Male involvement in Birth Preparedness and Complication Readiness in Ethiopia: A Systematic Review and Meta-analysis

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Abstract

Background: Maternal death may occur from complications while a woman is pregnant, during labor and post-partum period. Birth preparedness and complication readiness during pregnancy period prominently increase positive maternal as well as child health outcomes. Male involvement in pregnancy, labor and post-partum care has been shown to improve maternal and newborn outcomes. Nevertheless, it continues to be low, especially in low income countries. One of the reasons is the lack of birth preparedness and complication readiness, which is recognized as the most cost-effective and achievable components of safe motherhood programs around the world. Thus, this systematic review and meta-analysis study tried to determine the pooled prevalence of male involvement in birth preparedness and complication readiness (BP/CR) and its associated factors in Ethiopia.

Methods: Searching of the primary articles was completed by PubMed/MEDLINE, EMBASE, CINAHAL, and Google Scholar, HINARI portal which includes the SCOPUS, African Index Medicus, and African Journals Online Database. The data was extracted by using a standard data extraction checklist that developed according to Joanna Briggs Institute (JBI). For assessing heterogeneity across the studies I^2 statistics was used. The Funnel plot asymmetry and Egger's tests were used to check the presence of publication bias. A random effect model was used to estimate the pooled prevalence of male involvement in birth preparedness and complication readiness. Odds Ratio (OR) with the 95% confidence interval was also used to determine the association of identified factors with the outcome variable. Statistical analysis was conducted using STATA version 11 software.

Result: From a total of 614, primary studies with (sample participants 3413), 8 were eligible for inclusion in the final systematic Review and meta-analysis. The pooled estimate of male involvement in birth preparedness and complication readiness was found to be 40.17% [95%CI (24.01-56.33)]

Conclusion: The pooled prevalence of male involvement in birth preparedness and complication readiness was relatively low. Thus, Minister of Health with its stake holders better to give emphasis on community awareness programs so as to increase male involvement for birth preparedness and complication readiness.

Background

Birth preparedness and complication readiness (BP/CR) is a wide-ranging and inclusive package aimed at encouraging timely access to skilled maternal and neonatal services, promotes active preparation and decision making for delivery by pregnant women and their families[1]. Maternal mortality is one of the most important markers of health inequalities in low, middle and high-income countries and remains a major contributor to unmet public health concerns worldwide [2]. The 2015 World Health Organization report, indicated that more than half a million women were dying each year from the complications of pregnancy and childbirth, in which 99% of these deaths occurring in the developing world [3]. Besides this,

for every 100,000 live births, 240 women died during pregnancy, childbirth, or the postpartum period which are mostly from developed countries [4, 5]. There are notable disparities between and within countries in maternal deaths, with wide variations between rich and poor, urban and rural areas particularly in sub-Saharan Africa [6, 7].

A male companion at antenatal care is rare and in many communities, it is unthinkable to find male companions accompanying a woman to the labor room during delivery. Thus male involvement in reproductive health has been promoted as a promising new strategy for improving maternal and child health [8, 9]. Although, birth preparedness and complication readiness is among the common approaches in employment for implementing safe motherhood programs, it may be hindered by male partners involvement since husbands had been the most influential decision-makers and as the key member of the family [10, 11]. According to the Ethiopian Federal Ministry of Health, health and health related indicators 82.20% coverage for ANC, only 18.4% of the deliveries are attended by health professionals, 42.10% for postnatal care coverage [12].

Internationally, there was an estimated 303,000 maternal deaths happen maternal deaths happen year after year from pregnancy and childbirth related complications. About 99% of these deaths happen in underdeveloped countries and the great portion (62%) belongs to the sub-Saharan Africa region [6]. The death of mothers might happen from unexpected emerging complications that happened while the women are pregnant, during labor, or in post-partum period. Birth preparedness and complication readiness during pregnancy period prominently increase positive maternal as well as child health outcomes [13].

Globally, around 1500 women die every day from complications related to pregnancy and childbirth [[4, 5, 14]. Globally, nearly 80% of the maternal morbidity and mortality are directly linked to pregnancy and childbirth complications. Different kinds of evidence showed that the commonest causes of maternal death among women in low-income and middle-income countries differ noticeably according to region. For example; In Africa, hemorrhage causes a third of maternal deaths. However, hypertensive disorders are the most common cause of maternal mortality in Latin American countries[5, 15]. Other major causes of death sepsis, obstructed labor, and complications from abortion also vary by geography [6, 16]. Obstetric related complications including severe hemorrhage, infection, hypertensive disorders, sepsis and obstructed labor, and unsafe abortion are among the key factors to maternal death [3]. Although, there is significantly declined in Abortion and infection related maternal deaths in the last decade, Obstructed labor, hypertensive disorders and hemorrhage continues to be the major cause of maternal deaths[16]. About 125,000 women and 870,000 neonates die every year in Africa, predominantly in the first week of post-partum period. The country Ethiopia, is one of six countries sharing 50% of the total global burden of maternal mortality[17]. Male involvement in pregnancy and labor care has been shown to improve maternal and newborn outcomes. Nevertheless, it continues to be low, especially in low income countries. Numerous strategies have been suggested aimed at backup male involvement in reproductive health and maternity care, nonetheless no assessment has been made in terms of their effectiveness [8, 13, 18]. One of the reasons is the lack of birth preparedness and complication readiness,

which is recognized as the most cost-effective and achievable components of safe motherhood programs around the world[1, 19] . Due to this and that reason mothers who are productive and basis for countries development through delivering and growing new generation might be morbid and die. This in turn could drain individuals, families pocket and countries budget at large unless the level of male involvement at each spot of maternal care improved. Thus, this systematic review and meta-analysis study tried to determine the pooled prevalence of male involvement in birth preparedness and complication readiness (BP/CR) and its associated factors in Ethiopia.

Methods

Reporting of the result

The preferred reporting Items for systematic Reviews and Meta-analysis (PRISMA) guideline were used to report the result of this systematic reviews and Meta-analysis.

Data bases and Searching strategy

We searched through PubMed, Web of Science Excerpt Medica Database (EMBASE), Google Scholar and psycEXTRA database for all available studies using the following search terms: “Male involvement”; “Birth preparedness”; “Complication readiness”; “Factors”; *determinants*; *predictors*; and “Ethiopia”. In this systematic Reviews and Meta-analysis the search string was developed using “AND” and “OR”. The Gerry literatures were also searched from Ethiopian’s Universities (Jimma, Gondar, and Addis Ababa) research repository online library. In addition, a manual search of the references lists included was performed so as to address all evidences.

Inclusion and exclusion criteria

The studies were included in this review and meta-analysis if and only: they met the following criteria:(1) Crossectional observational studies, (2) Studies conducted in Ethiopia,(3) Studies that clearly reported the proportion of male involvement and complication readiness and/or factors (4) both published and unpublished studies at any time: Those studies with no clear report of the outcome ,program evaluation studies, qualitative studies and citations without full text were excluded from the review and meta-analysis.

Study selection and quality assessment

All the retrieved studies were exported to Endnote version 7 (Thomason Reuters, London) reference manager and duplicated studies were carefully removed. Three investigators (CKM, NGD and HKA)

independently screened the titles and abstracts which were followed by a full-text review to determine the eligibility of each study. The disagreement was solved by consensus.

The quality of each study was evaluated by using Joanna Briggs Institute (JBI) quality appraisal criteria adapted for studies reporting prevalence data, Crosssectional studies, and case control studies [20].

Data extraction

Data were independently extracted by two authors using standardized data extraction format that developed according to 2014 Joanna Briggs Institute Reviewers' Manual[21]. The tool includes Authors, Region, country, and study year, study design, sample size and proportion of Male involvement in birth preparedness and complication readiness in Ethiopia as well as associated factors. Articles that fulfilled the predefined criteria were used as a source of data for the final analysis. The three independent reviewers (CKM, HKA and NGD) extracted the data by using Excel spread sheet and cross checked to insure consistency. Any discrepancy was solved through discussion and repeating the procedure to overcome the difference occurred during extracting each single study. The information regarding author, year of publication, study design, sample size, proportion/prevalence of male involvement in birth preparedness and complication readiness, and odds ratio (OR) for associated factors were extracted.

Heterogeneity and publication bias

The percentage of total variation across studies due to heterogeneity was assessed by using I^2 statistics[22]. The value of I^2 , 25, 50, and 75% represented low, moderate, and high heterogeneity respectively. Funnel plot and Egger's regression test was done to check whether publication bias exists or not across studies [23]. Visual examination of funnel plot asymmetry, Begg-Mazumdar Rank correlation tests and Egger's regression tests were utilized to check for publication bias [23]

Data Analysis

The overall pooled proportion of male involvement was estimated using random effect model. The pooled odds ratio (OR) of knowledge of pregnancy danger signs, previous pregnancy and post-partum complication was done. Subgroup analysis was done based regional location in the country to adjust the variation in the pooled estimate of the prevalence/proportion of male involvement in birth preparedness and complication readiness. STATA version 11 (Stata Corp, College Station, TX, USA) statistical software was used for all statistical analysis. The Begg and Egger's weighted regression method were used to detect evidence of publication bias. The p-value of ≤ 0.05 was considered as presence of significant publication bias.

Result

Selection and identification of articles

A total of 614 with (3413 participants) were retrieved through from electronic databases and other sources. The title and abstract of every study was screened and duplicated or irrelevant articles were removed using EndNote Version7 software. Doing these, 146 articles were removed due to duplication and the remaining 468 articles, 460 were removed due to their title and abstracts was not in-line with our inclusion criteria(did not correctly report the correct outcome, studies conducted outside of Ethiopia). Finally, a total of only 8 articles were included for this systematic review and meta-analysis (Fig.1).

Description of the included studies

We included a total of 8 crossectional observational studies with 3413 participants in the final systematic review and meta-analysis. The smallest sample size was 233 in the study conducted from Southern Nations and nationalities region of Ethiopia[24]. Whereas, the largest sample size, was 824 from the study conducted in the Amhara region, Ethiopia. The detailed characteristics of the included studies were presented (Table1). In the current systematic review and meta-analysis, four regions and one administrative town in the country were included. Three studies were from Tigray [25-27], two were from Oromia region [28, 29].

Table 1

Descriptive summary of eight studies included in the final systematic review and meta-analysis overall male involvement in birth preparedness and complication readiness in Ethiopia

Author	Year	Design	Region	Sample	r(pwo)	Proportion(p)	NOS Score
Destaw et al. [30]	2014	Crossectional	Addis Ababa	403	264	65.5	5
Demessie et al. [28]	2016	Crossectional	Oromia	374	224	50.8	6
Tantu et al.[29]	2018	Crossectional	Oromia	421	127	30.2	7
Baraki et al. [31]	2019	Crossectional	Tigray	399	187	46.9	7
Weldearegay et al.[25]	2015	Crossectional	Tigray	376	227	60.4	6
Mersha et al. [32]	2016	Crossectional	Amhara	824	82	10	6
Gebrehiwot et al.[26]	2013	Crossectional	Tigray	376	101	26.9	7
Paulos et al.[24]	2020	Crossectional	SNNPR	233	72	30.9	6

Male involvement in birth preparedness and complication readiness

Overall involvement in birth preparedness and complication readiness

From a total of 8 studies [24-26, 28-32] cross-sectional observational studies, all studies provided information on overall involvement of males in birth preparedness and complication readiness. As stated in the forest plot (Fig.2), the pooled estimate of overall male involvement was 40.17% [95%CI (24.01-56.33)]. High heterogeneity was observed (I-squared= 99.2%), however there was no evidence to show publication bias using Egger's statistical test (p-value=0.258) (Table2). For reducing the potential random variations between the included studies, we conducted a sub-group analysis by region where the primary studies conducted. According to the sub-group analysis the highest proportion of male involvement was observed from Addis Ababa 65.5% [95%CI (60.86-70.14)], followed by Tigray 44.71% [95%CI (25.29-64.13)] (Fig.3).

Table 2
Egger's and Begg's Tests to assess publication bias of eight included for overall analysis of birth preparedness and complication readiness

Std_Eff	Coef.	Std. Err.	T	p> t	[95% Conf. Interval]
Slope	3.951501	3.164253	1.25	0.258	-3.791148-11.69415
Bias	-39.61011	28.66138	-1.38	0.216	-109.742-30.52175

A Meta regression analysis was done using year of study and sample size as covariate to explore the possible source of heterogeneity (Table3). But, there was no significant statistical evidence that show the presence of heterogeneity, which explained by using these two variables

Table 3
Table 3: Meta-regression analysis for eight included studies for overall analysis of birth preparedness and complication readiness

Logp	Coef.	Std. Err.	T	p> t	[95%Conf. Interval]
Year of study	-.0284132	.4516844	-0.06	0.952	-1.189505-1.132678
Sample size	-.0030312	.0031921	-0.95	0.386	-0.0112369-0.0051744
Constant	62.11284	909.9485	0.07	0.948	-2276.984-2401.21

In addition, sensitivity analysis was conducted by using a random effect model to identify the effect of single study on overall pooled estimate. The analysis showed that there was no evidence of single study influence on overall pooled estimate (Fig.4).

Male involvement in three main domains (Antenatal, delivery, and post-partum)

In this systematic review and meta-analysis, we measure male involvement using three domains such as involvement during antenatal care (ANC), during delivery, and post-partum period. Accordingly, eight studies [24-26, 28-32] which reported antenatal care involvement were included in the pooled analysis of male involvement during ANC. In this meta-analysis, the proportions of pooled male involvement during antenatal care were found to be 41.14% [95% CI (23.68-58.60)] (Fig.7). Whereas, male involvement during delivery and post-partum period was found unfortunately similar with the pooled proportion of 45.56% [95%CI (28.82-62.13)] (Fig.9&11). High heterogeneity was observed ($I^2=99.3\%$, $p\leq 0.001$), for reducing the potential random variations between the included studies, we conducted a sub-group analysis by region where the primary studies conducted. According to the sub-group analysis the highest proportion of male involvement during ANC was observed from Addis Ababa 73.2% [95%CI (68.88-77.52)] followed by Tigray 44.71% [95%CI (25.29-64.13)] (Fig.8).

We found Six studies [25, 26, 28, 29, 31, 32] that describe about male involvement during delivery and post-partum periods from three regions of Ethiopia (Oromia, Amhara, and Tigray). Similarly there was high heterogeneity for delivery and post-partum involvements ($I^2=98.9\%$, $p\leq 0.0001$). Having this in mind we have done sub-group analysis by region and we found that the highest proportion of male involvement during delivery and post-partum period was reported from Tigray region of Ethiopia 51.09% [95%CI(23.55-78.64)] followed by 47.23%[95%CI(14.60-79.87)] in Oromia region of Ethiopia (Fig.12). We have also done the statistical tests of Egger's and Begg's to assess publication bias for the included studies in the Meta-analysis of male involvement during delivery and post-partum period. There was no evidence of bias ($p\text{-value}>0.069$) (Table6). We have performed meta-regression by using year of study and sample size as a covariate (Table7).

Factors associated with male involvement in birth preparedness and complication readiness.

Among the variables included in the meta-analysis husband's level of education was found to be statistically significant in three studies [28, 29, 32]. However, the pooled odds ratio found to be borderline statistically significant with [OR=1.27, 95% CI (0.26-6.30)] (Fig.15). The distance from health facilities was also statistically significant in three primary studies [24, 29, 32]. But, it was also borderline significant [OR=0.75, 95%CI (0.10-5.83)] (Fig.16). Moreover the husband's knowledge of at least one danger sign during pregnancy was statistically significant in four included primary articles [25, 28, 29, 32]. The pooled odds ratio was found to be border line significant [OR=3.18, 95%CI [(0.54-18.66)] with male involvement

for birth preparedness and complication readiness (Fig.17). The husband's knowledge of danger signs during delivery was also found to be significant in two primary studies[25, 32]. However, the pooled odds ratio was found to be borderline significant [OR=4.60, 95%CI (0.06-375.06)] predictors of male involvement in birth preparedness and complication readiness (Fig.18). Similarly husband's knowledge about post-partum danger signs was found to be [OR=2.50, 95%CI (0.06-104.65)] with involvement in birth preparedness and complication readiness (Fig.19). Husband's attendance of at least one ANC visit with their wives was found to be [OR=3.20, 95% CI (1.97-5.19)] statistically significant predictor of male involvement (Fig.20).

Table 4

Egger's and Begg's test for studies included in the analysis of Antenatal care involvement of males

Egger's test

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	1.337642	.3882297	3.45	0.014	.3876783	2.287606
bias	.9795741	.1983439	4.94	0.003	.494244	1.464904

Table 5

Meta-regression of eight included studies for the meta-analysis of male involvement during antenatal period.

logp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
yearofstudy	-.0375768	.4497639	-0.08	0.937	-1.193732	1.118578
sample	-.0030746	.0031861	-0.97	0.379	-.0112647	.0051155
_cons	80.62486	906.058	0.09	0.933	-2248.471	2409.721

Table 6

Egger's and Begg's test for studies included in delivery& post-partum

Egger's test

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.90059	.3647555	2.47	0.069	-.1121337	1.913314
bias	.3232009	.1721852	1.88	0.134	-.154862	.8012638

Table 7

Meta-regression six included studies for delivery and post-partum involvement

logp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
yearofstudy	.0004093	.505516	0.00	0.999	-1.608368	1.609187
sample	-.0005577	.0043782	-0.13	0.907	-.0144911	.0133758
_cons	1.043674	1018.363	0.00	0.999	-3239.841	3241.928

Discussion

This systematic review and meta-analysis was conducted to assess male involvement in birth preparedness and complication readiness with its major components. The overall pooled estimate of male involvement in birth preparedness and complication readiness was found to be 40.17% [95%CI(24.01-56.33)]. This result was in line with the studies conducted in Uganda (40.82%) and Nepal(50.49%) respectively [33, 34]. It was also consistent with another study conducted in Nepal in which (50.07%) of males were involved in birth preparedness [35].

This meta-analysis study result was higher than the study conducted in Northern Nigeria (32.1%) of males were involved in birth preparedness and complication readiness[27]. The possible explanation might be due to the fact that there was time gap between the current study and Nigeria that was in 2010. The finding was lower than the study conducted in Per-Urban Northern Uganda in which (65.4%) males were involved in accessing the skilled birth delivery [36]. The possible explanation might be due to the fact that the socio-demographic variation because the study in Uganda was conducted only in the urban. Male involvement has a great impact on maternal and child health during pregnancy, labor and postpartum [18]. The meta-analysis result of male involvement during ANC 41.1%[95%CI(23.68-58.60)] was in line with the study conducted in Rural Uganda which was 29.4% of males were involved during antenatal care of their wives[37]. It was also found consistent with the study conducted in Nepal in which 48.0% of males were involved during ANC period.[34]. Similarly the finding of this meta-analysis was in line with another study conducted in Nepal in which 39.3% of husband's were involved during ANC of their wives[35].

In this meta-analysis the pooled estimate of male involvement during delivery was found to be 45.56% [95%CI(28.82-62.13)] which was in line with the study conducted with the study conducted in Nepal[35] in which 47.9% of males were involved ,but higher than the study conducted in Rural Uganda in which (22.3%)of husbands were involved during delivery[37]. The possible explanation might be due to the fact that the study in Uganda was conducted in rural communities only, but not the meta-analysis. The finding of this meta-analysis was found lower than the study conducted in India in which 67.7% of males were involved during delivery[38].

In the current meta-analysis post-partum male involvement was found to be 45.56%[95%CI(28.82-62.13)] which was in line with the study conducted with the study conducted in Nepal[35] in which 47.9% of males were involved. But, lower than the study conducted in India in which 67.4% of the husbands were involved during post-partum period[38]. The possible explanation might be socio-demographic variations

and the size of the studies could bring the discrepancy. Male involvement during the three domains (ANC, delivery, and post-partum periods) played a significant role to healthy maternal and child outcomes. This claim has been supported by a systematic and meta-analysis studies [18, 39]. Husband's attendance of at least one ANC visit with their wives was found to be three times more likely to involve as compared with no attended at all. The possible explanation might be those who attend at least once could have an insight about the importance of their involvement that not attending at all.

Limitation Of The Study

This systematic review and meta-analysis included only articles reporting in English language, which may restrict our findings. The majority of the articles use small sample size, might be affect the prevalence estimation. All included studies were cross sectional study design in which the result might potentially affected by confounding variables. In addition the meta-analysis didn't include all regions which only include four regions and one administrative city of the country. Therefore; further country based studies to assess other factors related to health service, health policy and health care giver related factors for the involvement of males in birth preparedness and complication readiness, in Ethiopia are recommended.

Conclusion

The overall proportion of male involvement for birth preparedness and complication readiness was found to be low. Husband's attendance of at least one antenatal visit was found to be significant predictor of male involvement. Therefore, Minister of Health with its stake holders should emphasis on community and institution based programs in the manner to improve male involvement to bring positive maternal and child health outcomes.

Abbreviations

ANC; Antenatal Care, CI; Confidence Interval, OR; Odds Ratio, SNNR; Southern Nations and Nationality Region,

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

Data will be available from the corresponding author upon reasonable request.

Competing interests

We all the authors ascertained that there is no competing interest concerning this manuscript.

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No funding was obtained for this study.

Authors' contributions

CKM developed the protocol and involved in the design, selection of study, data extraction, statistical analysis and developing the initial drafts of the manuscript. HKA and NGD involved in quality assessment. CKM, HKA and NGD prepared and revising subsequent drafts as well as prepared the final draft of the manuscript. We authors read and ascertained the final draft of this manuscript.

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Figures

Figure 1

PRISMA flow diagram of included studies

Figure 2

Meta-analysis (forest plot) for the overall all proportion of male involvement in birth preparedness and complication readiness in Ethiopia

Sub-group analysis of male involvement by region

Figure 3

Meta-analysis (forest plot) for the overall all proportion of male involvement in birth preparedness and complication readiness in Ethiopia

Figure 4

Sub-group analysis of the proportion of male involvement by region in Ethiopia.

Figure 5

Funnel plot to assess the presence of publication bias for the studies included in overall analysis of male involvement in birth preparedness and complication readiness: The plot showed that there is no bias.

Figure 6

Filled and trim analysis

Figure 7

Meta-analysis (forest plot) for the proportion of antenatal care (ANC) involvement of males' in Ethiopia

Figure 8

Subgroup analysis of male involvement during antenatal care (ANC) by region in Ethiopia

Male involvement in Delivery

Study

%

ES (95% CI)

Weight

Figure 9

Meta-analysis (forest plot) of the proportion of male involvement during delivery in Ethiopia

Figure 10

subgroup Meta-analysis (forest plot) of proportion of male involvement during delivery in Ethiopia

Figure 11

Meta-analysis (forest plot) of male involvement during post-partum period in Ethiopia

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Subgroup analysis of male involvement by region during post-partum in Ethiopia

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Funnel plot of the included studies in the meta-analysis of male involvement during antenatal care

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Funnel plot of studies included in delivery and post-partum

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Figure 20

Meta-analysis (forest plot) of the association between husband's at least one ANC attendance with their wives and involvement in birth preparedness and complication readiness in Ethiopia

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