



Research article

The level and deriving factors of repeat-induced abortion in Ethiopia: A systematic review and meta-analysis

Maru Mekie^{a,*}, Dagne Addisu^a, Enyew Dagne^a, Worku Necho^b^a Department of Midwifery, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia^b Department of Neonatal and Child Health Nursing, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia

ARTICLE INFO

Keywords:

Repeat abortion
Prevalence
Predictors
Systematic review
Meta-analysis

ABSTRACT

Background: Despite repeat induced abortion is a growing challenge for both developing as well as developed countries, abortion-related complications are found to be higher among women in developing countries. This systematic review and meta-analysis was intended to assess the level of repeat-induced abortion and its deriving factors in Ethiopia.

Methods: Different data sources such as PubMed, EMBASE, Google Scholar, and University online data bases were used to identify candidate articles for this systematic review and meta-analysis. The article search was conducted from June 10 to 26, 2020. The Newcastle-Ottawa Quality Assessment Scale (NOS) was used to assess the quality of the included studies. Data extraction was performed through a format prepared on Microsoft excel work book and exported to Stata 11 for analysis. The heterogeneity of the studies was tested using Cochran (Q test) and I² test statistics. Publication bias was assessed by funnel plot and Egger's regression asymmetry test. Subgroup-analysis was conducted based on sample size and study Regions.

Results: Five studies with 2000 participants who visited health facilities for abortion services were included in this systematic review and meta-analysis. The pooled level of repeat-induced abortion was found to be 29.93% (95% CI 23.15%, 36.71%). Urban residence (OR = 5.10, 95% CI 2.51, 10.33), illiteracy (OR = 4.12, 95% CI 2.40, 7.07), having multiple sexual partners (OR = 6.28, 95% CI 4.28, 9.22), and early sexual initiation (OR = 3.80, 95% CI 1.76, 8.19) were found to be the deriving factors for experiencing repeat induced abortion. However, there was no significant association between ever use of family planning and repeat induced abortion (OR = 1.03, 95% CI 0.09, 11.59).

Conclusion: The level of repeat-induced abortion was found to be high in Ethiopia. High risk of experiencing repeat-induced abortion was reported among participants who were urban residents, illiterate, who had multiple sexual partners, and early sexual initiation. However, a statistically significant association was not found between ever use of family planning and repeat-induced abortion. Health education shall be given about the risk of subsequent abortion and the relevance of avoiding unintended pregnancy, multiple sexual partners, and early sexual initiations through various mechanisms.

1. Introduction

One-quarter of pregnancies worldwide ended with abortion in 2010–2014. Nearly 7 million women in developing countries are treated for complications of unsafe abortions and at least 22,000 die from abortion-related complications every year [1]. According to studies, unsafe abortion was responsible for nearly one-third of maternal deaths in Africa, and half of maternal death in Sub-Saharan Africa. The rates of abortion are almost similar among developing and developed countries with 29 per 1000 women and 26 per 1000

women respectively [2, 3]. However, complications related to abortion are higher among women in developing countries compared to developed ones.

Repeat-induced abortion continues to be a growing challenge for developing as well as developed countries [4, 5]. A study in Sweden indicated that 35% of abortions were found to be repeat abortions [4]. On the other hand, a study conducted in Kenya indicated that 16% of women seeking post-abortion services for an induced abortion were reported to be repeat abortion [6]. Women all over the world are likely to undertake unsafe abortions when encountering unplanned pregnancy

* Corresponding author.

E-mail address: maru.mekie1@gmail.com (M. Mekie).<https://doi.org/10.1016/j.heliyon.2021.e05984>

Received 24 October 2020; Received in revised form 19 November 2020; Accepted 11 January 2021

2405-8440/© 2021 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

and provisions for safe abortions are restricted, unavailable, or inaccessible at all. Poor family planning coverage and poor access to reproductive health services play an important role in increasing abortion rates particularly repeat induced abortion [7, 8, 9]. Women who receive abortion services shall be counseled about the mechanisms how to prevent unintended pregnancy and the risk of consecutive abortion [10, 11, 12].

The government of Ethiopia revised the abortion law in 2005 to reduce morbidity and mortality related to abortion complications [13]. A study conducted about trends of abortion complications in the transition period of the revised abortion law from 2003 to 2007 indicated that there was no significant reduction of abortion complications in five years. The study even indicated that the case fatality rate of abortion has increased from 1.1% in 2003 to 3.6% in 2007 [14].

Different factors play a substantial role in the increased proportion of induced abortion. Sexual initiation at an earlier age [10], parity [4, 10], illiteracy/low educational level [4, 6], lack of emotional support, unemployment or sick leave, and tobacco use [4], being not in union, having an unwanted pregnancy, having one to two prior births, and using traditional methods of contraception [6] were reported to be the significant predictors of repeat-induced abortion. A systematic review conducted about induced abortion indicated that poor contraceptive use, domestic abuse, and other adverse life events were found to be the predictors of repeat-induced abortion [15]. Individuals with repeat-induced abortion are more likely to experience long term obstetric complications in subsequent pregnancies in addition to short term complications [16]. Women who undergo repeat-induced abortion are also more likely to experience a feeling of shame and stigma compared with those who visited health facilities for the first time. Women's contraceptive choice following an abortion is a major factor in determining the likelihood of experiencing repeat-induced abortion since most prefers to use short acting methods with high failure rates [17].

National representative evidence is lacking in developing countries regarding the level and deriving factors of repeat-induced abortion. This systematic review and meta-analysis was aimed to assess the level of repeat-induced abortion and its deriving factors in Ethiopia. The finding of this study provides evidence for intervention to reduce the burden of repeat-induced abortion and its complications in the country.

2. Methods

Following the retrieval of both published and unpublished studies with different databases including University repositories (Master thesis, Ph.D. Dissertations, and Conference proceedings), this systematic review and meta-analysis was conducted to assess the level and deriving factors of repeat-induced abortion in Ethiopia.

2.1. Search strategy and study selection

Both published and unpublished studies conducted about the level and deriving factors of repeat-induced abortion in Ethiopia were searched. Different databases such as PubMed, EMBASE, Google Scholar, and University online repositories (master thesis, Ph.D. dissertations, and conference proceedings) were used to search candidate articles for the systematic review and meta-analysis. Separate search terms were used for PubMed and Google Scholar databases (Table 1).

The selection and exclusion of studies for the systematic review and meta-analysis was presented using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Figure 1). Similarly, the quality of our systematic review and meta-analysis was assessed by the AMSTAR checklist which is a measurement tool to assess the methodological quality of systematic reviews [18].

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

Observational studies (both published and unpublished) conducted in Ethiopia on repeat-induced abortion among women who seek abortion services were included in this systematic review and meta-analysis. Studies reported in the English language from January 2005 to June 26, 2020, were included.

2.2.2. Exclusion criteria

Studies that did not report the outcome of interest and not fully accessible were excluded.

2.3. Data extraction

Data extraction format was prepared on Microsoft excel worksheet. The data extraction format was prepared by MM and DA for extracting data on the prevalence of repeat-induced abortion and predictor variables. The extraction format on excel workbook includes author name, publication year, study region, study site, study design, study period, sample size, prevalence, and standard error of the prevalence. Moreover, the extraction form includes possible deriving factors of repeat-induced abortion like the place of residence, age at first sexual initiation, multiple sexual partners, level of education of the participants, and ever/current use of contraceptives.

2.4. Measurement of the outcome variable

Induced abortion refers to deliberate intervention to terminate a pregnancy either by a health professional or by the woman herself. In this

Table 1. Search strategies used for PubMed and related databases.

Data bases	Search terms	Number of studies
PubMed/Medline	("epidemiology"[Subheading] OR "epidemiology"[All Fields] OR "prevalence"[All Fields] OR "prevalence"[MeSH Terms]) OR "incidence"[MeSH terms] AND "repeat"[All Fields] AND ("abortion, induced"[MeSH Terms] OR ("abortion"[All Fields] AND "induced"[All Fields]) OR "induced abortion"[All Fields] OR ("induced"[All Fields] AND "abortion"[All Fields])) OR "miscarriage"[all fields] AND "associated"[All Fields] AND "factors"[All Fields] OR "Determinant factors"[All Fields] AND ("ethiopia"[MeSH Terms] OR "ethiopia"[All Fields]) AND ("2005/01/01"[PubDate]: "2020/06/26"[PubDate]).	1502
Google scholar	"Epidemiology" OR "epidemiology" OR "prevalence" AND repeat AND "induced abortion" AND "associated factors" OR "Determinant factors" AND "Ethiopia" ("2005/01/01"[Pub Date]: "2020/06/26"[Pub Date]).	102
Other data bases		90
Gray literature		1
Total search		1694
Numbers candidate for inclusion		6
Excluded with reasons		1
Studies included in the analysis		5

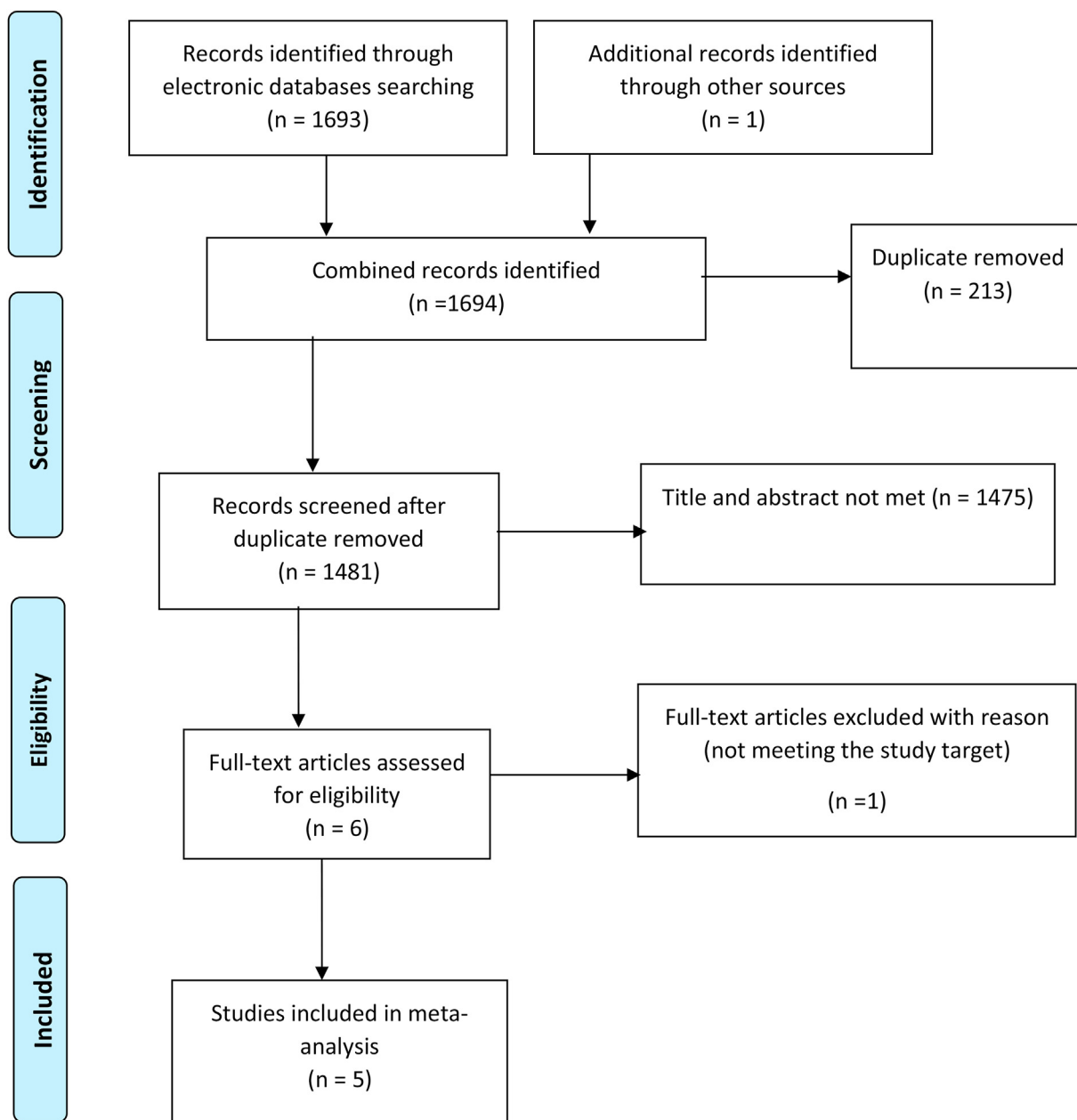


Figure 1. PRISMA flow chart revealing study selection for systematic review and meta-analysis of repeat-induced abortion in Ethiopia.

study, repeat-induced abortion was considered when participants had experienced induced abortion two or more times [19].

2.5. Data quality assurance

Two authors, MM, and DA independently reviewed the titles and abstracts of studies to be included in this systematic review and meta-analysis. Then articles were exported to Endnote 7 to manage duplications. Disagreements on inclusion and exclusion of the studies were resolved through the involvement of the third (ED) and the fourth (WN) authors. The quality appraisal of studies was assessed using the Newcastle-Ottawa Quality Assessment Scale (NOS). Representativeness of the sample, the sample size, non-response rate, the ascertainment of

the risk factor, the comparability of outcome groups, management of the confounding factors, the assessment of the outcome variable, and the statistical tests used were the criteria used to assess the quality of the studies for inclusion in this systematic review and meta-analysis. Hence, the included studies were found to have a quality score of 7–9 using the NOS quality assessment scale (Table 2).

2.6. Statistical analysis

Following the extraction, data were exported to Stata version 11 software for analysis. Publication bias was assessed by using a funnel plot and Egger's regression asymmetry test. Similarly, the pooled level of repeat-induced abortion and its predictor variables were presented using

Table 2. Characteristics of studies reporting repeat-induced abortion in Ethiopia.

Author	Publication year	Region	Study area	Study design	Sample size	Population with outcome	Prevalence	Response rate	Risk of bias
Alemayehu B. et al [26]	2019	Addis Ababa City administration	Addis Ababa Health facilities	Cross-sectional	429	144	33.56	97	Low risk
Alemayehu M. et al [25]	2017	Tigray Region	Tigray Hospitals	Case-control	314	105	-	98.4	Low risk
Getachew Ferede [27]	2014	Addis Ababa City administration	Addis Ababa Mari stops clinic	Cross-sectional	355	110	30.98	100	Low risk
Waktola et al [24]	2020	Amhara Region	Debre Markos Health facilities	Cross-sectional	547	191	34.91	96.5	Low risk
Behulu et al [23]	2019	Amhara Region	Debre Birhan Health facilities	Cross-sectional	355	72	20.28	97.18	Low risk

a forest plot with a 95% confidence interval. Moreover, Cochran (Q test) and I^2 test were used to assess the random variations between primary studies [20]. Hence, heterogeneity was interpreted as an I^2 value = 0% as no heterogeneity, 25% = low heterogeneity, 50% = moderate heterogeneity, and 75% = high heterogeneity [21]. To estimate the pooled level of repeat-induced abortion and its deriving factors, a random effect model was used by assuming the existence of variability between and within studies.

3. Results

A total of 1694 studies were retrieved through electronic databases and University repositories. Two hundred thirteen studies were excluded due to duplicates, giving 1481 studies. After the review of titles and abstracts, 1475 studies were excluded. Then one study was excluded with reason (not meeting the study target). Finally, five full articles were included in this systematic review and meta-analysis (Figure 1).

3.1. Characteristics of included studies

A total of 5 studies (four published studies and one unpublished study) conducted about repeat induced abortion published from January 2005 to June 26, 2020, were included in the systematic review and meta-analysis. Studies with a total of 2000 women who visited a health facility for abortion services were included. The NOS quality assessment tool was used to assess the quality of the included studies [22]. Studies with quality score of ≥ 7 were considered as low risk for bias based on the NOS quality assessment scores. The included studies were conducted in Amhara Region [23, 24], Tigray Region [25], and Addis Ababa City Administration [26, 27] (Table 2).

3.2. The prevalence of repeat induced abortion based on individual studies

The prevalence of repeat-induced abortion was reported to be higher in the study by Waktola et al [24] (34.92, 95% CI 30.92, 38.91) followed by the study by Alemayehu B. et al [26] (33.57, 95% CI 29.10, 38.03). Whereas, the prevalence was found to be low in the study by Behulu et al [23] (20.28, 95%, CI 16.10, 24.46).

3.3. Meta-analysis

3.3.1. The level of repeat-induced abortion

The pooled level of repeat-induced abortion in Ethiopia was found to be 29.93% (95%, CI 23.15%, 36.71%). Four studies were used to estimate the pooled level of repeat-induced abortion in Ethiopia (Figure 2). One study was excluded in the estimation of the pooled level of repeat-induced abortion since it was a case-control study [25].

3.3.2. Assessment of publication bias and heterogeneity

Publication bias was assessed using visual inspection of the funnel plot (Figure 3) and Egger's asymmetry test. Egger's regression asymmetry test indicated that there was no evidence of publication bias with a P-value of 0.938.

As illustrated in (Figure 2), high heterogeneity was observed between the included primary studies while estimating the pooled level of repeat-induced abortion in Ethiopia. Hence, to discover the sources of heterogeneity, subgroup analysis was conducted based on sample size and study Regions (Figure 4 and Figure 5).

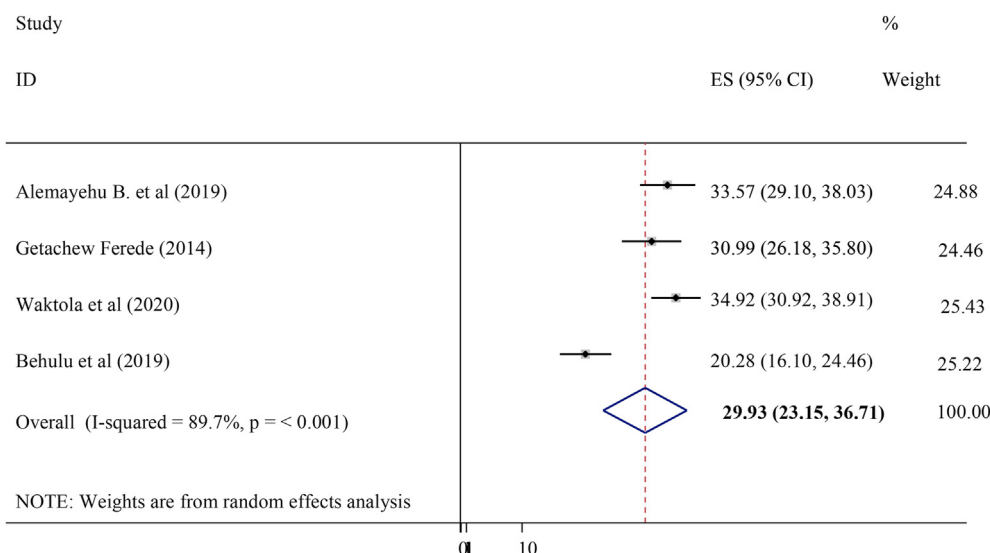


Figure 2. Forest plot of the pooled level of repeat-induced abortion in Ethiopia.

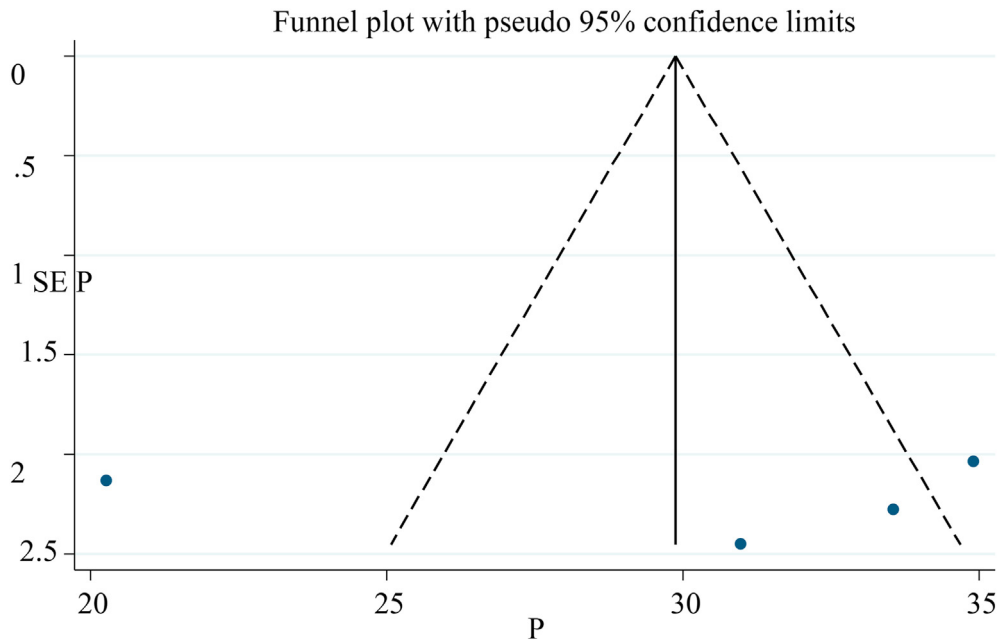


Figure 3. Funnel plot assessing publication bias of the pooled level of repeat-induced abortion in Ethiopia.

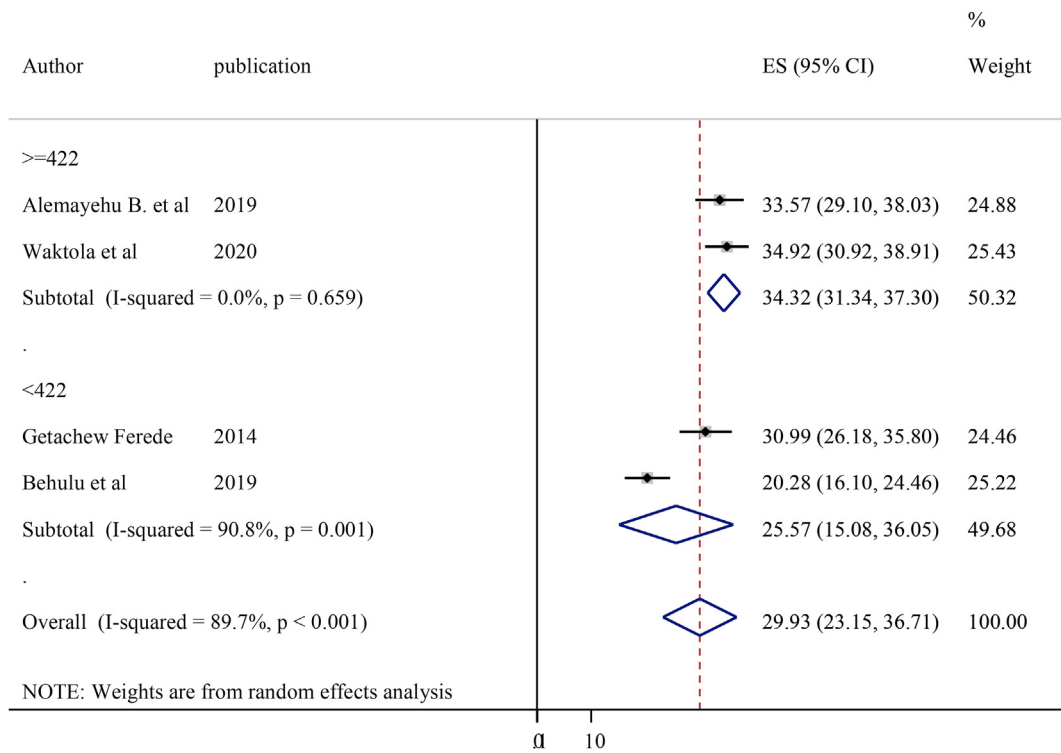


Figure 4. Forest plot of the subgroup analysis of the level of repeat-induced abortion based on sample in Ethiopia.

3.3.3. Subgroup analysis of the level of repeat-induced abortion in Ethiopia

In this meta-analysis, we have performed subgroup analysis based on the sample size of the included studies and study Regions to determine the sources of heterogeneity between primary studies. The finding revealed that the level of repeat-induced abortion was found to be higher in studies with sample size of ≥ 422 (Figure 4) and Addis Ababa City Administration (Figure 5) with no heterogeneity between studies.

Whereas, high heterogeneity was observed among studies with a sample size of < 422 and Amhara Region.

3.3.4. Subgroup analysis based on the sample size

The level of repeat-induced abortion was found to be higher among studies with sample size of ≥ 422 ($P = 34.32\%$, 95% CI 31.34%, 37.30%) compared to studies with sample size of < 422 ($P = 25.57\%$, 15.08%,

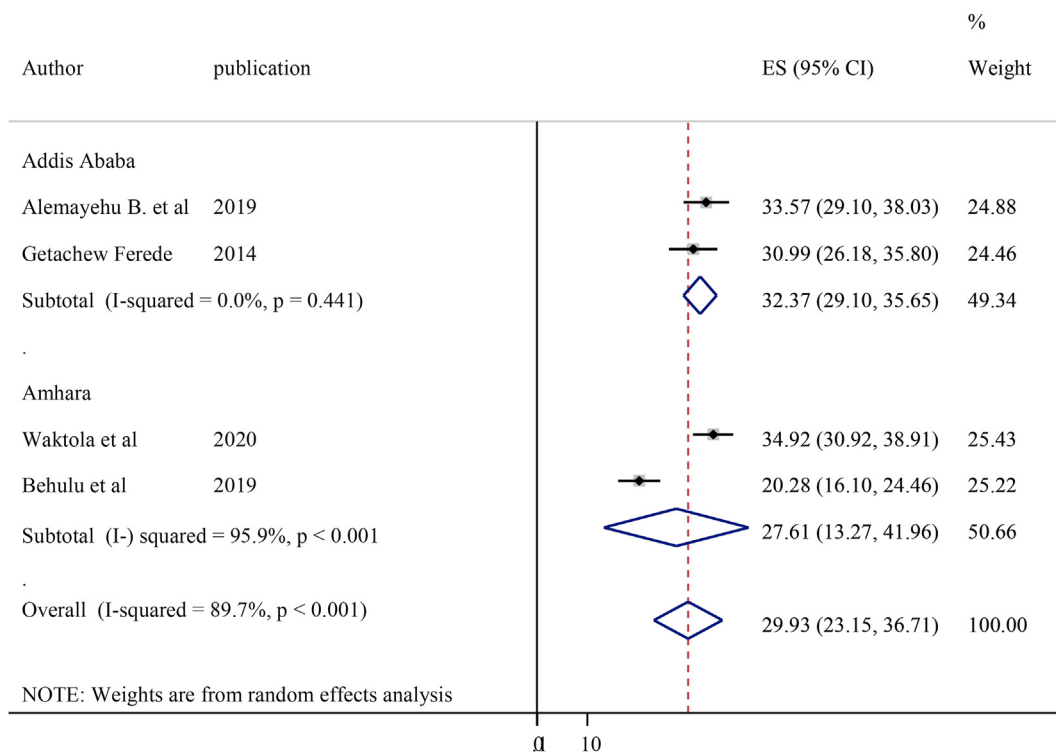


Figure 5. The subgroup analysis of the pooled level of repeat-induced abortion based on study Regions in Ethiopia.

36.05%). The subgroup analysis based on sample indicated that there was no heterogeneity among studies with a sample size of ≥ 422 ($I^2 = 0\%$, $p = 0.659$). However, significant heterogeneity was observed among

studies with a sample size of < 422 ($I^2 = 90.8\%$, $p = 0.001$) (Figure 4). The sample mean was used to perform subgroup analysis of the included studies based on sample size.

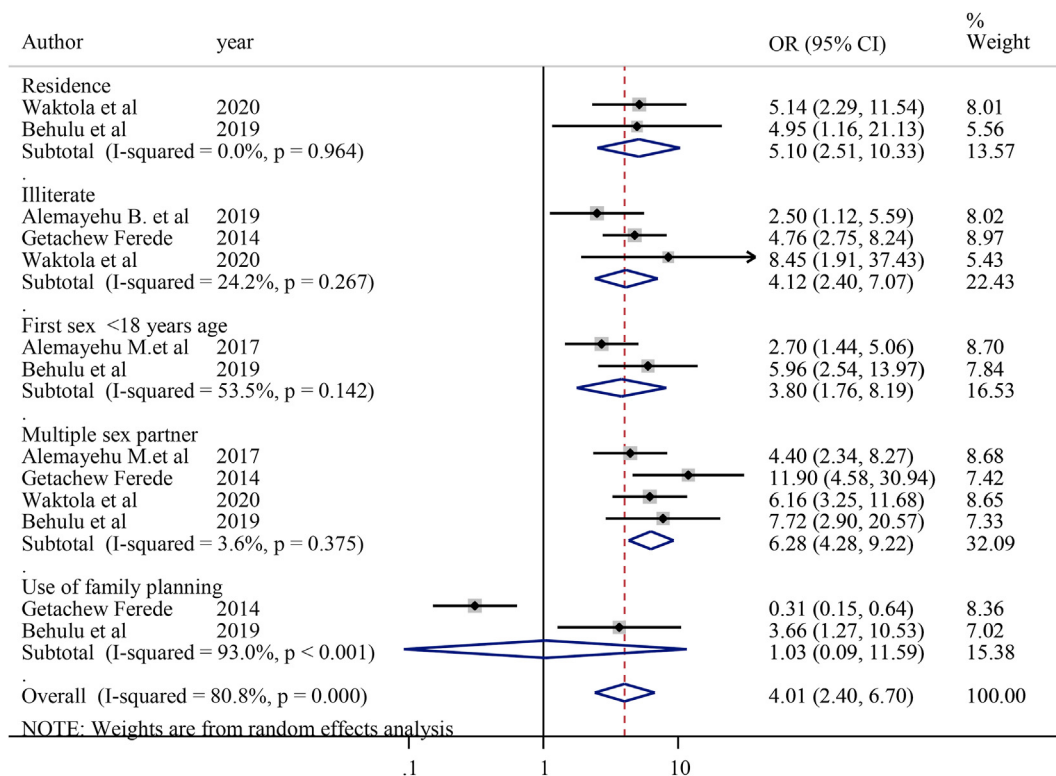


Figure 6. Forest plot of variables associated with repeat-induced abortion in Ethiopia.

3.3.5. Subgroup analysis based on the study regions

The subgroup analysis of repeat-induced abortion based on study Regions indicated that the level of repeat-induced abortion was found to be high in Addis Ababa 32.37% (95%, CI 29.10%, 35.65%) with no heterogeneity between studies ($I^2 = 0\%$, $p < 0.441$) followed by Amhara Region 27.61% (95%, CI 13.27%, 41.96%) with high heterogeneity between studies ($I^2 = 95\%$, $p < 0.001$) (Figure 5).

3.3.6. The deriving factors of repeat induced abortion in Ethiopia

The finding of this meta-analysis indicated that rural residence, being illiterate, having multiple sexual partners, and first sexual engagement before 18 years of age were the deriving factors for undergoing repeat-induced abortion (Figure 6).

3.3.7. Factors associated with repeat-induced abortion in Ethiopia

Statistically, a significant association was observed between residence and repeat-induced abortion [23, 24]. The risk of experiencing repeat-induced abortion was found to be 5.20 times higher among urban residents compared to the rural counterparts (OR = 5.10, 95%, CI 2.51, 10.33) with no heterogeneity between studies ($I^2 = 0.0\%$, $p = 0.964$). Similarly, the education level of the participants was found to be the predictor of repeat-induced abortion [24, 26, 27]. The odds of experiencing repeat-induced abortion were found to be 4.12 times higher among illiterates compared with participants with above secondary level of education (OR = 4.12, 95%, CI 2.40, 7.07) with low heterogeneity between primary studies used ($I^2 = 24.2\%$, $p = 0.267$) (Figure 6).

Age at first sexual initiation was found to be the determinant factor of experiencing repeat-induced abortion in this systematic review and meta-analysis [23, 25]. Study participants who reported engaging in sex before age 18 years were 3.80 times more likely to have repeat-induced abortion compared with counterparts (OR = 3.80, 95%, CI 1.76, 8.19) with moderate heterogeneity ($I^2 = 53.5\%$, $p = 0.142$) (Figure 6).

With regards to the number of sexual partners, participants who had multiple sexual partners were found to have increased odds of experiencing repeat-induced abortion compared with those who had a single sexual partner (OR = 6.28, 95% CI 4.28, 9.22) with low heterogeneity between the included studies ($I^2 = 3.6\%$, $p = 0.375$). Four studies were used to determine the association between having multiple sexual partners and the risk of experiencing repeat-induced abortion [23, 24, 25, 27]. However, a statistically significant association was not found between ever use of family planning and repeat-induced abortion by using two primary studies [23, 27] (OR = 1.03, 95%, CI 0.09, 11.59) with high heterogeneity between the included studies ($I^2 = 93.0\%$, $p < 0.001$) (Figure 6).

4. Discussion

Repeat-induced abortion is a growing problem that claimed millions of lives in developing countries. Despite there is a reduction in abortion-related admissions following the 2005 revised abortion law, significant numbers of adolescent girls and women are still facing repeat-induced abortion in Ethiopia [24, 26]. We aimed to assess the pooled level of repeat-induced abortion and its deriving factors in Ethiopia. The pooled level of repeat-induced abortion in Ethiopia was found to be 29.93% (95%, CI 23.15%, 36.71%). The finding of our systematic review and meta-analysis is supported by studies conducted in Ghana [28] and Sweden [4] which reported 34.6% and 35% of repeat-induced abortions respectively [4, 28]. However, the finding of our systematic review and meta-analysis is higher than a study conducted in Kenya which reported 16% of repeat-induced abortion [6]. The discrepancy between the levels of repeat-induced abortion might be attributed to the variation in the level of understanding between study population and the difference in health policy of the countries. This finding indicated that repeat-induced abortion is a challenge for both developing and developed countries. Improving access and availability of effective family planning methods could be important to reduce the risk of repeat-induced abortion [4, 11, 29].

The subgroup analysis of the level of repeat-induced abortion based on the study Regions was found to be higher in Addis Ababa 32.37% (95%, CI 29.10, 35.65) with no heterogeneity between studies followed by Amhara Region 27.61% (95%, CI 13.27%, 41.96%) with high heterogeneity between the included studies. The possible explanation for the variation could be variation in access to abortion services in which access to abortion services might be high in Addis Ababa in contrast to Amhara Region since the included studies were conducted at the institution level. The higher level of repeat-induced abortion might also be related to failure to provide education about the risk of repeat-induced abortion and the mechanisms how to counteract unintended pregnancy. The utilization of contraception helps women to avoid unintended pregnancy and prevent unsafe abortions [30]. A prospective study in Brazil indicated that only 8.8% of women seeking abortion services got a prescription of contraceptives during hospitalization [31]. A study in Dessie, northeast Ethiopia indicated that more than half of women who visited health facilities for abortion services left the health facility without getting any family planning methods [11]. Even those who reported to use family planning are reported to use short acting and ineffective methods.

In this systematic review and meta-analysis, urban residents were found to have higher odds of experiencing repeat-induced abortion compared to the rural counterparts. This might be related to the difference in access to abortion services where the service is higher in urban areas in contrast to a rural area. Similarly, those in urban areas are usually found to have premarital sex which might result in unintended pregnancy that leads to induced abortion. The finding of this systematic review and meta-analysis is supported by the 2016 Ethiopian Demographic and Health Survey (EDHS) finding which reported a higher proportion of premarital sex among urban residents compared with the rural counterparts [30].

The education level of women was found to be a significant predictor of experiencing repeat-induced abortion. The odds of experiencing repeat-induced abortion were found to be higher among illiterates compared with those who attended above the secondary school level of education. A similar finding was reported in a study conducted in Sweden which found higher odds of experiencing repeat abortion among participants with low educational levels [4]. The finding specified that low awareness related to the complications of repeat-induced abortion and the mechanisms of how to counteract unintended pregnancy might be the reason for the increased risk of repeat-induced abortion among participants with low education level. On the contrary, those who attended above the secondary school levels of education might have better awareness about the risk of induced abortion and the mechanisms to prevent unintended pregnancy [30].

The number of sexual partners was found to be a significant predictor of repeat-induced abortion. Study participants who had multiple sexual partners were found to have an increased odds of having repeat-induced abortion compared with those who had a single sexual partner. The finding of this systematic review and meta-analysis is supported by a study conducted in Britain which reported greater numbers of sexual partners among women with repeat abortion [10].

Study participants who reported to engaging in sex before age 18 years were found to have a higher odds of experiencing repeat induced abortion compared with counterparts. This might be due to poor awareness of adolescents about safe sex practice including the prevention of unintended pregnancy and other reproductive ill-health. The risk of having a repeat-induced abortion was also reported to be higher among participants who reported sexual debut at a younger age in a study conducted in Britain [10]. Young adolescents are less likely to discuss family planning methods with health professionals either due to low awareness or poor access to health services. The 2016 EDHS report indicated that only 13% of women ages 15–19 years have reported to discussing how to avoid unintended pregnancy in the last 12 months before the survey compared to 32% among women ages 30–34 years [30]. Emphasis shall be given to health education particularly for

adolescent girls regarding to the access where and how to get counseling how to prevent unintended pregnancy that leads to repeat-induced abortion.

This systematic review and meta-analysis indicated that there was no a statistically significant association between repeat-induced abortion and ever use of family planning. A similar finding was reported in a study conducted in Ghana which reported no significant association between the current use of contraceptives and repeat-induced abortion [28]. Non-significant association between family planning use and repeat-induced abortion might be related to the type of contraceptive used which needs clients commitment such as oral contraceptives and the method effectiveness which is related to contraceptives failure rate [12, 32]. Those who found to use ineffective contraceptives are more likely to have unintended pregnancy that predisposes to repeat-induced abortion. A study conducted in Luanda, Angola indicated that condom was the most commonly reported method of family planning method among abortion clients which has a high failure rate resulting in unintended pregnancy among users [12].

5. Limitations of the study

This systematic review and meta-analysis has its limitations. Due to the non-availability of studies, this systematic review and meta-analysis was conducted by using a few studies. Similarly, we could not find studies conducted on repeat-induced abortion in all regions of the country which might affect generalization.

6. Conclusion

The level of repeat-induced abortion was found to be high in Ethiopia. High risk of experiencing repeat-induced abortion was reported among participants who were urban residents, illiterate, who had multiple sexual partners, and early sexual initiation. However, a statistically significant association was not found between ever use of family planning and repeat-induced abortion. Health education shall be given about the risk of subsequent abortion and the relevance of avoiding unintended pregnancy, multiple sexual partners, and early sexual initiations through various mechanisms.

Declarations

Author contribution statement

M. Mekie: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

D. Addisu, E. Dagne and W. Necho: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

References

- [1] WHO, Key facts on induced abortion world wide. <https://www.who.int/reproductivehealth/news/440KeyAbortionFactsFinal.pdf?ua=1> accessed on 24/6/2020.
- [2] D. Mesce, D. Clifto, Abortion Facts and Figures; Population Reference bureau, WHO, Geneva, 2011.
- [3] S. Singh, D. Wulf, R. Hussain, A. Bankole, G. Sedgh, Abortion Worldwide: A Decade of Uneven Progress, Guttmacher Institute, Sio, B, 2006. Samoa: a Situation Analysis of Children.
- [4] M. Makenzius, T. Tydén, E. Darj, M. Larsson, Repeat induced abortion – a matter of individual behaviour or societal factors? A cross-sectional study among Swedish women, *Eur. J. Contracept. Reprod. Health Care* 16 (2011) 369–377.
- [5] G. Tesfaye, M.T. Hambisa, A. Semahegn, Induced abortion and associated factors in health facilities of guraghe zone, southern Ethiopia, *Journal of Pregnancy* 2014 (2014).
- [6] B. Maina, M. Mutua, E. Sidze, Factors associated with repeat induced abortion in Kenya, *BMC Publ. Health* 15 (1048) (2015).
- [7] S. Dastgiri, M. Yoosefian, M. Garjani, L. Kalankesh, Induced abortion: a systematic review and meta-analysis, *Mater Sociomed* 29 (1) (2017) 58–67.
- [8] WHO, Safe and Unsafe Induced Abortion Global and Regional Levels in 2008, and Trends during 1995–2008, WHO., 2012.
- [9] I.K. Warriner, I.H. Shah (Eds.), Preventing Unsafe Abortion and its Consequences: Priorities for Research and Action, Guttmacher Institute, New York, 2006.
- [10] N. Stone, R. Ingham, Who presents more than once? Repeat abortion among women in Britain, *J. Fam. Plann. Reprod. Health Care* 37 (2011) 209–215.
- [11] A. Seid, A. Gebremariam, M. Abera, Integration of family planning services within post abortion care at health facilities in Dessie –north east Ethiopia, *Sci. Technol. Arts Res. J.* 1 (1) (2012) 38–46.
- [12] N. Morris, N. Prata, Abortion history and its association with current use of modern contraceptive methods in Luanda, Angola, *Dove press Open Access Journal of Contraception* 9 (2018) 45–55.
- [13] FDRE, The Criminal Code of the Federal Democratic Republic of Ethiopia. Proclamation No 414/2004, Addis Abeba, 2005.
- [14] Y. Gebrehiwot, T. Liabsuetrakul, Trends of abortion complications in a transition of abortion law revisions in Ethiopia, *J. Publ. Health* 31 (1) (2008) 81–87.
- [15] S. McCall, U. Ibrahim, M. Imamura, et al., PP25 Exploring the determinant factors for repeat abortion: a systematic review, *J. Epidemiol. Community Health* 68 (2014) A57.
- [16] I. Carlsson, K. Breeding, P. Larsson, Complications related to induced abortion: a combined retrospective and longitudinal follow-up study, *BMC Wom. Health* 18 (158) (2018).
- [17] L. Hoggart, V. Newton, L. Bury, Repeat abortion', a phrase to be avoided? Qualitative insights into labelling and stigma, *Fam Plann Reprod Health Care* 43 (2017) 26–30.
- [18] Shea, et al., *BMC Medical Research Methodology*, 2007, p. 10, 7.
- [19] S. Rowlands, More than one abortion, *J. Fam. Plann. Reprod. Health Care* 33 (3) (2007) 155–158.
- [20] G. Rücker, G. Schwarzer, J.R. Carpenter, M. Schumacher, Undue reliance on I² in assessing heterogeneity may mislead, *BMC Med. Res. Methodol.* 8 (2008) 79.
- [21] J.P. Higgins, D.G. Altman, Assessing Risk of Bias in Included Studies, *Cochrane Handbook for Systematic Reviews of Interventions*, Cochrane book series, 2008, pp. 187–241.
- [22] Newcastle-Ottawa Scale customized for cross-sectional studies, Available from, https://static-content.springer.com/esm/.../12889_2012_5111_MOESM3_ESM.doc.
- [23] G.K. Behulu, E.A. Fenta, G.L. Aynalem, Repeat induced abortion and associated factors among reproductive age women who seek abortion services in Debre Berhan town health institutions, *Central Ethiopia, Reprod. Health* 12 (2019), 2019.
- [24] M. Waktoala, D. Mekonen, T. Nigusie, E. Cherkose, A. Abate, Repeat induced abortion and associated factors among women seeking abortion care services at Debre Markos town health institutions, Amhara regional state, Ethiopia, *BMC Res. Notes* 13 (44) (2017), 2020.
- [25] M. Alemayehu, H. Yebyo, A.A. Medhanyie, A. Bayray, M. Fantahun, G.K. Goba, Determinants of repeated abortion among women of reproductive age attending health facilities in Northern Ethiopia: a case-control study, *BMC Publ. Health* 17 (2017).
- [26] B. Alemayehu, A. Addissie, W. Ayele, S. Tiroro, D. Woldeyohannes, Magnitude and Associated Factors of Repeat Induced Abortion Among Reproductive Age Group Women Who Seeks Abortion Care Services at Marie Stopes International Ethiopia Clinics in Addis Ababa, Ethiopia, 2019, 16.
- [27] F. Geatachew, Determinants of Repeat Induced Abortion in Addis Ababa, Addis Ababa University, 2014 [unpublished/gray].
- [28] M. Boah, T. Adampah, D. Achinkok, Is there a relationship between repeat induced abortion and current use of contraception among women in the reproductive age? A study in Ghana, *Asian Journal of Pregnancy and Childbirth* 2 (2) (2019) 1–11.
- [29] A. Mekuria, H. Gutema, H. Wondiyie, M. Abera, Postabortion contraceptive use in Bahir Dar, Ethiopia: a cross sectional study, *Contraception and Reproductive Medicine* 4 (19) (2019).
- [30] Central Statistical Agency [CSA], The Ethiopian Demographic and Health Survey 2016 Addis Ababa, the DHS Program, ICF, Rockville, Maryland, USA, 2017.
- [31] A. Borges, F. OlaOlorun, E. Fujimori, L.A.K. Hoga, A. Tsui, Contraceptive use following spontaneous and induced abortion and its association with family planning services in primary health care: results from a Brazilian longitudinal study, *Reprod. Health* 12 (94) (2015).
- [32] L. Alemu, Y. Ambelie, M. Azage, Contraceptive use and associated factors among women seeking induced abortion in Debre Marko's town, Northwest Ethiopia: a cross-sectional study, *Reprod. Health* 17 (97) (2020).