






BMJ Open Male involvement in antenatal care follow-up and its determinants in Ethiopia: a systematic review and meta-analysis

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ABSTRACT

Objective To determine the involvement of males in antenatal care (ANC) follow-up and its determinants in Ethiopia.

Design A systematic review and meta-analysis.

Data sources A systematic search was done on PubMed, African Journals Online, HINARI, ScienceDirect, Google Scholar and direct Google up to 20 November 2023.

Eligibility criteria We included cross-sectional or case-control studies reporting male involvement in ANC service and its determinants in Ethiopia, which were published as full-length articles in English.

Data extraction and synthesis The Joanna Briggs Institute checklist was used to appraise the included studies, and the I^2 test was used to evaluate heterogeneity among the studies. We assessed publication bias using a funnel plot and Begg's test. The forest plot presented the combined proportion of male involvement and OR, along with a 95% CI.

Results The pooled proportion of male involvement in ANC follow-up in Ethiopia was 43.3% (95% CI 31.7% to 54.8%). Male partners with secondary education or higher (Adjusted Odds Ratio (AOR) 2.72, 95% CI 1.81 to 4.10), government employment (AOR 2.09, 95% CI 1.49 to 2.94), attendance at health education (AOR 3.02, 95% CI 1.39 to 6.54) and knowledge about ANC or pregnancy danger signs (AOR 2.36, 95% CI 1.33 to 4.19) demonstrated a significant association with increased male involvement.

Conclusion Male involvement in ANC in Ethiopia is low. Recommendations include targeted education for males with no formal schooling, improved health education on ANC and pregnancy risks, and interventions for males in the private sector.

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INTRODUCTION

Maternal and neonatal health has emerged as a critical global priority, reflected in its adoption as the fourth and fifth Millennium Development Goals^{1 2} and its continued inclusion in the third Sustainable Development Goals (SDGs).³ However, the goal of reducing maternal mortality by 75% by 2015 fell short worldwide.¹ In 2017, approximately

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Screening, data extraction and quality assessment were performed independently by multiple authors.
- ⇒ All the included studies were cross-sectional in design, making it difficult to establish causal relationships.
- ⇒ We only included articles published in English.
- ⇒ We failed to consult a librarian or information scientist to optimise our search results, which may hinder our outcomes.
- ⇒ Some factors were reported by only one study, precluding the generation of a pooled effect size.

295 000 women died during or after pregnancy, with sub-Saharan Africa (SSA) and Southern Asia bearing the largest burden.⁴ These regions struggle with weak health systems, limited access and minimal utilisation of health services.⁵ In Ethiopia, one of the SSA countries, the maternal mortality ratio is 401 maternal deaths per 100 000 live births.⁶

Additionally, globally, in 2021, around 1.9 million stillbirths and 2.3 million neonatal deaths were reported,^{7 8} perhaps the highest number in Ethiopia and other SSA countries and Southern Asia.^{7 8} The majority of this maternal and child mortality occurred during childbirth or shortly after.^{4 5} Timely,^{9 10} frequent^{9 11 12} and adequate^{9 11 12} antenatal care (ANC) services minimise the risks of complications and death for both the mother and unborn fetus.

In low-income and middle-income countries (LMICs) patriarchal societies, men hold the power to make decisions and provide for their families, often dictating women's access to economic resources.¹³ Promoting male involvement in reproductive health is a promising strategy to improve maternal and child health, elevating the number of women receiving adequate ANC, institutional

deliveries, postnatal check-ups, child health services and emotional support.^{14–18} Male partner participation in ANC also deters unhealthy maternal practices,¹⁹ boosts contraception usage and alleviates stress, pain and anxiety during delivery.^{13 20}

Even though studies highlight the positive impact of male partner involvement in ANC services, the proportion remains low in Ethiopia.^{21–30} One systematic review and meta-analysis done on the involvement of males in birth preparedness and complication readiness in Ethiopia³¹ did not include all studies and focused only on birth preparedness, which is only one component of ANC.³² In addition, previous primary studies done in Ethiopia have reported varying degrees of male participation in ANC utilisation, ranging from 9% to 65.5%,^{28 33} and several factors have been associated with hindering male involvement in ANC utilisation.^{21 25–28 30 33–37} These primary studies were conducted in a fragmented manner across different parts of Ethiopia, and the current pooled prevalence of male involvement in ANC services has not been determined in Ethiopia. Therefore, this systematic review and meta-analysis aims to determine the current pooled prevalence and factors associated with males' involvement in ANC services in Ethiopia. The study's objective has paramount importance to the overarching goal of achieving SDG 3, which aims to end preventable maternal and neonatal mortality by 2030. Also, a comprehensive strategic plan will be developed at the national level to address the identified factors.

METHOD AND MATERIALS

Study setting and period

Ethiopia, situated in the Horn of Africa, stands out as one of the prominent East African countries. It comprises nine national regional states, including Tigray, Afar, Amhara, Oromia, Somalia, Benishangul-Gumuz, Southern Nations Nationalities and People Region (SNNPR), Gambella and Harari, alongside two administrative states—Addis Ababa City Administration and Dire Dawa City Administration. These states and administrative councils are further divided into 800 woredas and approximately 15 000 kebeles. It covers an area of 1 119 683 km² and boasts a population of 118 million (2021 est.), with more than 84% residing in rural areas.³⁸ The search period was from 30 October 2023 to 20 November 2023.

Search strategies

PubMed, African Journals Online, HINARI, ScienceDirect, Google Scholar and direct Google search were used to access relevant studies for this review. Moreover, reference lists of eligible studies were retrieved to account for the missed studies in the database search. All primary cross-sectional or case-control studies published before 20 November 2023 were included. The search was done using keywords such as male involvement in ANC, or male participation in ANC, and associated factors, or determinants, or predictors, and Ethiopia. Combinations of

Boolean operators (AND, OR), free keywords and MeSH terms were used in the search process (online supplemental additional file 1).

Eligibility criteria

The inclusion criteria include (1) studies conducted in Ethiopia, (2) cross-sectional or case-control studies, (3) studies reporting the prevalence of male involvement in ANC services and/or associated or determinant factors and (4) studies published as full-length articles in English. Whereas, conference papers or abstracts, articles lacking full texts, anonymous reports, editorial reports and qualitative studies were excluded.

Outcome of the study

Male involvement in ANC follow-up was defined as the active participation of the male partner in (1) engaging in discussions with healthcare professionals regarding the delivery location of the spouse and (2) accompanying the woman during at least one ANC check-up. Those male partners who reported engaging in both of these activities were classified as 'involved in ANC', while those who missed one of these activities were categorised as 'not involved in ANC'.²¹

Data extraction

Data from all included studies were extracted by Microsoft Excel spreadsheet. The extraction process was conducted by three authors (GFA, DG and ZA). The study extracted essential details from each study, including the author's name, publication year, prevalence, study region, study design and the associated predictors of male involvement, including ORs.

Quality assessment/critical appraisal

The Joanna Briggs Institute Critical Appraisal Checklist for cross-sectional studies was used to assess the quality of the study.³⁹ The qualities of the included studies were independently evaluated by two reviewers (GFA and MSA). Any discrepancy between the two authors was resolved through discussion led by the fourth author (YN) (online supplemental additional file 2).

Statistical analysis

A Microsoft Excel database was used for data entry, which was then imported into R software V.4.1.3 for further analysis using the Meta-package. Heterogeneity between studies was assessed using the I² index,⁴⁰ with 25%, 50% and 75% indicating low, medium and high heterogeneity, respectively.⁴¹ Publication bias was evaluated by visual inspection of funnel plot symmetry and the Begg's test. A p value of less than 0.05 on the Begg's test noted the presence of publication bias among the included studies. In order to identify potential sources of heterogeneity, a univariate meta-regression analysis was conducted, taking into account the sample size and year of publication. Also, a leave-one-out sensitivity analysis was done by systematically removing one study at a time to assess the impact of each individual study on the overall estimate.⁴²

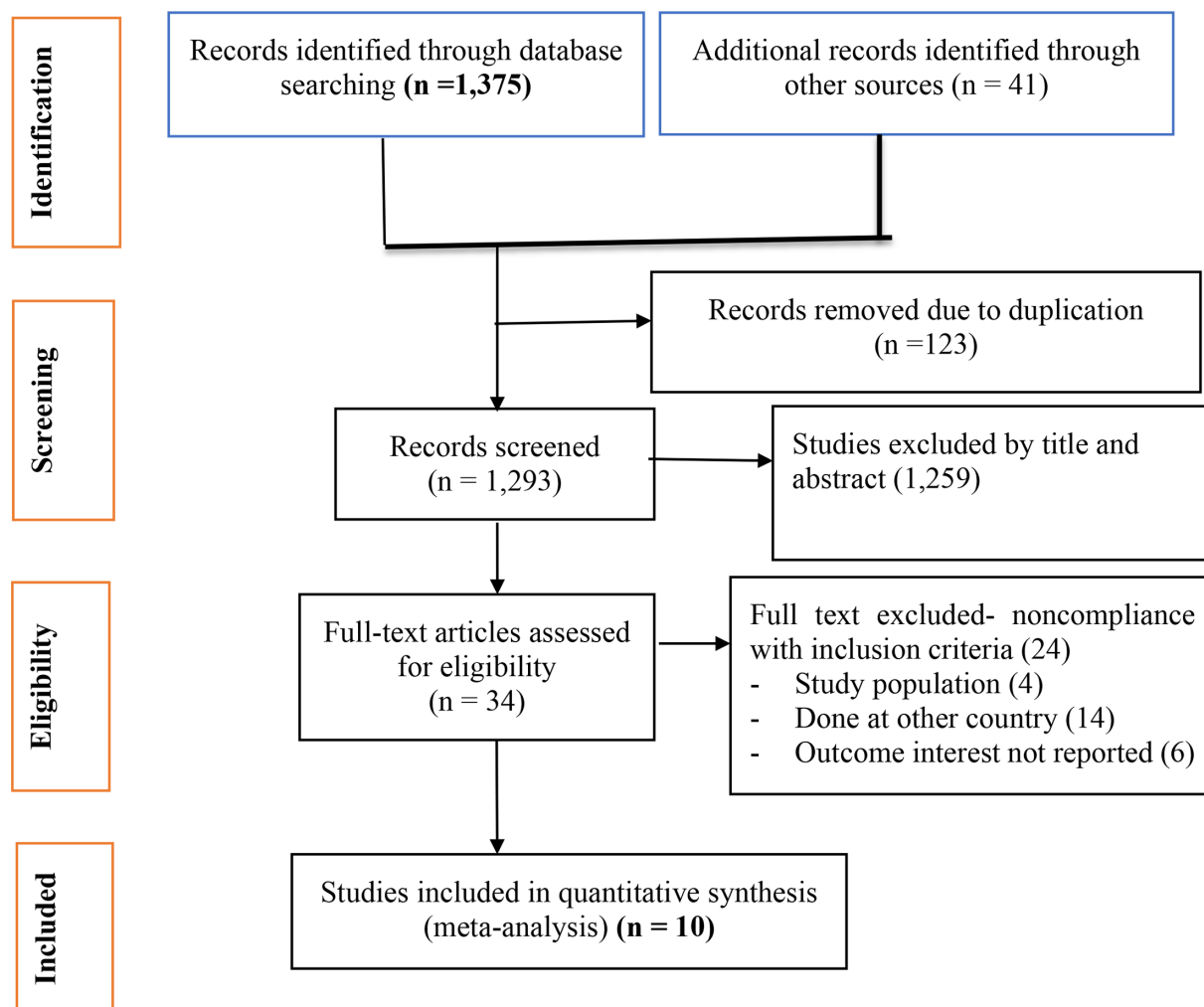


Figure 1 PRISMA flow chart showing the process of search and selection of studies included in the systematic review and meta-analysis. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Furthermore, a trim-and-fill analysis was conducted to determine the extent of distortion in the pooled prevalence of male involvement caused by publication bias. The results are presented in a forest plot, displaying a point estimate along with 95% CIs. All analyses were done by using R software V.4.1.3.

Patient and public involvement

None.

RESULT

Characteristics of the included studies

Of the total number of 1416 records retrieved, 123 duplicated records were removed. An additional 1259 articles were excluded after titles and abstracts review. Then, 35 articles were eligible for full-text assessment. After evaluation, it was determined that 10 of these articles met the eligibility criteria for this systematic review and meta-analysis (figure 1).

A total of 4760 participants participated, and sample size ranged from 210 to 801.^{21 25–29 33–35 37} The studies were done from different parts of Ethiopia (Amhara, Oromia,

SNNPR, Harari regions and Addis Ababa city administration) (table 1).

Pooled prevalence of male involvement in ANC follow-up in Ethiopia

The overall pooled prevalence of male involvement in ANC follow-up was found to be 43.3% (95% CI 31.7% to 54.8%, $I^2=99%$, $p<0.01$), using random effect model (figure 2). To determine the regional variations, subgroup analysis was done. The highest prevalence was reported from the Amhara region, 62.2%, while the lowest prevalence was reported from Harari region, 19.7% (figure 3).

Assessment of publication bias

Publication bias was assessed using both forest plots and the Begg's test. The funnel plot showed an asymmetrical distribution of studies from the line of effect (online supplemental figure 1), and Begg's test also noted a significant value for publication bias ($p=0.04$). To estimate the number of missing studies, meta-trim and fill analysis were done, two studies were filled, and the pooled prevalence of male involvement became

Table 1 Characteristics of studies included in the meta-analysis for the pooled prevalence of male involvement in ANC follow-up in Ethiopia

Authors	Region	Study design	N	Number of males involved in ANC	Prevalence
Adane <i>et al</i> (2019) ²⁵	SNNPR	Cross-sectional study	402	128	31.8%
Assefa <i>et al</i> (2018) ³⁴	Harari	Cross-sectional study	385	76	19.7%
Demissie <i>et al</i> (2016) ³⁵	Oromia	Cross-sectional study	374	224	59.9%
Destaw (2014) ³³	Addis Ababa	Cross-sectional study	422	264	65.5%
Kassahun <i>et al</i> (2018) ²⁶	Oromia	Cross-sectional study	609	253	41.4%
Megersa <i>et al</i> (2023) ²⁷	SNNPR	Cross-sectional study	560	319	57%
Mekonen <i>et al</i> (2022) ²¹	SNNPR	Cross-sectional study	801	306	38.2%
Mohammed <i>et al</i> (2019) ²⁸	Addis Ababa	Cross-sectional study	210	19	9%
Shine <i>et al</i> (2020) ³⁷	Amhara	Cross-sectional study	405	252	62.5%
Tadesse <i>et al</i> (2018) ²⁹	SNNPR	Cross-sectional study	592	301	50.8%

ANC, antenatal care; SNNPR, Southern Nations Nationalities and People Region.

38.1% (95% CI 26.4% to 49.8%) (online supplemental figure 2).

Meta-regression and sensitivity analysis

The impact of study characteristics on the pooled estimates was evaluated using meta-regression. However, none of the study characteristics, including publication year and sample size, were found to be associated with the pooled estimates ($p>0.05$) (table 2).

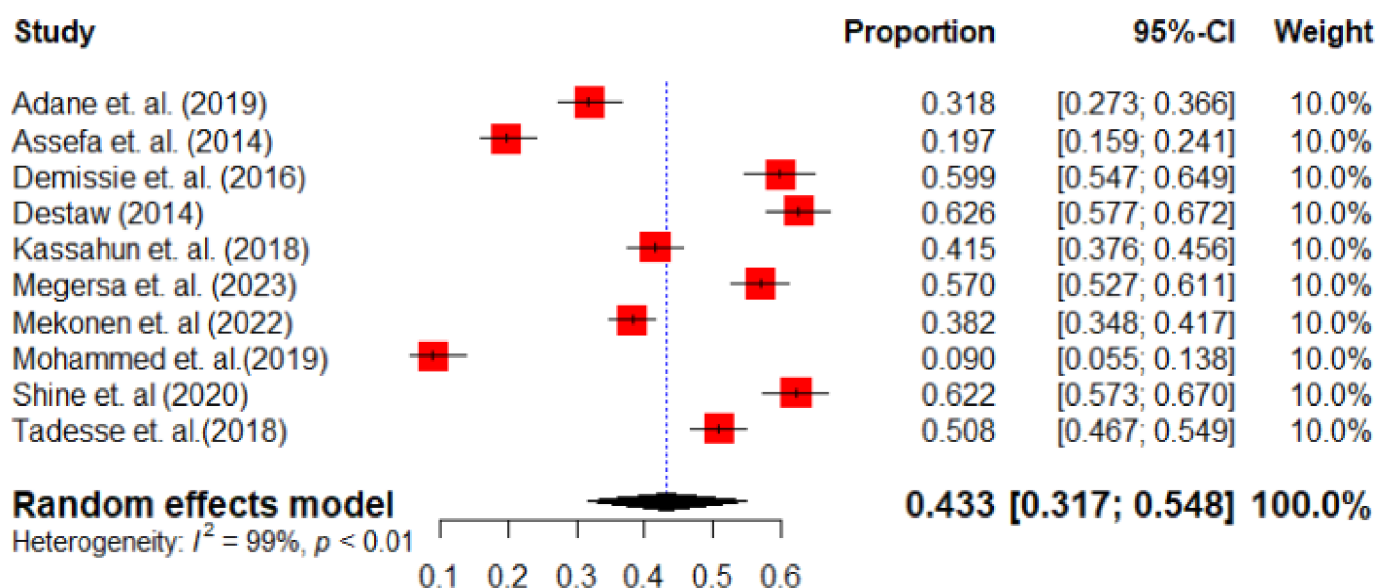
In order to determine the influence of each individual study on the pooled estimates, a sensitivity analysis was carried out by systematically excluding one study at a time. The results of these sensitivity analyses revealed that, with the exception of three specific studies,^{25 28 34} nearly all the studies made comparable contributions to the overall prevalence of male involvement in ANC services utilisation in Ethiopia (online supplemental figure 3).

Factors associated with male involvement in ANC follow-up in Ethiopia

This comprehensive meta-analysis identified several significant factors associated with male involvement in ANC services in Ethiopia. These factors include male partner educational status, employment status, knowledge of ANC or danger signs of pregnancy and attendance of health education.

Association between male partner education and male involvement in ANC service uptake

Four studies,^{21 25 27 35} involving a total of 2137 participants, examined the association between male partner educational status and involvement in ANC services uptake. Male partner who had attended at least secondary education or higher were found to be three times more likely to engage in ANC services compared with those without formal education (OR 2.72, 95% CI

**Figure 2** The forest plot showing the pooled prevalence of male involvement in antenatal care services in Ethiopia.

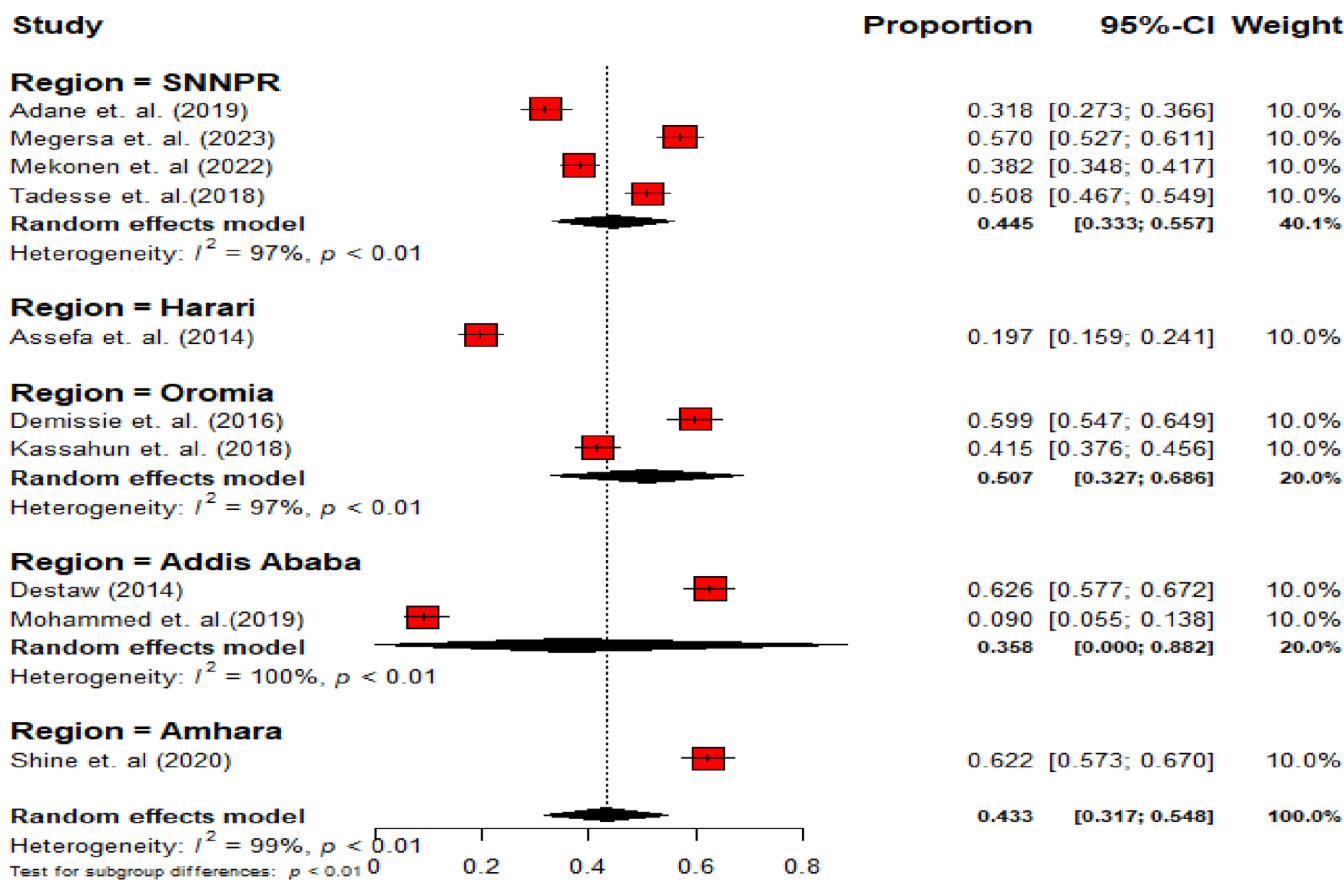


Figure 3 Forest plot showing the subgroup analysis of the pooled prevalence of male involvement in antenatal care services by region in Ethiopia. SNNPR, Southern Nations Nationalities and People Region.

1.81 to 4.10, $I^2=49\%$, $p=0.12$) (online supplemental figure 4).

Association between employment and male partner involvement in ANC services uptake

Three studies,^{27 33 35} including a total of 1356 participants, assessed the association between male partner employment and involvement in ANC follow-up. Male partners who are government employed had twice the odds of involvement in ANC services compared with those who are non-government employed (OR 2.09, 95% CI 1.49 to 2.94, $I^2=0\%$, $p=0.99$) (online supplemental figure 5).

Association between knowledge of ANC or danger signs of pregnancy and male partner involvement in ANC services uptake

Three studies,^{21 25 27} incorporating a total of 1763 participants, examined this factor. Male partners with good knowledge about ANC or danger signs of pregnancy were three times more likely to be involved in ANC services

compared with those with poor knowledge (OR 2.95, 95% CI 2.25 to 3.87, $I^2=0\%$, $p=0.9$) (online supplemental figure 6).

Association between attendance of health education and male partner involvement in ANC services uptake

Two studies,^{27 35} with a total of 934 respondents, evaluated the association between male partners attending health education and involvement in ANC services. The odds of male involvement in ANC services were three times higher (OR 3.02, 95% CI 1.39 to 6.54, $I^2=76\%$, $p=0.04$) among those who attended health education compared with those who did not (online supplemental figure 7).

DISCUSSION

Despite the recognition that enhancing male partner engagement in maternal health is a promising and efficacious intervention to enhance maternal and newborn health outcomes,⁴³ this approach remains inadequate in numerous LMICs, where men occupy the roles of household heads and primary breadwinners.¹³ Although epidemiological investigations have been conducted to ascertain the proportion and factors influencing male participation in ANC in Ethiopia, the results have reported varying degrees, ranging from 9% to 65.5%,^{28 33} and several factors have been associated with hindering

Table 2 Meta-regression analysis of factors affecting study heterogeneity

Variables	Coefficients	P value
Publication years	0.003 (−0.039, 0.046)	0.89
Sample size	0.0003 (−0.0019, 0.0011)	0.38

male involvement in ANC utilisation.^{21 25–28 30 33–37} Thus, this systematic review and meta-analysis was undertaken to establish the pooled prevalence and determinants of male involvement in ANC follow-up in Ethiopia.

This systematic review and meta-analysis found the pooled prevalence of male involvement in ANC follow-up in Ethiopia was 43.3% (95% CI 31.7% to 54.8%). This finding is in line with studies conducted in Kenya (34.1%),⁴⁴ Nepal (39.3%)⁴⁵ and Nigeria (51.1%).⁴⁶ However, this finding is lower than studies done in Ghana (67.2%),⁴⁷ Afghanistan (69.4%),¹⁶ India (61%)⁴⁸ and Myanmar (64.8%).⁴⁹ The observed disparity could be attributed to the execution and utilisation of maternal and child health services in Ethiopia, which were comparatively lower than those in other African nations.⁵⁰

Based on this meta-analysis, the probability of male engagement in ANC services was significantly greater among male partners who had received at least a secondary education or higher, in comparison to those who lacked formal education. This finding is supported by studies done in Ghana,⁵¹ Nepal⁵² and Nigeria.⁵³ The potential explanation behind this trend is that educated husbands tend to have greater financial empowerment and knowledge, making them more inclined to participate in ANC visits. This notion is further supported by a study conducted in Bangladesh, which revealed that uneducated male partners are less likely to involve women in decisions regarding maternal health issues, in contrast to their educated counterparts.⁵⁴

Consistent with studies done in Cameroon,⁵⁵ Uganda⁵⁶ and Nigeria,⁵⁷ male partners who are employed by the government are more likely to be involved in ANC services compared with those who are not. This could be explained by the fact that government-employed male partners had better educational status, have higher chance of exposure to information and more awareness of issues relating to maternal and child health than workers in the private sector, such as daily labourers and farmers. As a result, they tend to be more actively engaged in ANC for their spouses. However, a study conducted in Tanzania revealed a negative association between male partner involvement in ANC visits and government employment.⁵⁸ The possible reason for this variation might be that the study in Tanzania noted longer waiting times for accessing services, which could potentially discourage male partner participation.

In line with studies employed in United Nation⁵⁹ and Uganda,⁶⁰ male partner with good knowledge about ANC or danger signs of pregnancy were three times more likely to be involved in ANC services compared with those with poor knowledge. This finding is further supported by a study conducted in Tanzania, which revealed that male partners with inadequate knowledge of ANC services are less inclined to engage in ANC services.⁶¹

The odds of male involvement in ANC services were three times higher among those who attended health education compared with those who did not. This finding is supported by studies done in Tanzania,⁵⁸ Uganda,⁶²

Myanmar⁶³ and Zambia.⁶⁴ The possible reason could be that exposure to ANC information has the potential to provide the necessary knowledge about the benefits of male attendance during their partner's ANC visits while also addressing misconceptions and myths that hinder men from participating in maternal care. Consequently, this enhances male involvement in ANC visits.

The clinical and public health implication

This study significantly contributes to the existing body of knowledge by providing insights into the pooled prevalence and persistent determinants that hinder male partners from attending ANC visits. Policy-makers and planners must now prioritise these identified determinants to actively involve men in ANC visits and mitigate the adverse fetomaternal complications and poor perinatal outcomes resulting from missed opportunities. The Ethiopia Federal Minister of Health, in collaboration with non-governmental organisations, should place special emphasis on male partners with no formal education, those not employed by the government, individuals with limited knowledge of ANC usage or pregnancy danger signs and those who have not received health education. Addressing these factors will enhance male involvement in ANC utilisation, leading to improved health outcomes for both mothers and babies.

CONCLUSION AND RECOMMENDATIONS

The prevalence of male involvement in ANC in Ethiopia is low, necessitating immediate and concerted action to promote active participation of men in the process. To achieve this, targeted education programmes must be designed specifically for men without formal education, aimed at raising awareness about the importance of their involvement and the benefits it brings to maternal health. Additionally, health education programmes need to be strengthened, with a particular focus on ANC and pregnancy danger signs. These programmes should effectively communicate the significance of male engagement and equip men with the necessary knowledge to support their partners throughout the pregnancy journey.

Contributors GFA was comprehended and designed the conception of the study. All authors (GFA, MSA, ZA, YN, LGL and DG) contributed to the data extraction, analysis, interpretation of the result and article drafting. All authors participated fully in revising the article, agreed on the journal to which the article will be sent for publication, gave final approval of the version to be published and agreed to take responsibility for all aspects of the work. GFA is the guarantor.

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