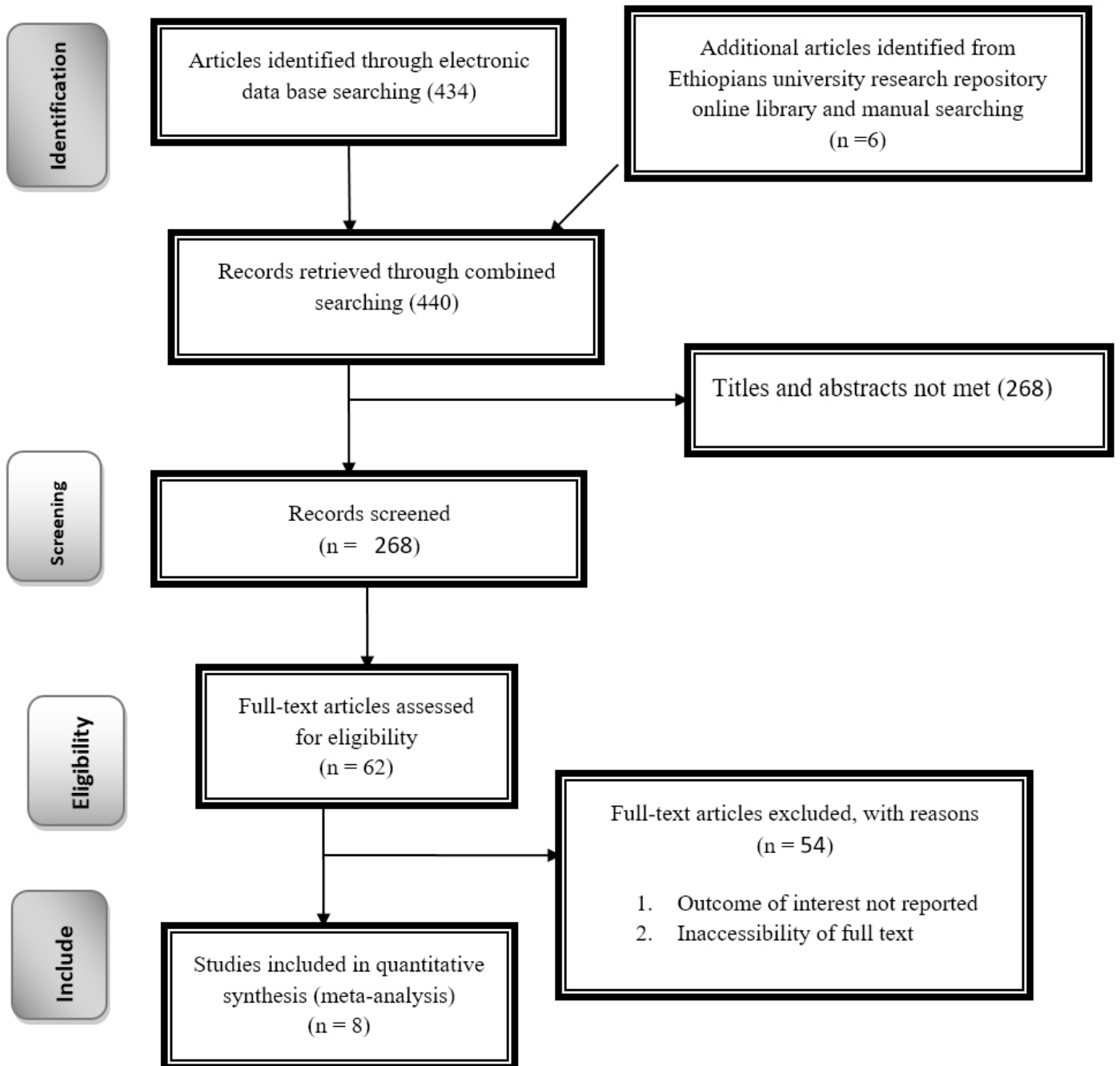
Author(year of study)	study design(setting)	Sample Size	Study region	Prevalence (%)	NOS quality score
Tolossa T.et al(2020)[21]	a retrospective follow-up study	393	Oromia	15.4	9
Israel M. et al (2016) [31]	a retrospective cohort study	418	Amhara	16.5	9
Yeshalem A.et al(2020)[32]	Institutional-based cross-sectional	190	Amhara	18.9	8
Dereje B.et al(2018) [33]	prospective cohort study	334	Oromia	18.2	9
Melkamu M.et al (2020)[34]	retrospective follow-up study	416	Amhara	6.8	8
Tolosa E.et al(2019) [1]	retrospective follow-up study	248	Oromo	4.2	8
Haftom E.et al(2015) [35]	Cross– sectional study	277	Tigray	13	9
Wondimu F.et al (2020)[36]	Cross–sectional study	347	Amhara	19.8	9
<b>Mihratu T.</b> et al(2018)[37]	Cross –sectional study	304	Oromo	17.4	9

## Supplementary

Additional File 1 is not available with this version

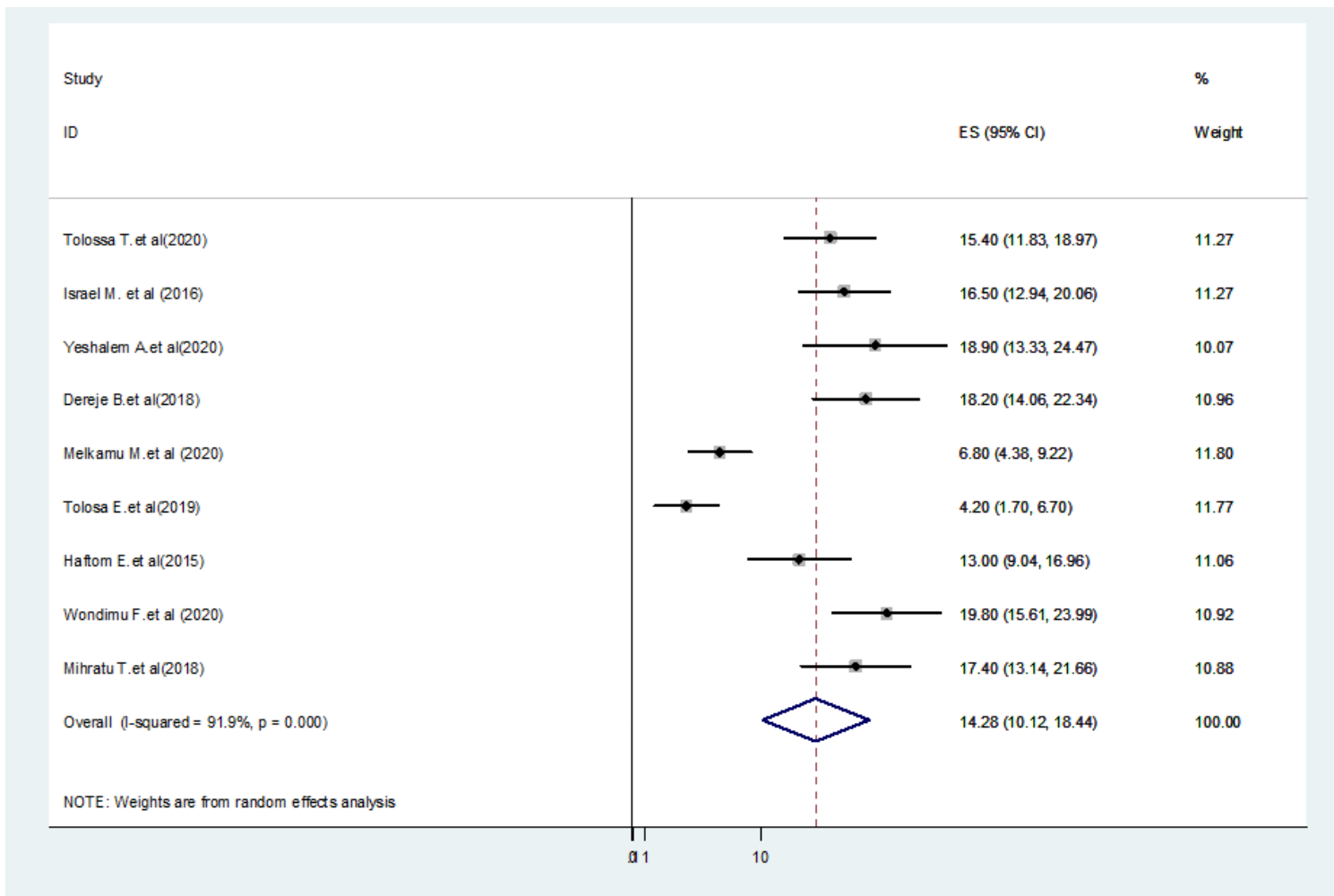
## Figures





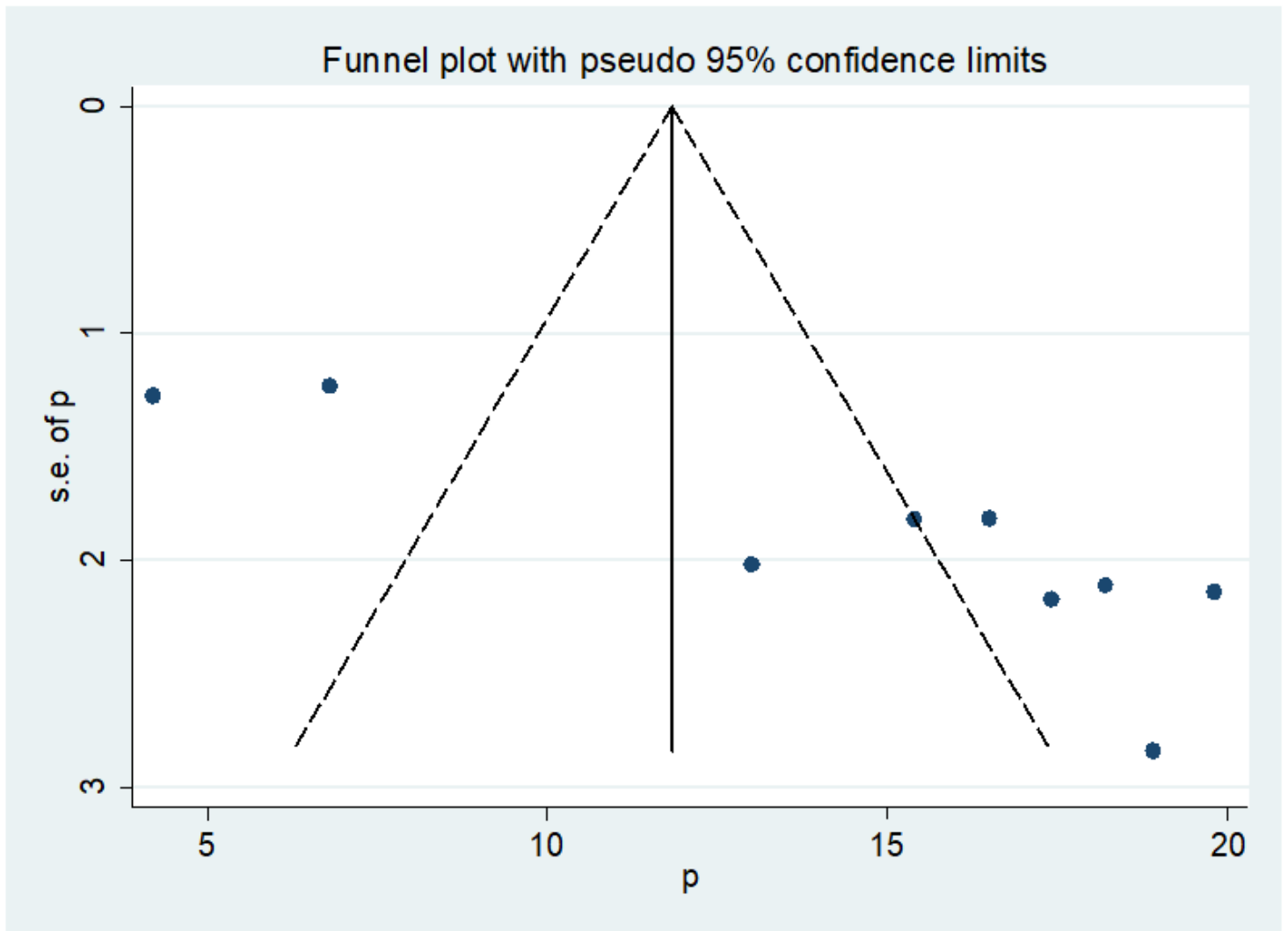
**Figure 1**

PRISMA Flow diagram for identification and selection of articles for inclusion in the review.



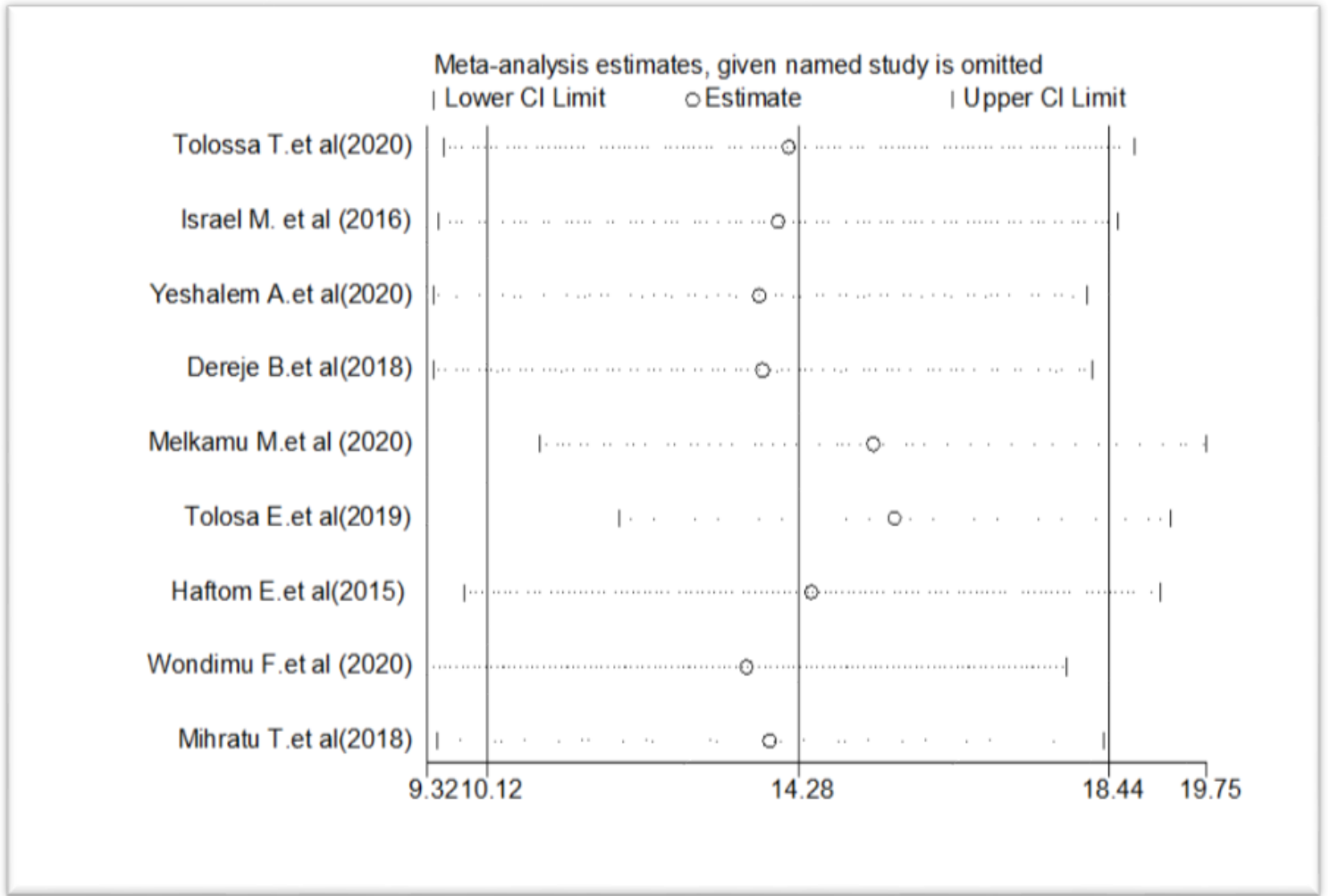
**Figure 2**

Forest plot for prevalence of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia, 2020



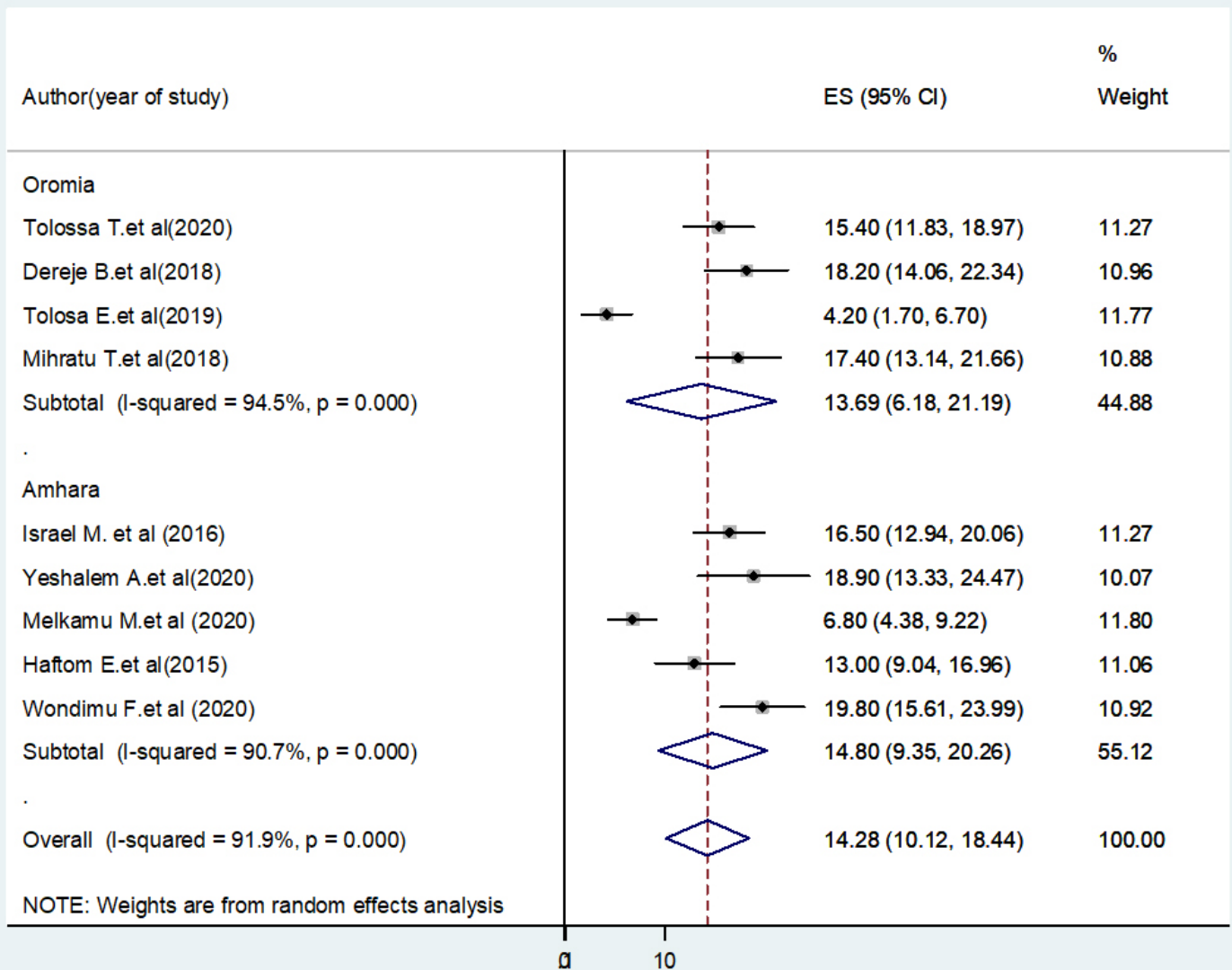
**Figure 3**

Funnel plot with 95% confidence limits of the pooled prevalence of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia, 2020



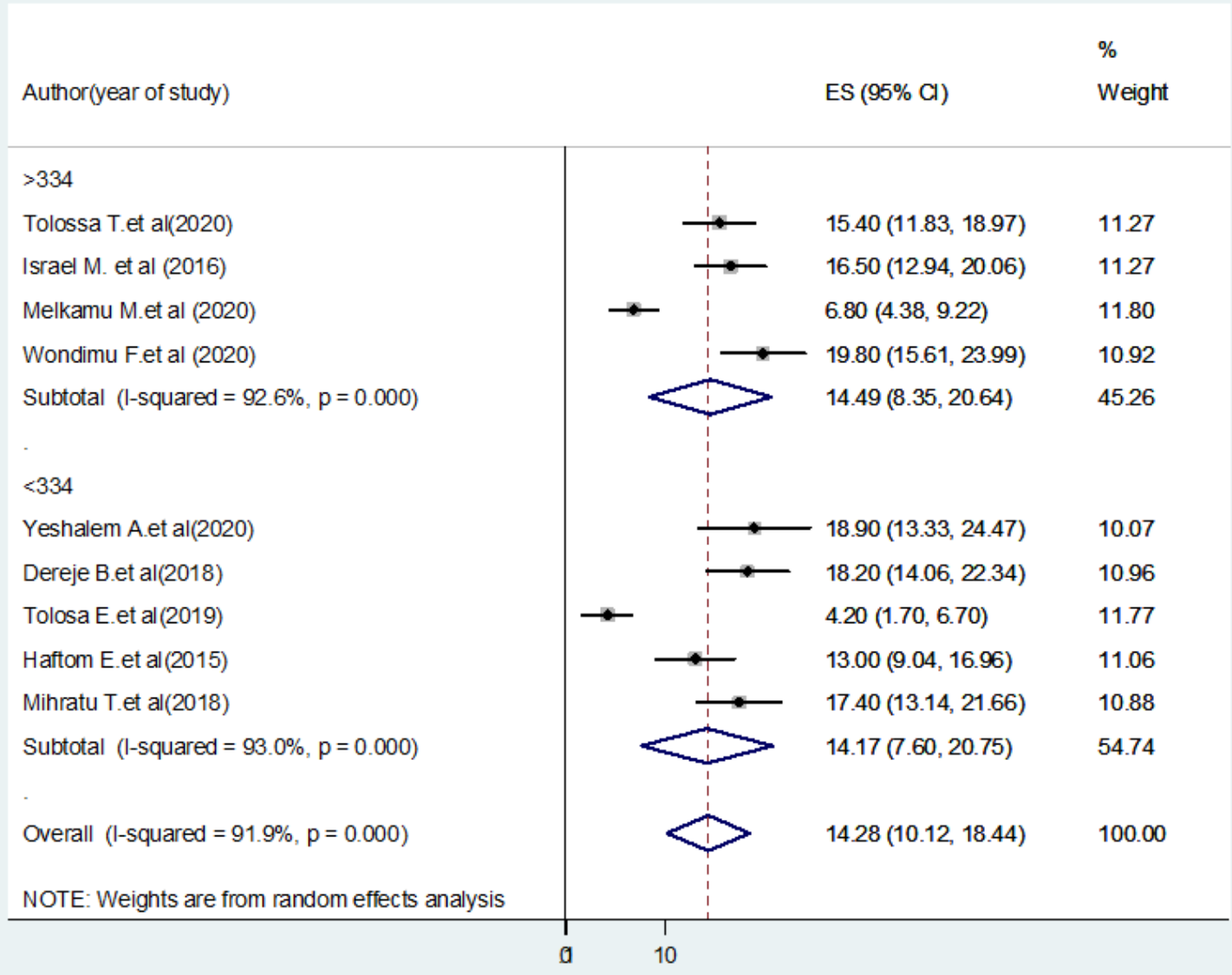
**Figure 4**

Sensitivity analysis of the pooled prevalence of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia, 2020



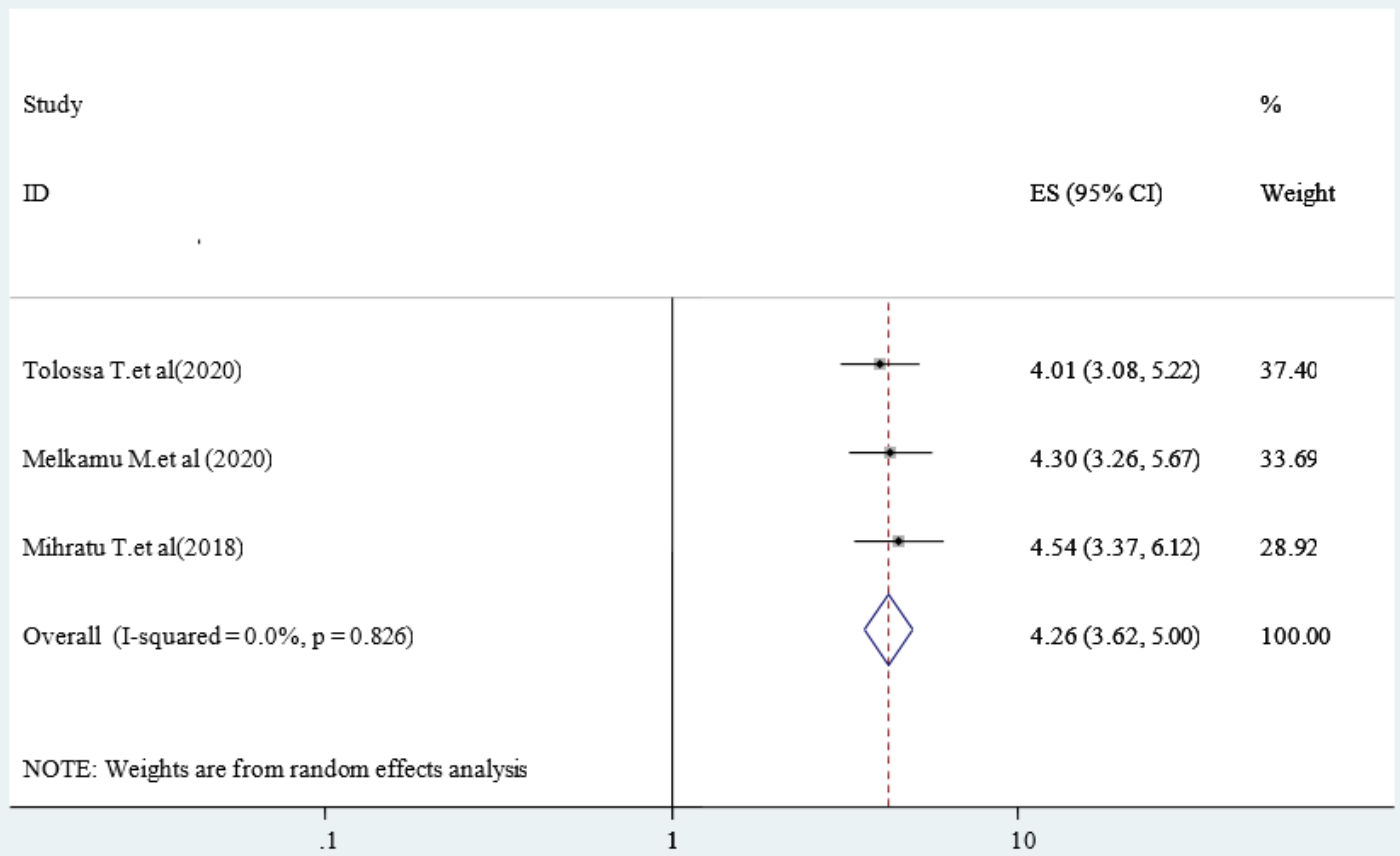
**Figure 5**

Subgroup analysis of the pooled prevalence of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia based on the study region



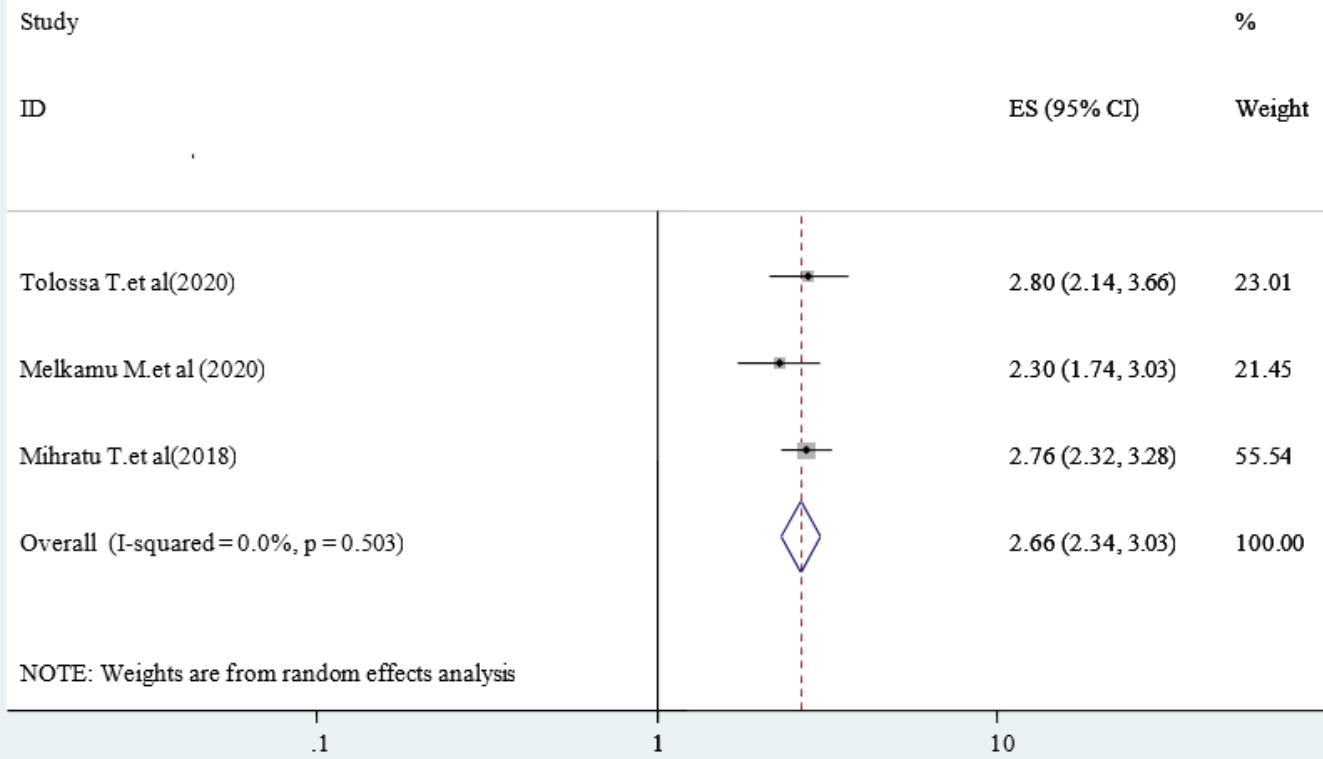
**Figure 6**

Subgroup analysis of the pooled prevalence of lost to follow-up among pregnant and lactating mothers living with HIV and enrolled in HIV care clinics in Ethiopia based on the sample size



**Figure 7**

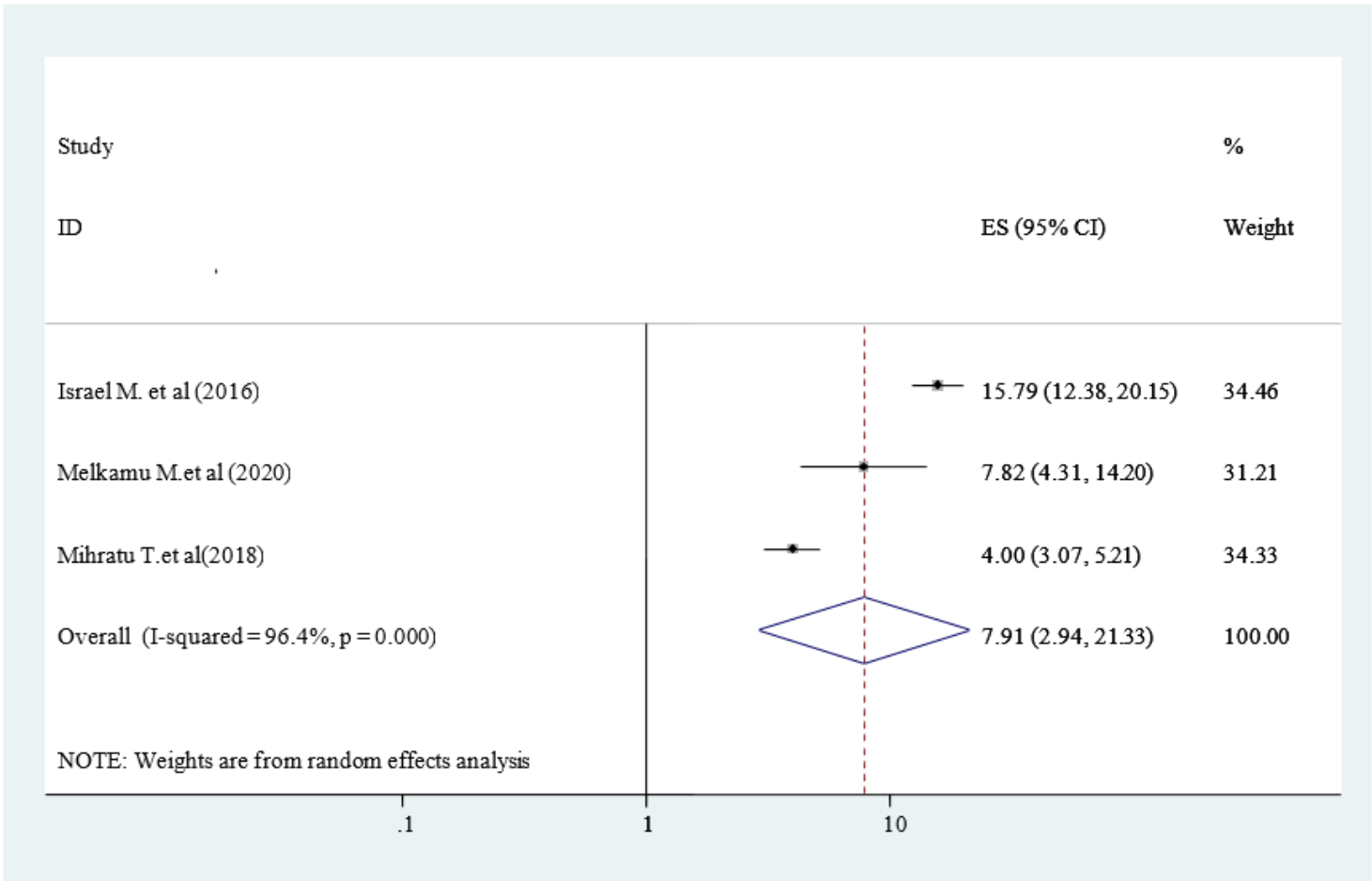
Relationship between women’s educational level and lost to follow-up



**Figure 8**

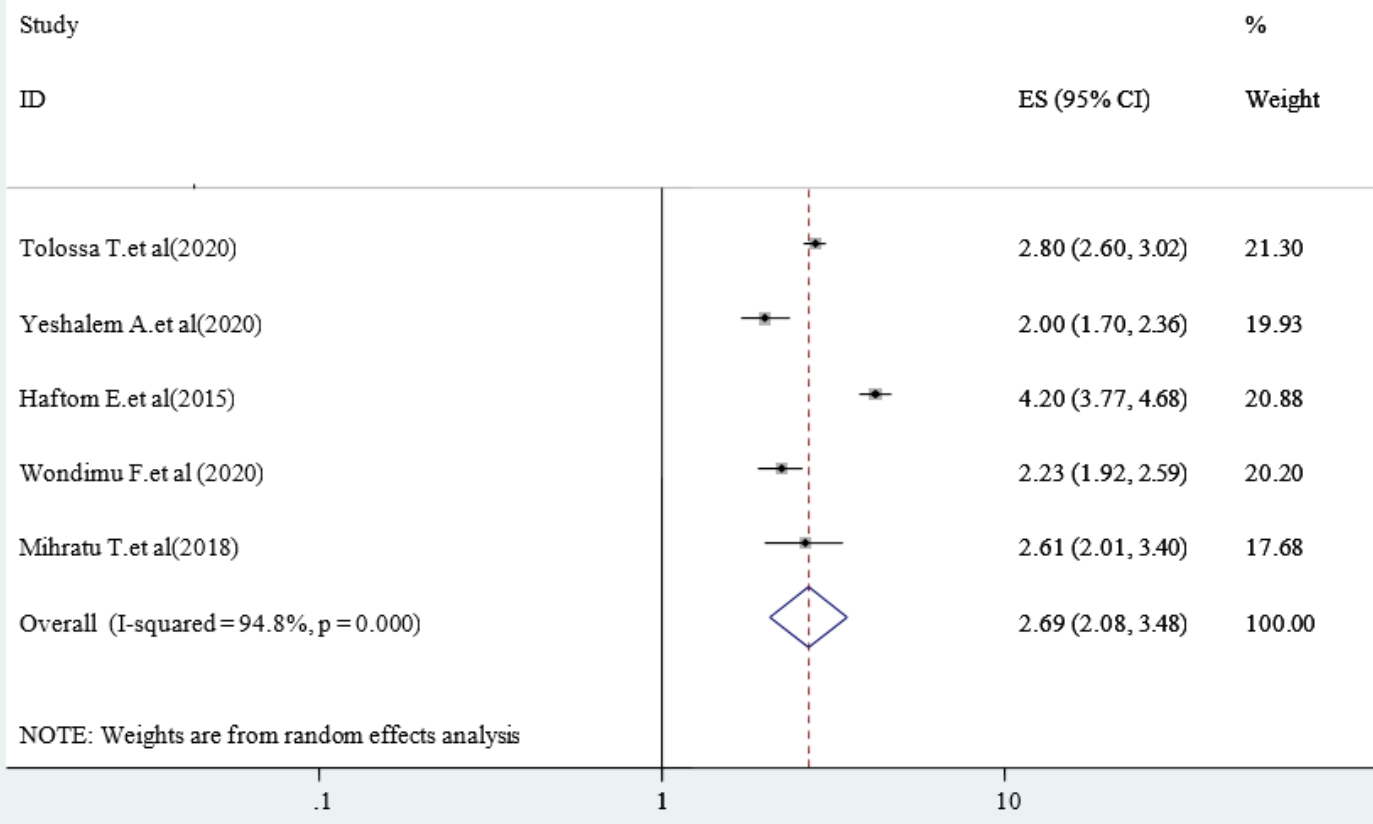
Relationship between women's residency and lost to follow-up





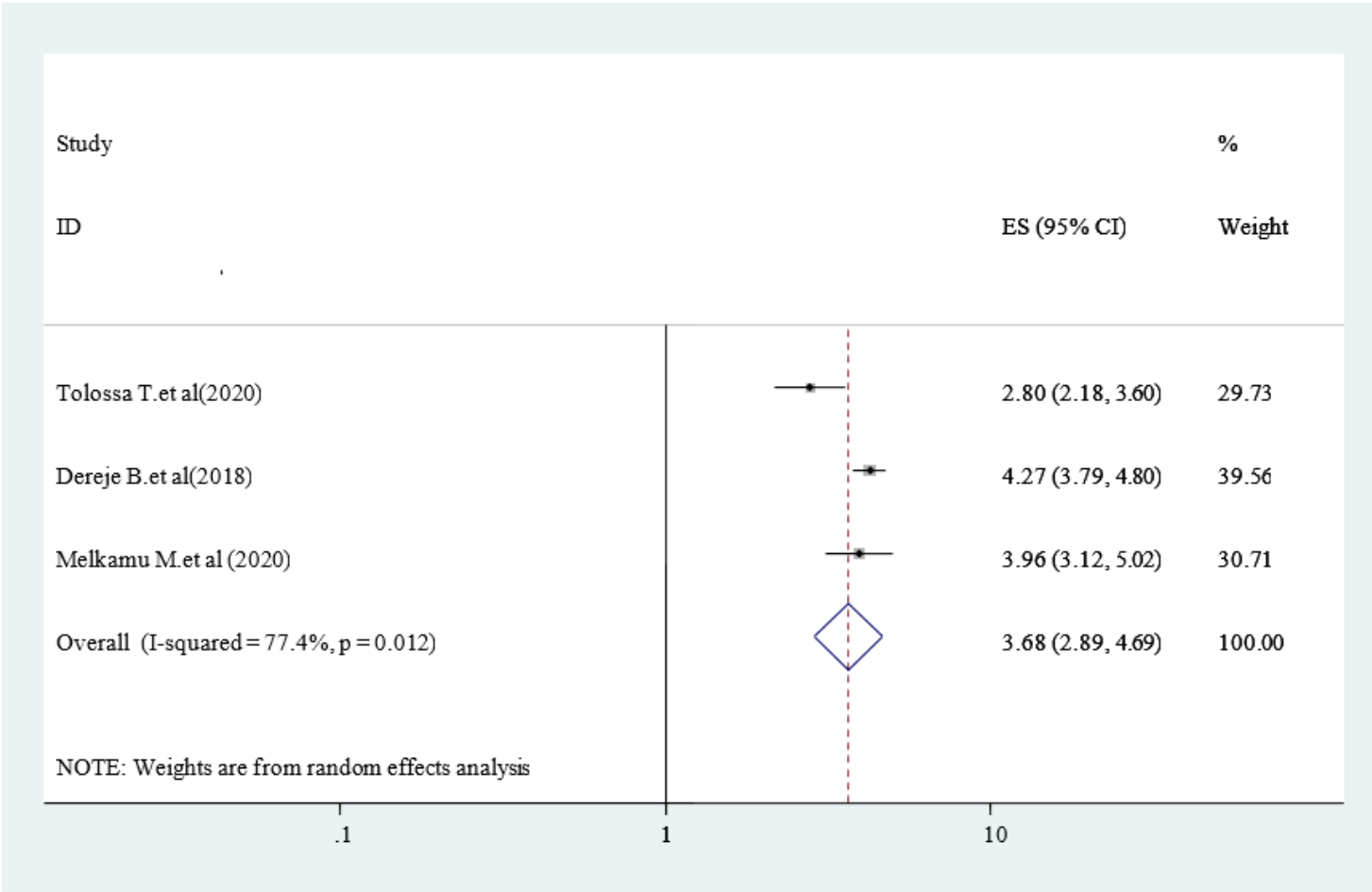
**Figure 9**

Relationship between experienced drug side effects and lost to follow-up



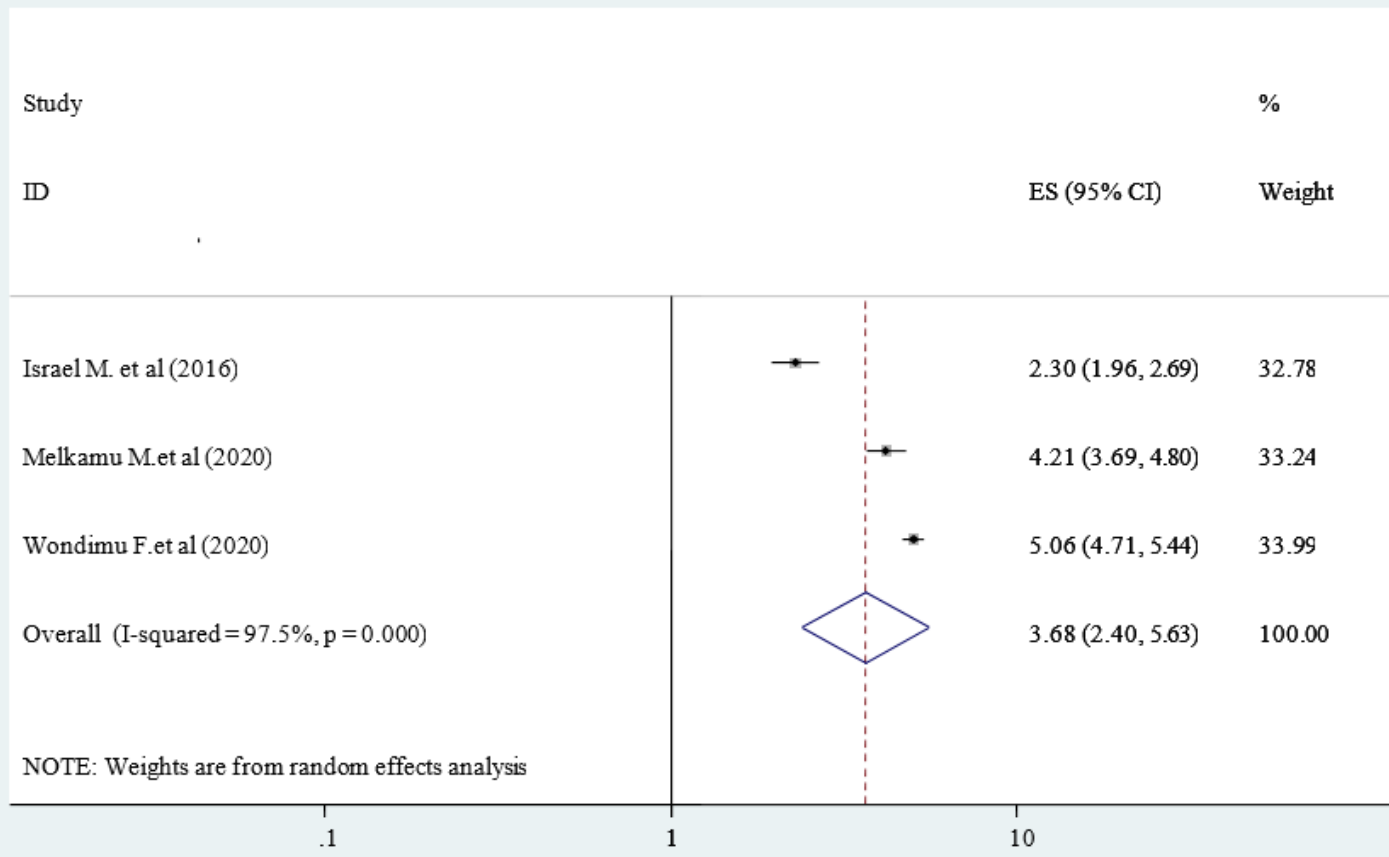
**Figure 10**

Relationship between disclosure of HIV status to partners and lost to follow-up



**Figure 11**

Relationship between poor/fair antiretroviral treatment adherences and lost to follow-up



**Figure 12**

Relationship between knowing base line CD4 level and lost to follow-up