Partograph utilization as a decision making tool and associated factors among obstetric care providers in Ethiopia: A systematic review and Meta-analysis

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Keywords: partograph utilization, obstetric care providers, systematic review, meta-analysis, Ethiopia.

Abstract

Background: Globally, a total of 13.6 million women have died due to maternal causes from 1990 to 2015. Majority of these deaths occurred in resource-limited countries. Among the causes of these deaths obstructed and prolonged labour covers the highest percentage which could be prevented by cost-effective and affordable health interventions like partograph utilization. Therefore, this systematic review and meta-analysis aimed to assess the level of partograph utilization among obstetric care providers and its associated factors in Ethiopia.

Method: For this study systematic review and meta-analysis guideline was followed. Different online databases were used for the review: PubMed, Google scholar, Cochrane Library, HINARI, and African Online Journals. Based on the adapted PICO principles different searching terms were applied to achieve and access all the essential articles. Microsoft Excel was used for data entrance and Stata 11 soft ware for data analysis.

Result: Nineteen studies were included in this systematic review and meta-analysis with a total of 6237 obstetric care providers. The overall pooled prevalence of partograph utilization was 59.9% (95%CI:46.8,73). Being midwifery profession (AOR=4,95% CI:2.6,6), female health care providers (AOR=3.2,95%CI:2.2,4.7), Emergency Obstetric and Newborn Care training (AOR =2.9,95%CI:2.2,3.8), Knowledge of partograph (AO =2.5,95%CI:1.6,3.9), short term training on partograph(AOR=5.7,95%CI:2.5,12.9), favorable attitude (AOR=2.3,95%CI:1.5,3), and working at health center(AOR=3.5,95%CI:2.5,4.9).

Conclusion: The overall pooled prevalence of partograph utilization among obstetric care providers was lower than the World Health Organization recommendation. Midwifery profession, female obstetric care provider, Emergency Obstetric and Newborn Care training, knowledge of partograph, short term training on partograph, favorable attitude towards partograph, and working at the health center were factors associated with partograph utilization. This finding is important to design strategic policies, to prevent obstetric complications, and maternal mortality resulted from preventable maternal deaths.

Background

Globally, a total of 13.6 million women have died due to maternal causes from 1990 to 2015. Of all the deaths, 99% were in developing countries with 546 per 100,000 live births, and Sub-Saharan Africa only accounts (66%)of deaths[1]. In Ethiopia, the tragedy of maternal mortality recognized as a major public health issue, maternal mortality figures continue to rise, in spite of the apparent commitment by stakeholders. Maternal mortality was still high in 2016 accounted for 412 per 100,000 live births [2].

The majority of maternal deaths and obstetric complications are resulted from prolonged and obstructed labour. In the developing world, prolonged labor is a leading cause of death among mothers and newborns. If the labour does not progress normally, a woman may experience serious short and long term complications such as obstructed labor, exhaustion and dehydration, rupture of the uterus, uterine

prolaps, nerve damage, incontinence, obstetric fistula, infertility, and others. Moreover, it may also contribute to maternal hemorrhage or infection, neonatal infection, sepsis and death. This can be prevented by accessing skilled delivery services such as plotting partograph during the progress of labour [3, 4].

Partograph is an effective tool to monitor the progress of labor, and when used effectively, it prevents obstructed labor, which accounts for 8% of maternal deaths globally. It also serves as an 'early warning system' and assists in early decision on transfer, intervention decisions in hospitals and ongoing evaluation of the effect of interventions to prevent maternal deaths caused by prolonged labour. Partograph has been promoted by the World Health Organization as the "gold" standard for assessing progress of labor in most low resource countries like Ethiopia [5, 6].

Universal use of partograph to monitor laboring mothers is recommended by World Health Organization (WHO). However, It is not broadly used in Ethiopia due to different factors such as lack of human resources, work overload, lack of detailed knowledge of the components, low supportive supervision, stock-outs of partograph paper, lack of traning on partograph, preference of different monitoring tools like (clinical records, monitoring charts, piece of papers) during labour, time of admission of women, nature of membrane during admission, attitude towards partograph, health instituation factors, and lack of institutional policy to utilize partograph[7-9].

Universal utilization of partograph could improve care during labour, increase the frequency of follow up, decrease unnecessary intervention, and reduce prolonged labour and its squeal including obstructed labour, maternal exhaustion, uterine rupture, stillbirths, birth asphyxia, and neonatal sepsis, postpartum hemorrhage, puerperal sepsis, obstetric fistula, and others[10-12].

The Ethiopian government health policy adopted partograph use for labour management in the country. However, different studies revealed that there is low utilization of partograph, and poor documentation of components in the country. Moreover, those studies showed inconsistent findings ranging from 92.6 % in Dire Dawa[13] to 6.9% in the Oromia region[14]. Additionally, no systematic review was conducted on partograph utilization among obstetric care providers. Therefore, this systematic review and meta-analysis aimed to estimate the pooled prevalence of partograph utilization among obstetric care providers and its associated factor in Ethiopia.

Methods

The result is reported in accordance with the Preferred Reporting Items for Systematic review and Meta-Analysis Protocols (PRISMA-P) checklist, and the PRISMA extension statement for reporting of systematic reviews incorporating network meta-analyses of healthcare interventions (see checklist in Additional file 1).

Search strategy

We searched PubMed, Google scholar, Cochrane Library, HINARI, and African Online Journal databases for all available studies using the following terms:"Partograph utilization","knowledge on partograph", "labour", "midwives", "decion making", "attitude towards partograph", "labour monitoring", "health care providers","health institutions, "childbirth", "factors","determinants", "health instituatons", "intrapartum monitoring", "components", "partograph", and "Ethiopia". The search string was developed using "AND" and "OR" Boolean operators. Searching terms were based on adapted PICO principles to search through the above-listed databases to access all the relevant articles. For unpublished studies, the official website of Ethiopian's University research repository online library (University of Gondar and Addis Ababa University) were used.

Reporting items

This study was designed according to the preferred reporting items for systematic review and meta-analysis Protocols (Fig. 1).

Inclusion and exclusion criteria

Inclusion criteria

Studies will be included if they fulfill the following eligibility criteria:

- Study designs: All comparative epidemiological studies (cross-sectional, case-control & cohort)
- Study settings: studies conducted in Ethiopia
- Participants: Obstetric care providers
- Outcome Measures: Partograph utilization as a decision-making tool and associated factors
- Publication Status: All published and unpublished studies
- Data were published: All dates
- Language of Published Articles: English language

Exclusion Criteria

- Studies available only as abstract with unclear outcomes, commentaries, editorials, and reviews were excluded. Additionally, qualitative studies, and studies conducted in non-English language were excluded.

Data extraction and quality assessment

After getting findings from all databases were exported to Microsoft Excel spreadsheet. Two reviewers (AAA and BFZ) extract the data independently. Any difference between the reviewers was fixed by checking and reading the articles again in collaboration, discusses together, and agreed through consensus amongst the authors.

A modified version of NOS (the Newcastle-Ottawa Scale) for cross-sectional studies was used to assess the methodological quality of a study and to determine the extent to which a study addressed the possibility of bias in the design, conduct, and analysis.

Both authors independently assessed the articles for inclusion in the review. All the included articles scored (NOS) 8 and more can be considered a "good" study and low risk.

Outcome of measurement

This review has two main outcomes. Utilization among Obstetric care providers to monitor the progress of labour and feto-maternal condition was the primary outcome of the study whereas associated factors for partograph utilization among Obstetric care providers were the second outcome variable. The odds ratio was calculated for the common risk factors of the reported studies. The most common associated factors included in this systematic review and meta-analysis were midwifery profession, female health care providers, Basic Emergency Obstetric and Newborn Care training, Knowledge of partograph, short term training on partograph, favorable attitude towards partograph, and working at the health center..

Publication bias and heterogeneity

I^2 and p-value were used to check the heterogeneity. A value of 25, 50, and 75% was used to declare the heterogeneity test as low, moderate, and marked heterogeneity respectively. With the evidence of heterogeneity, a random effect model analysis was used. Moreover, the funnel plot and Egger regression asymmetry test were used to check the existence of publication bias. Sub-group analysis and sensitivity analysis were employed to select the most influential risk factors with the evidence of publication bias.

Data analysis

The data were entered, analyzed using Microsoft Excel and Stata 11 software respectively. Forest plots with 95% confidence interval (CI) were used to report the estimated prevalence of each study. The estimated pooled prevalence was computed with 95% CI. Subgroup analysis was computed using year of study and study area. The random-effects model was used to obtain the pooled odds ratio estimate if statistically significant heterogeneity ($I^2 \geq 0$) is evidenced; whereas, in case of no inconsistency in risk estimates ($I^2 = 0$), a fixed-effect model was used. Finally, association of Partograph utilization with midwifery profession, female health care providers, Emergency Obstetric and Newborn Care training, Knowledge of partograph, short term training on partograph, favorable attitude towards partograph, and working at the health center were computed with the evidence of odds ratio.

Results

Study selection and data extraction

The search strategy identified 80 articles from PubMed, 60 articles from Google Scholar, 45 articles from Cochrane Library, 10 articles from African Journals Online, 7 articles from Ethiopian's University online

library and 5 articles by manual search. Of which, 134 were excluded due to duplication, 35 through review of titles and abstracts. Additionally, 31 full-text articles were excluded for not reporting the outcome variable and other reasons. Finally, 19 were included to the prevalence and/ or associated factor analysis on partograph utilization [Fig.1].

Study characteristics

Different factors such as; midwifery profession, female health care providers, Emergency Obstetric and Newborn Care training, Knowledge of partograph, short term training on partograph, favorable attitude towards partograph, and working at the health center were included in this study. Nineteen cross-sectional studies with a total of 6237 obstetric care providers were included in this review. All of them were conducted at facility-based by study setting. Regarding the study area, six of the studies were conducted at SNNPR (south nation nationalities and people representative), four in Tigray, Amhara, Oromia; each account three studies respectively (Table 1).

Table 1: Descriptive summary of fifteen included studies in the systematic review and meta-analysis

Author (year of study) (reference number)	Sample size	Response rate	Study region	P(95% :CI)	Quality of score
Fantu A.et al(2012)[15]	381	88	Amhara	29(24,33)	8
Habtamu R.et al(2017) [16]	224	90.2	Oromia	89(85,93)	9
Wakeshe W.et al(2015) [17]	266	97.4	Oromia	84(80,88)	9
Negash W.et al(2013) [18]	403	94.5	Amhara	40(35,45)	8
Haymanot M. et al(2015)[13]	441	98	Dire Dawa	92.6(90,95)	8
Tesfay H. et al(2017) [19]	220	90	Tigray	73(67,79)	8
Desalegne A. et al(2015) [20]	273	100	Amhara	53(48,60)	9
Kidist E. et al(2016)[21]	300	93.3	SNNP	51(45,57)	9
Kidest G.et al(2016)[22]	442	99	SNNP	73(68,78)	9
D.Markos et al(2014) [23]	401	91	SNNP	70(66,75)	8
Engida Y.et al(2012) [24]	202	96.5	Addis Ababa	57(50,64)	9
Sena B.et al(2012)[14]	340	80.6	Oromia	6.9(4,10)	9
Gutema C. et al(2015)	309	89	SNNP	54(48,59)	9
Daniel B.et al(2016)[25]	127	100	SNNP	26(18,34)	9
Haftom G et al(2015) [26]	233	93	Tigray	57(51,64)	8
Guesh W.et al(2018)[27]	414	98.1	Tigray	83(31,43)	8
Yosef Haile.et al(2019) [28]	436	95	SNNP	55.4(2,9)	9
Tesfay H. et al(2019) [19]	220	98	Tigray	73.3(21,32)	9
Azeb A.et al(2017)[29]	605	98.1	Addis Ababa	69(36,45)	9

Utilization of partograph in Ethiopia

In resource-limited countries like Ethiopia Partograph has been promoted by the World Health Organization as the "gold" standard for assessing the progress of labour, and as a decision-making tool. The overall pooled prevalence of partograph utilization among obstetric care providers in Ethiopia was

presented with a forest plot (Fig. 2). The pooled estimated prevalence of partograph utilization among obstetric care providers in Ethiopia was 59.95% (95% CI:46.8,73,I^2 = 99.4%, P < 0.001)

Publication bias

Funnel plot was assessed for asymmetry distribution of prevalence of partograph utilization among obstetric care providers by visual inspection (Fig. 3). Egger's regression test showed with a p-value of 0.02 indicated the existence of publication bias.

Sensitivity analysis

This systematic review and meta-analysis showed that the point estimate of its omitted analysis lies within the confidence interval of the combined analysis. Therefore, trim and fill Analysis was no further computed (fig. 3).

Subgroup analysis

Subgroup analysis was employed with the evidence of heterogeneity. Furthermore, the Cochrane I^2 statistic =99.4%, $P< 0.001$) with evidence of marked heterogeneity, subgroup analysis was done by using year of study and study area (Table 2).

Table 2: Sub-group analysis of the prevalence of partograph utilization in Ethiopia by region and year of publication.

Subgroup	No. of studies	Model	Prevalence (95% CI)	I^2 (%)	p-value
By region					
Amhara	3	random	40.89 (27.40, 54.38)	95.3	<0.001
Oromia	3	random	60.1(1.75, 118)	99.9	<0.001
Addis Ababa+Dire Dawa	3	random	73(52.56,93.7)	98.8	<0.001
Tigiray	4	random	71.9 (61,82.59)	93.9	<0.001
SNNP	6	random	55.10 (43.6, 66)	97.4	<0.001
By publication year					
2012-2014	5	random	40.67 (15.61, 65.72)	99.4	<0.001
2015-2017	11	random	65.93 (55.06, 76.81)	98.4	<0.001
2018-2019	3	random	70.59 (53.28, 87.91)	97.6	<0.001

Associated factors of partograph utilization

A total of 19 studies were included for analysis of associated factors of partograph utilization. We identified seven main associated factors with the pooled odds ratio ranging from 2.12 to 5.66. These associated factors were midwifery profession, female health care provides, Emergency Obstetric and Newborn Care training, attitude, Knowledge of partograph, health center, and short term training on partograph, favorable attitude towards partograph, and working at health center.

Midwifery profession on partograph utilization

The result of this systematic review showed a significant association between midwifery profession and partograph utilization. Obstetric care providers who were midwifery in profession were 4 times more likely to utilize partograph as compared to other Obstetric care providers (AOR: 3.97,95%CI:2.6,6, p=0.19, I^2 =28.8%)(Fig.4).

Emergency Obstetric and Newborn Care training

This study also revealed that there is a significant association between Emergency Obstetric and Newborn Care training and partograph utilization. Those obstetric care providers who received Emergency Obstetric and Newborn Care training were around 3 times more likely to utilize partograph as a decision-making tool (OR = 2.9,95% CI:2.19, 3.83) (Fig. 6).

Training on partograph and partograph utilization.

Having short term training on partograph showed statistically significant association with partograph utilization among obstetric care providers.

Obstetric care providers who had training on partograph were around 6 times more likely to utilize partograph (O=5.7,95%CI:2.5,12.9) as a decision-making tool as compared to those obstetric care providers who did not receive training on partograph(Fig. 7).

Attitude of obstetric care providers on partograph utilization

Obstetric care providers who had favorable attitude towards partograph utilization were more likely to utilize partograph as a decion making tool (AOR=2.3,95%CI:1.5,3) as compared to obstetric care providers

who had unfavorable attitude towards partograph(Fig. 9).

Working at health center on partograph utilization

Additionally, working at health center was significantly associated with partograph utilization among obstetric care providers. Obstetric care providers who worked at health center were around 4 times(AOR=3.5,95%CI:2.5,4.9) more likely to use partograph as compared to obstetric care providers worked in Hospitals (Fig. 10).

Discussion

In Ethiopia, the maternal mortality rate is 412 per 100 000 live births, yet the majority of these deaths could have been prevented by using the partograph to detect abnormal progress of labour. This meta-analysis tried to estimate the pooled prevalence of partograph utilization among obstetric care providers in Ethiopia.

In this meta-analysis, the pooled estimates showed that around sixty (59.95%) of obstetric care providers used partograph as a decision making tool during labor and delivery. The finding was lower than the study result South Africa [30], Gambia[31], and Kenya[12]. These differences might be due to differences in strategies and policies to implement partograph utilization, availability of health care providers, availability of tools, work overload, supportive professional environment from peers and leaders, with quality assurance systems, and promotion on the implementation of the partograph utilization.

The other reason might be the level of empowerment of women to get better care, with delivery at health facilities and earlier admission, which would be more likely to increase partograph use.

In the studies of Gambia and South Africa; the participants were only midwives by profession with a great chance to work in labour and delivery unit, to be trained on partograph and might have better knowledge, skill, and commitment of using partograph to follow the progress of labour.

The profession of the obstetric care provider was among the factors affecting partograph utilization as a decision making tool. Partograph utilization was higher when the obstetric providers were midwives (AOR: 4.9,95%CI:3.4,7) as compared to other obstetric care providers. This result agrees with a study conducted in nineteen Ethiopian hospitals[32], study conducted in Nigeria[33], and South Africa[30]. This might be due to the fact that midwives have more chance of being assigned in delivery wards and consequently received training on partograph utilization, which might in turn have improved their knowledge and skills to use partograph as a decision-making tool than others. Secondly, as obstetric care is their major duty; they might have the better skill, importance, and favorable attitude towards partograph utilization as a decision-making tool than others.

Being a female obstetric care provider also positively associated with partograph utilization. Female obstetric care providers were four times (AOR: 3.92, 95%CI: 2.64, 4.12) more likely to utilized partograph than male obstetric care providers. This finding is in line with a study conducted in India[34]. This might be because females are closer to obstetric information as they tend to become midwives which makes them more likely to have good knowledge of the partograph. The other reason might be female health care providers are more committed, optimistic to complete the components, and overvalued the use of partograph during childbirth.

This systematic review also revealed that obstetric care providers who had Emergency Obstetric Care and Newborn care training were 2.7 times more likely to utilize partograph than their counterparts (AOR:2.7,95%CI:2.26, 3.22). This finding is in line with a study done in Malawi[35], and Nigeria[36]. The reason might be having Emergency Obstetric and Newborn care training capacitate obstetric care providers to use as a decision-making tool, to interpret the components of partograph, and to follow best practices during childbirth.

This systematic review also showed that knowledge of partograph as a key determinant factor for partograph utilization among obstetric care providers. Obstetric care providers who were knowledgeable on partograph were 3.3 times more likely to utilize partograph than their counterparts(AOR: 3.3, 95%CI: 1.5, 6.87). This result was supported by other studies[37] and [36]. The possible reason might be the knowledge that enables them to understand what critical progress of labour will occur and decide on alternatives such as referral and caesarian section which encourage obstetric care providers to use as a decision-making tool.

This study also indicated that having short term training on partograph was positively associated with partograph utilization. Health care providers who had short term training on partograph were 7 times more likely to utilize partograph (OR: 7.28 (95%CI: 1.58, 33.64) as a decision-making tool. The reason might be health care providers who received training on partograph had better knowledge, skill, and motivation about partograph, which in turn improves partograph utilization. Furthermore, this systematic review and meta-analysis revealed attitude as another factor influencing partograph utilization among obstetric care providers. Partograph utilization was significantly higher among obstetric care providers who had a favorable attitude (AOR=2.3,95%CI:1.5,3) as compared to those who had an unfavorable attitude. The possible reason might be having a favorable attitude towards partograph might come after having knowledge about partograph that may influence the utilization of partograph.

Secondly, this might be because those who had a favorable attitude toward partograph might be well motivated to improve their knowledge on partograph, to fill all components, and to use partograph as a decision-making tool.

According to this study, working at the health center were around 4 times more likely to utilize partograph (AOR=3.5,95%CI:2.5,4.9) as a decision-making tool than hospital workers. The possible explanation for this might be obstetric care providers at health centers utilize partograph as a guide to take an action early to have adequate evidence even to refer to a higher health institution. Moreover, health centers

might have client load than hospitals. On the contrary, Hospital workers of obstetric care providers might have confidence than health center workers that lead them not to follow the labor progress by using partograph. The reason might be hospital workers think they can easily manage disorders and complications at their ground knowledge without wasting time by transporting the laboring mother to other health institutions.

Strength and limitation

This review used a predefined search strategy for both published and unpublished articles to reduce the reviewer's bias and conducting data extraction and quality evaluation by two independent reviewers to minimize the possible reviewer bias. We also performed sensitivity and subgroup analysis based on the years of the study and study area. Besides, the effects of seven key predictors of partograph utilization were estimated.

On the other hand, included articles were restricted to the English language only; this is a limitation of the study as it missed studies published in other languages. All studies included were cross-sectional which cannot show a cause and effect relationship between partograph utilization and the characteristics presented.

Conclusion

The overall pooled prevalence of partograph utilization among obstetric care providers was lower than the WHO recommendations. Midwifery profession, female health care provider, having short in-service Emergency Obstetric and Newborn Care training, Knowledge of partograph, short term training on partograph, working at the health center, and favorable attitude towards partograph were significant factors for partograph utilization. This finding is important to design strategic policies and to prevent obstetric complications; maternal and neonatal death resulted from obstructed and prolonged labour. Therefore, partograph utilization to monitor labour can be improved by increasing the number of the midwifery profession, train obstetric care providers on Emergency Obstetric and Newborn Care, and improving the attitude of obstetric care providers towards partograph.

Abbreviations

AA: Addis Ababa

CI: Confidence Interval

EmOC: Emergency Obstetric Care

NC: Newborn Care

OR: Odds Ratio

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

SNNP: Southern Nation Nationality and Peoples

WHO: World Health Organization

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and material

The data sets generated during the current study are available from corresponding author on reasonable request.

Competing interests

All authors declare that they have no competing interests

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Authors' contributions

Both authors (AAA) and (BFZ) contributed to the data analysis and read and approved the final manuscript.

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References

1. WHO. Trends in maternal mortality: 1990 to 2015: estimates by WHO, U., UNFPA, World Bank Group and the United Nations population division. Geneva, Switzerland: World Health Organization. 2015.
2. Central Statistical Authority (CSA) [Ethiopia] and ICF. Ethiopia Demographic and Health Survey 2016.Addis Ababa, E., and Rockville ,Marryland,USA:CSA and ICF. 2016.

3. 1994;343:1404., W.W.H.O.p.i.m.o.l.L.

4. Leven THA, S.R.E.o.p.u.o.o.f.w.i.s.l.a.t.C.D.S.R.

5. 1994., W.M.h.a.s.m.h.p.G.W.

6. Philpot RH, C.W.C.i.t.m.o.l.i.p., action line & treatment of abnormal labor. J Obstet Gynecol Br Commonwealth. 1972;79:599–602.

7. Luwei Pearson ML. Vincent Fauveau, J.S.O.f.A.s.n.J.A.H.

8. Haymanot MAS, B.S.H.p.s.k.a.u.o.t.p.i.p.h.i.i.e.E.B.P.C.

9. Habtamu R. TT, H.A.P.u.a.i.d.f.a.o.c.i.h.o.W.O., Ethiopia. Panacea J Med Sci January-April 2018;8 (1):21–24.

10. Rahnama, P., S. Ziaei, and S. Faghihzadeh, Impact of early admission in labor on method of delivery. International Journal of Gynecology & Obstetrics, 2006. 92(3): p. 217-220.

11. Tayade, S.a.P.J., The impact of use of modified WHO partograph on maternal and perinatal outcome. International Journal of Biomedical and Advance Research, 2012. 3(4): p. 256-262.

12. Z.P. Q, C.S.-K., S.M. M. , "Rapid assessment of partograph utilization in selected maternity units in Kenya. East Afr Med J. , 2010. 87(6): p. 235-41.

13. Mezmur, H., A. Semahegn, and B.S. Tegegne, *Health professional's knowledge and use of the partograph in public health institutions in eastern Ethiopia: a cross-sectional study.* BMC Pregnancy and Childbirth, 2017. **17**(1): p. 291.

14. Kitila, S., *Utilization of Partograph during Labour and Birth Outcomes at Jimma University.* Journal of Pregnancy and Child Health, 2014. **01**.

15. Abebe, F., et al., *Assessment of knowledge and utilization of the partograph among health professionals in Amhara region, Ethiopia.* Science journal of clinical medicine, 2013. **2**(2): p. 1-17.

16. Habtamu Regasa, T.T., Hasen Adem, *Utilization of partograph and associated factors among obstetric care givers in hospitals of Western Oromia, Ethiopia.* Panacea Journal of Medical Sciences, 2018.

17. Wakeshe, W., *Magnitude of partograph use and factors that affecting its utilization among obstetric caregivers in public health institutions of West Showa Zone, Oromia Regional state, Ethiopia.* 2015(2015-05-13 00:00:00).

18. Wakgari, N., et al., *Partograph utilization and associated factors among obstetric care providers in North Shoa Zone, Central Ethiopia: a cross sectional study.* African health sciences, 2015. **15**(2): p. 552-559.

19. Hailu, T., et al., *Assessment of partograph utilization and associated factors among obstetric care givers at public health institutions in central zone, Tigray, Ethiopia.* BMC Research Notes, 2018. **11**(1): p. 710.

20. Zelellw, D.A., T.K. Tegegne, and G.A. Getie, *Knowledge and attitude of obstetric care providers on partograph and its associated factors in East Gojjam Zone, Northwest Ethiopia.* Advances in medicine, 2016. **2016**.

21. Kidist Eshetu, E.H., Dubale Dulla, *Magnitude of Partograph Use and Associated Factors among Obstetric Care Givers in Public Health Institution in Sidama Zone, Southern Ethiopia.* Diversity and Equality in Health and Care 2017. **14(16)**: p. 316-323.

22. Getu, K. and T. Eyasu, *Knowledge of partograph utilization and its associated factors: A cross-sectional survey in Wolaita Zone Southern Ethiopia.* International Journal of Nursing and Midwifery, 2019. **11**: p. 1-6.

23. Markos, D. and D. Bogale, *Documentation status of the modified World Health Organization partograph in public health institutions of Bale zone, Ethiopia.* Reproductive Health, 2015. **12**(1): p. 81.

24. Yisma, E., et al., *Completion of the modified World Health Organization (WHO) partograph during labour in public health institutions of Addis Ababa, Ethiopia.* Reproductive health, 2013. **10**(1): p. 23.

25. Daniel Bekele, K.B., Leta Hinkosa et al. Partograph Utilization and Associated Factors among Graduating Health Professional Students in Asella Referal and Teaching Hospital, Ethiopia, 2016. Research & Reviews: A Journal of Computational Biology. 2017; 6(2): 12–18p.

26. Haftom Gebrehiwot, S.M., Tsige Araya, et al. Partograph: an essential tool for midwives to manage labor at public health institutions in Tigray, Northern Ethiopia. Research and Reviews: Journal of Immunology. 2015; 5(3): 23–29p.

27. al., G.W.G.e., *Utilization of the partograph and its associated factors among obstetric care providers in the Eastern zone of Tigray, Northern Ethiopia.* Pan African Medical Journal 2017(1937-8688).

28. Haile, Y., et al., *Partograph Utilization and Associated Factors among Obstetric Care Providers at Public Health Facilities in Hadiya Zone, Southern Ethiopia.* 2020.

29. Hagos, A.A., Teka, E.C. & Degu, G. , *Utilization of Partograph and its associated factors among midwives working in public health institutions, Addis Ababa City Administration,Ethiopia. .* BMC Pregnancy Childbirth 2017. **20, 49 (2020).**

30. Mathibe-Neke, J., F. Lebeko, and B. Motupa, The partograph: A labour management tool or a midwifery record? International Journal of Nursing and Midwifery, 2013. 5(8): p. 145-153.

31. Badjie, B., et al., Partograph use among Midwives in the Gambia. African Journal of Midwifery and Women's Health, 2013. 7(2): p. 65-69.

32. Getachew, A., et al., *Quality of care for prevention and management of common maternal and newborn complications: a study of Ethiopia's hospitals.* Baltimore: Jhpiego, 2011.

33. Opiah, M.M., et al., Knowledge and Utilization of the Partograph among Midwives in the Niger Delta Region of Nigeria. African Journal of Reproductive Health / La Revue Africaine de la Santé Reproductive, 2012. 16(1): p. 125-132.

34. Palo SK, P.K., Singh S, Priyadarshini S, Pati S., Intrapartum monitoring using partograph at secondary level public health facilities -A cross-sectional study in Odisha, India. . Family Med Prim Care 2019. 8: p. 2685-90.

35. K., M., Use and documentation of partograph in urban hospitals in Lilongwe- Malawi health workers' perspective. University of Oslo, Faculty of Medicine; Institute of Health and Society 2012.

36. A. O. Fawole, K.I.H., and D. A. Adekanle, , Knowledge and utilization of the partograph among obstetric care givers in south west Nigeria. African Journal of Reproductive Health, 2008.12(1): p. 22-29. .

37. Ernest Okechukwu ORJ, F.A.A., MAKINDE Niyi O, ADEYEMI Babalola A, ONWUDIEGWU U. , Impact of Training on the Use of Partograph on Maternal and Perinatal Outcome in Peripheral Health Centres. . Turkish-German Gynecol Assoc., 2008. 8.

Figures
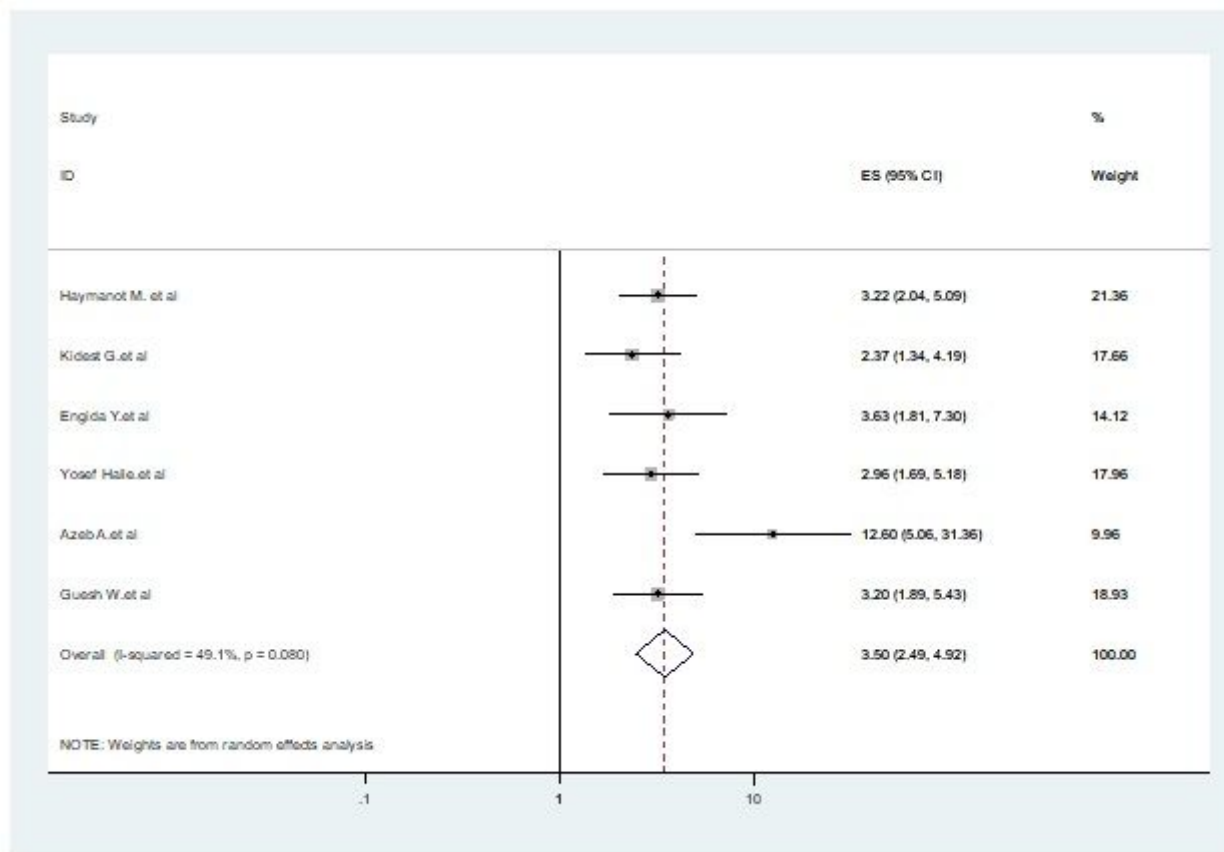
Figure 1

Association between attitude towards partograph and partograph utilization in Ethiopia, 2020
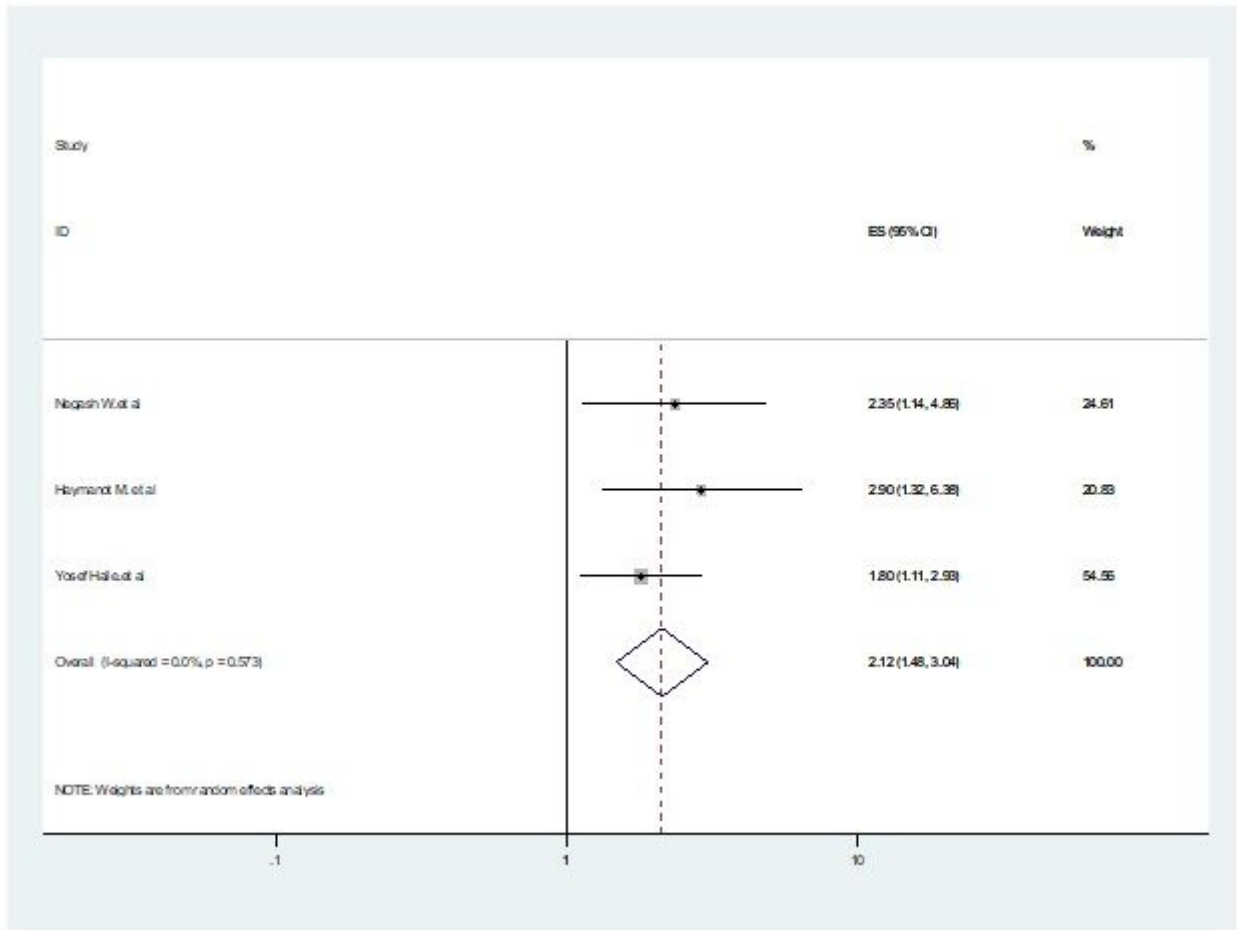
Figure 2

Association between knowledge of partograph and partograph utilization in Ethiopia, 2020
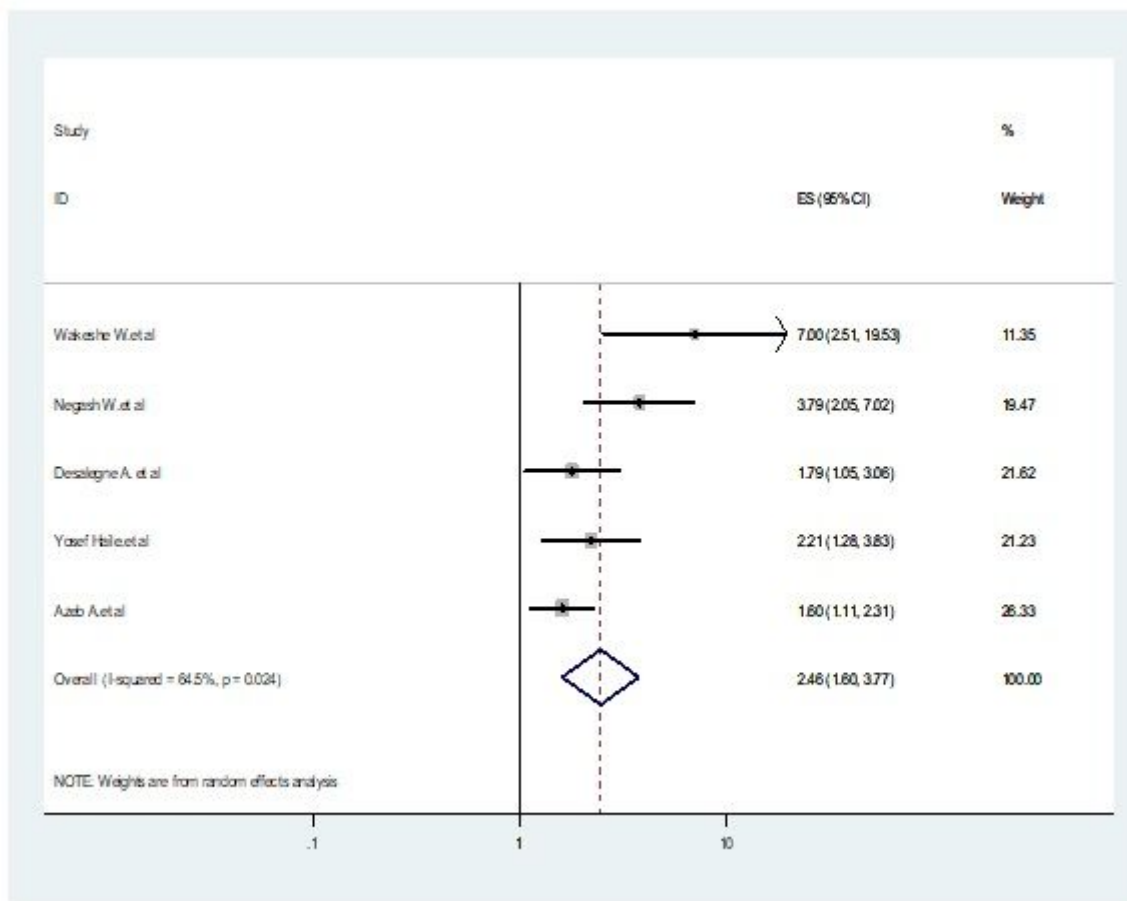
Figure 3

Association between training on partograph and partograph utilization in Ethiopia, 2020
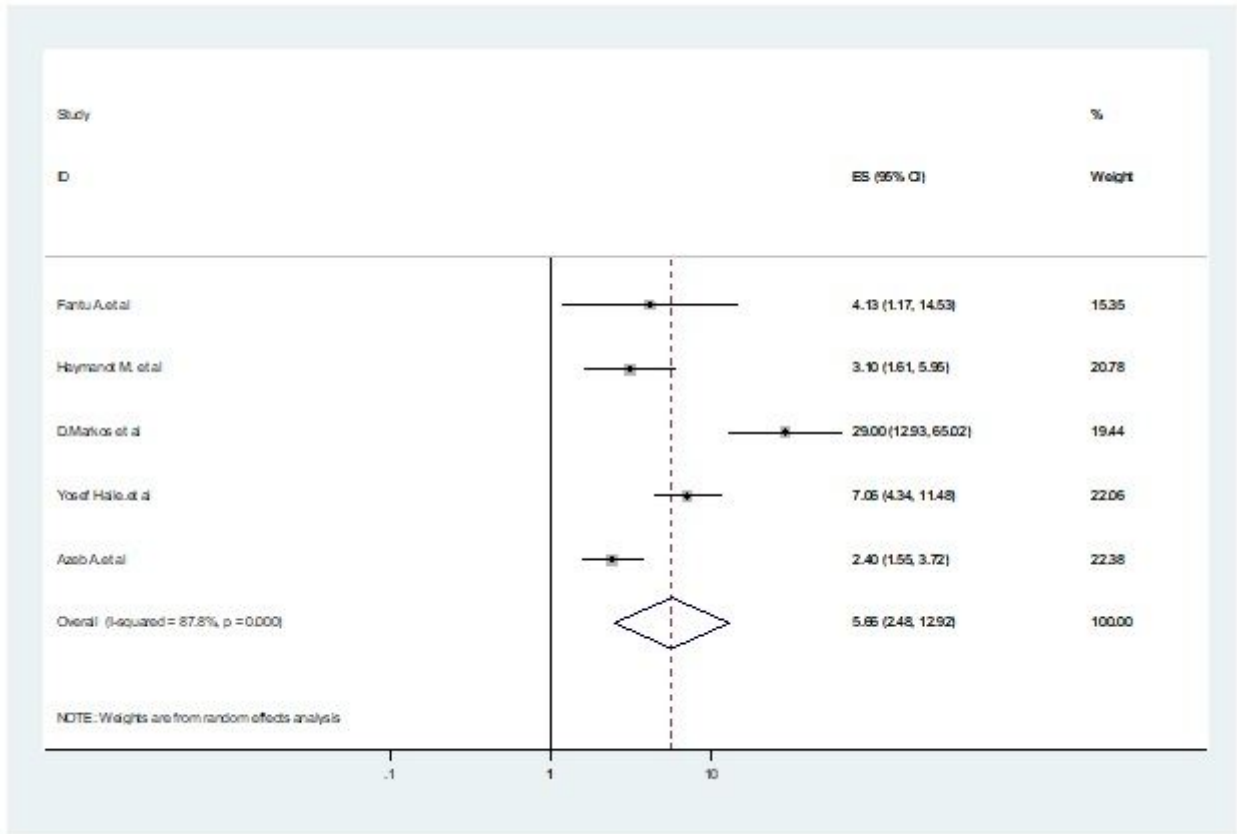
Figure 4

Association between Emergency Obstetric and Newborn Care training and partograph utilization in Ethiopia, 2020
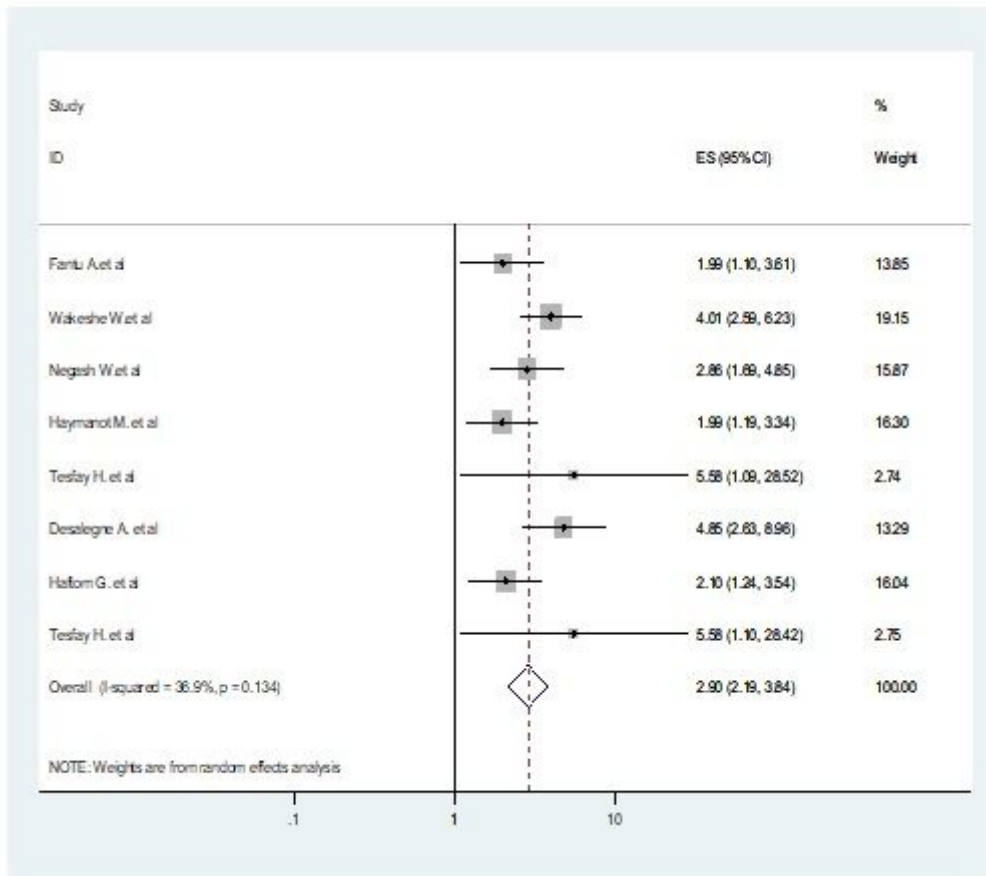
Figure 5

Association between female obstetric care providers and partograph utilization in Ethiopia, 2020
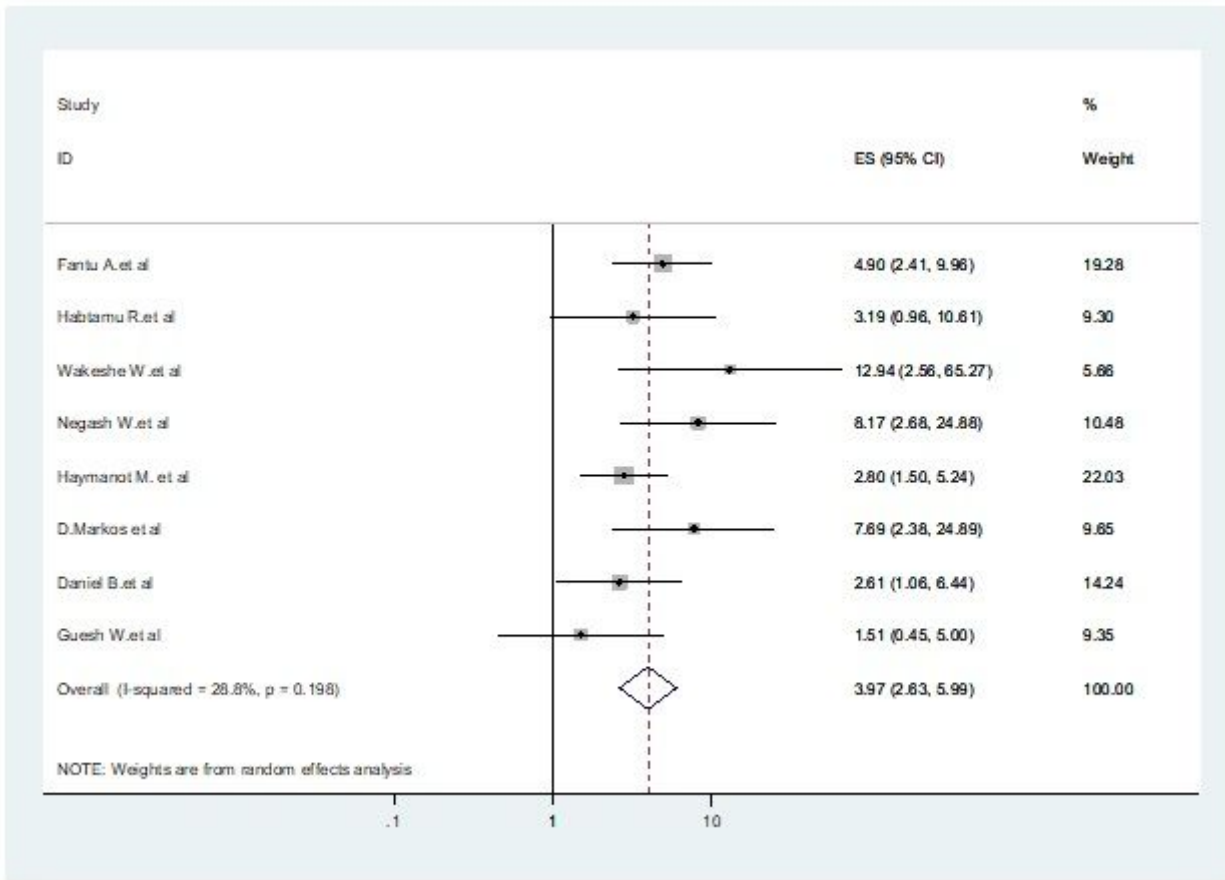
Figure 6

Association between midwifery profession and partograph utilization in Ethiopia, 2020
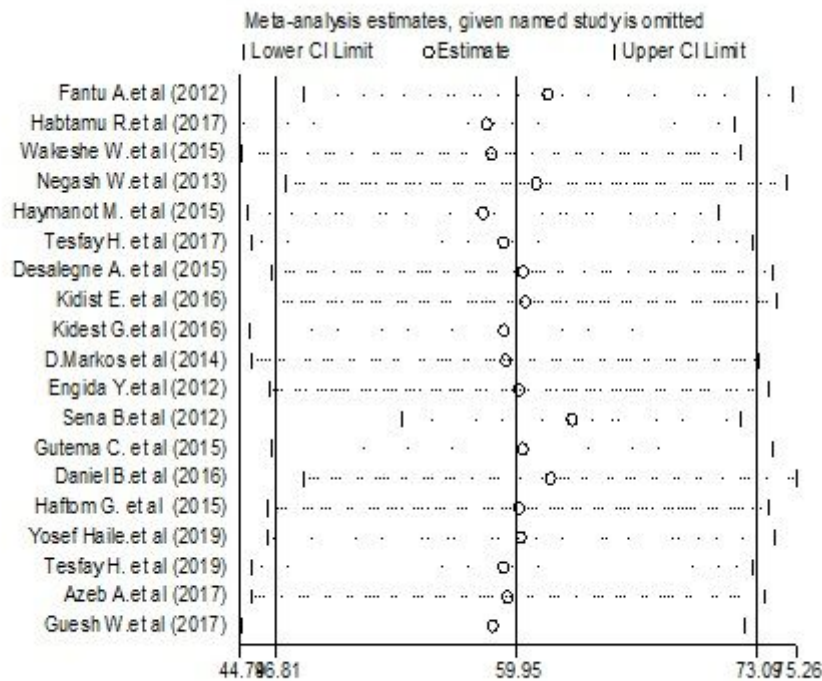
Figure 7

Sensitivity analysis of the pooled prevalence of partograph utilization in Ethiopia.
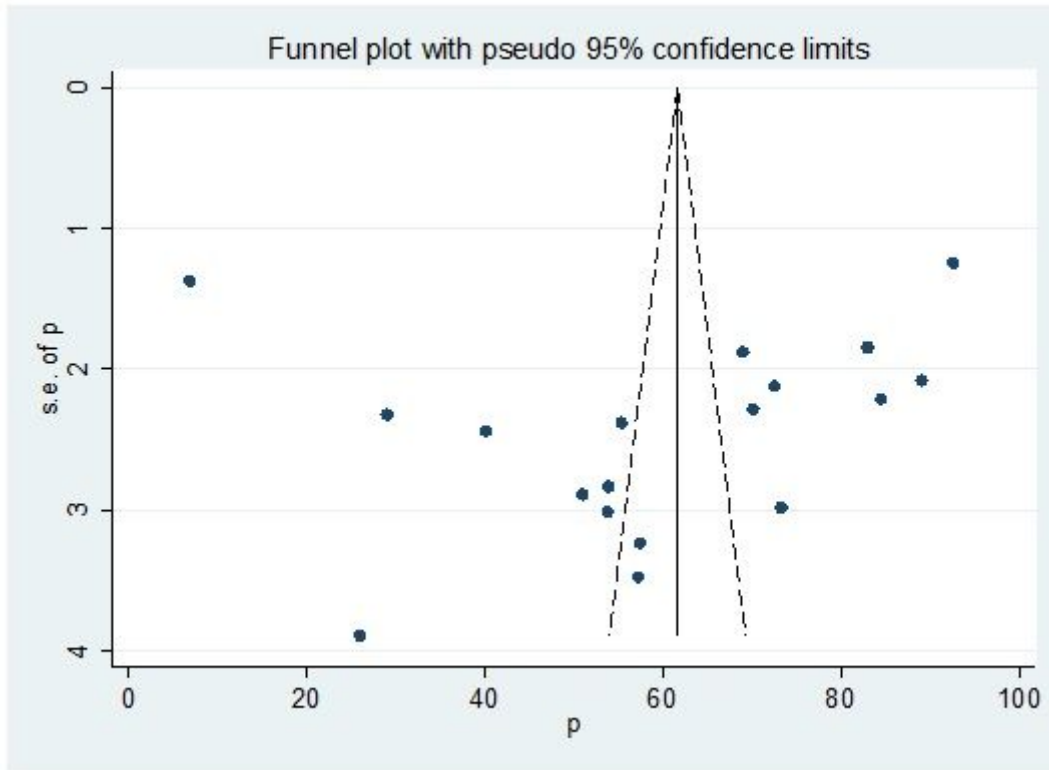
Figure 8

Funnel plot with 95% confidence limits of the pooled prevalence of partograph Utilization among obstetric care providers in Ethiopia, 2020
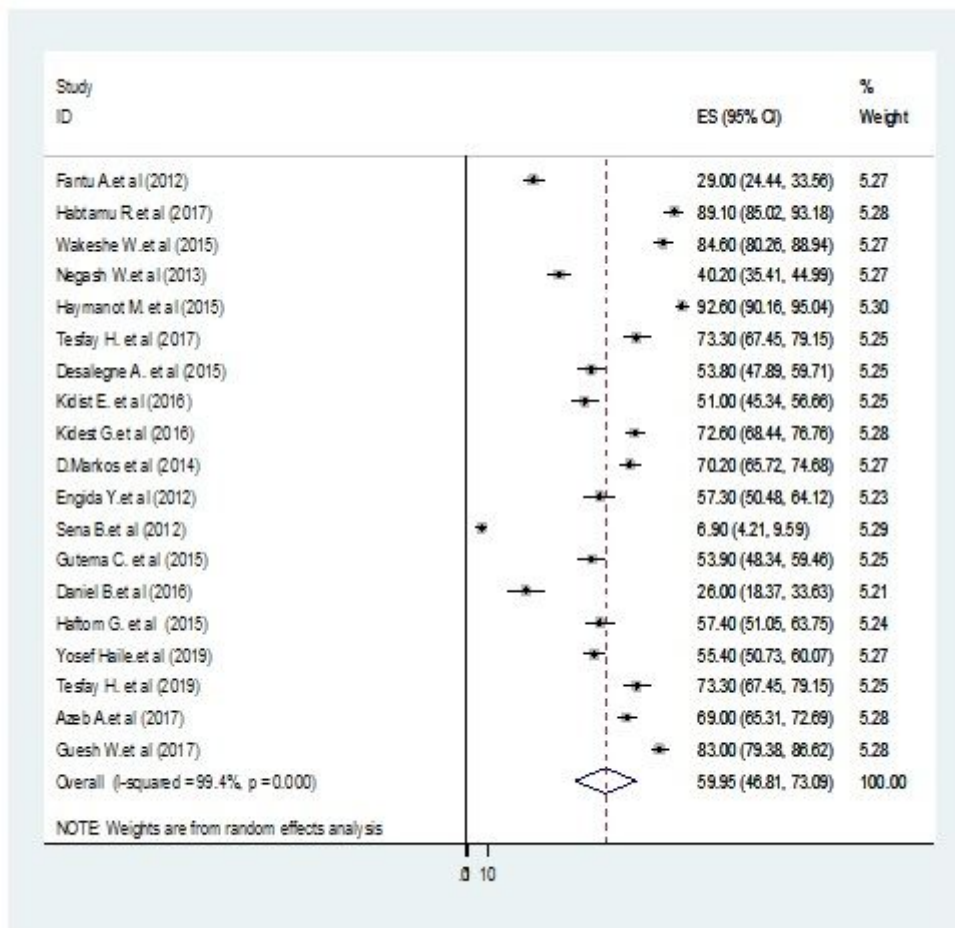
Figure 9

Forest Plot for the Prevalence of partograph Utilization among obstetric care providers in Ethiopia, 2020
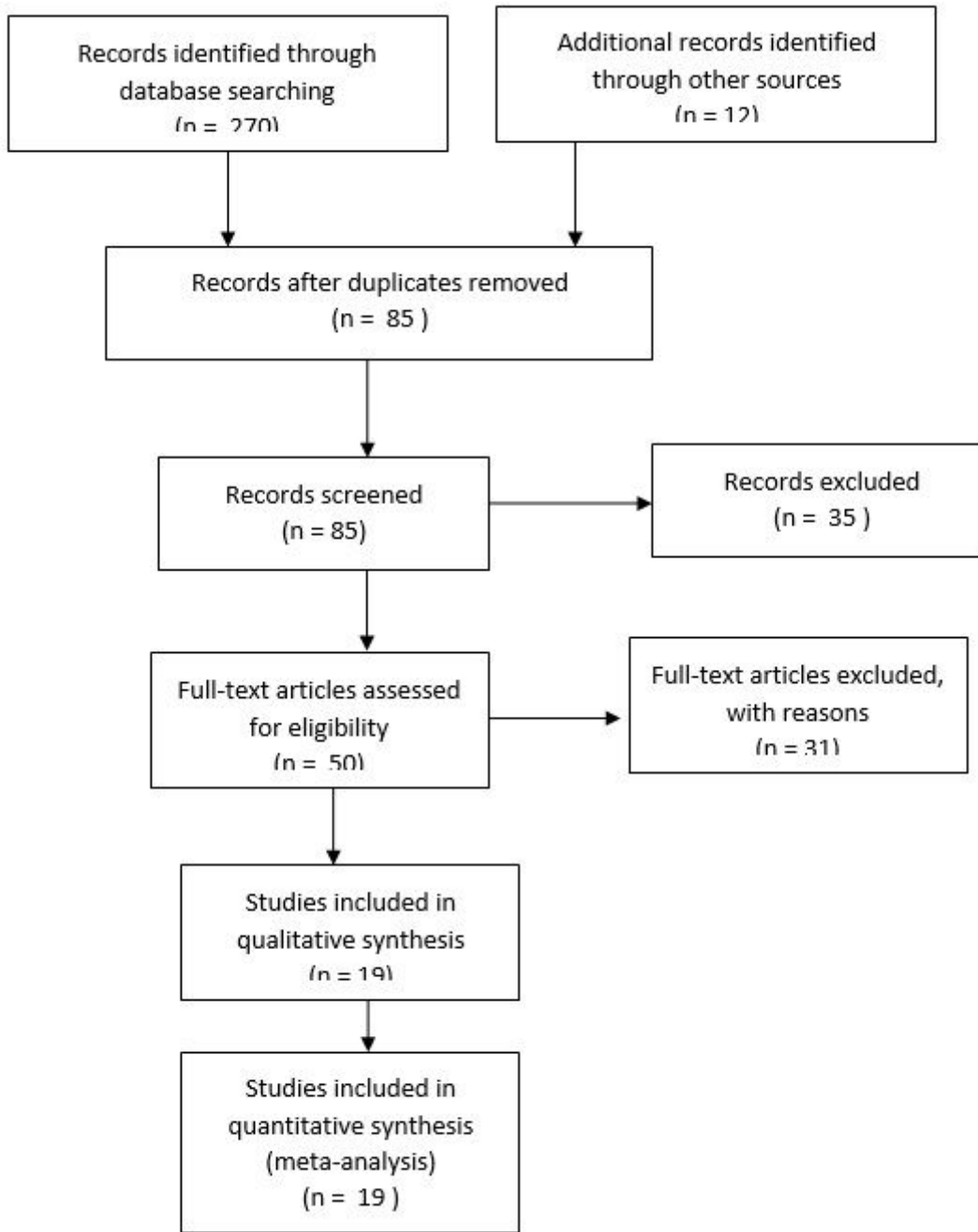
Figure 10

Flow chart of study selection for systematic review and meta-analysis of Partograph utilization as a decision making tool among obstetric care providers in Ethiopia.