Post-abortion family planning use, method preference, and its determinant factors in Eastern Africa: a systematic review and meta-analysis

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Abstract

Background: Utilization of post-abortion family planning is very critical to reduce high levels of unintended pregnancy, which is the root cause of induced abortion. In Eastern Africa, it is estimated that as many as 95% of unintended pregnancies occurred among women who do not practice contraception at all. Therefore, this meta-analysis aimed to assess post-abortion family planning utilization and its determinant factors in Eastern Africa.

Methods: Published papers from Scopus, HINARI, PubMed, Google Scholar, and Web of Science electronic databases and grey literature repository were searched from database inception to January 30, 2020, with no restriction by design and date of publishing. We screened records, extracted data, and assessed risk of bias in duplicate. Cochrane I 2 statistics were used to check the heterogeneity of the studies. Publication bias was assessed by Egger and Biggs test with a funnel plot. A random-effects model was calculated to estimate the pooled prevalence of post-abortion family planning utilization.

Results: A total of twenty-nine cross-sectional studies with 70,037 study participants were included. The overall pooled prevalence of post-abortion family planning utilization was 67.86% (95% CI 63.59–72.12). The most widely utilized post-abortion family methods were injectable 33.23% (95% CI 22.12–44.34), followed by implants 24.71% (95% CI 13.53–35.89) and oral contraceptive pills 23.42% (95% CI 19.95–26.89). Married marital status (AOR=3.20; 95% CI 2.02–5.05), multiparity (AOR=3.84; 95% CI 1.43–10.33), having a history of abortion (AOR=2.33; 95% CI 1.44–3.75), getting counselling on post-abortion family planning (AOR=4.63; 95% CI 3.27–6.56), and ever use of contraceptives (AOR=4.63; 95% CI 2.27–5.21) were factors associated with post-abortion family planning utilization in Eastern Africa.

Conclusions: This study revealed that the marital status of the women, multiparity, having a history of abortion, getting counselling on post-abortion family planning, and ever used contraceptives were found to be significantly associated with post-abortion family planning utilization.

Keywords: Post-abort, Family planning, Systematic review, Meta-analysis, Eastern Africa
**Background**

Post-abortion family planning is the initiation and use of family planning methods immediately after and within 48 h of an induced or spontaneous abortion or treatment of complications before fertility returns [1, 2]. The provision of family planning is important for women in the post-abortion period because fertility can return surprisingly quickly after having an abortion. Even if a woman wants to have a child immediately after an abortion, the World Health Organization (WHO) and Federation of International Gynaecology and Obstetrics (FIGO) guidelines recommend she should wait at least 6 months before getting pregnant again [2, 3]. The global estimates for the year 2017 indicate that there were 295,000 maternal deaths worldwide, with Sub-Saharan Africa and Southern Asia accounting for approximately 86% (254,000), with Eastern Africa alone accounting for roughly 542/100,000 maternal deaths [4].

Every year, more than 44 million women have been complicated with induced abortions, and of these, around 20 million women accounted for unsafe abortions. Unsafe abortion contributes to 13% of maternal deaths globally and 37 deaths per 100,000 live births in Sub-Saharan Africa (SSA). The World Health Organization (WHO) estimates that in Eastern Africa unsafe abortion accounts for one in seven maternal deaths [1, 5]. In Africa, 99% of all abortions carried out were unsafe, and the risk of maternal death from an unsafe abortion is one in every 150 procedures which is the highest in the world [6, 7].

Offering a wide range of post-abortion family planning methods is likely to increase family planning uptake; as a result, in the immediate post-abortion period, WHO recommended that a woman can safely use a full range of contraceptive methods, including condoms, spermicides, oral contraceptives, emergency contraceptive pills, injectable implants, IUDs, and female sterilization [8]. Almost every abortion-related death and disability could be prevented through sexuality education; use of effective contraception; provision of safe, legal-induced abortion; and timely care for complications. Post-abortion family planning (PAFP) has been proposed as a key strategy to reduce unintended pregnancy, repeat-induced abortions and lower morbidity and mortality among women, neonates, infants, and children [9–11]. However, the accessibility and quality of PAFP services remain a challenge in Eastern Africa where a higher number of unintended pregnancies occur each year. In Eastern Africa, a lot of fragmented studies have been conducted to assess post-abortion family planning utilization and its associated factors among post-aborted women. These fragmented studies reported that the magnitude of post-abortion family planning utilization in Eastern Africa ranged from 15.5 to 90.6% [12–20].

From the reports of these studies, there was a great variation and inconsistency related to the prevalence of post-abortion family planning utilization throughout East African countries.

The reasons for the above variation in the prevalence and associated factors of post-abortion family planning utilization among East African women have not yet been investigated. The provision of safe, legal abortion is essential to fulfilling the global commitment to the Sustainable Development Goal (SDGs) of universal access to sexual and reproductive health (target 3.7). A systematic review and meta-analysis would help policymakers and health managers and planners to make evidence-based decisions that have taken into account all available information, as well as indicating the quality of the results. Therefore, the main aim of this systematic review and meta-analysis was to estimate the pooled prevalence of post-abortion family planning utilization and to identify its associated factors among post-aborted women that could be used in policy formulation and evidence-based decision-making practices in Eastern Africa.

**Materials and methods**

**Study reporting**

In this systematic review and meta-analysis, we used the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)” guideline [21] (Table S1).

**Databases and search strategies**

In this systematic review and meta-analysis, we checked databases without the restriction of design and date of publishing. The search included keywords and MeSH terms, combinations, and snowball searching about relevant papers providing data on the prevalence of post-abortion family planning utilization and/or its associated factors in a search focused on eastern Africa. Studies were searched from databases including PubMed/MEDLINE, Web of Science, Embase, Scopus, HINARI, Science Direct, African Journals, and Cochrane Library. Besides, bibliographies of identified articles and grey literature, like Google and Google scholar, Mednar, World Wide Science, and online University repositories have been scientifically searched (Table 1). The following websites were hand-searched: Ipas, Jhpiego, Family Health International, Marie Stopes International, Population Council, Post-abortion Care Consortium, Gynuity Health Projects Engender Health, PRIME II, and Eldis. The following search terms were used: (Prevalence OR Epidemiology OR Magnitude) AND (determinants OR associated factors OR predictors) AND (Post-abortion OR postabortion OR postabortal OR post abortal OR post-abortion OR incomplete abortion OR incomplete abortions OR unsafe abortion OR unsafe abortions AND (family planning use OR family planning utilization OR
family planning uptake OR family planning services OR contraceptive use OR contraceptive utilization OR contraceptive uptake OR birth control OR fertility control OR population control) AND (east Africa) and related terms. All countries are categorized under Eastern Africa, namely, Kenya, Uganda, Tanzania, Rwanda, Burundi, Ethiopia, South Sudan, Djibouti, Eritrea, Mozambique, Madagascar, Malawi, Zambia, Comoros, Mauritius, Seychelles, and Somalia. The search terms were used independently and in amalgamation using Boolean operators like "OR" or "AND" and related terms. All article searched from databases was exported to EndNote library. Systematic review with narrative synthesis was used to summarize the findings of articles in Eastern Africa.

Inclusion and exclusion criteria
In this systematic review and meta-analysis, both published and unpublished articles in the English language without time limiting that reported prevalence of post-abortion family planning utilization and/or its associated factors among women in Eastern Africa were included. Articles searched from January 1–30, 2020, were included. Additionally, we restricted our search to observational studies such as cross-sectional, comparative cross-sectional, case-control, and retrospective and prospective cohort studies. Interventional studies, case reports, letters, editorials, systematic reviews, narrative reviews, policy statements, news, and inaccessible full text after two contact attempts of the corresponding author by email were excluded from the final analysis.

Data extraction
After removing duplicates from the Endnote version X8 software, all studies were exported to a Microsoft Excel spreadsheet. Two authors (ADB and GGA) independently extracted all important data using a standardized data extraction form which was adapted from the JBI data extraction format. Substantial agreement between reviewers, i.e., Cohen's kappa coefficient >0.60, was accepted and resolved through discussion and consensus. For the first outcome (prevalence), the data extraction format included (primary author, year of publication, country, study area, sample size, and prevalence with 95% CI). Data were extracted with a 2 by 2 table format, and then, the log odds ratio for each factor was calculated for the second outcome (associated factors).

Measurement of outcomes
This meta-analysis had two outcomes. The first outcome of this study mainly focused on the prevalence of post-abortion family planning utilization in Eastern Africa. The prevalence was calculated by dividing the number of women who used post-abortion family planning by the total number of women who have been included in the study (sample size) multiplied by 100. The second outcome of the study was factors associated with post-abortion family planning utilization, which were measured by using the adjusted odds ratio from primary published studies.

Quality evaluation
Two authors (ADB and GGA) independently assessed the quality of each study using Newcastle-Ottawa scale (NOS) for cross-sectional studies [22]. All included articles were cross-sectional in design. The methodological quality of the study, comparability of the study, and the outcome and statistical analysis of the study were the three major assessment tools we used to declare the quality of the study. Lastly, studies that scored a scale of ≥7 out of 10 were considered as achieving high quality.
During quality appraisal of the articles, any discrepancies between the two authors were resolved.

Data synthesis and statistical analysis
We pooled the overall prevalence estimates of post-abortion family planning utilization using the random-effects model [23]. After extraction of the articles in Microsoft Excel spreadsheet format, the analysis was carried out using the STATA version 14 statistical software. Cochrane Q test and $I^2$ statistics were computed to assess heterogeneity among studies [23, 24]. After computing the statistics, the results showed there was significant heterogeneity among the studies ($I^2 = 99.2\%$, $p <0.001$); therefore, considerable heterogeneity was assumed, and Mantel-Haenszel random-effects model meta-analysis was employed to estimate the Dersimonian and Laird’s pooled effect [25]. Publication bias was also assessed using Egger’s correlation and Begg’s regression intercept tests at a 5% significance level [26, 27]. Due to the presence of publication bias in the study, Egger’s test was statistically significant ($p=0.006$); as a result, trim-fill analysis was executed. Subgroup analysis was done by the study country, sample size, and year of publication to minimize the random variations between the point estimates of the primary study. Forest plot format was used to present the pooled point prevalence with 95% CI. For associations, a log odds ratio was used to decide the association between associated factors and post-abortion family planning utilization.

Results
Of the total retrieved articles from different databases, 1420 articles remained after expunging the duplicates. Out of the remaining articles, 925 and 403 were excluded after reviewing the titles and abstracts, respectively. Therefore, 92 full-text articles were accessed and assessed for eligibility based on the preset criteria, which resulted in the further exclusion of 63 articles primarily due to the outcome of interest not reported ($n=61$) and inaccessibility of the full text ($n=2$). As a result, 29 studies meeting the eligibility criteria were included in the final meta-analysis (Fig. 1).

Characteristics of original studies
Among the 29 articles which were published in East African countries until January 2020, 70,037 study participants were involved to determine the pooled prevalence of post-abortion family planning utilization. Regarding the study design, all studies were cross-sectional. Fifteen of the studies were from Ethiopia [15–18, 28–38], five studies were from Kenya [20, 39–42], four studies were from Tanzania [43–46], and the rest five studies were from Malawi [47], Mozambique [48], Zimbabwe [49], Somalia [50], and Rwanda [51]. Regarding the quality.

![Fig. 1 Flow chart of selection for systematic review and meta-analysis of post-abortion family planning utilization and its associated factors in eastern Africa](image-url)
scores, the quality score of each original study ranged from a low of six to a high of eight (Table 2).

Post-abortion family planning utilization in eastern Africa
In this systematic review and meta-analysis, the overall pooled prevalence of post-abortion family planning utilization was 67.86% (95% CI 63.59–72.12) (Fig. 2).

Heterogeneity and publication bias
The existence of heterogeneity within the included studies was declared with the evidence of $I^2 = 99.2\%$. The evidence of asymmetric distribution of the funnel plot and the statistically significant ($p=0.006$) value of Egger’s test showed the presence of publication bias (Fig. 3).

Trim-fill analysis
In this meta-analysis, due to the presence of publication bias, we executed a trim-fill analysis by using a random-effects model; the filled meta-analysis results showed that three studies were filled, which increases the number of studies from 29 to 32 with the pooled estimate for post-abortion family planning utilization in Eastern Africa was 65.08% (95% CI 59.42–70.73, $p<0.0001$) (Fig. 4).

Subgroup analysis
Due to the presence of heterogeneity within the included studies, a subgroup analysis based on the country, year of publication, and the sample size was conducted to identify the source of heterogeneity. Accordingly, the highest prevalence was observed in Zimbabwe with 91.97% (95% CI 90.29–93.65), and the lowest prevalence

### Table 2 Study characteristics included in the systematic review and meta-analysis on post-abortion family planning utilization and its associated factors in Eastern Africa

| Authors                | Country    | Publication year | Study design | Sample size | Prevalence | Quality |
|------------------------|------------|------------------|--------------|-------------|------------|---------|
| Abamecha et al. [15]   | Ethiopia   | 2016             | Cross-sectional | 399         | 72.93      | 7       |
| Abebe et al. [18]      | Ethiopia   | 2019             | Cross-sectional | 125         | 84.00      | 8       |
| Alemayehu et al. [38]  | Ethiopia   | 2009             | Cross-sectional | 2231        | 78.26      | 7       |
| Asrat et al. [16]      | Ethiopia   | 2018             | Cross-sectional | 552         | 90.58      | 7       |
| Chukwumalu et al. [50] | Somalia    | 2017             | Cross-sectional | 1111        | 85.96      | 8       |
| Erko et al. [37]       | Ethiopia   | 2016             | Cross-sectional | 184         | 70.11      | 8       |
| Evens et al. [20]      | Kenya      | 2014             | Cross-sectional | 283         | 15.55      | 8       |
| Gallo et al. [48]      | Mozambique | 2004             | Cross-sectional | 332         | 37.05      | 7       |
| Hagos et al. [36]      | Ethiopia   | 2018             | Cross-sectional | 409         | 70.90      | 8       |
| Kassahun [35]          | Ethiopia   | 2017             | Cross-sectional | 459         | 68.85      | 7       |
| Kokeb et al. [34]      | Ethiopia   | 2015             | Cross-sectional | 414         | 59.18      | 8       |
| Lerna and Mpanga [47]  | Malawi     | 2000             | Cross-sectional | 464         | 80.39      | 7       |
| Mahomed et al. [49]    | Zimbabwe   | 1997             | Cross-sectional | 1009        | 91.97      | 7       |
| Makenziius et al. [42] | Kenya      | 2018             | Cross-sectional | 810         | 75.19      | 8       |
| Mekuria et al. [33]    | Ethiopia   | 2019             | Cross-sectional | 400         | 78.50      | 8       |
| Moges et al. [17]      | Ethiopia   | 2018             | Cross-sectional | 400         | 61.50      | 7       |
| Muche et al. [32]      | Ethiopia   | 2019             | Cross-sectional | 371         | 45.82      | 7       |
| Mutua et al. [41]      | Kenya      | 2019             | Cross-sectional | 2568        | 55.45      | 9       |
| Omyango et al. [40]    | Kenya      | 2010             | Cross-sectional | 403         | 30.52      | 8       |
| Packer et al. [51]     | Rwanda     | 2019             | Cross-sectional | 68          | 70.59      | 8       |
| Prata et al. [31]      | Ethiopia   | 2011             | Cross-sectional | 1200        | 77.67      | 7       |
| Rasch et al. [46]      | Tanzania   | 2004             | Cross-sectional | 788         | 89.85      | 8       |
| Rasch et al. [45]      | Tanzania   | 2008             | Cross-sectional | 392         | 88.52      | 7       |
| Samuel et al. [30]     | Ethiopia   | 2016             | Cross-sectional | 44682       | 80.68      | 8       |
| Seid et al. [29]       | Ethiopia   | 2012             | Cross-sectional | 282         | 47.52      | 8       |
| Solo et al. [39]       | Kenya      | 1999             | Cross-sectional | 319         | 48.28      | 7       |
| Stephens et al. [44]   | Tanzania   | 2019             | Cross-sectional | 8230        | 80.63      | 8       |
| Tesfaye and Oljira [28]| Ethiopia   | 2013             | Cross-sectional | 400         | 56.50      | 8       |
| Wanjiru et al. [43]    | Tanzania   | 2007             | Cross-sectional | 752         | 69.81      | 8       |
Fig. 2 Forest plot of the pooled prevalence of post-abortion family planning utilization in Eastern Africa

| Study ID | OR (95% CI) | Weight |
|----------|-------------|---------|
| Abamecha et al. (2016) | 72.93 (68.57, 77.29) | 3.45 |
| Abebe et al. (2019) | 84.00 (77.57, 90.43) | 3.31 |
| Asmare et al. (2005) | 78.26 (76.55, 79.97) | 3.56 |
| Araz et al. (2016) | 90.58 (88.14, 93.02) | 3.54 |
| Chukwuma et al. (2017) | 85.96 (83.92, 88.00) | 3.55 |
| Erko et al. (2016) | 70.11 (63.50, 76.72) | 3.29 |
| Evers et al. (2014) | 15.55 (11.33, 19.77) | 3.46 |
| Gallo et al. (2004) | 37.05 (31.86, 42.24) | 3.40 |
| Hagos et al. (2019) | 70.90 (66.50, 75.30) | 3.45 |
| Kassahun (2017) | 68.85 (64.61, 73.08) | 3.45 |
| Kokeb et al. (2015) | 59.18 (54.45, 63.91) | 3.43 |
| Lemma and Moonga (2000) | 80.39 (76.78, 84.00) | 3.49 |
| Mahomed et al. (1997) | 91.97 (90.29, 93.65) | 3.56 |
| Makekian et al. (2018) | 75.19 (72.22, 78.16) | 3.52 |
| Merkata et al. (2019) | 78.50 (74.47, 82.53) | 3.47 |
| Moges et al. (2018) | 61.50 (56.73, 66.27) | 3.42 |
| Muche et al. (2019) | 45.82 (40.75, 50.89) | 3.40 |
| Muta et al. (2019) | 55.45 (53.53, 57.37) | 3.55 |
| Onyango et al. (2010) | 30.52 (28.02, 32.02) | 3.44 |
| Pacini et al. (2019) | 70.59 (59.76, 81.42) | 2.91 |
| Prata et al. (2011) | 77.67 (75.31, 80.03) | 3.54 |
| Rasch et al. (2004) | 89.85 (87.74, 91.96) | 3.55 |
| Rasch et al. (2005) | 88.52 (85.36, 91.68) | 3.51 |
| Samuel et al. (2016) | 80.58 (80.31, 80.85) | 3.58 |
| Seid et al. (2012) | 47.52 (45.69, 49.35) | 3.35 |
| Soo et al. (1999) | 48.28 (42.80, 53.76) | 3.58 |
| Stephens et al. (2019) | 80.63 (78.79, 81.48) | 3.57 |
| Tesfaye and Oljins (2013) | 56.50 (51.64, 61.36) | 3.42 |
| Wanjiru et al. (2007) | 69.81 (65.53, 73.09) | 3.50 |
| Overall (I-squared = 99.2%, p < 0.001) | 67.88 (63.59, 72.12) | 100.00 |

NOTE: Weights are from random effects analysis

Fig. 3 Funnel plot with pseudo 95% confidence limits of the pooled prevalence of post-abortion family planning utilization in Eastern Africa
was observed in Mozambique with 37.05% (95% CI 31.86–42.24). Regarding sample size, the highest prevalence was observed in studies with a sample size of ≥1000 with 78.68% (95% CI 73.42–83.93).

Besides, we also executed a subgroup analysis based on publication year. Accordingly, the highest prevalence of post-abortion family planning utilization has occurred in studies published before 2006, which was 69.70% ([95% CI 53.83–85.58], $I^2 = 99.3, p < 0.001$) (Table 3).

**Types of post-abortion family planning methods utilized**

In this meta-analysis, women in post-abortion time utilized the common post-abortion family planning methods, namely, injectable 33.23% (95% CI 22.12–44.34), implants 24.71% (95% CI 13.53–35.89), oral contraceptive pills 23.42% (95% CI 19.95–26.89), intra-uterine devices 9.12% (95% CI 5.36–12.88), and condom 7.43% (95% CI 5.17–9.69) (Table 4).

**Sensitivity analysis**

We executed a leave-one-out sensitivity analysis to further investigate the potential source of heterogeneity observed in the pooled prevalence of post-abortion family planning utilization in Eastern Africa. Our sensitivity analysis suggested that our findings were robust and not dependent on a single study. The pooled estimated prevalence varied between 66.96 (62.59–71.33%) and

**Table 3** Subgroup prevalence of post-abortion family planning utilization in eastern Africa

| Variables      | Characteristics | Included studies | Number of study participants | Prevalence with (95% CI) | $I^2$, P-value |
|----------------|-----------------|-----------------|-----------------------------|--------------------------|----------------|
| Publication year | 2006 and above  | 24              | 67,125                      | 67.42 (62.85–71.98)      | 99.2, <0.001   |
|                 | Before 2006     | 5               | 2912                        | 69.70 (53.83–85.58)      | 99.3, <0.001   |
| Sample size     | ≥ 1000          | 7               | 61,031                      | 78.68 (73.42–83.93)      | 99.3, <0.001   |
|                 | < 1000          | 22              | 9006                        | 64.21 (55.56–72.86)      | 99.0, <0.001   |
| Country         | Ethiopia        | 15              | 52,508                      | 69.75 (65.08–74.43)      | 97.9, <0.001   |
|                 | Kenya           | 5               | 4383                        | 45.04 (26.05–64.04)      | 99.4, <0.001   |
|                 | Tanzania        | 4               | 10,162                      | 82.25 (75.35–89.15)      | 97.7, <0.001   |
|                 | Malawi          | 1               | 464                         | 80.39 (76.78–84.00)      | -              |
|                 | Rwanda          | 1               | 68                          | 70.59 (59.76–81.42)      | -              |
|                 | Somalia         | 1               | 1111                        | 85.96 (83.92–88.00)      | -              |
|                 | Mozambique      | 1               | 332                         | 37.05 (31.86–42.24)      | -              |
|                 | Zimbabwe        | 1               | 1009                        | 91.97 (90.29–93.65)      | -              |
| Overall         |                 | 29              | 70,037                      | 67.86 (63.59–72.12)      | 99.2, <0.001   |

Fig. 4 Trim-fill analysis filled funnel plot with 95% confidence limits of the pooled prevalence of post-abortion family planning utilization in Eastern Africa
69.78% (66.00–73.57%) for post-abortion prevalence after the deletion of a single study (Table 5).

Factors associated with post-abortion family planning utilization

Association between marital status and post-abortion family planning utilization

In this meta-analysis, four studies were included to see the association between marital status and post-abortion family planning utilization. Those women who had married marital status were 3.2 times more likely to use family planning during the post-abortion period compared to their counterparts (AOR=3.20; 95% CI 2.02–5.05) (Fig. 5).

Association between parity and post-abortion family planning utilization

Two studies also indicated that multiparity was strongly associated with post-abortion family planning utilization. Multiparous women were 3.84 times more likely to use family planning during the post-abortion period compared to their counterparts (AOR=3.84; 95% CI 1.43–10.33) (Fig. 6).

Association between having a history of abortion and post-abortion family planning utilization

Two studies also indicated that the history of abortion was strongly associated with post-abortion family planning utilization. Those women who had a history of abortion were 2.33 times more likely to utilize family planning during the post-abortion period compared to their counterparts (AOR=2.33; 95% CI 1.44–3.75) (Fig. 7).

Association between getting counselling on post-abortion family planning and its utilization

Furthermore, eight study results from the meta-analyses of the study (Fig. 8) have also revealed that getting counselling about post-abortion family planning was a significant factor associated with post-abortion family planning utilization of women. Women who had got counselling on post-abortion family planning were 4.63 times more likely to use family planning compared to their counterparts (AOR=4.63; 95% CI 3.27–6.56) (Fig. 8).

Table 4 Pooled prevalence of post-abortion family planning methods among women in eastern Africa

| Type of post-abortion family planning methods | Pooled prevalence 95% | I-squared |
|---------------------------------------------|-----------------------|-----------|
| Injectable                                   | 33.23 (22.12–44.34)   | 99.8, p<0.001 |
| Implants                                    | 24.71 (13.53–35.89)   | 99.8, p<0.001 |
| Oral contraceptive pills (OCP)              | 23.42 (19.95–26.89)   | 97.5, p<0.001 |
| Intrauterine devices (IUD)                  | 9.12 (5.36–12.88)     | 99.0, p<0.001 |
| Female condom                               | 7.43 (5.17–9.69)      | 98.2, p<0.001 |
| Female sterilization                        | 0.35 (0.19–0.89)      | 95.2, p<0.001 |

Table 5 Sensitivity analysis of prevalence for each study being omitted with 95% CI prevalence of post-abortion family planning methods in eastern Africa

| Study omitted                  | Prevalence | 95% CI   |
|-------------------------------|------------|----------|
| Abamecha et al. [15]          | 67.67      | 63.31–72.03 |
| Abebe et al. [18]             | 67.30      | 62.95–71.65 |
| Alemayehu et al. [38]         | 67.46      | 62.95–71.96 |
| Asrat et al. [16]             | 67.02      | 62.65–71.39 |
| Chukwumalu et al. [50]        | 67.18      | 62.75–71.61 |
| Erko et al. [37]              | 67.78      | 63.43–72.12 |
| Evens et al. [20]             | 69.78      | 66.00–73.57 |
| Gallo et al. [48]             | 68.95      | 64.75–73.15 |
| Hagos et al. [36]             | 67.74      | 63.38–72.10 |
| Kassahun [35]                 | 67.82      | 63.46–72.17 |
| Kokeb et al. [34]             | 68.16      | 63.84–72.48 |
| Lema and Mpanga [47]          | 67.39      | 63.02–71.77 |
| Mahomed et al. [49]           | 66.96      | 62.59–71.33 |
| Makenzius et al. [42]         | 67.58      | 63.19–71.97 |
| Mekuria et al. [33]           | 67.47      | 63.09–71.84 |
| Morges et al. [17]            | 68.08      | 63.75–72.41 |
| Muche et al. [32]             | 68.64      | 64.38–72.89 |
| Mutua et al. [41]             | 68.34      | 64.27–72.41 |
| Onyango et al. [40]           | 69.21      | 65.13–73.28 |
| Packer et al. [51]            | 67.77      | 63.43–72.11 |
| Prata et al. [31]             | 67.49      | 63.06–71.91 |
| Rasch et al. [46]             | 67.04      | 62.65–71.43 |
| Rasch et al. [45]             | 67.10      | 62.73–71.47 |
| Samuel et al. [30]            | 67.31      | 61.58–73.04 |
| Seid et al. [29]              | 68.56      | 64.28–72.84 |
| Solo et al. [39]              | 68.54      | 64.26–72.82 |
| Stephens et al. [44]          | 67.33      | 62.25–72.42 |
| Tesfaye and Olijira [28]       | 68.26      | 63.95–72.57 |
| Wanjiru et al. [43]           | 67.78      | 63.41–72.15 |
Association between ever used contraceptives and post-abortion family planning utilization

In this meta-analysis, three study results revealed that ever used contraceptive method was a significant factor associated with post-abortion family planning utilization. Women who had ever used contraceptive methods were 3.44 times more likely to use family planning compared to those women who had not used contraceptive methods (AOR=4.63; 95% CI 2.27–5.21) (Fig. 9).

Discussions

Low post-abortion family planning utilization is considered as one of the primary and major causes of induced abortion or spontaneous abortion or stillbirth since most post-abortion women are at risk of pregnancy almost immediately. Therefore, this systematic review and meta-analysis aimed to estimate the pooled prevalence of post-abortion family planning utilization and its associated factors in Eastern Africa. In this meta-analysis, the overall pooled prevalence of post-abortion family
planning utilization in Eastern Africa was 67.86% (95% CI 63.59–72.12). This is lower than the study done in Brazil 97.4% [52], Asia and Sub-Saharan Africa (SSA) 77% [53], Pakistan 73% [54], and India 81% [55]. However, it is higher than a study done in Kenya 60.9% [56] and Nepal 49.5% [57]. This might be due to variation in sample size and differences in socioeconomic status, sociocultural values, norms, religious beliefs, and study setting of the study populations. Besides, it might be due to differences in post-abortion counselling practices, availability of family planning methods and services, and more than half of the included studies in the final meta-analysis were from Ethiopia.

### Fig. 7
The overall pooled odds ratio of the association between history of abortion and post-abortion family planning utilization in Eastern Africa

### Fig. 8
The overall pooled odds ratio of the association between post-abortion contraceptive counselling and post-abortion family planning utilization in Eastern Africa

| Study                      | %   | OR (95% CI) | Weight |
|----------------------------|-----|-------------|--------|
| Kassahun (2017)            |     | 3.35 (1.38, 8.12) | 29.27  |
| Mekuria et al. (2019)      |     | 2.00 (1.13, 3.53)  | 70.73  |
| Overall (I-squared = 0.0%, p = 0.337) | | 2.33 (1.44, 3.75) | 100.00 |

**NOTE:** Weights are from random effects analysis.
Regarding the subgroup analysis, the highest prevalence was observed in Zimbabwe with 91.97% (95% CI 90.29–93.65), and the lowest prevalence was observed in Mozambique with 37.05% (95% CI 31.86–42.24). The possible justification could be due to the difference in the participant’s level of awareness, educational level, religious beliefs, and various misconceptions and large gaps in the availability and distribution of facilities with basic and comprehensive post-abortion care capabilities across countries. Besides, in Zimbabwe, there is a strong family planning program with one of the highest contraceptive prevalence rates in Sub-Saharan Africa (SSA). Zimbabwe also has a restrictive abortion law, with legal abortion limited to circumstances of rape, incest, fetal impairment, or to save the woman’s life [17, 58].

In this study, the overall post-abortion family planning utilization was highest in studies published before 2006, which was 69.70% compared to studies published in 2006. The probable reason might be only five studies with a small sample size that were published before 2006 were included in the analysis, which might contribute to the higher utilization of post-abortion family planning methods. Additionally, those published articles before 2006 also include studies done in Zimbabwe which has one of the lowest abortion rates in Sub-Saharan Africa, likely due to high contraceptive use and a robust family planning program [59].

Regarding the type of post-abortion family planning methods utilized, the most commonly utilized post-abortion family planning was injectable 33.23% (95% CI 22.12–44.34), implants 24.71% (95% CI 13.53–35.89), oral contraceptive pills 23.42% (95% CI 19.95–26.89), intrauterine devices 9.12% (95% CI 5.36–12.88), and condom 7.43% (95% CI 5.17–9.69). This is in line with a study conducted in Brazil, Pakistan, India, and Nepal [52, 54, 55, 57]. This might be due to most women preferring to use short-acting methods to conceive after a short period due to higher pregnancy desire. Moreover, it might be due to provider bias towards specific methods, general demand for short-term methods (including the barriers women face in accessing longer-term methods like health care coverage, ongoing source of care, quality of care, disparate access to health information, contraception myths, and increased apprehension of side effects), and supply-related concerns might also contribute.

Women who were married were more likely to utilize post-abortion family planning compared to single women. This finding is consistent with the study conducted in Gondar, Ethiopia [60]. This might be due to married women may be likely to be having sex more regularly than unmarried women, which may explain their high post-abortion family planning utilization. Besides, currently, married women’s decision-making power on family planning has been raised [61, 62] and contraceptive prevalence continues to increase [63]. Similarly, multiparous women were more likely to utilize post-abortion family planning compared to their counterparts. This might be due to multiparous women who were at higher risk of death due to recurrent abortion, anemia, diabetes mellitus, and other chronic diseases; as a result, they decided to use post-abortion family planning methods.
planning for the recommended period before getting pregnant again. Moreover, multiparous women might want to limit their number of children. Additionally, the multiparous mother may feel more confident to decide on post-abortion family planning individually and by discussing with her partner.

The odds of post-abortion family planning utilization were higher among those women who had a history of abortion compared to those women who had not a history of abortion. This might be due to women who had a history of abortion may get counselling on family planning methods, and they became awarded on the use of post-abortion family planning methods. Similarly, the odds of post-abortion family planning utilization were higher among those women who got counselling on family planning methods as compared with their counterparts. This might be explained that women who get counselling about family planning methods may easily understand the risks of frequent pregnancy for women and the growing fetus, which ultimately increases post-abortion family planning utilization.

Post-abortion family planning utilization was higher among women who used contraceptives compared to those women who never used any contraceptives. This finding is supported by a study conducted in Pakistan [54]. This might be due to women who ever used contraceptives had previous exposure to family planning services, which might influence the awareness of women towards post-abortion family planning utilization. Besides, there is limited evidence contributing to each pooled odds ratio (OR) result in the final meta-analysis.

Limitations of the study
The study designs for all primary articles incorporated in this review were cross-sectional; as a result, the confounding variables most of the time might affect the outcome variable. Furthermore, only papers published in English were included in the review. Most of the publications were from a few countries in eastern Africa which may not be representative of the subregion, and there is also a limited sample size from some countries which makes it difficult to conclude for the entire population of the country. Lastly, relevant research published in another language, or not indexed in the selected databases, has been excluded.

Conclusion
This study revealed that the marital status of the women, multiparity, having a history of abortion, getting counselling on post-abortion family planning, and ever used contraceptives were found to be significantly associated with post-abortion family planning utilization. Therefore, based on the study findings, the authors recommended that policies and protocols should be updated to eliminate barriers such as the requirement that women and adolescents have to be married or have parental or spousal consent for contraceptive services. Advocacy is needed from policymakers and governments for ensuring quality post-abortion family planning services and reducing the unmet need for family planning by giving individualized and patient-centred post-abortion family planning counselling and client interaction, upgrading clinical skills on post-abortion contraceptive methods and implementing efforts to reduce stigma. Generally, health systems and providers in Eastern Africa need support to ensure quality PAC in the face of a reportedly high burden of complications arising from unsafe abortion in the subregion. There is a disturbing lack of evidence on PAFP utilization in most countries in the subregion. As a result, little is known about the utilization of PAFP services in the majority of Eastern African countries. Research with longer follow-up with women, a more rigorous study design with more qualitative support to understand women’s reasons for or objections to PAFP, is needed to fill these knowledge gaps.

Abbreviations
ANC: Antenatal care; CI: Confidence interval; CSA: Central Statistical Agency; EDHS: Ethiopian Demographic and Health Survey; EMDHS: Ethiopian Mini Demographic and Health Survey; OR: Odds ratio; PAFP: Post-abortion family planning; WHO: World Health Organization

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s13643-021-01731-4.

Additional file 1: Table S1 PRISMA 2009 Checklist

Acknowledgements
Not applicable.

Authors’ contributions
All authors critically reviewed and contributed to the intellectual content of this systematic review and meta-analysis. The authors read and approved the final manuscript.

Funding
The authors did not receive funds from any funding agency.

Availability of data and materials
The dataset supporting the conclusions of this article is available from the authors on request.

Declarations

Ethics approval and consent to participate
Not applicable

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.
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