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Women's satisfaction with existing labor and delivery services in Ethiopia: a systematic review and meta-analysis

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Abstract

Objective: To estimate the pooled prevalence of maternal satisfaction with existing labor and delivery services in Ethiopia.

Design: Systematic review and meta-analysis.

Methods: MEDLINE/Pub Med, Scopus, Hinari, Google scholar, and web of science electronic databases and grey literature from repository were searched for all the available references. This systematic review included **19** cross-sectional studies. Subgroup analysis was conducted for the evidence of heterogeneity. Cochrane I^2 statistics were used to check the heterogeneity of the studies. Egger and Biggs test with funnel plots were used to investigate publication bias. This meta-analysis was performed using a weighted inverse variance random-effects model.

Result: Nineteen studies were included in the systematic review and meta-analysis. The pooled prevalence of the level of women's satisfaction with existing labor and delivery services in Ethiopia was 70.64% (95% CI: 61.04, 80.24). Having informal education of the women (AOR:2.16,95%CI:1.98, 2.36), time to be seen by the health care providers within 20 minutes(AOR:3.03,95%CI:2.77,3.32), receiving free service (AOR:4.89,95%CI:2.64, 9.08), keeping women privacy (AOR:2.77,95%CI:1.3, 5.88), planned delivery in the health institution (AOR:2.85,95%CI:2.64, 3.07), duration of labor within 12 hours (AOR:2.7,95%CI:1.88, 3.88), and haven't antenatal care follow up (AOR:4.03,95%CI:3.26, 4.98), were associated factors for women satisfaction with existing labor and delivery services.

Conclusion: The pooled prevalence of women's satisfaction with labor and delivery services was higher. Informal educational status of the women, Not having antenatal care follow up, planned delivery in the health institution, keeping women privacy, getting free service, time to be seen by the health care providers within 20 minutes and duration of labor within 12 hours were the associated factors of women's satisfaction with labor and delivery services. This finding is important to design strategic policies and to prevent emergency neonatal and women complications during the intrapartum and postpartum periods.

Keywords: Women satisfaction, delivery, systematic review, and meta-analysis

Strength and limitation of the study

- ✓ The strength of this study is including wide geographical areas, different eligible articles across the country setting increases the accuracy of the finding.
- ✓ This systematic review and meta-analysis review provided an overall prevalence of maternal satisfaction with the existing labor and delivery services in Ethiopia.
- ✓ This systematic review and meta-analysis result reporting was stick on to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines
- ✓ Declaring the absence of publication bias by computing trim and fill analysis increase the reliability of the findings.
- ✓ All included studies in this systematic review and meta-analysis were cross-sectional studies, which may limit the opportunity to generate a causal link between variables.

Introduction

Labor and delivery is a critically dangerous time for women and newborns. The World Health Organization reported that approximately more than eight hundred fifty women die from preventable causes related to childbirth every day, with 99% of all these maternal deaths occurring in low and middle-income countries, the majority of which are in sub-Saharan Africa (162,000) and Southern Asia (83, 000) (1). Women's satisfaction with labor and delivery service is an important factor for the choice of health facility; comply with service provided and follow-ups and its future utilization for labor and delivery services (2-6).

Even though the primary target of the Sustainable Development Goal (SDG) is to reduce the global maternal mortality rate to less than 70 per 100,000 live births, the quality of labor and delivery services in most low and middle-income countries was poor which had been identified as one of the precursors to the unacceptably high maternal mortality rate (7). Ethiopia is still struggling to reduce the maternal mortality rate in the country which stands at 412 deaths for every 100,000 live births, which is very far from the international target (8, 9).

Identifying the factors that affect women's satisfaction with labor and delivery services is important for health care providers to continuously improve the quality of labor and delivery services. Women's satisfaction with labor and delivery services can be affected by numerous factors including waiting time and availability of basic drugs, physical environment of the health care facility (cleanliness of the environment, delivery room, and wards), cost paid to service and waiting area, privacy, lack of consideration for cultural practices and beliefs and health providers' technical competency (10-14). Only,

provision of maternal health service does not improve maternal health, as a result, World Health Organization promotes skilled attendance at every birth to reduce maternal mortality and recommends that women's satisfaction is the most important index to improve the quality and effectiveness of health care provision (15).

Currently, most patients in low and middle-income countries and specifically in Ethiopia complain about hospital services, of which labor and delivery services is the primary one. Although studies have been conducted to assess women's satisfaction with labor and delivery services in Ethiopia, they were conducted in a specific institution with a small sample size and their findings were inconclusive and inconsistent. Similarly, the level of women's satisfaction with labor and delivery services nationally remains unknown yet. Therefore, the objective of this systematic review and meta-analysis was to estimate the level of women's satisfaction with labor and delivery services at the national level and identify factors associated with women's satisfaction with delivery services. The findings of this study will be very important to monitor and improve the quality of labor and delivery services and to inform stakeholders from government and nongovernmental organizations (NGOs) and policymakers for areas of improvement in the health care system of the country to reduce maternal mortality and morbidity related to complications of pregnancy, labor, and delivery.

Women's satisfaction with labor and delivery service is a key determinant of quality of care and an important component in measuring performance. Nowadays, satisfaction had been identified as the major index to assess the quality of health care provision in low and middle-income countries. Therefore, this systematic review and meta-analysis aimed to assess the levels of women's satisfaction with labor and delivery services in Ethiopia.

Methods

Study design and Setting

This systematic review and meta-analysis were conducted to assess the pooled prevalence of women's satisfaction towards labor and delivery services and its associated factors in Ethiopia, 2019.

Search Strategies

Studies were searched from databases MEDLINE/PubMed, Scopus, Hinari, Google scholar, and web of science electronic databases and grey literature from the repository. Additionally, bibliographies of identified articles from MEDNAR, World Wide Science Maternity and Infant Care and Wiley Online Library were searched. Moreover, missing data were handled by contacting corresponding authors. Search terms were formulating from PICO questions on the above-mentioned databases and comprehensive search strategy had been developed using different Boolean operators.

The following search terms were used: Satisfaction AND "Delivery Services" OR "Delivery care services" OR "Skilled delivery services" OR "Institutional delivery services" OR "Labor" OR "Labor and Delivery services" OR "Labor and Delivery care" OR "Labor and Delivery care services" OR "Intrapartum care" OR "Childbirth care" OR "Childbirth care services" AND "Mother's" OR "Women" OR "Clients" AND "Associated factors" AND Ethiopia and related terms. All articles searched from databases were exported to the EndNote library and initially screened by title and abstract. The full text of those articles satisfying inclusion criteria by title and abstract was reviewed the full articles. Systematic review with narrative synthesis was used to summarize the findings of articles in Ethiopia. Quantitative meta-analysis was considered for the homogeneous articles.

Eligibility Criteria

Inclusion criteria

Population: only studies involving women who gave birth in public and private institutions

Study design: observational studies such as cross-sectional, case-control, and retrospective and prospective cohort studies and national survey and surveillance reports.

Study area: only studies conducted in Ethiopia without time limiting and reported the prevalence or at least one least adjusted associated factors of women's satisfaction towards labor and delivery services.

Publication status and language: Both published and unpublished reported articles in English language were considered.

Exclusion criteria

Citations without abstracts and/or full-text, commentaries, anonymous reports, letters, editorials and articles not reporting our outcome of interest were excluded after reviewing the full texts.

Outcome variables

This systematic review and meta-analysis have two essential outcomes. The first outcome of this study mainly focused on the level of women's satisfaction towards labor and delivery services. The second outcome of the study was factors affecting satisfaction of women towards labor and delivery services which were measured by maternal educational status, accessing free service, duration of labor, time to be seen by health care providers, keeping women privacy, planned pregnancy and attending antenatal care follow up (yes/no), were the main contributing factors for women satisfaction with labor and delivery services.

Data extraction

First, all studies obtained from all databases were exported to Endnote version X8 software to remove duplicates. Secondly, all studies were exported to Microsoft Excel

spreadsheet. Two authors (AD and GG) independently extracted all the 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, regions, study area, sample size, and prevalence with 95%CI). For the second outcome (associated factors) data were extracted with 2 by 2 table format and then the log odds ratio for each factor was calculated.

Quality assessment

Two authors (AD & GG) independently assessed the quality of each studies using Newcastle-Ottawa-scale (NOS) for cross-sectional studies (16). All Articles underwent systematic review and meta-analysis is cross-sectional studies. 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 that we used to declare the quality of the study. Last, studies scored a scale of ≥ 7 out of 10 was considered as achieving high quality. Two authors (AD and GG) independently assessed the quality of each original study using the quality assessment tool. During quality appraisal of the articles, any discrepancies between the two authors were resolved by taking the second group authors (AW, AG, MB, and BA). All of the studies were included based on the Newcastle –Ottawa Scale quality assessment criteria.

Data processing and analysis

Random effect model was applied to estimate the pooled prevalence of women's satisfaction towards labor and delivery services. After extraction of the articles in Microsoft Excel spreadsheet format, the analysis was carried out using STATA version 14 statistical software. Cochrane Q-test and I^2 statistics were computed to assess

heterogeneity among studies (17). After computing the statistics, results showed there is significant heterogeneity among studies (I^2 = 99.3%, p <0.001). To estimate the overall prevalence of having good knowledge of the postnatal women, via back-transform of the weighted mean of the transformed proportions arcsine variance weights and Dersimonian-Laird weights for fixed-effects model and random effect model respectively (18). Publication bias was assessed using egger's and Begg's test. Subgroup analysis was done based on the study setting (study setting (region), year of study and sample size to minimize the random variations between the point estimates of the primary study. Trim and Fill analysis using Duval and Tweedie were implemented [38]. 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 satisfaction of women towards delivery services in the included studies

Results

Characteristics of the included studies

524 articles were retrieved using a search strategy regarding women satisfaction towards labor and delivery and associated factors in Ethiopia at MEDLINE/Pub Med, Google Scholar, Scopus, Hinari, MEDNAR, World Wide Science, Maternity and Infant Care and Wiley Online Library, a web of science and other gray and unpublished literature. After duplication is removed, 324 studies were remaining.

Out of the remaining 324 articles, 248 articles were excluded after review of their titles and abstracts. Therefore, 76 full-text articles were accessed and assessed for inclusion criteria, which resulted in the further exclusion of 57 articles primarily due to reasons. As a result, 19 studies were fulfilled the inclusion criteria to undergo the final systematic review and meta-analysis (Figure 1). This systematic review and meta-analysis consist of nineteen cross-sectional studies with their sample size and prevalence (Table 1).

Table 1: Study characteristics included in the systematic review and meta-analysis

Authors	Region	Study area	Study design	Sample size	Prevalence	Quality
Gizew Asres[19]	Amhara	Bure	cross sectional	420	88.095	Low risk
Getenet et al[20]	Harari	Harar	cross sectional	398	84.673	Low risk
Temamo et al[21]	SNNPR	Wolaita	cross sectional	736	95	Low risk
Edaso et al[22]	Oromia	West Arsi	cross sectional	477	74.6	Low risk
Gashaye et al[23]	Amhara	Gondar	cross sectional	579	31.3	Low risk
Yarinbab et al[24]	SNNPR	Mizan	cross sectional	280	30.4	Low risk
Demas et al[25]	Addis Ababa	Addis Ababa	cross sectional	394	19.00	Low risk
Bitew et al[26]	Amhara	Debre Markos	cross sectional	398	81.7	Low risk
Kidane et al[27]	Harari	Harar	cross sectional	400	80	Low risk
Melese et al[28]	Addis Ababa	Addis Ababa	cross sectional	423	92.9	Low risk
Gonie et al[29]	Oromia	Jimma	cross sectional	366	78.7	Low risk
Tayelign et al[30]	Amhara	Dessie and Bahirdar	cross sectional	417	61.9	Low risk
Dewana et al[31]	SNNPR	Arbaminch	cross sectional	256	90.2	Low risk

Tesfaye et al[32]	SNNPR	Gamogofa zone	cross sectional	430	79.1	Low risk
Mekonen et al[33]	Amhara	Bahirdar	cross sectional	594	74.9	Low risk
Amdemichael et al[34]	Oromia	Assela	cross sectional	398	80.7	Low risk
Tadesse et al [35]	Oromia	Omo Nada	cross sectional	391	65.2	Low risk
Assefa et al[36]	Addis Ababa	Addis Ababa	cross sectional	461	82	Low risk
Demis et al[37	Amhara	Woldia	cross sectional	398	51	Low risk

Level of women satisfaction with labor and delivery services in Ethiopia

The overall pooled prevalence of women's satisfaction with labor and delivery services is presented with a forest plot (Fig.2). Therefore, the pooled estimated prevalence of women's satisfaction with labor and delivery services in Ethiopia was 70.64% (95% CI: 61.04–80.24; I^2=99.3%, P<0.001).

Publication bias

Funnel plot was assessed for asymmetry distribution of women satisfaction with labor and delivery services by visual inspection (Fig. 3). Egger's regression test showed a p-value of 0.002 with the evidence of publication bias. As a result, trim and fill analysis was conducted to overcome the publication bias. After three studies were filled, twenty-two studies were enrolled and computed through the trim and fill analysis with a pooled prevalence of 66.48% (95%CI; 55.65-77.29) using a random effect model.

Subgroup analysis

Subgroup analysis was conducted with the evidence of heterogeneity. Therefore, the Cochrane I^2 statistic =74.5%, P<0.001) with the evidence of moderate heterogeneity. Therefore subgroup analysis was done by study year, sample size and study area. Based on the subgroup analysis, the level of women's satisfaction with labor and delivery services was highest in Harari region 82.58% whereas 84.5 % in the study conducted within the year 2006-2010(Table 2).

Table 2: Subgroup analysis on the level of women satisfaction with labor and delivery services in Ethiopia, 2019 (n = 19)

Variables	Subgroup	No. of studies	Prevalence (95%CI)	I^2 (%)	P-value
Sample size	≥400	10	68.99(55.49-82.47)	99.2	<0.001
	<400	9	70.51(53.68-87.34)	99.5	<0.001
Study area	Addis Ababa	3	64.65(22.42-96.88)	99.8	<0.001
	Oromia	4	74.89(68.59-81.2)	89.1	0.838
	Amhara	6	64.84(47.04-82.64)	99.2	<0.001
	Harari	2	82.47(77.84-86.99)	66.8	<0.001
	SNNPR	4	73.79(51.94-95.65)	99.4	<0.001
Study year	2006-2010	2	84.5(73.23-95.77)	99.7	<0.001
	2011-2015	8	74.9(69.5-80.23)	99.2	<0.001
	2016-2019	9	62.37(43.6-81.13)	99.3	<0.001

Associated factors for women satisfaction with labor and delivery services

In this systematic review and meta-analysis; duration of labor, free service, keeping privacy, time to be seen by health care provider <20minute, planned delivery in the health institution, antenatal care, and maternal education were the factors associated with women satisfaction with labor and delivery services.

Women who hadn't formal education (AOR = 2.16; 95% CI: 1.98- 2.36) 2.16 times more likely to be satisfied by labor and delivery services than women who had formal education (Fig.4)

The odds of having antenatal care (AOR = 4.03; 95% CI: 3.26- 4.98), had a low level of satisfaction by the labor and delivery services (Fig.5).

In this study women who had planned pregnancy (AOR = 2.85; 95% CI: 2.64- 3.07), were 2.85 times more likely to be satisfied by labor and delivery services than their counterparts (Fig.6).

Women who have seen by the health care provider within 20 minutes (AOR = 3.03; 95% CI: 2.77- 3.32), were 3.03 times more likely satisfied by the labor and delivery services than the counterparts (Fig.7).

Women whose privacy kept (AOR = 2.77; 95% CI: 1.3- 5.88), were 2.77 times more likely to be satisfied by the labor and delivery services than their counterparts (Fig.8).

The odds of not staying more than 12 hours to give birth (AOR = 2.7; 95% CI: 1.88- 3.88), had high level of satisfaction by the labor and delivery services (Fig.9).

Women who received free service (AOR = 4.89; 95% CI: 2.64- 9.08), were 4.89 times more likely to be satisfied by labor and delivery services than women who got their service with cost expense (Fig.10).

Discussion

Globally critical maternity and infant care is implementing efforts are to reduce maternal mortality has been stepped up, maternal satisfaction with the existing labor and delivery services needs to be addressed by the low and middle-income countries. Quality improvement efforts in low and middle-income countries could focus on strengthening the process of labor and delivery care. In this systematic review and meta-analysis, the pooled level of women's satisfaction with labor and delivery services in Ethiopia was 70.64% (95% CI: 61.04–80.21).

The finding of this review is in line with the study done in India [39], and Egypt [40]. This similarity report might be due to labor and delivery services given in low and middle-income countries that are nearly similar due to the limited number of health institutions, health professionals and the availability of drugs.

The finding of this systematic review and meta-analysis is lower than the study conducted in Senegal [41], and Nepal [42]. This discrepancy might be due to this study reports a review result from many institutions whereas studies reported in Senegal and Nepal are from a single institution.

Being able to maintain privacy is an important associated factor for women's satisfaction with labor and delivery services. This study finding is supported by the study done in India [39], Uganda [44], and report from developing countries [43]. This might be the fact that inadequate privacy during labor and delivery care and counseling was associated with women's poor perception of services.

Women who have been seen by the health care provider within 20 minutes are a key determinant factor for women to be satisfied with the existing labor and delivery services. This finding is consistent with the stud done in Nepal [42]. This might be due to

that being treated with dignity, respect, kindness, approachability, and courtesy was a key interpersonal behavior that enhances women's satisfaction.

The absence of antenatal care follow up is the associated risk factors for maternal satisfaction with labor and delivery care in this systematic review and meta-analysis. The probable reason might be that the exposure to facilities through antenatal care increases the understanding of women about the service provided by the health care professionals. This, in turn, demands enhanced healthcare services and better-quality labor care in hospitals or health centers.

The odds of having planned delivery in the health institution were nearly three times more likely to be satisfied with the labor and delivery services provided in the institution. Women who had awareness and knowledge regarding facility delivery and its important may enhance the utilization and satisfaction of labor and delivery services. Indeed, clients had various expectations about hospital delivery that influenced their perception of care.

Having informal education of the women were two times more likely to be satisfied with the existing and provided labor and delivery services in the health institutions. This finding is parallel with the study conducted in Serbia [45] and Uganda [44]. This might be explained as women who had higher educational status, may expect high-quality care of labor and delivery is provided which might be inconsistent due to a limited number of health care professionals, availability of medications and the number of equipped health facilities which results in low satisfaction among laboring women.

The odds of receiving free service are the associated factor for women's satisfaction with labor and delivery services. This might be due to providing available and accessible medications and medical resources with free service settings may significantly increase their satisfaction.

Women whose labor is commenced within 12 hours are 2.7 times more likely to be satisfied by the labor and delivery services. This might be because women whose labor persists beyond 12 hours were more prone to privacy breakage due to repeated pelvic examination, and persistent labor pain which results in dissatisfaction.

Conclusion

The pooled prevalence of women's satisfaction with labor and delivery services was higher. Informal educational status of the women, Not having antenatal care follow up, planned delivery in the health institution, keeping women privacy, getting free service, time to be seen by the health care providers within 20 minutes and duration of labor within 12 hours were the associated factors of women's satisfaction with labor and delivery services. This finding is important to design strategic policies and to prevent emergency neonatal and women complications during the intrapartum and postpartum period

List of Abbreviations

AOR: Adjusted Odds Ratio, ANC: Antenatal Care, EDHS: Ethiopia Demographic Health Survey, MMR: Maternal Mortality Ratio,, WHO: World Health Organization

Declarations

Funding

Not applicable

Availability of data and materials

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

Author's Contributions

AD and GG developed the draft protocol under the supervision of AW, AG, MB, and BA. All authors (AD, GG) 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. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable.

Competing interest

The authors declared that they have no competing interests

Patient and Public involvement

No patient involved

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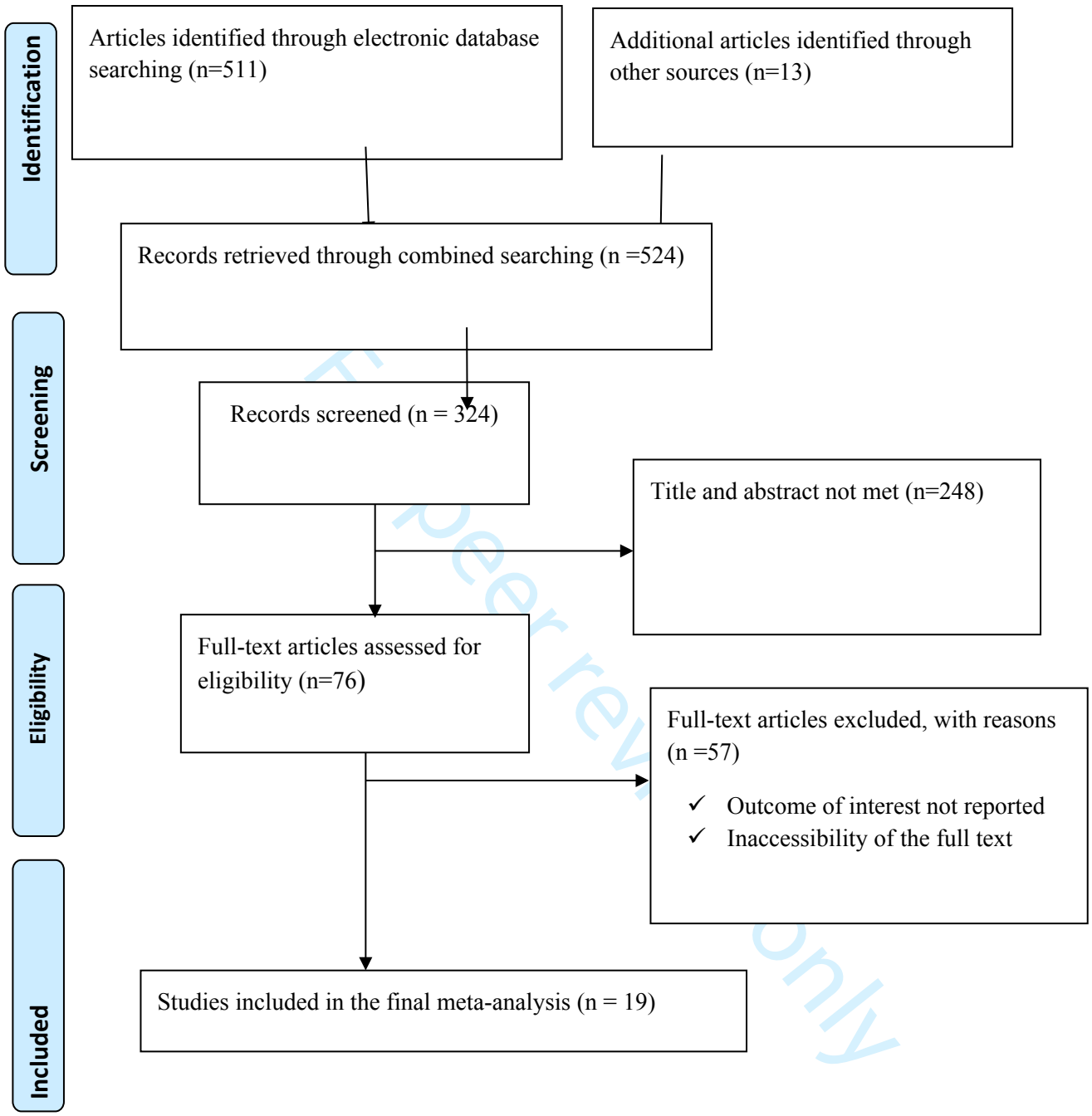

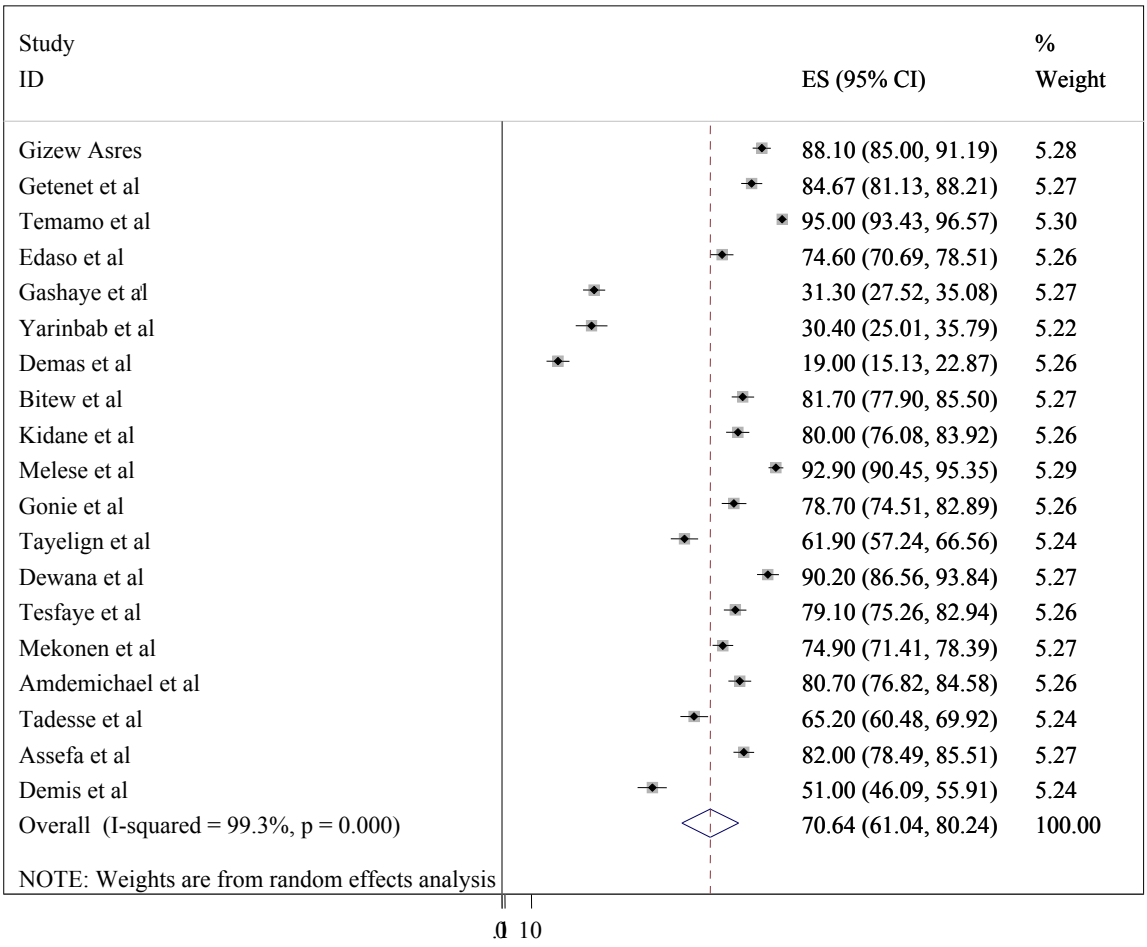

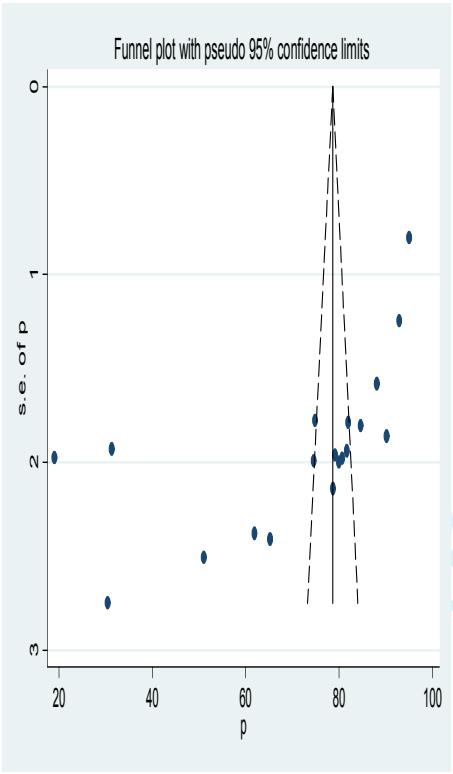

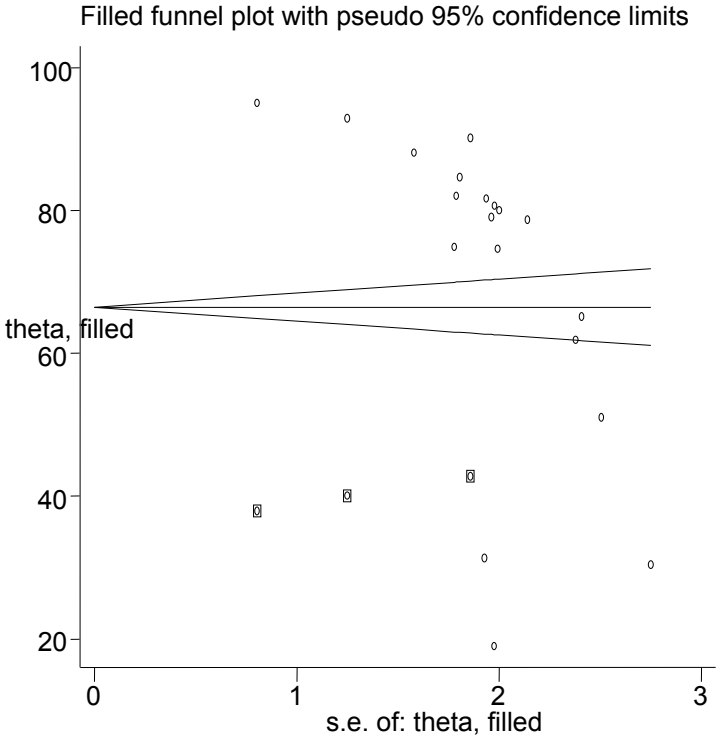

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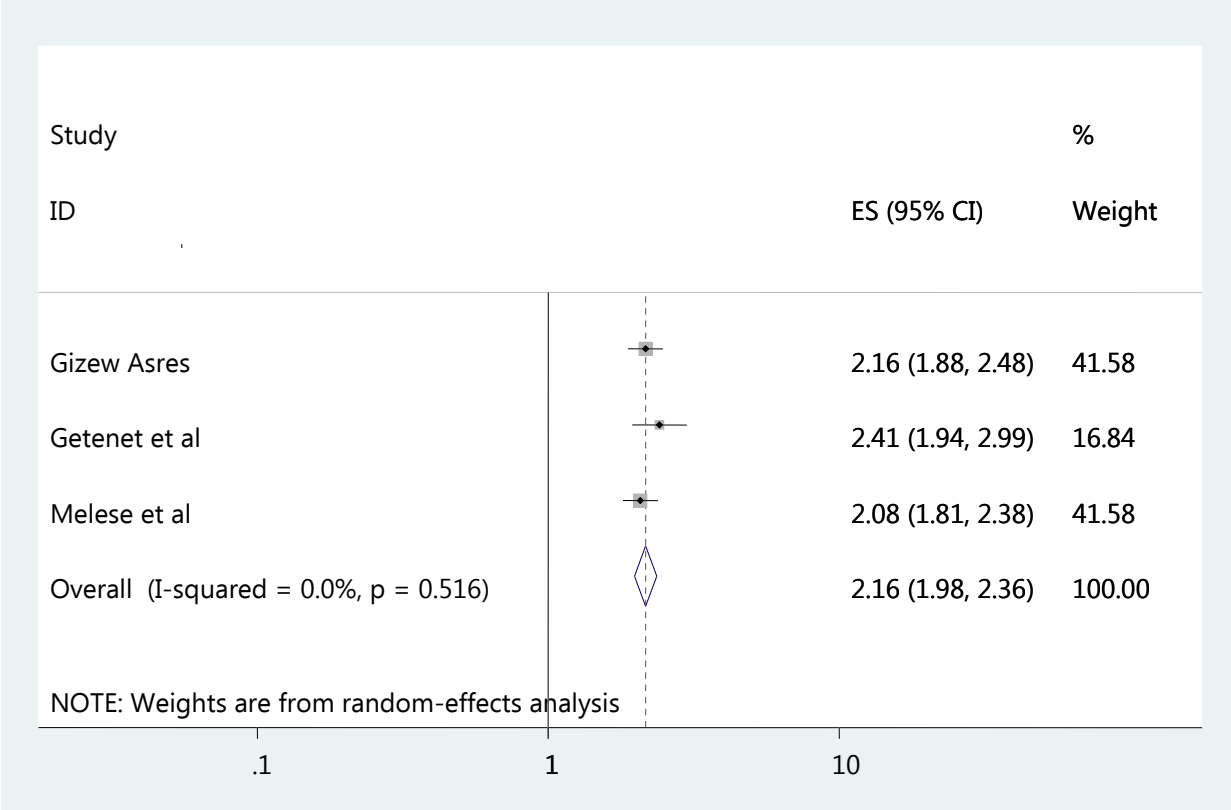
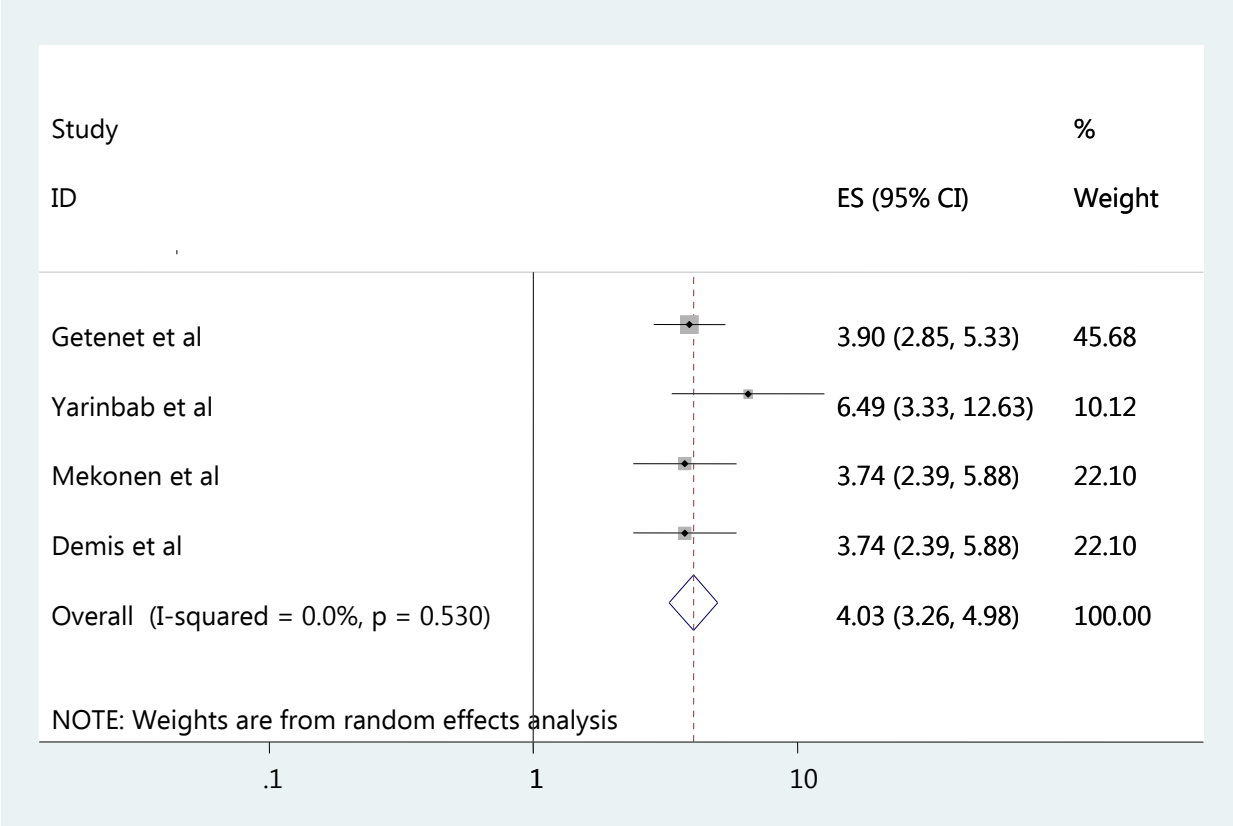
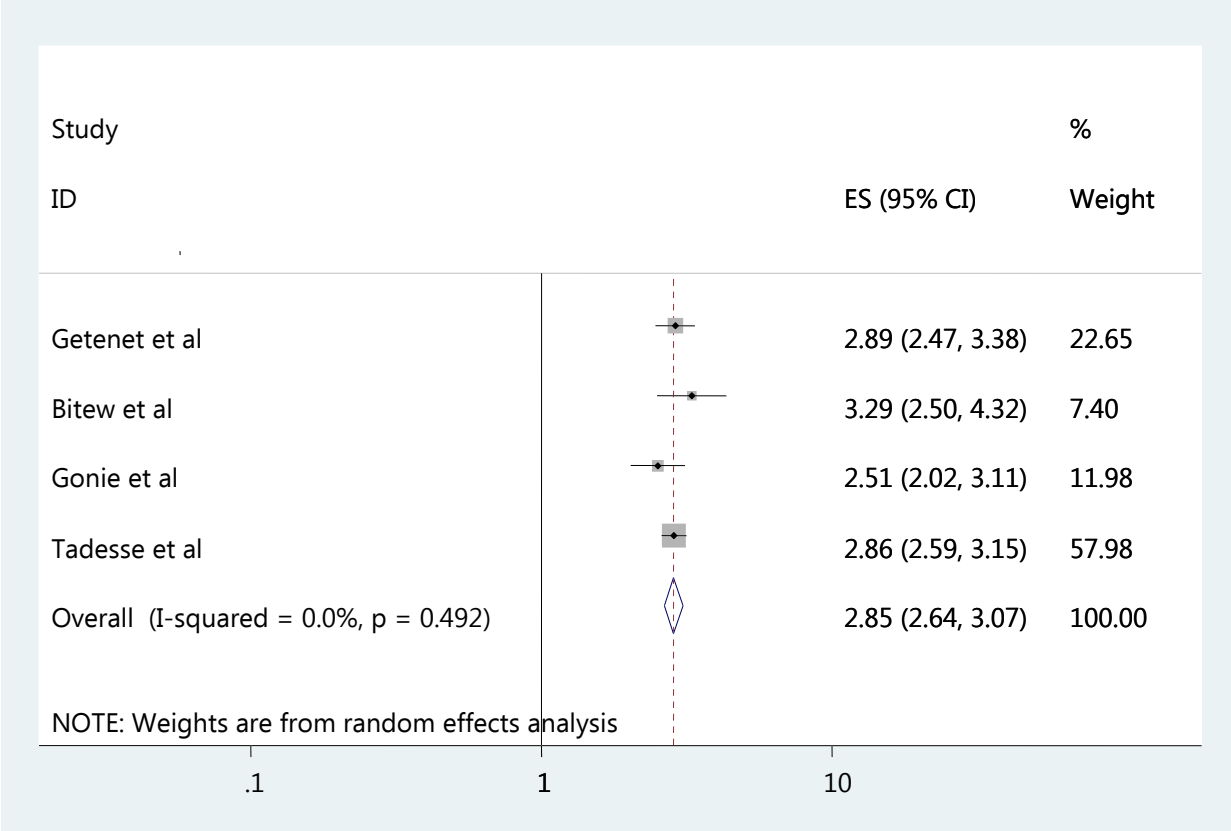
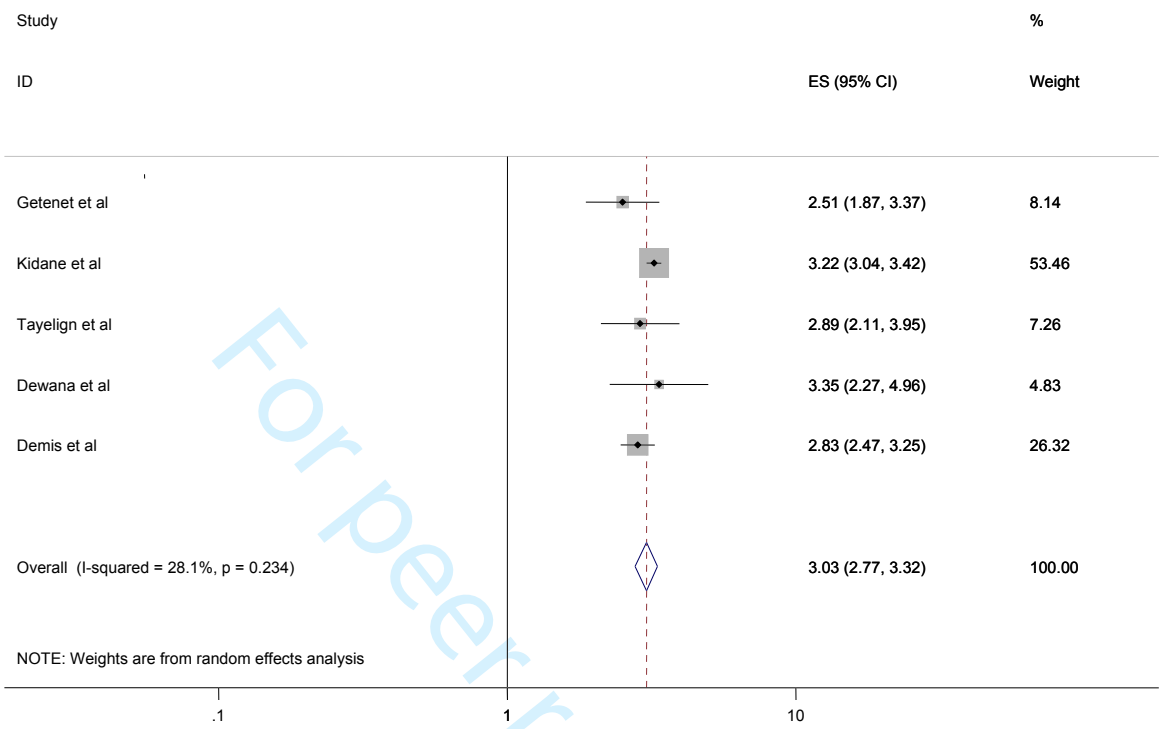





Study
ID
ES (95% CI)
%
Weight
Getenet et al
2.89 (2.47, 3.38)
22.65
Bitew et al
3.29 (2.50, 4.32)
7.40
Gonie et al
2.51 (2.02, 3.11)
11.98
Tadesse et al
2.86 (2.59, 3.15)
57.98
Overall (I-squared = 0.0%, p = 0.492)
2.85 (2.64, 3.07)
100.00
NOTE: Weights are from random effects analysis
.1
1
10



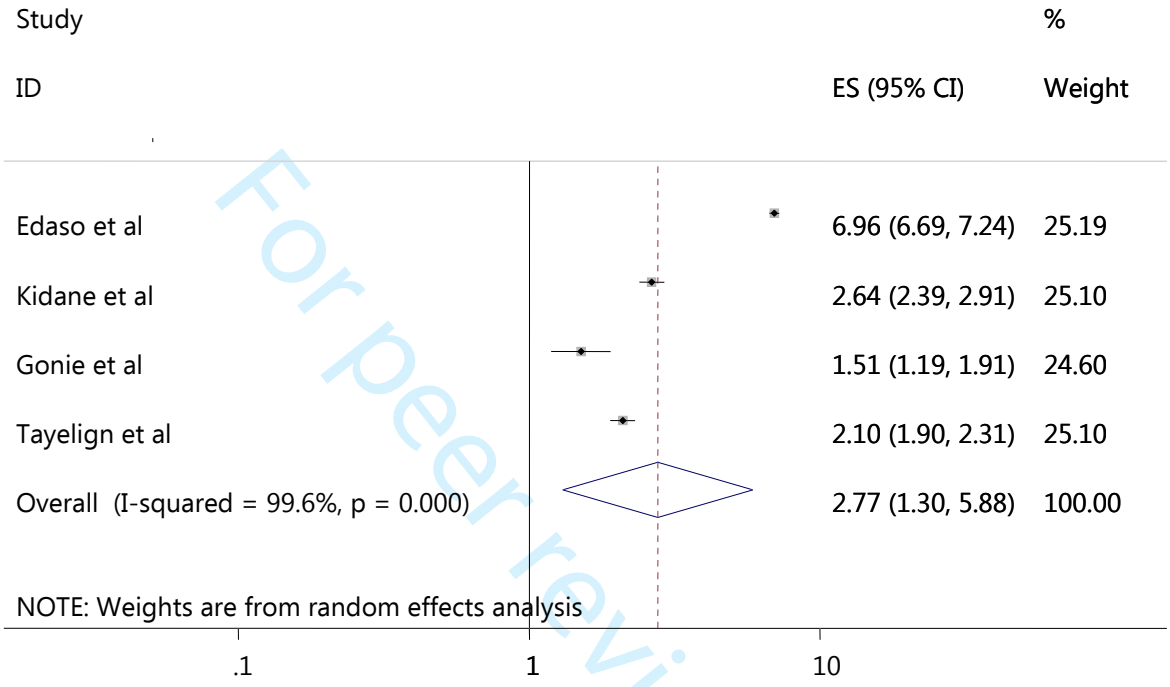
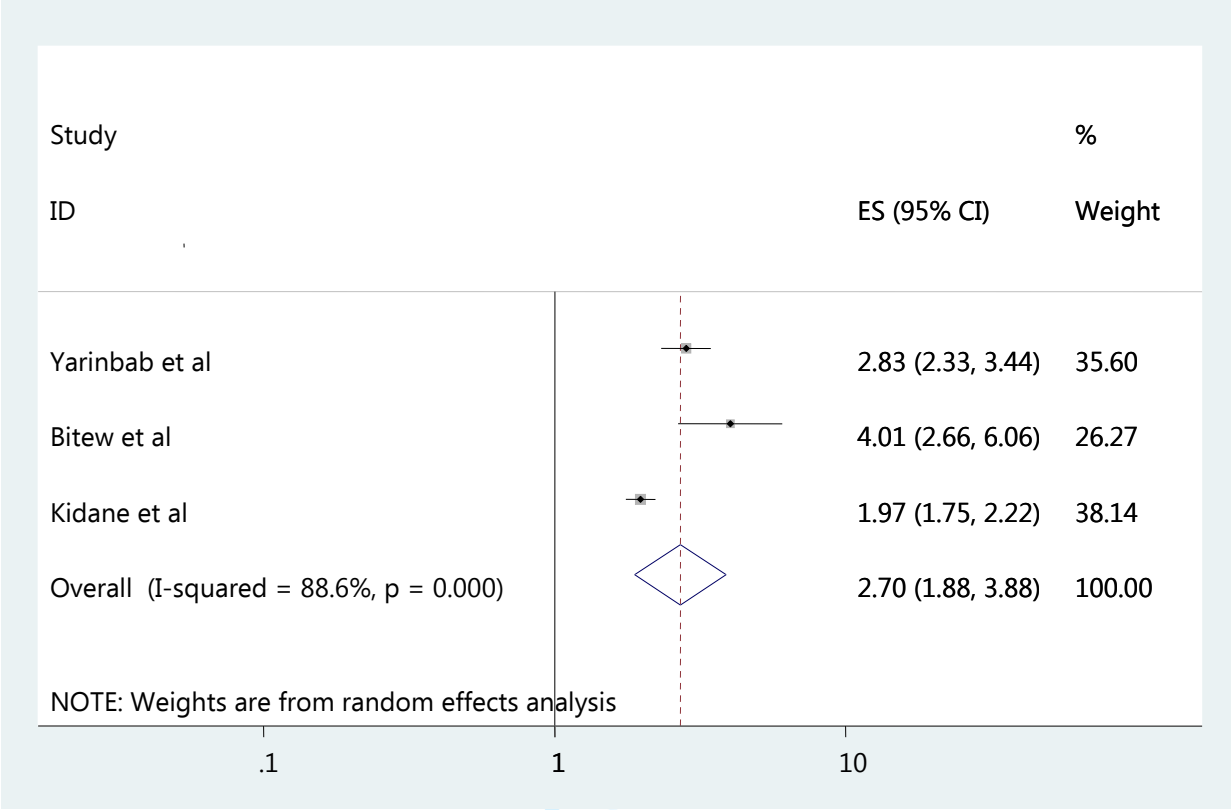
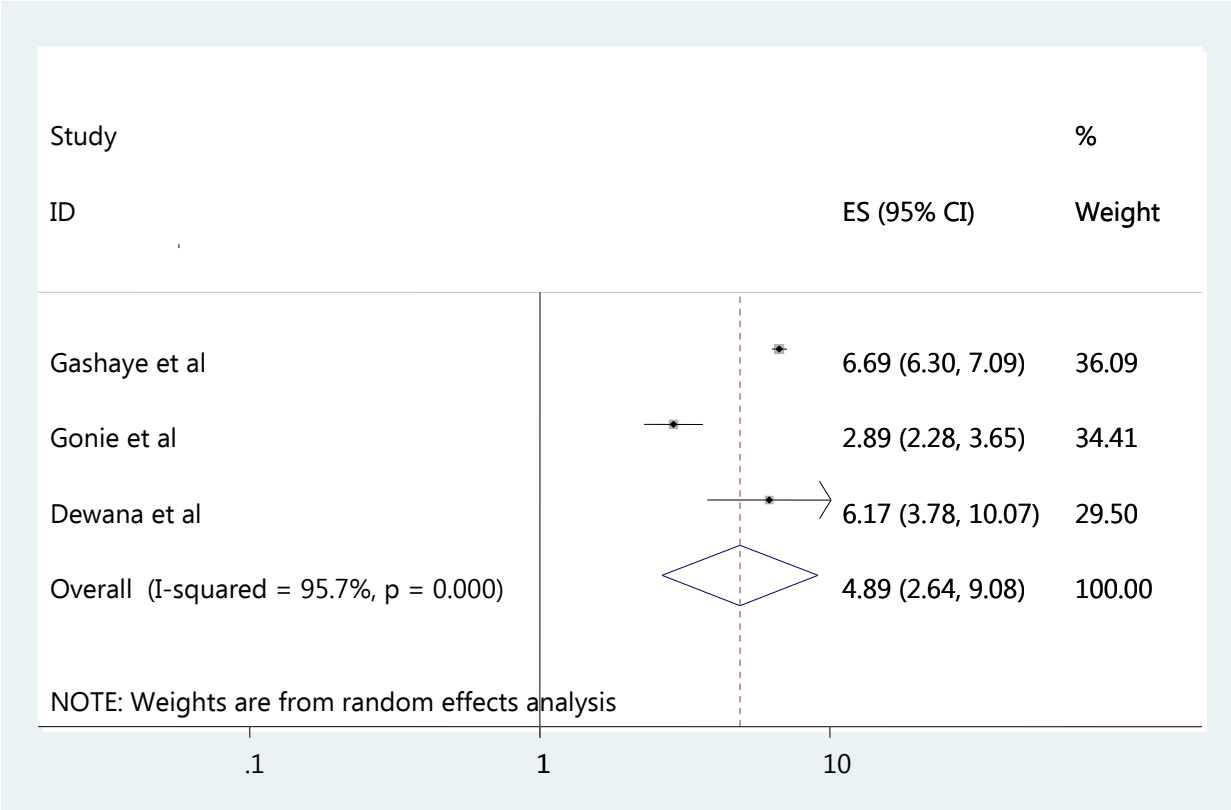


Figure 8: The pooled odds ratio of the association between privacy of the mother and satisfaction of women with labor and delivery services in Ethiopia





PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5,6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6,7
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	7

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	7
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	7,8
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	9,10
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	11,12
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	13-14
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	14-21
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	18
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	19
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	22
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	2
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	25
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	25

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Women's satisfaction with existing labor and delivery services in Ethiopia: a systematic review and meta-analysis

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Women's satisfaction with existing labor and delivery services in Ethiopia: a systematic review and meta-analysis

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Abstract

Objective: To estimate the pooled prevalence of women's satisfaction with existing labor and delivery services in Ethiopia.

Design: Systematic review and meta-analysis.

Methods: MEDLINE/PubMed, Scopus, Hinari, Google scholar, and web of science electronic databases were searched for the study. This meta-analysis included nineteen cross-sectional studies. Cochrane I^2 statistics were used to check the heterogeneity of the studies. Subgroup and sensitivity analysis was conducted with the evidence of heterogeneity. Egger test with funnel plot were used to investigate publication bias.

Result: Nineteen studies were included in the systematic review and meta-analysis. The overall prevalence of women's satisfaction with existing labor and delivery services in Ethiopia was 70.54% (95% CI: 60.94–80.15). Having informal education of the women (AOR = 2.19; 95% CI: 1.47- 3.25), time to be seen by the health care providers within 20 minutes(AOR = 2.97; 95% CI: 2.11- 4.19), receiving free service (AOR = 5.01; 95% CI: 2.87- 8.75), keeping women privacy (AOR = 2.84; 95% CI: 1.46- 5.55), planned delivery in the health institution (AOR = 2.85; 95% CI: 1.99- 4.07), duration of labor within 12 hours (AOR = 2.55; 95% CI: 1.70- 3.81), and haven't antenatal care follow up (AOR = 4.03; 95% CI: 2.21- 7.35) were factors associated with women satisfaction with labor and delivery services in Ethiopia.

Conclusion: The pooled prevalence of women's satisfaction with existing labor and delivery services was high. Informal education of the women, antenatal care follow up, planned delivery in the health institution, keeping women privacy, getting free service, time to be seen by the health care providers and duration of labor were factors associated with women's satisfaction during labor and delivery services. This finding is important to design strategic policies and to prevent emergency neonatal and women complications during the childbirth and postpartum periods.

Keywords: Delivery, Labor, Satisfaction, Meta-analysis

Strength and limitation of the study

- ✓ The strength of this study is including wide geographical areas, different eligible articles across the country setting increases the accuracy of the finding.
- ✓ This systematic review and meta-analysis review provided an overall prevalence of women's satisfaction with the existing labor and delivery services in Ethiopia.
- ✓ This systematic review and meta-analysis result reporting was stick on to the Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines
- ✓ Declaring the absence of publication bias by computing trim and fill analysis increase the reliability of the findings.
- ✓ All included studies in this systematic review and meta-analysis were cross-sectional studies, which may limit the opportunity to generate a causal link between variables.

Introduction

Globally, nearly half million women die during the time of pregnancy and childbirth every year (1). More than two-third of obstetric complications has been carried out during labor and delivery. Around 99% of the global maternal deaths happened in Low and middle income countries; however 56% of the global burden accounted in sub-Saharan Africa and 5% of the global maternal death report existed in Ethiopia (2). Globally, 2.5 million neonates died during the neonatal period, moreover two in three neonates died on the day of birth due to inadequate labor and delivery services (3). Women's satisfaction with existing labor and delivery service is the best predictor for the choice of health facility, comply with service provided, follow up and early detection of complications and its management during prenatal, childbirth and postnatal period (4-8).

Access to proper and adequate labor and delivery services including medical attention and hygienic conditions can reduce the risk of complications and infections that may lead to death or serious illness for the mother and her baby (9). In Ethiopia, 50% of the delivery attended by a skilled provider and 48% of the deliveries were accompanied in the health facility (10). Despite Sustainable Development Goal (SDG) aimed to reduce the global maternal mortality rate to less than 70 per 100,000 live births, the quality of labor and delivery services in settings where lack of skilled professionals and medical equipment's had been identified as one of the precursors to the incongruously to have maternal mortality rate (11).

Ethiopia is still struggling to reduce maternal mortality rate in the country which stands at 412 deaths for every 100,000 live births, which is incredibly far from the sustainable development goal achievement with (12, 13). The cause can be linked with delay in receiving care due to inadequate skilled personnel in emergency obstetric care, inadequate supplies and equipment and poor quality of services (14). Identifying factors that affect women's satisfaction with existing labor and delivery services is imperative for health care providers to improve the quality of labor and delivery services continuously. Women's satisfaction with existing labor and delivery services can be affected by numerous factors such as; waiting time and availability of basic drugs, physical environment of the health care facility (cleanliness of the environment, delivery room and wards), privacy, cost paid to service and waiting area, lack of consideration for cultural practices and beliefs and health providers' technical competency (15-19).
World Health Organization promotes skilled birth attendance at every birth to reduce maternal mortality and recommends that women's satisfaction is the most important index to improve the quality and

effectiveness of health care provision Moreover, only provision of maternal health care services does not improve maternal health and her babies (20).

Although studies have been conducted to assess women's satisfaction with existing labor and delivery services in Ethiopia, however, the representativeness and the findings of a single study are not conclusive and consistent. Likewise, at national level, the proportion of women satisfaction with existing labor and delivery services remains unknown yet. Therefore, this systematic review and meta-analysis aimed to estimate the level of women's satisfaction with existing labor and delivery services in Ethiopia and to identify predictors of women's satisfaction with existing labor and delivery services. Furthermore, the finding of this study will be important to monitor and improve the quality of labor and delivery services. Improving maternity care services in the health care system of the country has a vital role to reduce maternal mortality and morbidity related to complications of pregnancy, labor and delivery.

Methods

Study design and setting

This systematic review and meta-analysis were conducted to assess the pooled prevalence of women's satisfaction towards labour and delivery services and its associated factors in Ethiopia, 2019.

Reporting

This systematic review and meta-analysis was presented according to the Meta-analysis of Observational Studies in Epidemiology (MOOSE) (**Table S1)**

PROSPERO Registration code: CRD42020149217

Figure 1: Flow chart of study selection for systematic review and meta-analysis of women satisfaction with labor and delivery services and its associated factors in Ethiopia

Search Strategies

Studies were searched from databases MEDLINE/PubMed, Hinari, Google scholar, and web of science electronic databases and grey literature from repository. Besides, research articles from MEDNAR, World Wide Science Maternity and Infant Care and Wiley Online Library were retrieved **(Table 1).** Moreover, missing data were handled by contacting corresponding authors. Comprehensive search strategy had been developed using different Boolean operators via PICO standard questions. The following search terms were used using OR and AND Boolean operators: satisfaction AND "delivery Services" OR "delivery care services" OR "skilled delivery services" OR "institutional delivery services" OR "Labor" OR "labor and delivery services" OR "labor and delivery care" OR "labor and delivery care services" OR "intrapartum care"

OR "childbirth care" OR "childbirth care services" AND "mother's" OR "women" OR "clients" AND "associated factors" AND Ethiopia and related terms. All articles searched from databases was exported to End Note library and initially screening by title and abstract. The full text of those articles satisfying inclusion criteria by title and abstract were reviewed the full articles. Systematic review with narrative synthesis was used to summarize the findings of articles in Ethiopia. Quantitative meta-analysis was considered for the articles that are homogeneous.

Eligibility criteria

Inclusion criteria

Population: Only studies involving women who gave birth in public and private institutions

Study design: All observational studies (i.e cross-sectional, case-control, and retrospective and prospective cohort studies and national survey and surveillance reports) were considered for this review.

Study area: Only studies conducted in Ethiopia without time limiting and reported the prevalence or at least one associated factors of women satisfaction towards labour and delivery services.

Publication status and language: Only English language literature and research articles were included

Search date: All research articles accessed from 01-30/9/2019 were included

Exclusion criteria

Citations without abstracts and/or full-text, commentaries, anonymous reports, letters, editorials and articles not reporting our outcome of interest were excluded after reviewing the full texts.

Table 1: Example of searches for the MEDLINE/ PubMed and Google Scholar databases to assess Women's satisfaction with existing labor and delivery services in Ethiopia.

Databases	Searching terms	Number of studies
PubMed	("satisfaction" AND "delivery care services"[All Fields] OR "childbirth care"[All Fields] OR "labor services"[MeSH Terms]) OR ("skilled delivery services"[All Fields] OR "intrapartum care"[MeSH Terms] AND women[All Fields] OR ("client"[MeSH Terms] OR" mother"[All Fields] AND'' determinants ''AND ("Ethiopia" [MeSH Terms]	41
Google scholar	"Satisfaction" and "determinants" or "associated	113

	factors " and "women" or "client" and "labor" or "delivery services" and "Ethiopia"	
From other databases		351
Total retrieved articles		524
Number of included studies		19

Outcome variables

This systematic review and meta-analysis had two main outcomes. Level of women satisfaction with existing labour and delivery services was the primary outcome whereas factors affecting satisfaction of women towards labour and delivery was the second outcome of the study.

Data extraction

After collecting findings from all databases, the articles were exported to Microsoft Excel spreadsheet. Two authors (AD and GG) independently extracted the data and reviewed all the screened and included articles. Secondly, all studies were exported to Microsoft Excel spreadsheet. Data extraction was carried out 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, regions, study area, sample size, and prevalence with 95%CI). For the factors affecting level of women satisfaction with labor and delivery services were extracted with 2 by 2 table format and then the log odds ratio for each factor was calculated.

Quality assessment

Two authors (AD & GG) independently assessed the quality of each studies using Newcastle-Ottawa-scale (NOS) for cross-sectional studies (21).

The methodological quality, comparability, outcome and statistical analysis of the study were the major assessment tools that we used to declare the quality of the study. The inter-rater reliability (IRR) coefficient (Cohen's kappa) between two authors (AD & GG) was 0.95 which suggest that there was almost perfect level of agreement between two authors (22). Moreover, studies scored a scale of ≥ 7 out of 10 was considered as having good quality. During quality appraisal of the articles, any discrepancies

between the two authors were resolved by taking the second group authors (AW, AG, MB and BA). All of the studies were included based on the Newcastle –Ottawa Scale quality assessment criteria **(Table S2).**

Data processing and analysis

Random effect model was applied to estimate the pooled prevalence of women satisfaction towards labour and delivery services. After extraction of the articles, the analysis was carried out using STATA version 14 statistical software. Cochrane Q-test and I^2 statistics were computed to assess heterogeneity within the studies (23).After computing the statistics, results showed there is significant heterogeneity among studies (I^2 = 99.3%, p <0.001).To estimate the overall prevalence of having good knowledge of the postnatal women, via back-transform of the weighted mean of the transformed proportions arcsine variance weights and Dersimonian-Laird weights for fixed-effects model and random effect model respectively (24).Publication bias was assessed using egger's test. Subgroup analysis was done based on the study setting (study setting (region), year of study and sample size to minimize the random variations between the point estimates of the primary study. Furthermore, trim and fill analysis using Duval and Tweedie were implemented (25). Forest plot format was used to present the pooled point prevalence with 95%Cl. For associations, a log odds ratio was used to decide the association between associated factors and satisfaction of women towards delivery services in the included studies

Patient and Public involvement

Neither patient nor public were involved in the review protocol, proposal development, the design and analysis of the study.

Results

Characteristics of the included studies

524 articles were retrieved using a search strategy regarding women satisfaction towards labor and delivery and associated factors in Ethiopia at MEDLINE/PubMed, Scopus, Google Scholar,, Hinari, MEDNAR, World Wide Science, Maternity and Infant Care and Wiley Online Library, a web of science and other gray and online repository accessed literatures. After duplicates removed, 324 studies were remained. Out of the remaining 324 articles, 248 articles were excluded after review of their titles and abstracts. Therefore, 76 full-text articles were accessed and assessed for inclusion criteria, which resulted in the further exclusion of 57 articles primarily due to reasons. As a result, 19 studies were fulfilled the

inclusion criteria to undergo the final systematic review and meta-analysis. This systematic review and meta-analysis consist of nineteen cross sectional studies **(Fig. 1).**

In the present meta-analysis, a total of 19 cross sectional studies were included across different regions of Ethiopia. Amongst, six of the studies were from Amhara, four from SNNPR, two from Harari, three studies from Addis Ababa, four from Oromia. In this meta-analysis, 8614, study participants were involved to estimate the pooled prevalence of women satisfaction towards the existing labor and delivery services in Ethiopia. Concerning sample size, the sample size of the individual studies ranged from 256 to 736. The highest and lowest prevalence (95%) and (19%) of women satisfaction towards existing labor and delivery services were reported in studies conducted in Wolaitta Soddo Town, Southern Nations, Nationalities, and Peoples Region and Addis Ababa respectively (26-44) **(Table 2).**

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

Authors	Region	Study area	Study design	Sample size	Prevalence	Quality
Gizew Asres (26)	Amhara	Bure	cross sectional	420	88.09	Low risk
Getenet et al (27)	Harari	Harar	cross sectional	398	84.67	Low risk
Temamo et al (28)	SNNPR	Wolaita	cross sectional	736	95.00	Low risk
Edaso et al (29)	Oromia	West Arsi	cross sectional	477	74.60	Low risk
Gashaye et al (30)	Amhara	Gondar	cross sectional	579	31.30	Low risk
Yarinbab et al (31)	SNNPR	Mizan	cross sectional	280	30.40	Low risk
Demas et al (32)	Addis Ababa	Addis Ababa	cross sectional	394	19.00	Low risk
Bitew et al (33)	Amhara	Debre Markos	cross sectional	398	81.70	Low risk
Kidane et al (34)	Harari	Harar	cross sectional	400	80.00	Low risk
Melese et al (35)	Addis Ababa	Addis Ababa	cross sectional	423	92.90	Low risk
Gonie et al (36)	Oromia	Jimma	cross sectional	366	78.70	Low risk
Tayelign et al (37)	Amhara	Dessie &Bahirdar	cross sectional	417	61.90	Low risk
Dewana et al (38)	SNNPR	Arbaminch	cross sectional	256	90.20	Low risk
Tesfaye et al (39)	SNNPR*	Gamogofa zone	cross sectional	430	79.10	Low risk
Mekonen et al (40)	Amhara	Bahirdar	cross sectional	594	74.90	Low risk

Amdemichael et al (41)	Oromia	Assela	cross sectional	398	80.70	Low risk
Tadesse et al (42)	Oromia	Omo Nada	cross sectional	391	65.20	Low risk
Assefa et al (43)	Addis Ababa	Addis Ababa	cross sectional	461	82.00	Low risk
Demis et al (44)	Amhara	Woldia	cross sectional	398	51.00	Low risk

* Southern Nation Nationalities and Peoples Region

Level of women satisfaction with labor and delivery services in Ethiopia

The overall pooled prevalence of women satisfaction with existing labor and delivery servicesis presented with a forest plot (**Fig.2**). Therefore, the pooled estimated prevalence of women satisfaction with labor and delivery services in Ethiopia was 70.54% (95% CI: 60.94–80.15; I^2=99.3%, P<0.001).

Publication bias

Funnel plot was assessed for asymmetry distribution of women satisfaction with labor and delivery services by visual inspection (**Fig. 3 (a)**). Egger's regression test showed with a p-value of 0.002 with the evidence of publication bias. As a result, trim and fill analysis was conducted to overcome the publication bias. After three studies were filled, twenty two studies were enrolled and computed through trim and fill analysis (**Fig. 3 (b)**) with pooled prevalence of 66.36% (95%CI; 55.52-77.20) using random effect model.

Sensitivity analysis

In this meta-analysis, to investigate the potential source of heterogeneity observed in pooled prevalence of women satisfaction with existing labor and delivery service a leave-one-out sensitivity analysis was executed and suggesting that our findings was not dependent on a single study. The pooled prevalence of women satisfaction with existing labor and delivery service was varied between 69.18% (95%CI: 59.25-79.09) and 73.43% (95%CI: 65.29-81.55) after deletion of a single study (**Table 3**).

Table 3: Sensitivity analysis of prevalence for each study being omitted with 95%CI: prevalence of women satisfaction with existing labor and delivery services in Ethiopia

Study omitted	Prevalence	95%CI
Gizew A (2018)	69.56	59.39-79.73
Getenet et al (2019)	69.75	59.62-79.88
Temamo et al (2018)	69.18	59.25-79.09
Edaso et al (2019)	70.31	60.22-80.41
Gashaye et al (2019)	72.74	63.89-81.59
Yarinbab et al (2019)	72.76	63.37-82.14
Demas et al (2017)	73.43	65.29-81.55
Bitew et al (2015)	70.02	59.92-80.12
Kidane et al (2018)	70.01	59.91-80.12
Melese et al (2014)	69.29	59.12-79.45
Gonie et al (2018)	70.09	60.01-80.16
Tayelign et al (2011)	71.02	61.08-80.96
Dewana et al (2016)	69.44	59.38-79.50
Tesfaye et al (2016)	70.06	59.95-80.18
Mekonen et al (2015)	70.29	60.14-80.45
Amdemichael et al (2014)	69.98	59.87-80.08
Tadesse et al (2017)	70.84	60.86-80.05
Assefa et al (2017)	69.90	59.75-80.05
Demis et al (2020)	71.62	61.84-81.41

Subgroup analysis

Sub group analysis was conducted with the evidence of heterogeneity. Therefore sub group analysis was done by study year, sample size and study area. Based on the subgroup analysis, the level of women satisfaction with existing labor and delivery services was highest in Harari region 82.41% whereas 84.51 % in the study conducted within the year of 2006-2010 **(Table 4).**

Table 4: Sub group analysis on the level of women satisfaction with existing labor and delivery services in Ethiopia (n = 19)

Variables	Subgroup	No. of studies	Prevalence (95%CI)	I^2 (%)	P-value
Sample size	≥400	10	76.02(65.05-86.99)	99.2	<0.001
	<400	9	64.45(47.72-81.17)	99.3	<0.001
Study area	Addis Ababa	3	64.67(22.47-96.88)	99.8	<0.001
	Oromia	4	74.89(68.61-81.17)	89.0	<0.001
	Amhara	6	64.53(46.82-82.25)	99.2	<0.001
	Harari	2	82.41(77.84-86.99)	66.7	0.083
	SNNPR	4	73.78(51.91-95.64)	99.4	<0.001
Study year	2006-2010	2	84.51(73.20-95.82)	94.0	<0.001
	2011-2015	7	74.63(69.40-79.86)	91.6	<0.001
	2016-2019	10	64.95(48.19-81.70)	99.6	<0.001

Associated factors for women satisfaction with labor and delivery services

In this systematic review and meta-analysis; duration of labor, free service, keeping privacy, time to be seen by health care provider <20minute, planned delivery in the health institution, antenatal care, and maternal education were the factors associated with women satisfaction with existing labor and delivery services.

Women who hadn't formal education were 2.19 times more likely to be satisfied with the existing labor and delivery services than women who had formal education (AOR = 2.19; 95% CI: 1.47- 3.25)(**Fig.4**).

The odds of women satisfaction with existing labor and delivery services were 4.03 times more likely among women who hadn't ANC follow-up as than women who had ANC follow up (AOR = 4.03; 95% CI: 2.21- 7.35)(**Fig.5**).

In this study women who had planned delivery in the health institution were 2.85 times more likely to be satisfied with existing labor and delivery services than their counterparts (AOR = 2.85; 95% CI: 1.99- 4.07), (**Fig.6**).

Women who have seen by the health care provider within 20 minutes were 2.97 times more likely satisfied by the labor and delivery services than their counterparts (AOR = 2.97; 95% CI: 2.11- 4.19)(**Fig.7**).

Women whose privacy kept were 2.84 times more likely to be satisfied with the existing labor and delivery services as compared with their counterparts (AOR = 2.84; 95% CI: 1.46- 5.55)(**Fig.8**).

The odds of women satisfaction with existing labor and delivery services were 2.55 times more likely among women not staying more than 12 hours to give birth than women who stayed more than 12 hours to give birth (AOR = 2.55; 95% CI: 1.70- 3.81) (**Fig.9**).

Women who received the existing labor and delivery service without fee were 5.01 times more likely to be satisfied as compared with women who got their service with cost expense (AOR = 5.01; 95% CI: 2.87- 8.75), (**Fig.10**).

Discussion

Globally critical maternity and infant care implementing efforts are important strategy to reduce maternal mortality has been stepped up, maternal satisfaction with the existing labor and delivery services need to be easily addressed in low and middle income countries. Quality improvement efforts in low and middle income countries could focus on strengthening the process of labor and delivery cares. In this systematic review and meta-analysis, the pooled level of women satisfaction with existing labor and delivery services in Ethiopia was 70.54% (95% CI: 60.94–80.15). The finding of this systematic review and meta-analysis is consistent with the study done in India (45), and Egypt (46). This similarity finding might be due to labor and delivery services provided in low and middle income countries are nearly similar due to the limited number of health institutions, health professionals and the availability of drugs whereas the finding of this study is lower than the study conducted in Senegal (47), and Nepal (48). The possible reason for this

discrepancy might be due to, this study reports a review result from many institutions whereas studies reported in Senegal and Nepal are from a single institutions. Besides, the difference might be due to variation in socio-demographic, socioeconomic characteristics, and measurement tools used to quantify the level of satisfaction and sample size.

Regarding the subgroup analysis result, using study area, sample size and study year revealed that the highest level of women satisfaction with existing labor and delivery service was reported in Harari region, having a sample size of less than four hundred and among studies published between 2006-2010. This difference might be explained as due to number of studies conducted in Harari region and published in between 2006-2010 were limited than studies conducted and published in other regions of the country and published above 2010 years.

Women who have been seen by the health care provider within 20 minutes were a key determinant factor for women to be satisfied with the existing labor and delivery services. This finding is consistent with the stud done in Nepal (48). This might be due to that, being treated with dignity, respect, kindness, approachability and courtesy was a key interpersonal behavior which enhances women satisfaction.

Being able to maintain privacy is the important associated factor for women satisfaction with existing labor and delivery services. This study finding is supported by the study report from developing countries (49) and Uganda (50). This might be the fact that inadequate privacy during labor and delivery care and counseling was associated with women's poor perception of services.

Absence of antenatal care follow up is one of the predictor for women satisfaction with existing labor and delivery care in this systematic review and meta-analysis. The probable reason might be that the exposure to facilities through antenatal care increases the understanding of women about the service provided by the health care professionals. This, in turn, demands enhanced healthcare services and better-quality labor care in the hospitals or health centers. The odds of having planned delivery in the health institution was nearly three times more likely to be satisfied with the labor and delivery services which provided in the institution. Women who had awareness and knowledge regarding facility delivery and its important may enhance the utilization and satisfaction towards the labor and delivery services. Indeed, clients had various expectations about hospital delivery that influenced their perception of care.

Having informal education of the women were two times more likely to be satisfied with the existing and provided labor and delivery services in the health institutions. This finding is parallel with the study conducted in Uganda (50) and Serbia (51). This might be explained as women who had higher educational status, may expect high quality care of labor and delivery is provided which might be inconsistent due to limited number of health care professionals, availability of medications and the number of equipped health facilities which results low satisfaction among laboring women.

The odds of receiving free service are the associated factor for women satisfaction with labor and delivery services. This might be due to providing available and accessible medications and medical resources with free service setting may significantly increase their satisfaction.

Women whose labor is commenced within 12 hours are 2.7 times more likely to be satisfied by the labor and delivery services. This might be due to the fact that women whose labor persists beyond 12 hours were more prone to privacy breakage due to repeated pelvic examination, and persistent labor pain which results in dissatisfaction.

Conclusion

The pooled prevalence of women satisfaction with labor and delivery services was higher. Informal educational status of the women, Not having antenatal care follow up, planned delivery in the health institution, keeping women privacy, getting free service, time to be seen by the health care providers within 20 minutes and duration of labor within 12 hours were the associated factors of women's satisfaction with labor and delivery services. This finding is important to design strategic policies and interventions to prevent preventable maternal and neonatal complications during childbirth and postpartum period.

Supporting information

Table S1. MOOSE checklist: (PDF)

Table S2. Quality assessment tool: (PDF)

List of Abbreviations

AOR: Adjusted Odds Ratio, ANC: Antenatal Care, EDHS: Ethiopia Demographic Health Survey, MMR: Maternal Mortality Ratio, SVD: Spontaneous vaginal Delivery, WHO: World Health Organization

Declarations

Funding

Not applicable

Availability of data and materials

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

Author's Contributions

AD and GG developed the draft protocol under the supervision of AW, AG, MB, and BA. All authors (AD, GG) 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. All authors read and approved the final manuscript.

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Consent for publication

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Competing interest

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Legend of figures

Figure 1: Flow chart of study selection for systematic review and meta-analysis of women satisfaction with labor and delivery services and its associated factors in Ethiopia

Figure 2: Forest plot of the prevalence with corresponding 95% CIs of the nineteen studies on women satisfaction with labor and delivery services in Ethiopia

Figure 3: Funnel plot before adjustment (a) and after adjustment (b) trim and fill analysis

Figure 4: Pooled odds ratio of the association between educational status and satisfaction of women with labor and delivery services in Ethiopia

Figure 5: Pooled odds ratio of the association between antenatal care and satisfaction of women with labor and delivery services in Ethiopia

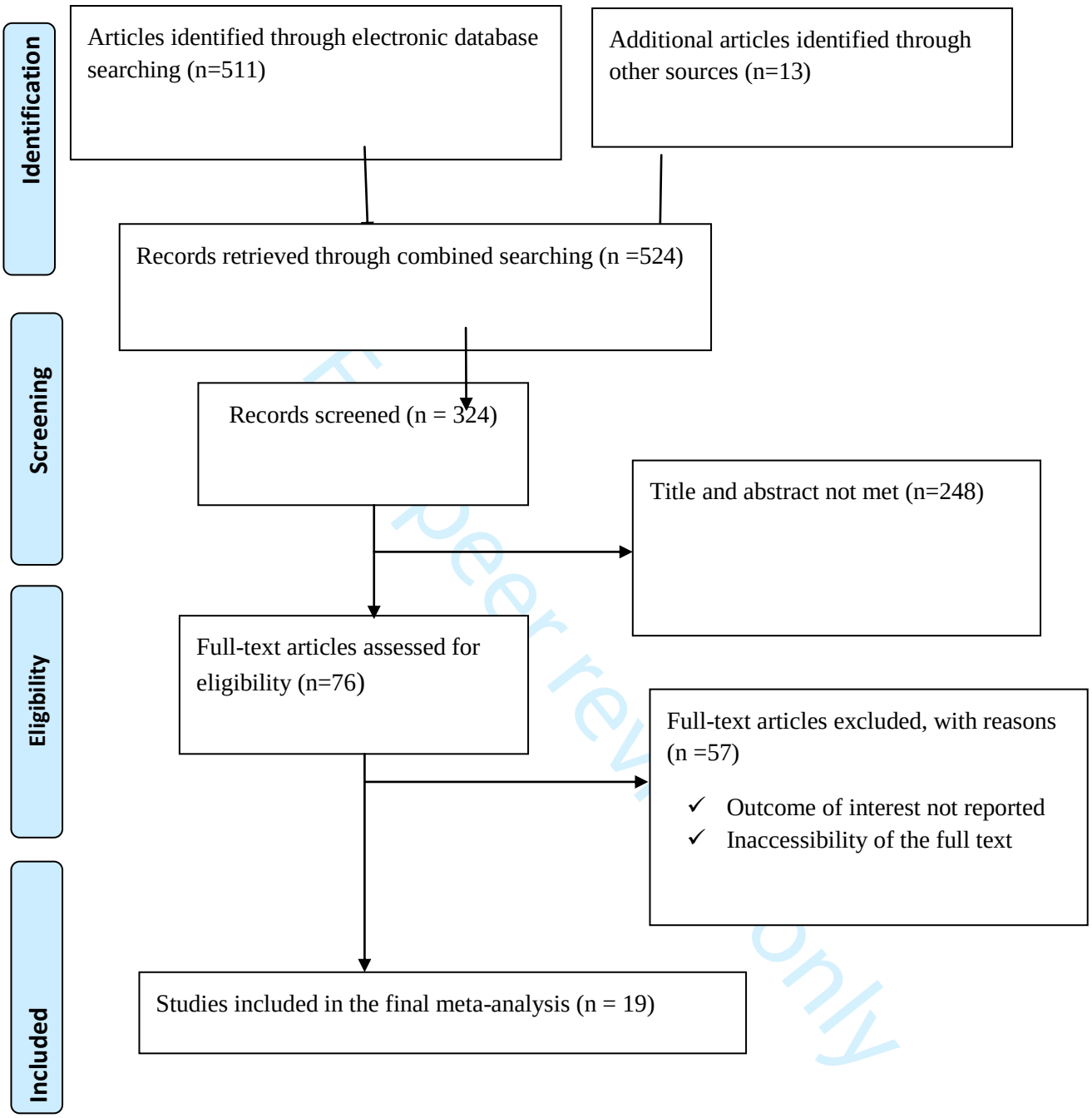
Figure 6: Pooled odds ratio of the association between planned pregnancy and satisfaction of women with labor and delivery services in Ethiopia

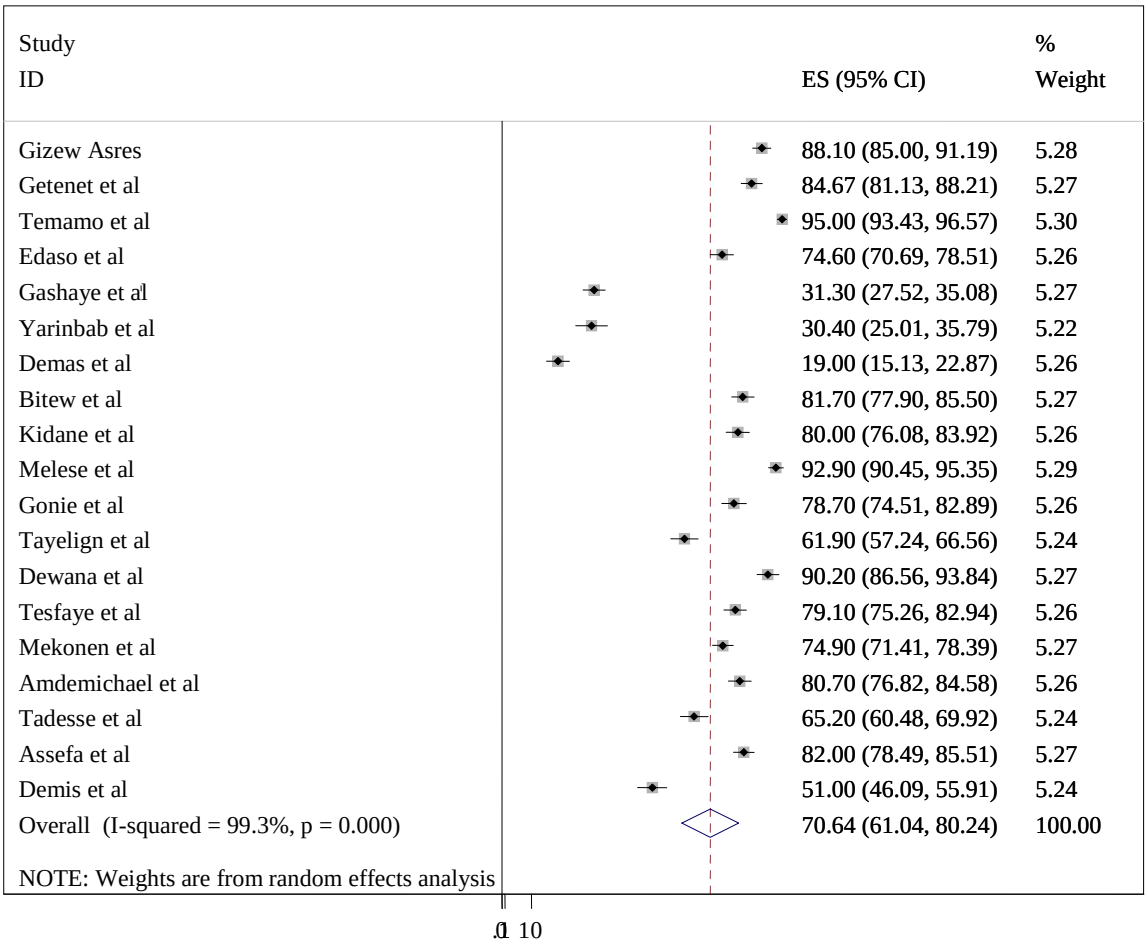
Figure 7: Pooled odds ratio of the association between time to be seen by health care provider and satisfaction of women with labor and delivery services in Ethiopia

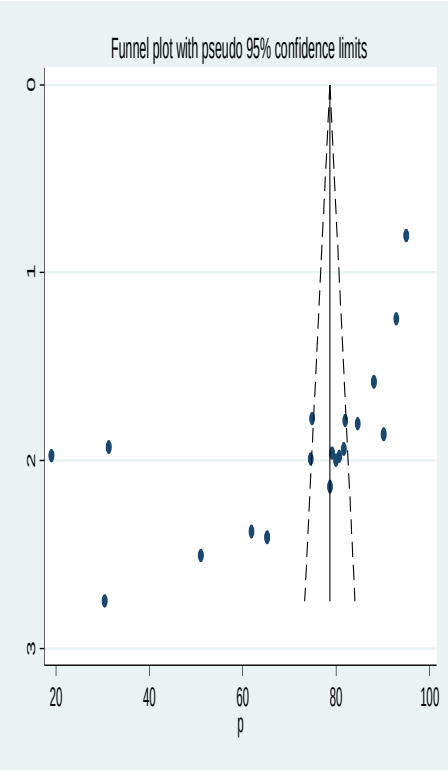
Figure 8: Pooled odds ratio of the association between privacy of the mother and satisfaction of women with labor and delivery services in Ethiopia

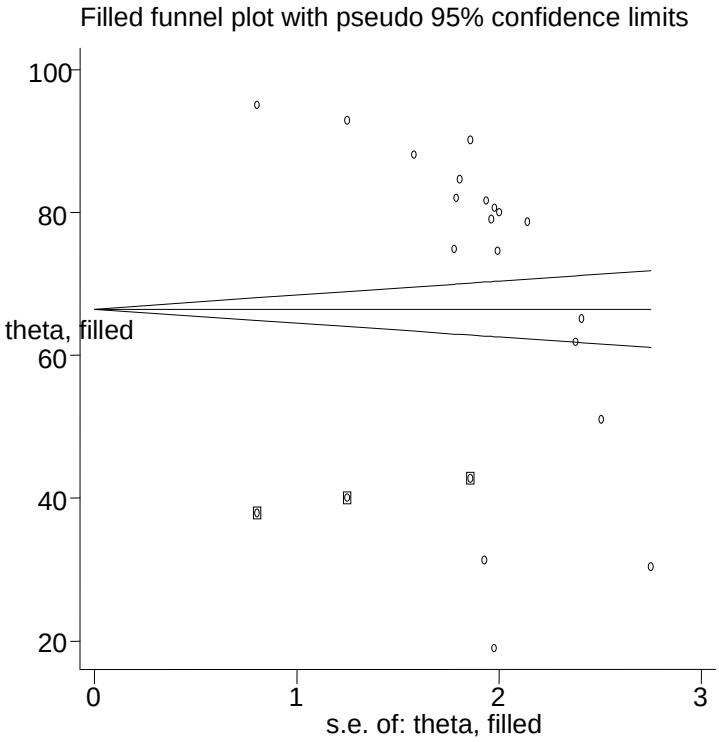
Figure 9: Pooled odds ratio of the association between duration of labor and satisfaction of women with labor and delivery services in Ethiopia

Figure 10: Pooled odds ratio of the association between getting free service and satisfaction of women with labor and delivery services in Ethiopia









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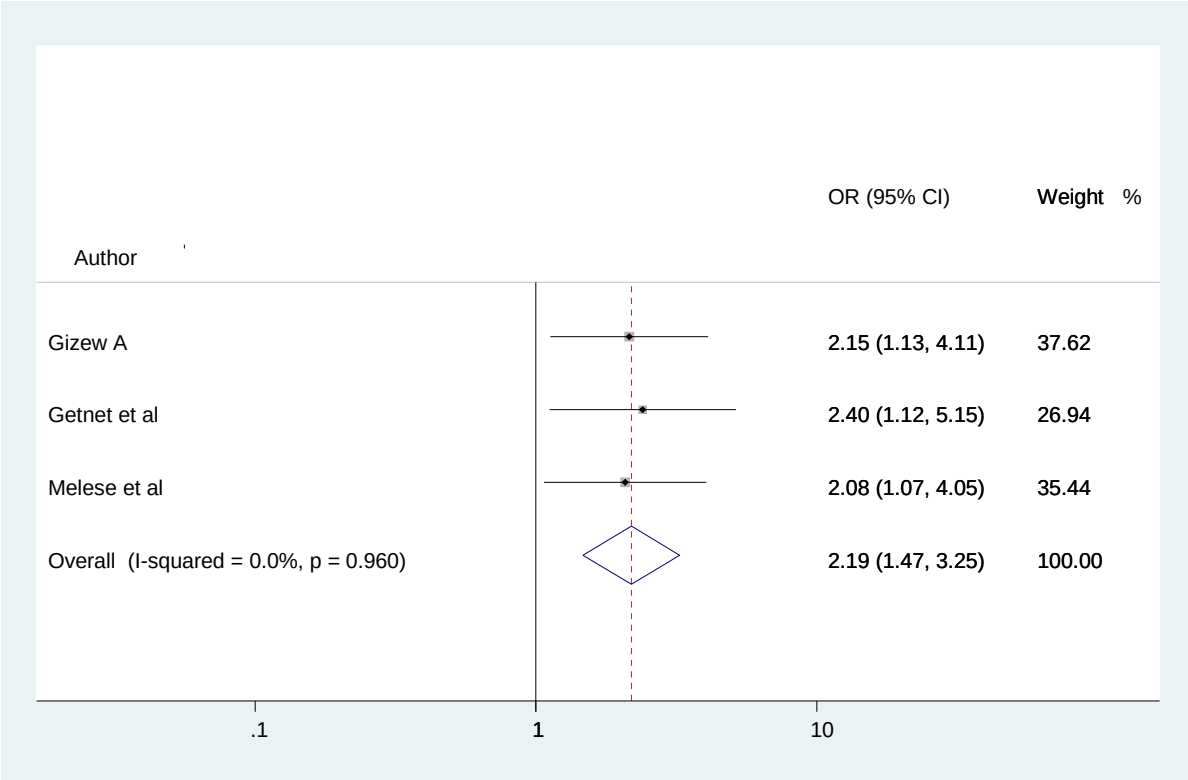

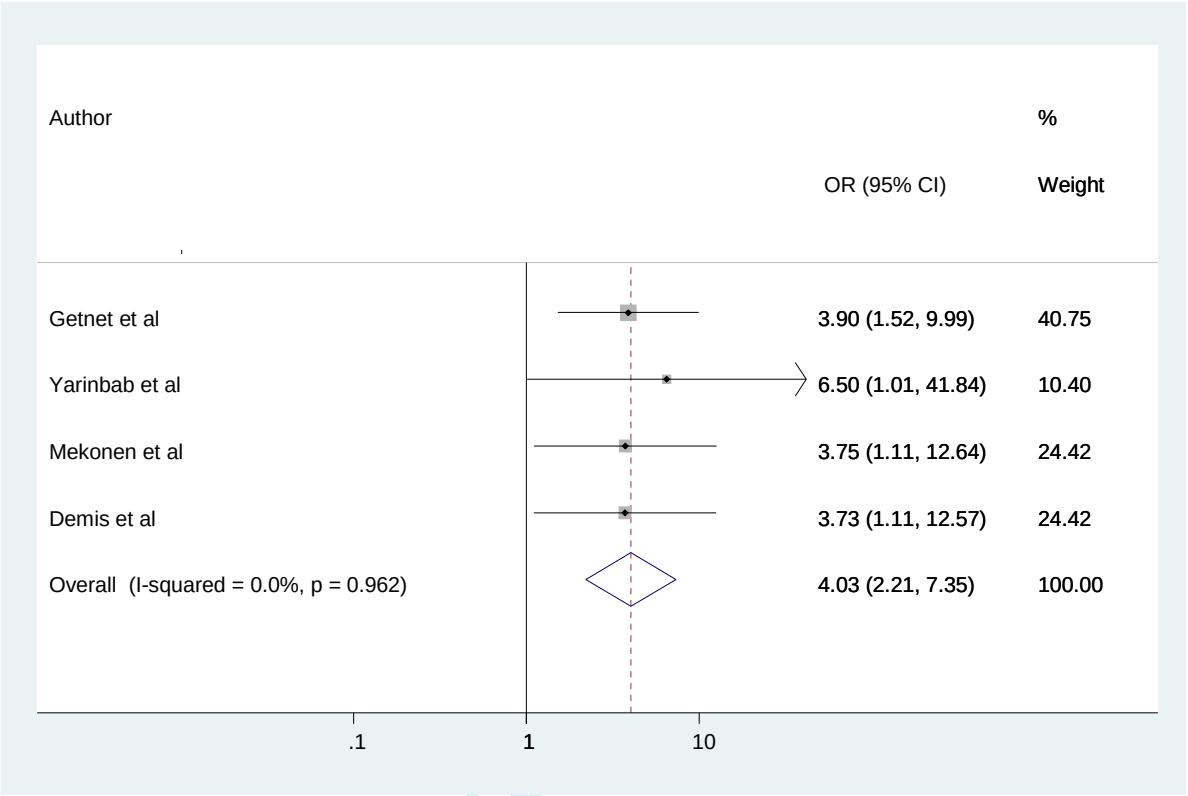

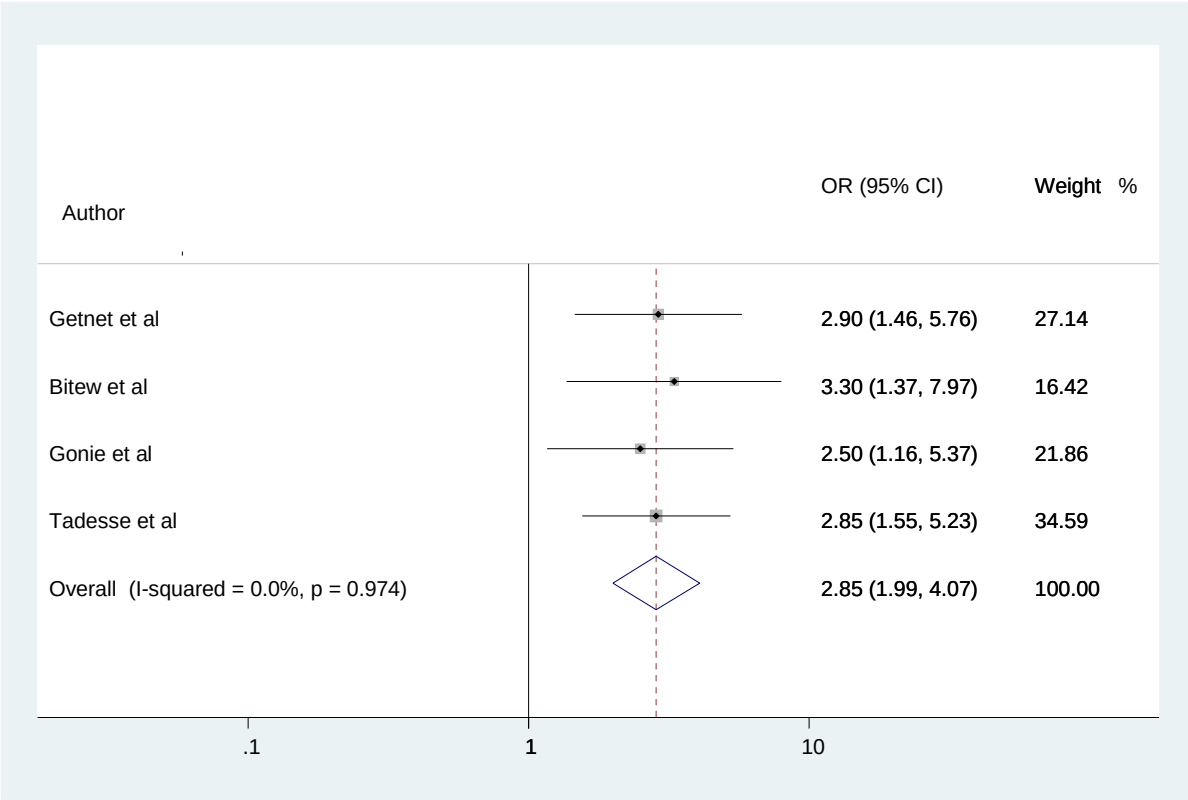

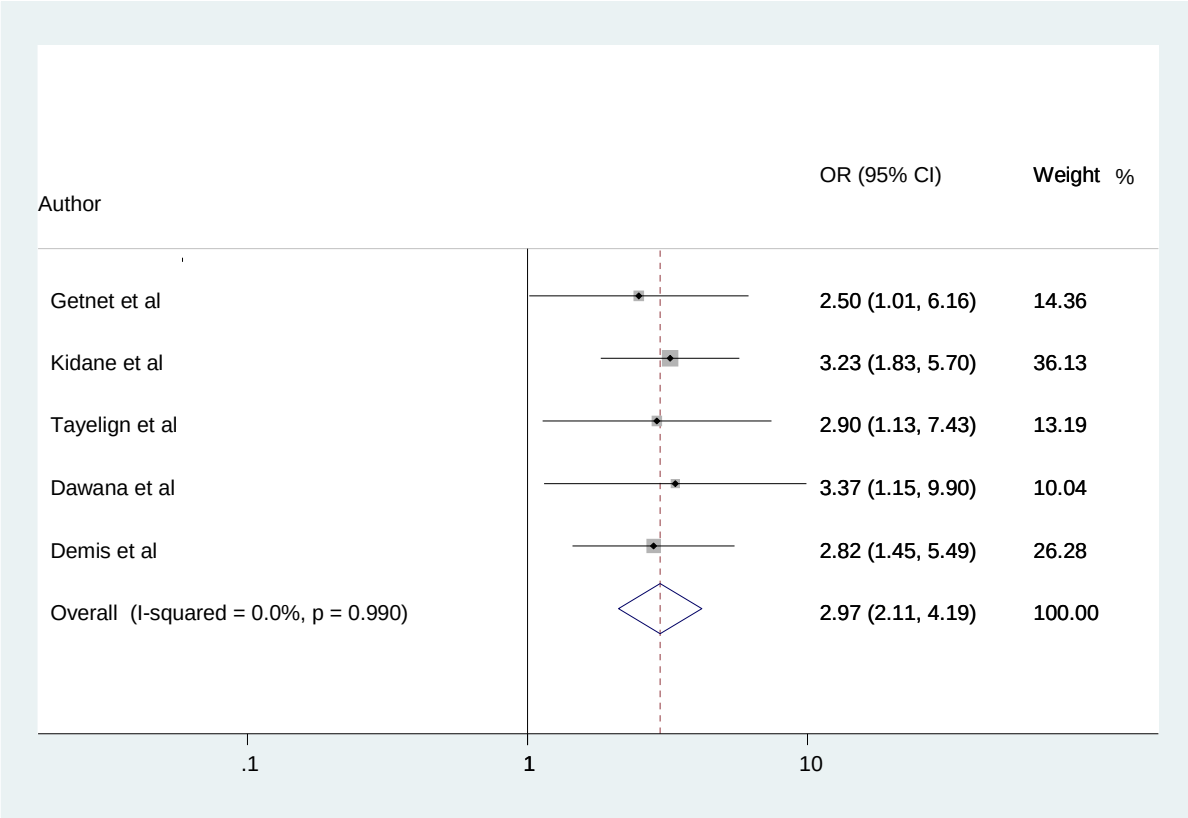

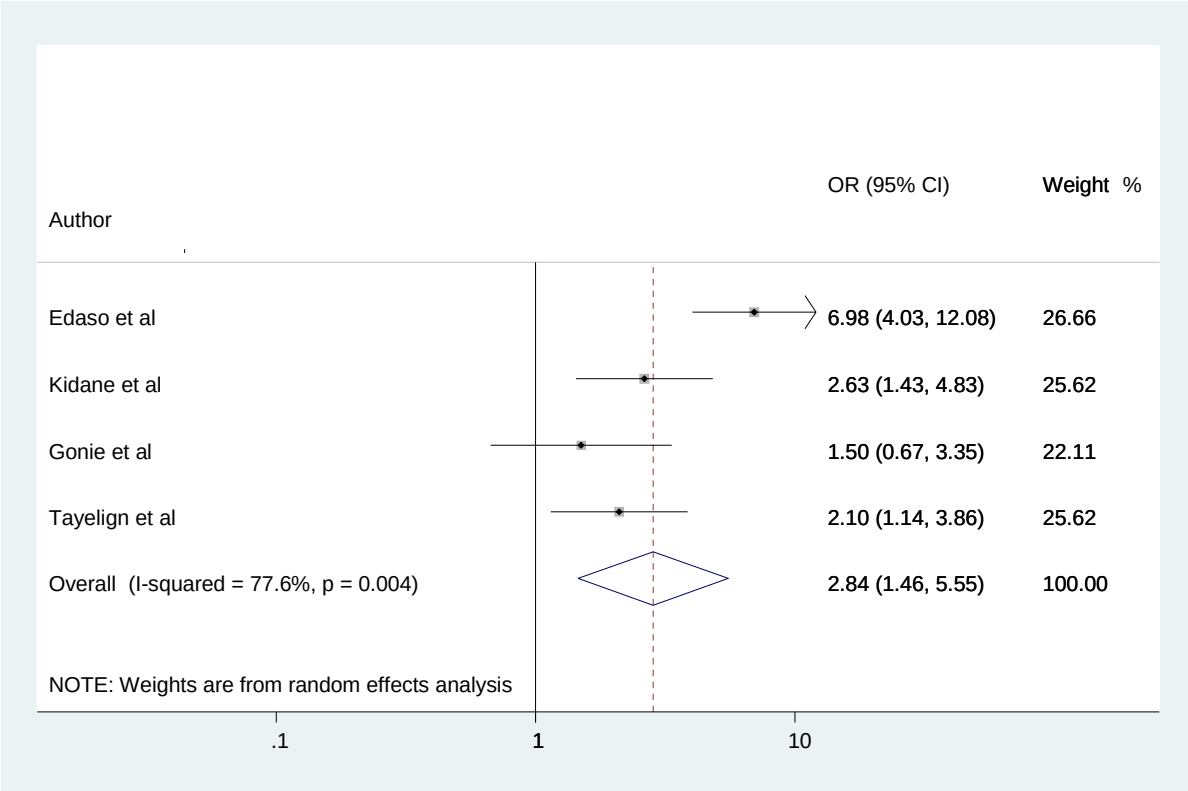

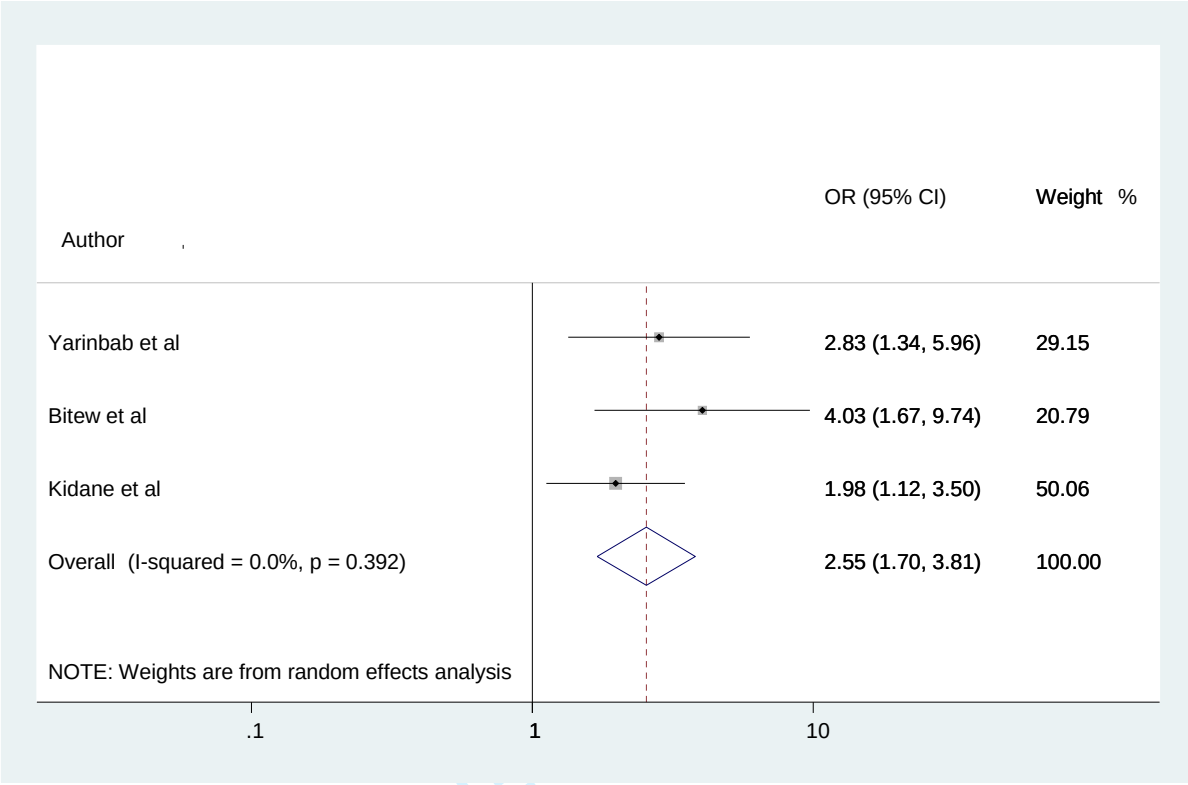

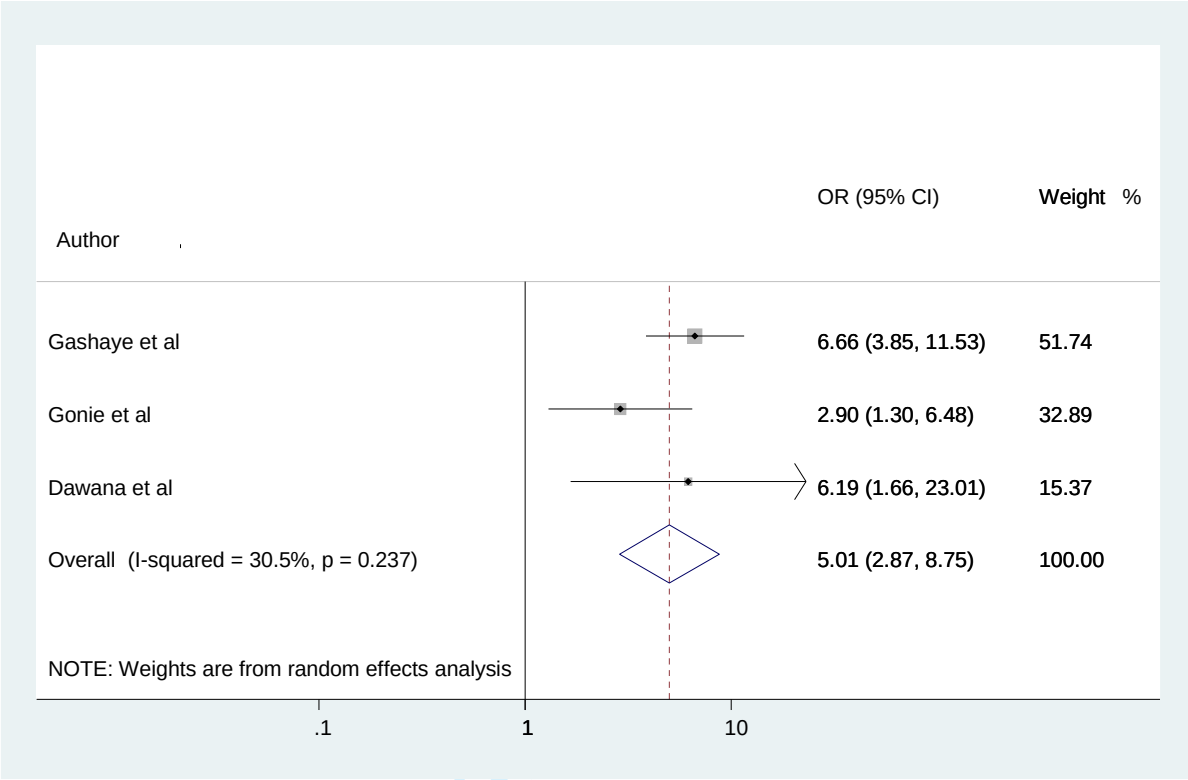

MOOSE Guidelines for Meta-Analyses and Systematic Reviews of Observational Studies*

	Topic	Page numbe
Title	Identify the study as a meta-analysis (or systematic review)	01
Abstract	Use the journal's structured format	02
Introduction	**Present:**	03
	The clinical problem	04
	The hypothesis	05
	A statement of objectives that includes the study population, the condition of interest, the exposure or intervention, and the outcome(s) considered	05
Sources	**Describe:**	05
	Qualifications of searchers (eg, librarians and investigators)	05
	Search strategy, including time period included in the synthesis and keywords	05-06
	Effort to include all available studies, including contact with authors	05-06
	Databases and registries searched	05-06
	Search software used, name and version, including special features used (e.g. explosion)	05-06
	Use of hand searching (e.g, reference lists of obtained articles)	05-06
	List of citations located and those excluded, including justification	06
	Method of addressing articles published in languages other than English	06
	Method of handling abstracts and unpublished studies	06
	Description of any contact with authors	N/A
Study Selection	**Describe**	06
	Types of study designs considered	06
	Relevance or appropriateness of studies gathered for assessing the hypothesis to be tested	06
	Rationale for the selection and coding of data (eg, sound clinical principles or convenience)	06
	Documentation of how data were classified and coded (eg, multiple raters, blinding, and inter-rater reliability)	07-08
	Assessment of confounding (e.g. comparability of cases and controls in studies where appropriate)	N/A
	Assessment of study quality, including blinding of quality assessors; stratification or regression on possible predictors of study results	07-08
	Assessment of heterogeneity	07-08
	Statistical methods (eg, complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated	07-08
Results	**Present**	09-14
	A graph summarizing individual study estimates and the overall estimate	09-14
	A table giving descriptive information for each included study	09-14
	Results of sensitivity testing (eg, subgroup analysis)	9-10
	Indication of statistical uncertainty of findings	9-11
Discussion	**Discuss**	13
	Strengths and weaknesses	3
	Potential biases in the review process (eg, publication bias)	10

	Assessment of quality of included studies	10
	Consideration of alternative explanations for observed results	13-15
	Generalization of the conclusions (ie, appropriate for the data presented and within the domain of the literature review)	15
	Guidelines for future research	15
	Disclosure of funding source	15

*Modified from Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) group. JAMA 2000;283:2008–12.

Quality assessment of articles (NOS for cross sectional study)

Studies	Selection				Comparability	Outcome		Total score
	Representativeness (1)	Sample size (1)	Non-respondents (1)	Ascertainment of the exposure (risk factor) (2)	The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled (2)	Assessment of the outcome (2)	Statistical test (1)	
Gizew Asres (26)	*	*	*	**	*	**	*	9
Getenet et al (27)	*	*	*	**	*	*	*	8
Temamo et al (28)	*	*	*	**	*	**	*	9
Edaso et al (29)	*	*	*	*	*	**	*	8
Gashaye et al (30)	*	*	*	**	*	**	*	9
Yarinbab et al (31)	*	*	*	**	*	**	*	9
Demas et al (32)	*	*	*	**	*	**	*	9
Bitew et al (33)	*	*	*	**	*	**	*	9
Kidane et al (34)	*	*	*	**	*	**	*	9
Melese et al (35)	*	*	*	**	*	**	*	9
Gonie et al (36)	*	*	*	*	*	*	*	7
Tayelign et al (37)	*	*	*	**	*	**	*	8
Dewana et al (38)	*	*	*	**	*	**	*	9
Tesfaye et al (39)	*	*	*	**	*	*	*	8
Mekonen et al (40)	*	*	*	*	*	**	*	8

Amdemichael et al (41)	*	*	*	**	*	*	*	8
Tadesse et al (42)	*	*	*	**	*	**	*	9
Assefa et al (43)	*	*	*	*	*	**	*	8
Demis et al (44)	*	*	*	**	*	**	*	9