Background. Preventing unintended pregnancies among HIV positive women has a vital role to prevent mother to child transmission. Besides, increasing access to contraceptives has a number of economical importance and reducing the costs for mitigating the unintended pregnancy consequences. Therefore, this study is aimed at assessing the contraceptive use and method of preference among HIV positive women in Ethiopia. Methods. A systematic review and meta-analysis reporting guideline was applied. Articles searched from the Scopus, Pubmed/MEDLINE, EMBASE, AJOL, Hinari, and Google scholar were included in this review. The Stata 11 software was used to compute the analysis. Heterogeneity of the studies was detected using the Cochran $Q$ test and $I^2$ test statistics. Egger’s test was used to check the evidence of publication bias within the studies. Subgroup analysis and sensitivity analysis was computed with the evidence of heterogeneity. Results. Ten thousand one hundred twenty one (10121) women living with HIV/AIDS were recruited in this study. The national estimated prevalence of contraceptive use among HIV positive women in Ethiopia was 57.78% (95% CI: 48.53-67.03). Injectables and male condom were the most preferred contraceptives accounted for 36.00% (95% CI: 6.64-45.35) and 32.74% (95% CI: 21.08-44.40), respectively. Discussion with husband/partner (AOR: 4.70, 95% CI: 2.18-10.12), disclosure of HIV status to spouse/partner (AOR: 2.18, 95% CI: 1.55-3.06), ever counseled for modern contraceptives (AOR: 2.79, 95% CI: 2.01-3.88), attending secondary and above education (AOR: 3.12, 95% CI: 2.15-4.51), and having more than one live child (AOR: 2.61, 95% CI: 1.86-3.66) were increasing the likelihood of contraceptive use whereas not currently married women (AOR: 0.23, 95% CI: 0.16-0.34) was decreases the odds of contraceptive use. Conclusion. In Ethiopia, more than half of the women living with HIV/AIDS were using contraceptives. Discussion with husband/partner, having adequate information towards contraceptive use, and having desired number of child could increase the utilization; as a result, obstetric complication with HIV positive women due to unintended pregnancy is significantly decreasing.
pregnancy is 96%, 71%, and 43% in Thailand, South Africa, and Uganda [2–4]. According to World Health Organization (WHO) comprehensive prong strategy, prevention of mother-to-child transmission of HIV/AIDS is the first strategy to prevent the vertical transmission of HIV to her baby; moreover, this strategy could be achieved through increasing access to and use of effective contraception [5, 6].

A study conducted in sub-Saharan African population showed that contraceptive strategy averts 28.6% more HIV positive births than Neverapine for PMTCT, furthermore increasing access to contraception and preventing unintended pregnancies, integration reduces new and opportunistic pediatric HIV infections, and the number of children needing HIV treatment, care, and support [7, 8].

According to the 2016 Ethiopia demographic and health survey report, one in every three currently married women used modern contraceptive. Besides, injectable contraceptive method, long acting or permanent methods, and condom constituted 23%, 8%, and 4%, respectively [9].

In Ethiopia, different studies have been showed variation in the magnitude of contraceptive use among women living with HIV accounted for 30.3% in Amhara region, 39% Addis Ababa, 46% Tigray region, 64.1% southern Ethiopia, and 50% in Gonder University specialized hospital [10–14], whereas injectable, male condom, implant, IUD, and oral contraceptives were the most commonly used and preferred methods of contraceptive [11–14].

Uptake of contraception helps women avoid unplanned or unwanted pregnancies and prevent unsafe abortions. A systematic review and meta-analysis study showed that HIV positive women have eight times the risk of a pregnancy-related death compared to women without HIV infection. Besides, contraceptive use helps the women to space and limit the births, which benefit the health of the mother and her baby [15].

Various factors such as sociocultural norms and traditions, lack of comprehensive knowledge on contraceptive methods, lack of advice from health professionals, not start ART, fear of side effects, illiteracy, and inaccessibility of preferred contraceptives limit women living with HIV to seek and use modern contraceptive service and information [16, 17].

Even though there are different single studies reported the prevalence of contraceptive use among women living with HIV/AIDS and its associated factors, there are no national studies which show the nationwide magnitude of contraceptive use among women living with HIV/AIDS in Ethiopia. Therefore, this systematic review and meta-analysis is aimed at estimating the pooled prevalence of contraceptive use and method of preferences among women living with HIV/AIDS in Ethiopia.

2. Method and Materials

2.1. Search Strategy. Articles accessed in the Scopus, Pubmed/MEDLINE, Hinari, EMBASE, Google scholar, African journals, and online university repositories were considered in this systematic review and meta-analysis (Table 1). Different MeSH terms and search engines including “contraceptive use” OR “uptake of contraceptive” OR “utilization of family planning,” OR “modern contraceptive use” OR “contraceptive preference,” OR “met need of family planning,” OR “uptake of family planning” AND “among women living with HIV/AIDS,” OR “among sexually active women living with HIV/AIDS” were included.

2.2. Eligibility Criteria

2.2.1. Inclusion Criteria

(1) Study Design. Cross-sectional studies reported the prevalence or widely used contraceptives and risk factors for contraceptive use among HIV positive women were included.

(2) Language. Only English language literature and research articles were included.

(3) Publication. Both published and unpublished research articles were used.

(4) Searching Date. Articles searched from April 1–30, 2020 were included.

(5) Study Population. Women living with HIV/AIDS were included in this study.

2.2.2. Exclusion Criteria. Articles without full text and abstract, duplicated studies, anonymous reports, and editorial reports were excluded.
2.3. Data Extraction and Quality Assessment. The Standard Microsoft Excel spreadsheet was used to export data from online databases. Two authors (GG and AD) were independently extracted and reviewed all the articles included in this study. Any disagreement was handled by the third reviewer (AW). After all, a consensus was reached through discussion between authors. The Newcastle-Ottawa Quality Assessment Scale (NOS) for cross-sectional studies was used to assess the methodological quality of each study (sampling strategy, sample size, and representativeness of the study), comparability, and measurement of outcomes [18]. Each study scored ≥7 out of 10 of the NOS criteria was considered as having good quality (Table S1). This cutoff point was declared after reviewing relevant piece of literatures. All authors independently assessed the articles for the consideration and inclusion for the study.

2.3.1. Measurement of Outcomes. This systematic review and meta-analysis had two main outcome measurements. Contraceptive use was the first outcome of the study whereas method of preference and predictors of contraceptive use among HIV positive women were the second outcome of this review. The pooled prevalence and adjusted odds ratio were calculated for risk factors reported in the study.

(1) Contraceptive Use. Contraceptive use is the current use of any modern method by women to delay or avoid unintended pregnancy for the last one month.

(2) Modern Methods. The modern methods are oral pills, intrauterine device, injectable, implants, male condom, female condom, and female and male sterilization.

2.3.2. Data Processing and Analysis. The Microsoft Excel (2016) and STATA version 11 software were used for the data entry and analysis, respectively. The funnel plot and Egger’s regression test were conducted to check potential publication bias [19, 20]. The Cochrane Q test and $I^2$ with its corresponding $p$ value were used to assess the heterogeneity of the study [21, 22]. Hence, there was marked heterogeneity within studies; the random effect model was used to compute the pooled prevalence of intestinal parasitic infection among HIV/AIDS patients. Furthermore, for the evidence of heterogeneity within studies subgroup and sensitivity analysis was computed. Moreover, the estimated pooled prevalence rate was reported with a 95% confidence interval (CI), and $p$ value < 0.05 was considered statistically significant. The odds ratio was calculated to measure the association between the outcome variable and the determinants.

3. Results

3.1. Characteristics of the Included Studies. We retrieved 577 studies from the PubMed/MEDLINE, HINARI, EMBASE, Scopus, Google Scholar and African Journals, and online university repository research articles. After duplicates were expunged, 234 studies remained.

Out of the remaining 234 articles, 193 articles were excluded after review of their titles and abstracts. Therefore, 41 full-text articles were accessed and assessed for inclusion criteria, which resulted in the further exclusion of 22 articles. Out of these, 20 studies were excluded due to the outcome of interest is not reported, and 2 of them were excluded due to inaccessibility of the full text. As a result, 19 studies were met the inclusion criteria to undergo the final systematic review and meta-analysis (Figure 1).

Studies were conducted from different regions of Ethiopia (Amhara, Oromia, SNNPR (South Nation Nationalities people and representatives), Addis Ababa (AA), and Tigray). Totally, ten thousand one hundred twenty one (10,121) women living with HIV/AIDS were included in this systematic review and meta-analysis. In this review, four studies were from Addis Ababa [14, 23–25], three studies from South Nation Nationalities and people representatives [16, 26, 27], two studies from Tigray region [15, 28], eight studies from Amhara region [13, 17, 29–34], and two were from Oromia region [35, 36]. Regarding the sample size, in range from 308-1418 HIV positive women were recruited for the study with a maximum and minimum contraceptive use report 30.14 percent to 93.63 percent, respectively (Table 2).

3.2. Contraceptive Use among HIV Positive Women in Ethiopia. In this study, the national estimated prevalence of contraceptive use in Ethiopia was 57.78% (95% CI 48.53-67.03) (Figure 2).

3.3. Preference of Current Contraceptive Use among HIV Positive Women. In this systematic review and meta-analysis, the commonest preferred contraceptive use among women living with HIV/AIDS was injectable 36.00% (95% CI: 26.64-45.35), male condom 32.74% (95% CI: 21.08-44.40), and implants 13.10% (95% CI: 8.82-17.38) (Table 3).

3.4. Heterogeneity and Publication Bias. In this meta-analysis, we execute heterogeneity within the included studies, indicating the presence of considerable heterogeneity ($I^2 = 99.1\%, p < 0.001$). We also assessed the presence of publication bias by using Egger’s test, which suggests the presence of publication bias ($p = 0.012$). As a result, trim and fill analysis was conducted to overcome the publication bias. After one study was filled, twenty studies were enrolled and computed through the trim and fill analysis with a pooled prevalence of 59.26% (95% CI: 58.44-60.08) using a random effect model (Figures 3(a) and 3(b)).

3.5. Sensitivity Analysis. In this meta-analysis, to investigate the potential source of heterogeneity observed in pooled prevalence of contraceptive use, a leave-one-out sensitivity analysis was executed and suggesting that our findings was not dependent on a single study. The pooled prevalence of contraceptive use among HIV positive women was varied between 55.78% (47.13-64.43%) and 59.33% (50.59-68.07%) after deletion of a single study (Table 4).

3.6. Subgroup Analysis. We conducted a subgroup analysis based on the region where the study was conducted and year and sample size. With regard to sample size, the highest
Additional articles identified through other sources (n = 2)

Records retrieved through combined searching (n = 577)

Articles excluded due to duplication (n = 343)

Records screened (n = 234)

Articles excluded by title (n = 148) and articles excluded after reading abstracts (n = 45)

Full-text articles excluded, with reasons (n = 22)
(i) Outcome of interest not reported (n = 20)
(ii) Inaccessibility of the full text (n = 2)

Included studies (n = 19)

Figure 1: Flow chart of selection for systematic review and meta-analysis of contraceptive use among HIV positive women in Ethiopia.

Table 2: Study characteristics included in the systematic review and meta-analysis.

| Authors                  | Publication year | Region | Study design | Sample size | % | Pill | Injectable | Implant | IUD | Condom | Quality |
|--------------------------|------------------|--------|--------------|-------------|----|------|------------|---------|-----|--------|---------|
| Derek et al. [12]        | 2019             | AA     | C-S          | 548         | 39.05 | 8.10 | —          | 17.20   | —   | 18.00  | 42.60   | Low risk |
| Kebede et al. [29]       | 2019             | Amhara | C-S          | 632         | 61.39 | 9.30 | 51.50      | 29.40   | 2.80 | 7.00   | Low risk |
| Kebede et al. [30]       | 2015             | Amhara | C-S          | 416         | 80.05 | 6.70 | 54.70      | 17.70   | 1.80 | 52.00  | Low risk |
| Alene and Ataell [10]    | 2018             | Amhara | C-S          | 803         | 30.14 | 4.90 | 42.80      | 11.10   | 6.20 | 32.90  | Low risk |
| Mersha et al. [31]       | 2019             | Amhara | C-S          | 314         | 93.63 | 7.00 | 25.80      | 5.10    | 28.40| 26.70  | Low risk |
| Melaku YA and Zeleke EG [28] | 2014         | Tigray | C-S          | 847         | 44.27 | 2.70 | 70.70      | 8.60    | —   | 47.60  | Low risk |
| Berhane et al. [11]      | 2013             | Tigray | C-S          | 364         | 46.15 | 4.20 | 22.70      | 2.40    | 19.00| —      | Low risk |
| Lemeneh T. [23]          | 2016             | AA     | C-S          | 682         | 88.27 | 9.40 | 32.00      | 24.70   | 9.80 | 21.30  | Low risk |
| Mitiku K. [13]           | 2017             | SNNPR  | C-S          | 382         | 64.14 | 10.20| 64.90      | 9.80    | 2.40 | 31.40  | Low risk |
| Demissie and Tolossa [26]| 2014             | SNNPR  | C-S          | 380         | 62.11 | 5.50 | 26.30      | 3.80    | —   | 90.70  | Low risk |
| Ayalew et al. [32]       | 2019             | Amhara | C-S          | 308         | 38.31 | —   | —          | —       | —   | —     | —       |
| Zewdie et al. [33]       | 2020             | Amhara | C-S          | 518         | 68.15 | 8.00 | 32.60      | 35.90   | 14.20| 8.20   | Low risk |
| Abeje and Motbaynor [34] | 2016             | Amhara | C-S          | 530         | 45.66 | 7.40 | 74.40      | 3.70    | 4.50 | 10.30  | Low risk |
| Asfaw and Gashe [24]     | 2014             | AA     | C-S          | 1418        | 71.02 | —   | 30.50      | —       | —   | 45.70  | Low risk |
| Polisi et al. [35]       | 2014             | Oromia | C-S          | 395         | 56.71 | 8.90 | 11.20      | 9.40    | 2.70 | 34.40  | Low risk |
| Abubeker et al. [25]     | 2019             | AA     | C-S          | 334         | 33.53 | 13.40| 22.30      | 33.00   | 6.30 | 20.50  | Low risk |
| Lemma and Mekonnen [27]  | 2014             | SNNPR  | C-S          | 397         | 57.68 | 1.80 | 8.80       | 3.50    | 0.80 | 35.80  | Low risk |
| Worke et al. [14]        | 2016             | Amhara | C-S          | 397         | 50.38 | 12.40| 48.50      | 16.50   | 1.50 | 8.20   | Low risk |
| Sufa A. [36]             | 2013             | Oromia | C-S          | 456         | 66.45 | 4.30 | 11.70      | 1.70    | 18.00| 41.60  | Low risk |

C-S: cross-sectional; SNNPR: Southern nation nationalities and peoples representatives; AA: Addis Ababa.
prevalence was observed among those studies with sample size of less than 500, 59.07% (95% CI: 46.88-71.25). Regarding the region of study conducted, the highest prevalence was observed in studies done in Oromia region with 61.65% (95% CI: 52.10-71.19), and the lowest was in Tigray with 44.83% (95% CI: 42.03-47.63) (Table 5).

3.7. Determinants of Contraceptive Use. In this systematic review and meta-analysis, a total of nineteen primary studies [19] with data that can be analyzed, we have examined the associations of determinants (discussion with husband/partner, HIV status disclosure, ever counseled on modern contraceptives, having more than one child and marital status) with contraceptive use among women living with HIV/AIDS.

In this meta-analysis, mothers who have discussed with their husband/parent were 4.7 times more likely to use contraceptives as compared with mothers who have not discussed with their husband/parent with odds ratio (AOR: 4.70, 95% CI: 2.18-10.12) (Figure 4(a)).

HIV status disclosure was also another determinant factor associated with contraceptive use. Mothers who disclose their HIV status to their spouse/parent were 2.18 times more likely to utilize contraceptives as compared with mothers who did not disclose their HIV status to their spouse/parent (AOR: 2.18, 95% CI: 1.55-3.06) (Figure 4(b)).
Table 4: Sensitivity analysis of the prevalence of contraceptive use among HIV positive women in Ethiopia.

| Study omitted                     | Prevalence | 95% CI         |
|-----------------------------------|------------|----------------|
| Derek et al. (2019)               | 58.82      | 49.42-68.23    |
| Kebede et al. (2019)              | 57.57      | 47.79-67.36    |
| Kebede et al. (2015)              | 56.54      | 46.94-66.14    |
| Alene and Atalell (2018)          | 59.33      | 50.59-68.07    |
| Mersha et al. (2019)              | 55.78      | 47.13-64.43    |
| Melaku YA and Zeleke EG (2014)    | 58.53      | 48.99-68.07    |
| Berhane et al. (2013)             | 58.42      | 48.87-67.97    |
| Lemenh T. (2016)                  | 56.07      | 47.12-65.03    |
| Mitiku K. (2017)                  | 57.43      | 47.74-67.11    |
| Demissie and Tolossa (2014)       | 57.54      | 47.86-67.21    |
| Ayalew et al. (2019)              | 58.85      | 49.41-68.29    |
| Zewdie et al. (2020)              | 57.20      | 47.46-66.94    |
| Abeje and Motbaynor (2016)        | 58.45      | 48.89-68.02    |
| Asfaw and Gashe (2014)            | 57.03      | 46.94-67.12    |
| Polisi et al. (2014)              | 57.84      | 48.18-67.49    |
| Abubeker et al. (2019)            | 59.12      | 49.78-68.45    |
| Lemma and Mekonnen (2014)         | 57.78      | 48.12-67.45    |
| Worke et al. (2016)               | 58.19      | 48.58-67.79    |
| Sufa A. (2013)                    | 57.29      | 47.58-67.01    |

Table 5: Subgroup analysis of contraceptive use among HIV positive women in Ethiopia.

| Variables     | Characteristics | Included studies | Number of study participants | Prevalence with (95% CI) | $I^2$, p value |
|---------------|-----------------|------------------|-----------------------------|--------------------------|----------------|
| Sample size   | >500            | 8                | 5978                        | 56.02 (41.05-70.98)      | 99.4, <0.001   |
|               | <500            | 11               | 4143                        | 59.07 (46.88-71.25)      | 98.8, <0.001   |
|               | AA              | 4                | 2982                        | 58.05 (34.99-81.11)      | 99.5, <0.001   |
|               | Amhara          | 8                | 3918                        | 58.49 (41.16-75.82)      | 99.4, <0.001   |
| Region        | Oromia          | 2                | 851                         | 61.65 (52.10-71.19)      | 88.3, =0.003   |
|               | SNNPR           | 3                | 1159                        | 61.32 (57.58-65.06)      | 44.1, =0.167   |
|               | Tigray          | 2                | 1211                        | 44.83 (42.03-47.63)      | —              |
| Overall       |                 | 19               | 10,121                      | 57.78 (48.53-67.03)      | 99.1, <0.001   |

Figure 3: (a) Funnel plot to test publication bias of 19 studies. (b) Result of trim and fill analysis for adjusting publication bias of the 20 studies.
| Study ID | OR (95% CI) | % Weight |
|----------|-------------|----------|
| Derek et al. (2019) | 4.35 (2.69, 7.04) | 27.15 |
| Kebede et al. (2019) | 1.76 (1.12, 2.77) | 27.48 |
| Melaku YA, Zeleke EG (2014) | 6.30 (3.40, 11.68) | 25.39 |
| Sufa A. (2013) | 13.84 (5.06, 37.83) | 19.98 |
| Overall (I-squared = 85.2%, p ≤ 0.001) | 4.70 (2.18, 10.12) | 100.00 |

Note: weights are from random effect analysis

(a)

| Study ID | OR (95% CI) | % Weight |
|----------|-------------|----------|
| Derek et al. (2019) | 1.84 (1.14, 2.96) | 51.18 |
| Lemeneh T. (2016) | 3.40 (1.53, 7.58) | 18.01 |
| Asfaw and Gashe (2014) | 2.23 (1.21, 4.11) | 30.82 |
| Overall (I-squared = 0.0%, p = 0.433) | 2.18 (1.55, 3.06) | 100.00 |

(b)

| Study ID | OR (95% CI) | % Weight |
|----------|-------------|----------|
| Kebede et al. (2019) | 2.37 (1.44, 3.91) | 43.66 |
| Kebede et al. (2015) | 2.63 (1.46, 4.73) | 31.53 |
| Alene and Atalell (2018) | 4.01 (2.07, 7.78) | 24.81 |
| Overall (I-squared = 0.0%, p = 0.449) | 2.79 (2.01, 3.88) | 100.00 |

(c)

Figure 4: Continued.
| Study ID                                      | OR (95% CI) | % Weight |
|---------------------------------------------|-------------|----------|
| Melaku YA, Zeleke EG (2014)                 | 2.46 (1.19, 5.10) | 21.56    |
| Lemeneh T. (2016)                           | 2.80 (1.22, 6.42) | 16.65    |
| Asfaw and Gashe (2014)                      | 2.61 (1.70, 4.02) | 61.80    |
| Overall (I-squared = 0.0%, p = 0.974)       | 2.61 (1.86, 3.66) | 100.00   |

| Study ID                                      | OR (95% CI) | % Weight |
|---------------------------------------------|-------------|----------|
| Kebede et al. (2015)                        | 2.35 (1.03, 5.34) | 20.30    |
| Berhane et al. (2013)                       | 2.85 (1.17, 6.95) | 17.21    |
| Mitiku K. (2017)                             | 2.78 (1.22, 6.35) | 20.04    |
| Lemma and Mekonnen (2014)                   | 4.63 (1.23, 17.39) | 7.80     |
| Worke et al. (2016)                         | 5.63 (1.74, 18.21) | 9.91     |
| Sufa A. (2013)                              | 3.19 (1.52, 6.71) | 24.74    |
| Overall (I-squared = 0.0%, p = 0.864)       | 3.12 (2.15, 4.51) | 100.00   |

| Study ID                                      | OR (95% CI) | % Weight |
|---------------------------------------------|-------------|----------|
| Kebede et al. (2019)                        | 0.34 (0.14, 0.83) | 16.22    |
| Lemeneh T. (2016)                           | 0.22 (0.09, 0.52) | 17.47    |
| Mitiku K. (2017)                             | 0.21 (0.10, 0.45) | 22.71    |
| Zewdie et al. (2020)                        | 0.19 (0.10, 0.37) | 30.02    |
| Asfaw and Gashe (2014)                      | 0.31 (0.12, 0.82) | 13.57    |
| Overall (I-squared = 0.0%, p = 0.829)       | 0.23 (0.16, 0.34) | 100.00   |

**Figure 4**: Forest plot showing the pooled odds ratio of the associations between contraceptive use and its determinants: (a) discussion with partner, (b) disclosing HIV status, (c) counseling on contraceptive, (d) having more than one child, (e) secondary and above education, and (f) being widowed/separated.
Those mothers who ever counseled about modern contraceptives were 2.79 times more likely to use contraceptives as compared with their counter parts (AOR: 2.79, 95% CI: 2.01-3.88) (Figure 4(c)). Similarly, mothers who have more than one live child were 2.61 times more likely to utilize contraceptives as compared with mothers who have one child (AOR: 2.61, 95% CI: 1.86-3.66) (Figure 4(d)). Those women living with HIV/AIDS who completed secondary and above education were 3.12 times more likely to use contraceptives as compared with their counter parts (AOR: 3.12, 95% CI: 2.15-4.51) (Figure 4(e)). But in this meta-analysis, the odds of contraceptive use among currently unmarried women were 77% less likely as compared with currently married women (AOR: 0.23, 95% CI: 0.16-0.34) (Figure 4(f)).

4. Discussion

Modern contraceptive utilization among HIV positive mothers added the benefit of preventing unintended pregnancies, reducing the need for unsafe abortions, and HIV positive births and can have a major impact on improving the overall maternal and infant health. Therefore, this systematic review and meta-analysis is aimed at estimating the pooled prevalence of contraceptive use among HIV positive mothers and its associated factors in Ethiopia. In this meta-analysis, the pooled prevalence of contraceptive use among HIV positive mothers in Ethiopia was 57.78% (95% CI: 48.53-67.03). Even though there was no analogous meta-analysis study conducted on this specific research question within the area, the pooled prevalence of contraceptive use among HIV positive mothers is comparable with a survey done in Nairobi, Kenya (55.5%) [37], Northern Tanzania (54%) [38], Uganda (58%) [5], and Swaziland (62.5%) [39] (Warren et al. 2013). This is higher than a survey conducted in Kenya (32.3%) [40] and Northern Uganda (25%) [41]. But, it is lower than a study conducted in South Africa (78%) [42], Togo (73.1%) [43], Southeast Nigeria (73.1%) [44], and Zambia (69%) [45]. This difference might be due to regional variation and variation in guidelines of reproductive health and health policy of the country.

In this meta-analysis concerning method of contraceptive preference, the most widely preferred contraceptive method was injectable for 36.00% (95% CI: 26.64-45.35) and male condom for 32.74% (95% CI: 21.08-44.40). This is supported with a study conducted in Northern Tanzania [38]. This might be due to the fact that most HIV positive women preferred short acting contraceptive methods to conceive within a short period of time due to high pregnancy desire.

This meta-analysis showed that women who attended secondary and above education were more likely to utilize contraceptive as compared with their counter parts. This is supported with a study done in Northern Uganda [41] and Lusaka, Zambia [45]. This might be due to the fact that education improves HIV/AIDS knowledge and communication with partner as well as increasing female decision-making power on reproductive health particularly family planning, thus enabling them to easily change risky sexual behavior. Mothers who have discussed with their husband/parent were more likely to use contraceptives as compared with mothers who have not discussed with their husband/parent. This is consistent with a study done in Northern Uganda [41], Northern Tanzania [38], and India [46]. This might be due to the fact that male has higher decision-making power, and currently in Ethiopia, male involvement in PMTCT and related reproductive health services became increased which ultimately increase contraceptive usage to minimize unintended pregnancy. Similarly, mothers who disclosed their HIV status to their spouse/parent were more likely to utilize contraceptives as compared with mothers who did not disclosed their HIV status to their spouse/parent. This is in line with a study done in Uganda [5], Canada [47], and Zambia [45]. This might be due to nowadays stigmatization, and misconception-related HIV/AIDS was reduced due to community awareness and raised spousal support which leads HIV positive women to disclose their status to their spouse/parent.

Those mothers who ever counseled about modern contraceptives were more likely to use contraceptives as compared with their counter parts. This is consistent with a study conducted in Northern Tanzania [38]. This might be explained by HIV positive women who receive more information on reproductive health since they are frequently in contact with health care providers during their follow-up visit. Additionally, nowadays, the government gives great emphasis on couple counseling about contraceptive methods to minimize the occurrence of unintended pregnancy due to disapproval of the husband.

Contraceptive use was higher among mothers who have more than one living child as compared with mothers who have one child. This finding is supported with a study conducted in Nairobi, Kenya [37]. This might be explained by women with more than one living child that might use contraceptive methods to space or limit child births. In fact, those women who have already reached the number of children they want used contraceptive methods. But in this meta-analysis, the odds of contraceptive use among currently unmarried women were less likely as compared with currently married women. This is in line with a study done in Nairobi, Kenya [37], and Swaziland (62.5%) [39]. This might be explained that they did not use contraceptive methods due to the fact that they were free from sexual intercourse.

4.1. Limitations of the Study. The study designs for all primary studies included in this systematic review and meta-analysis were cross-sectional; as the result, the confounding variables most of the time might affect the outcome variable. Despite, generalizability is possible since the study is at national level; however, establishing temporal cause and effect relationship is impossible due to the natural design limitation of cross-sectional studies.

5. Conclusion

In this study, nearly three-fifth of HIV positive women used contraceptive methods. HIV status disclosure, attending secondary and above education, women discussed with their spouse/parent, having more than one living child, and ever
counseled about contraceptive methods were factors that increase the likelihood of contraceptive use among HIV positive women. Therefore, based on the study findings, husband involvement and providing counselling about contraceptive methods for HIV positive women should be encouraged, and there is a need for an intensified effort to improve reproductive health service utilization. Health care providers in charge of HIV care giving must also integrate family planning services in HIV care during follow-up visits.

Abbreviations

AIDS: Acquired immunodeficiency syndrome
AOR: Adjusted odds ratio
ART: Antiretroviral treatment
CI: Confidence interval
EDHS: Ethiopian Demographic and Health Survey
HIV: Human immunodeficiency virus
IUD: Intrauterine device
WHO: World Health Organizations.

Data Availability

All related data has been presented within the manuscript. The dataset supporting the conclusions of this article is available from the authors on request.

Disclosure

It was performed as part of the employment of Woldia University.

Conflicts of Interest

The authors declare that they have no competing interests.

Authors’ Contributions

GG developed the draft proposal under the supervision of AD. All authors (GG, AW, and AD) critically reviewed, provided substantive feedback and contributed to the intellectual content of this paper, and made substantial contributions to the conception, conceptualization, and manuscript preparation of this systematic review and meta-analysis. All authors read and approved the final manuscript.

Supplementary Materials

Additional file: Table S1: NOS Checklist tool for included studies. (Supplementary Materials)

References

[1] UNAIDS, Global HIV & AIDS statistics — 2019 fact sheet, 2019, https://www.unaids.org/en/resources/fact-sheet.
[2] O. V. Adeniyi, A. I. Ajayi, M. G. Moyaki, D. Ter Goon, G. Avramovic, and J. Lambert, "High rate of unplanned pregnancy in the context of integrated family planning and HIV care services in South Africa," BMC health services research, vol. 18, no. 1, p. 140, 2018.
[3] W. Munsakul, R. Lolekha, B. Kowadisaiburana et al., “Dual contraceptive method use and pregnancy intention among people living with HIV receiving HIV care at six hospitals in Thailand,” Reproductive health, vol. 13, no. 1, p. 8, 2015.
[4] Central Statistical Agency (CSA) [Ethiopia] and ICF, Ethiopia Demographic and Health Survey 2016: HIV Report, CSA and ICF, Addis Ababa, Ethiopia, and Rockville, Maryland, USA, 2018.
[5] R. K. Wanyenze, N. M. Twumwesigye, R. Kindyomunda et al., “Uptake of family planning methods and unplanned pregnancies among HIV-infected individuals: a cross-sectional survey among clients at HIV clinics in Uganda,” Journal of the International AIDS Society, vol. 14, no. 1, p. 35, 2011.
[6] WHO, World Health Organization; Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants: Recommendations for a Public Health Approach, 2010, https://apps.who.int/iris/bitstream/handle/10665/75236/9789241599818_eng.pdf;jsessionid= B25196542A8EBA0237261D9035637C?sequence=1.
[7] H. W. Reynolds, B. Janowitz, R. Homan, and L. Johnson, “The value of contraception to prevent perinatal HIV transmission,” Sexually transmitted diseases, vol. 33, no. 6, pp. 350–356, 2006.
[8] WHO, World Health Organizations; PMTCT strategic vision 2010–2015: preventing mother-to-child transmission of HIV to reach the UNGASS and Millennium Development Goals, 2010, https://www.who.int/hiv/pub/mctc/strategic_vision.pdf.
[9] Central Statistical Agency (CSA) (Ethiopia) and ICF, Ethiopia Demographic and Health Survey 2016, CSA and ICF, Addis Ababa, Ethiopia, and Rockville, Maryland, USA, 2016, https://dhsprogram.com/pubs/pdf/FR328/FR328.
[10] K. A. Alene and K. A. Atall, “Contraceptive use and method preference among HIV-positive women in Amhara region, Ethiopia,” BMC women’s health, vol. 18, no. 1, p. 97, 2018.
[11] Y. Berhane, H. Berhe, G. B. Aberra, and H. Berhe, “Utilization of modern contraceptives among HIV positive reproductive age women in Tigray, Ethiopia: a cross sectional study,” Isrn Aids, vol. 2013, 8 pages, 2013.
[12] A. Derek, A. Seme, C. S. Anye, C. N. Nkfusai, and S. N. Cumber, “Modern family planning use among people living with HIV/AIDS: a facility based study in Ethiopia,” The Pan African Medical Journal, vol. 33, 2019.
[13] K. Mitiku, S. Mulugeta, and B. Lemessa, “Modern contraceptive utilization and associated factors among HIV positive women on antiretroviral therapy in Mizan-Tepi teaching and referral hospital South-West Ethiopia,” Journal of Reproductive and Contraception, vol. 2, no. 2, p. 10, 2017.
[14] M. D. Worke, L. M. Bezabih, and M. A. Woldetensak, “Utilization of contraception among sexually active HIV positive women attending art clinic in University of Gondar Hospital: a hospital based cross-sectional study,” BMC women’s health, vol. 16, no. 1, p. 67, 2016.
[15] C. Calvert and C. Ronsmans, “The contribution of HIV to pregnancy-related mortality: a systematic review and meta-analysis,” AIDS, vol. 27, no. 10, pp. 1631–1639, 2013.
[16] A. A. Gelagay, D. N. Koye, and H. Y. Yeshita, “Factors affecting long acting and permanent contraceptive methods utilization among HIV positive married women attending care at ART clinics in Northwest Ethiopia,” Archives of Public Health, vol. 76, no. 1, p. 47, 2018.
[17] R. Subedi, I. Jahan, and P. Baatsen, “Factors influencing modern contraceptive use among adolescents in Nepal,” Journal of
[18] M. J. Downes, M. L. Brennan, H. C. Williams, and R. S. Dean, “Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS),” *BMJ Open*, vol. 6, no. 12, article e011458, 2016.

[19] F. Song and S. Gilbody, “Bias in meta-analysis detected by a simple, graphical test. Increase in studies of publication bias coincided with increasing use of meta-analysis,” *BMJ*, vol. 316, no. 7129, p. 471, 1998.

[20] J. A. Sterne and M. Egger, “Funnel plots for detecting bias in meta-analysis: guidelines on choice of axis,” *Journal of clinical epidemiology*, vol. 54, no. 10, pp. 1046–1055, 2001.

[21] M. Borenstein, L. V. Higgins, and H. R. Rothstein, “A basic introduction to fixed-effect and random-effects models for meta-analysis,” *Research synthesis methods*, vol. 1, no. 2, pp. 97–111, 2010.

[22] G. Rücker, G. Schwarzer, J. R. Carpenter, and M. Schumacher, “Undue reliance on I 2 in assessing heterogeneity may mislead,” *BMJ medical research methodology*, vol. 8, no. 1, p. 79, 2008.

[23] T. L. A. Seme, *Contraceptive utilization and associated factors among HIV positive women enrolled in HIV care in health centers of Addis Ababa*, 2016.

[24] H. M. Asfaw and F. E. Gashe, “Contraceptive use and method preference among HIV positive women in Addis Ababa, Ethiopia: a cross sectional survey,” *BMC Public Health*, vol. 14, no. 1, p. 566, 2014.

[25] F. A. Abubeker, M. B. Fanta, and V. K. Dalton, “Unmet need for contraception among HIV-positive women attending HIV care and treatment service at Saint Paul’s Hospital Millennium Medical College, Addis Ababa, Ethiopia,” *International journal of reproductive medicine*, vol. 2019, 7 pages, 2019.

[26] B. Demissie and D. Tolossa, “Contraceptive use among HIV-infected women attending treatment and Care at Yirgalem Hospital, Southern Ethiopia,” *Eastern Africa Social Science Research Review*, vol. 30, no. 2, pp. 85–102, 2014.

[27] L. Lemma, *Assessment of utilization of modern family planning methods among women living with HIV/AIDS who are on chronic care follow up in Yirgalem public health facilities, Addis Aababa University, Sidama Zone, SNNPR, Ethiopia*, 2014.

[28] Y. A. Melaku and E. G. Zeleke, “Contraceptive utilization and associated factors among HIV positive women on chronic follow up care in Tigray Region, Northern Ethiopia: a cross sectional study,” *PloS one*, vol. 9, no. 4, p. e94682, 2014.

[29] Y. B. Kebede, T. T. Geremew, Y. Mehretie, A. N. Abeje, L. Bewket, and E. Delfie, “Associated factors of modern contraceptive use among women infected with human immunodeficiency virus in Enemay District, Northwest Ethiopia: a facility-based cross-sectional study,” *BMC Public Health*, vol. 19, no. 1, p. 1584, 2019.

[30] H. G. Kebede, A. Ababa, A. Ababa, and A. Ababa, “Assessment of contraceptive use and associated factors among HIV positive women in Bahir-Dar Town Northwest Ethiopia,” *Open Access Library Journal*, vol. 2, no. 10, p. 1, 2015.

[31] A. G. Mersha, D. A. Erku, S. A. Belachew, A. A. Ayele, B. M. Gebresillassie, and T. M. Abegaz, “Contraceptive use among HIV-positive and negative women: implication to end unintended pregnancy,” *Contraception and reproductive medicine*, vol. 4, no. 1, p. 3, 2019.

[32] T. Tewabe, A. Abdanur, D. Jenbere, M. Ayehu, and G. Talema, “Contraceptive use and associated factors among sexually active HIV positive women attending ART clinic in FHRH in Bahir Dar, north west, Ethiopia, 2018,” *Facility based cross-sectional study*, 2019.

[33] Z. Zewdie, M. Yitayal, Y. Kebede, and A. Gebeyehu, “Status of family planning integration to HIV care in Amhara regional state, Ethiopia,” *BMJ pregnancy and childbirth*, vol. 20, no. 1, pp. 1–10, 2020.

[34] G. Abeje and A. Motbyanor, “Demand for family planning among HIV positive women on ART: the case of South Gonder and North Wollo Zones Amhara region,” *BMJ research notes*, vol. 9, no. 1, p. 43, 2016.

[35] A. Polisi, E. Gebrehanna, G. Tesfaye, and F. Asfafa, “Modern contraceptive utilization among female ART attendees in health facilities of Gimbit town, West Ethiopia,” *Reproductive health*, vol. 11, no. 1, p. 30, 2014.

[36] A. Sufa, M. Abera, and B. Admasu, “Utilization of family planning methods and associated factors among women living with HIV attending ART clinics in Nekemte public health facilities, East Wollega Zone, Ethiopia,” *Science, Technology and Arts Research Journal*, vol. 2, no. 4, pp. 71–77, 2013.

[37] E. Wekesa and E. Coast, “Contraceptive need and use among individuals with HIV/AIDS living in the slums of Nairobi, Kenya,” *International Journal of Gynecology & Obstetrics*, vol. 130, pp. E31–E36, 2015.

[38] D. J. Damian, J. M. George, E. Martin, B. Temba, and S. E. Msuya, “Prevalence and factors influencing modern contraceptive use among HIV-positive women in Kilimanjaro region, northern Tanzania,” *Contraception and reproductive medicine*, vol. 3, no. 1, p. 7, 2018.

[39] C. E. Warren, T. Abuja, and I. Askew, “Family planning practices and pregnancy intentions among HIV-positive and HIV-negative postpartum women in Swaziland: a cross sectional survey,” *BMJ pregnancy and childbirth*, vol. 13, no. 1, p. 150, 2013.

[40] M. A. Magadi and W. A. Magadi, “HIV/AIDS and contraceptive use: factors associated with contraceptive use among sexually active HIV-positive women in Kenya,” *Contraception*, vol. 95, no. 3, pp. 312–321, 2017.

[41] B. Nattabi, J. Li, S. C. Thompson, C. G. Orach, and J. Earnest, “Family planning among people living with HIV in post-conflict Northern Uganda: A mixed methods study,” *Conflict and Health*, vol. 5, no. 1, p. 18, 2011.

[42] A. Kaida, F. Laher, S. A. Strathdee et al., “Contraceptive use and method preference among women in Soweto, South Africa: the influence of expanding access to HIV care and treatment services,” *PloS one*, vol. 5, no. 11, p. e13686, 2010.

[43] I. Yaya, A. A. Patassi, D. E. Landoh et al., “Modern contraceptive use among HIV-infected women attending HIV care centres in Togo: a cross-sectional study,” *BMJ Open*, vol. 8, no. 4, article e019006, 2018.

[44] E. C. Ezugwu, P. O. Nkwo, P. U. Agu, E. O. Ugwu, and A. O. Asogwa, “Contraceptive use among HIV-positive women in Enugu, Southeast Nigeria,” *International Journal of Gynecology & Obstetrics*, vol. 126, no. 1, pp. 14–17, 2014.

[45] N. L. Hancock, C. J. Chibwesha, S. Bosomprah et al., “Contraceptive use among HIV-infected women and men receiving antiretroviral therapy in Lusaka, Zambia: a cross-sectional survey,” *BMJ Public Health*, vol. 16, no. 1, p. 392, 2016.
[46] P. Dugg, P. Chhabra, and A. K. Sharma, “Contraceptive use and unmet need for family planning among HIV-positive women: a hospital-based study,” Indian Journal of Public Health, vol. 64, no. 1, p. 32, 2020.

[47] M. R. Loutfy, T. A. Hart, S. S. Mohammed et al., “Fertility desires and intentions of HIV-positive women of reproductive age in Ontario, Canada: a cross-sectional study,” PloS one, vol. 4, no. 12, p. e7925, 2009.