

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

Asteray Ayenew (✉ amanuelbiruk0077@gmail.com)

Bahir Dar University

Biruk Ferede Zewdu

Bahir Dar University

Research

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

Posted Date: October 12th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-30599/v4>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published on November 3rd, 2020. See the published version at <https://doi.org/10.1186/s13643-020-01505-4>.

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 labor covers the highest percentage, which could be prevented by cost-effective and affordable health interventions like partograph use. 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 review, we used the standard PRISMA checklist guideline. Different online databases were used for the review: PubMed/Medline, Google Scholar, EMBASE, Cochrane Library, HINARI, WHO Afro Library Databases, and African Online Journals. Based on the adapted PICO principles, different search terms were applied to achieve and access all the essential articles. Microsoft Excel was used for data entrance and Stata version 11.0 (Stata Corporation, College Station, Texas, USA) 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 59.95% (95%CI: 46.8–73.09, $I^2=99.4\%$, $P<0.001$). Being midwifery profession (adjusted odds ratio (AOR):3.97; 95% confidence interval (CI):95%CI:2.63–5.99, $I^2=28.8\%$, $P=0.198$), presence of supervision (AOR = 3.21; 95%CI: 2.22–4.66, $I^2=0.0\%$, $p=0.742$), Basic Emergency Obstetric and Newborn Care (BEmONC) training (AOR = 2.90; 95% CI: 2.19–3.84, $I^2=36.9\%$, $P=0.13$), Knowledge of partograph (AOR=2.5; 95%CI: 1.6–3.8, $I^2=64.58\%$, $P=0.024$), on-the-job refresher training on partograph (AOR =5.7; 95%CI:2.5–12.9, $I^2=87.8\%$, $P<0.001$), favorable attitude (AOR=2.12; 95%CI: 1.48–3.04, $I^2=0.0\%$, $P=0.58$), and working at health center (AOR=3.50; 95%CI: 2.49–4.92, $I^2=49.1\%$, $P=0.08$) were the determinant factors for partograph use among obstetric care providers in Ethiopia.

Conclusion The overall pooled prevalence of partograph utilization among obstetric care providers was low. Therefore, supportive supervision, providing Basic Emergency Obstetric and Newborn Care training, on-the-job refresher training on partograph, and promoting midwifery profession are strongly recommended to increase the use of partograph.

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]. Additionally, there is a staggering evidence that peripartum fetal mortality and morbidity is directly related to the labor abnormalities like asphyxia, birth injuries, low Apgar scores (Appearance, Pulse, Grimace, Activity, and Respiration), and intrapartum or postpartum deaths. About 97% of all reported neonatal deaths occur in less developed countries. Of these majority are a direct consequence of labor complications[2]. In Ethiopia, the tragedy of maternal and neonatal mortality

is stagnant so far, in spite of the apparent commitment by stakeholders. In 2016 maternal mortality accounted for 412 per 100,000 live births and neonatal mortality was 29 per 1000 live births[3].

According to World Health Organization (WHO), one of the key important requirement for averting these deaths is the provision of care by a skilled birth attendant before, during and after childbirth[4]. Skilled birth attendant care needs to be available across all levels of the health system in order to reduce the delays for a referral to a higher care level if problems are expected to arise or do arise during labor. Thus, Partograph is also used in conjunction with this intervention[5]. The Partograph is a graphical record of the progress of labor and relevant details of the mother and the fetus. It has action and alert lines to stimulate commencement of additional interventions by a skilled birth attendant monitoring the progress of labor[6].

Partograph is an effective tool to monitor the progress of labor. When used effectively, it prevents obstructed labor, which is a leading cause of maternal and neonatal mortality, especially in developing countries [7-9]. Globally, it is estimated that obstructed labor occurs in 5% of pregnancies and accounts for an estimated 8% of maternal deaths [10-12]. Whereas, the prevalence of obstructed labor is 47 % in Ethiopia and accounts for 9% of the total maternal death[3].

Friedman in 1954 studied the natural course of human labor and proposed a new way of plotting progress of labor in first stage, against time, progress faster at the rate of 1.3cm/hour in primigravida and 1.5cm/hour in multigravida. Friedman devised a graph of labor depicting cervical dilatation and descent of fetal head in a graphical manner against time, this was known as 'the Friedman's curve'. The graph is a sigmoid curve divided into latent and active phase of labor[13]. The curve later became the basis of the modern partograph that is in clinical use today. World Health organization (WHO) launched the partogram in 1987 as a safe motherhood initiative following a multi-centre trial (WHO, 1994)[14]. The first WHO partograph or 'Composite partograph', covers a latent phase of labor of up to 8hours and an active phase beginning when the cervical dilatation reaches 3cm. The active phase is depicted with an alert line and an action line, drawn 4hours apart on the partograph. This partograph is based on the principle that during active labor, the rate of cervical dilation should not be slower than 1cm/hour. Since a prolonged latent phase is relatively infrequent and not usually associated with poor perinatal outcome, the usefulness of recording the latent phase of labor in the partograph has been questioned. Moreover, differentiating the latent phase from false labor is often difficult[15]. To alleviate these disadvantages, a modified WHO partograph was introduced and incorporated removal of the latent phase and defined the beginning of the active phase at 4cm cervical dilatation instead of 3cm [16].

World Health Organization recommends the universal utilization of the partograph during labor for routine monitoring of labor, and helps the health care provider in identifying slow progress in labor, and to make better decisions for the diagnosis and management of prolonged and obstructed labor [17, 18].

Moreover, partograph serves as an 'early warning system' and assists in early decisions on transfer, intervention decisions in hospitals and ongoing evaluation of the effect of interventions to prevent maternal deaths caused by prolonged labor. It has been promoted by the World Health Organization as

the “gold” standard for assessing the progress of labor especially for low resource countries like Ethiopia [19, 20].

For pregnant women obstructed labor remains an important cause of not only maternal death but also short and long term disability like obstetric fistula, uterine rupture, uterine prolaps, nerve damage, incontinence, puerperal sepsis, postpartum haemorrhage, and infertility from hysterectomy [21]. This can be prevented by accessing skilled delivery services such as plotting partograph during the progress of labor [22, 23]. Therefore, this systematic review and meta-analysis aimed to estimate the pooled prevalence of partograph use among obstetric care providers and its determinant factors in Ethiopia.

Methods

This systematic review and meta-analysis were conducted to estimate the national use of Partograph and its associated factors among obstetric care providers in Ethiopia. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist guideline[24] (additional file 1).

Searching strategy

First, the PROSPERO database and database of abstracts of reviews of effects (DARE) (<http://www.library.UCSF.edu>) were searched to check whether published or ongoing projects exist related to the topic. The literature search strategy, selection of studies, data extraction, and result reporting were done in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [25]. We searched PubMed, Google Scholar, EMBASE, Cochrane Library, HINARI, WHO Afro Library Databases, and African Online Journal databases for all available studies using the following terms: "Partograph utilization", "knowledge on partograph", "labor", "on-the-job refresher training on partograph", "obstetric care providers", "midwives", "decision making tool", "attitude towards partograph", "labor monitoring", "first stage of labor", "health care providers", "health institutions", "childbirth", "factors", "determinants", "health institutions", "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 websites of Ethiopian's University research repository online library (University of Gondar and Addis Ababa University) was used.

Inclusion and exclusion criteria

In this systematic review and Meta analysis we included all observational studies (cross-sectional, case-control and cohort studies) conducted in Ethiopia and only in English language. Additionally, studies that reported prevalence and/or risk factors, the outcome was partograph utilization as a decision-making tool, participants of obstetric care providers, and both published and unpublished studies at any time

were included. However, studies available only as abstract with unclear outcomes, commentaries, editorials, reviews, and qualitative studies were excluded.

Quality assessment

After collecting the findings from all databases, the articles were exported to Microsoft Excel spreadsheet. Two authors (AAA & BFZ) independently extracted the data and reviewed the screened and eligible articles. Any disagreement was handled by the two reviewers (AAA & BFZ). Finally, a consensus was reached between the two authors through discussion. The methodological quality of each study (sampling strategy, response rate, and representativeness of the study), comparability, and outcome were checked using the NOS tool. Newcastle-Ottawa Quality Assessment Scale (NOS) for cross-sectional and case-control studies was used to assess the methodological quality of a study and to determine the extent to which a study has addressed the possibility of bias in its design, conduct and analysis[26]. All the included articles scored (NOS) 7 and more can be considered as “good” studies with low risk (Additional file 2).

Outcome of measurement

This review has two main outcomes. Partograph utilization among obstetric care providers to monitor the progress of labor and fetomaternal 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, presence of supervision, Basic Emergency Obstetric and Newborn Care (BEmONC) training, knowledge of partograph, on-the-job refresher training on partograph, favorable attitude towards partograph, and working at the health center.

Data extraction

Microsoft Excel (2016), and Stata version 11.0 (Stata Corporation, College Station, Texas, USA) software were used for data entry and analysis, respectively. Two authors (AAA and BFZ) independently extracted all the important data using a standardized JBI data extraction format. The inter-rater agreement between Authors for study inclusion, data extraction, and methodological quality will be assessed using Cohen's kappa coefficient (values ≤ 0 as indicating no agreement and 0.01–0.20 as none to slight, 0.21–0.40 as fair, 0.41–0.60 as moderate, 0.61–0.80 as substantial, and 0.81–1.00 as almost perfect agreement)[27]. Substantial agreement between reviewers i.e. Cohen's kappa coefficient > 0.60 was accepted. Any disagreement between reviewers was resolved through discussion and then consensus was reached. During data extraction; name of the author, sample size, publication year, study design, prevalence, response rate, population outcome, study site, and different contributing factors were included. Moreover, prevalence of partograph use with 95%CI and associated factors were collected[28].

Statistical analysis

As the test statistic showed significant heterogeneity among studies ($I^2 = 99.4\%$, $p < 0.05$) the Random-effects model was used to estimate the DerSimonian and Laird's pooled effect[29]. Cochran's Q chi-square statistics and I^2 statistical test was conducted to assess the random variations between primary studies[30]. In this study, heterogeneity was interpreted as an I^2 value of 0% = no heterogeneity, 25% = low, 50% = moderate, and 75% = high[31]. In case of high heterogeneity, subgroup analysis and sensitivity analyses were run to identify possible moderators of this heterogeneity. Potential publication bias was assessed by visually inspecting funnel plots and objectively using the Egger's test (i.e. $p < 0.05$)[32]. To account for any publication bias, we used the trim-and-fill method, based on the assumption that the effect sizes of all the studies are normally distributed around the center of a funnel plot. The meta-analysis was performed using the Stata version 11.0 (Stata Corporation, College Station, Texas, USA) software. Finally, for all analyses, $P < 0.05$ was considered statistically significant.

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 use [Fig.1].

Study characteristics

Different factors such as; midwifery profession, presence of supervision, Basic Emergency Obstetric and Newborn Care training (BEmONC), Knowledge of partograph, on-the-job refresher 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 the included articles were facility-based 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 nineteen included studies in the systematic review and meta-analysis

| Author (year of study) (reference number) | Sample size | Response rate (%) | Study region | prevalence (95% CI) | NOS Quality of score |
|--|-------------|-------------------|--------------|---------------------|----------------------|
| Fantu A.et al(2012)[33] | 381 | 88 | Amhara | 29(24–33) | 9 |
| Habtamu R.et al(2017)[34] | 224 | 90.2 | Oromia | 89(85–93) | 9 |
| Wakeshe W.et al(2015)[35] | 266 | 97.4 | Oromia | 84(80–88) | 9 |
| Negash W.et al(2013)[36] | 403 | 94.5 | Amhara | 40(35–45) | 8 |
| Haymanot M. et al(2015)[37] | 441 | 98 | Addis Ababa | 92.6(90–95) | 9 |
| Tesfay H. et al(2017)[38] | 220 | 90 | Tigray | 73(67–79) | 9 |
| Desalegne A. et al(2015)[39] | 273 | 100 | Amhara | 53(48–60) | 9 |
| Kidist E. et al(2016)[40] | 300 | 93.3 | SNNP | 51(45–57) | 8 |
| Kidest G.et al(2016)[41] | 442 | 99 | SNNP | 73(68–78) | 9 |
| D.Markos et al(2014)[42] | 401 | 91 | SNNP | 70(66–75) | 9 |
| Engida Y.et al(2012)[43] | 202 | 96.5 | Addis Ababa | 57(50–64) | 8 |
| Sena B.et al(2012)[44] | 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)[45] | 127 | 100 | SNNP | 26(18–34) | 9 |
| Haftom G et al(2015)[46] | 233 | 93 | Tigray | 57(51–64) | 9 |
| Guesh W.et al(2018)[47] | 414 | 98.1 | Tigray | 83(31–43) | 9 |
| Yosef Haile.et al(2019)[48] | 436 | 95 | SNNP | 55.4(2–9) | 9 |
| Tesfay H. et al(2019)[38] | 220 | 98 | Tigray | 73.3(21–32) | 9 |
| Azeb A.et al(2017)[49] | 605 | 98.1 | Addis Ababa | 69(36–45) | 9 |

Partograph use among obstetric care providers in Ethiopia

The overall pooled prevalence of partograph is presented with a forest plot (Fig. 2). Therefore, the national estimated prevalence of partograph use among obstetric care providers in Ethiopia was 59.95% (95% CI: 46.8–73.09, $I^2 = 99.4\%$, $P < 0.001$).

Publication bias

The funnel plot was assessed for asymmetry distribution of prevalence of partograph use among obstetric care providers by visual inspection (Fig. 3). Egger's regression test showed a p-value of 0.759 with no evidence 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. 4).

Subgroup analysis

Subgroup analysis was employed with the evidence of heterogeneity. In this study, the Cochrane I^2 statistic was 99.4%, $P < 0.001$, which showed the evidence of marked heterogeneity. Therefore, subgroup analysis was done using the study region and year of study. As a result, the use of partograph was highest in Addis Ababa 73.4%, whereas 70.95% in the study conducted between 2018 and 2019 (Fig. 5&6).

Determinants of partograph utilization in Ethiopia

The association between midwifery profession, presence of supervision, Basic Emergency Obstetric and Newborn Care training (BEmONC), attitude, Knowledge of partograph, on-the-job refresher training on partograph, favorable attitude towards partograph, and working at health centers with partograph use was carried out.

In this meta-analysis, to identify the associated factors, eight articles were used for midwifery profession [33-37, 42, 45, 50], five for knowledge of partograph [35, 36, 39, 48, 49], three for attitude [36, 37, 48], and five for on-the-job refresher training on partograph [33, 37, 42, 48, 49], seven for BEmONC (Basic Emergency Obstetric and Newborn Care) training [33, 35-39, 46], four for presence of supervision [33, 34, 42, 45], and six for working at health center [37, 39, 40, 43, 48, 50].

Obstetric care providers who were midwives were 3.97 times more likely to use partograph as a decision-making tool. Those obstetric care providers who received BEmONC training were 2.9 times more likely to use partograph. The odds ratio of on-the-job refresher training on partograph to use partograph was 5.7. Obstetric care providers who supervised were 3.21 times more likely to use partograph. Additionally, obstetric care providers who had a good Knowledge of partograph were 2.5 times more likely to use partograph.

Obstetric care providers who had a favorable attitude towards partograph utilization were 2.12 more likely to utilize partograph as a decision-making tool. Moreover, those obstetric care providers working at the health center were 3.5 times more likely to use partograph (Table 2).

Table 2; Descriptive summary of determinant factors for partograph utilization among obstetric care providers.

| Variable name | NO. of included studies | OR (95% CI) | Overall (I-squared, p-value) |
|---|-------------------------|-------------------|------------------------------|
| midwifery profession | 8 | 3.97 (2.63–5.99) | 28.8%, p = 0.198 |
| presence of supervision | 4 | 3.21(2.22–4.66) | 0.0%, p = 0.742 |
| Emergency Obstetric and Newborn Care training | 7 | 2.90(2.19–3.84) | 36.9%, p = 0.134 |
| knowledge of partograph | 5 | 2.46 (1.60–3.77) | 64.5%, p = 0.024 |
| Attitude towards partograph | 3 | 2.12 (1.48–3.04) | 0.0%, p = 0.573 |
| on-the-job refresher training on partograph | 5 | 5.66 (2.48–12.92) | 87.8%, p = 0.000 |
| working at health center | 6 | 3.50 (2.49–4.92) | 49.1%, p = 0.08 |

Discussion

The use of partograph in this review was ranged from 6.9% to 92%. The highest use of partograph use was from Addis Ababa[37] while the lowest one was from Oromia region[44]. The purpose of this review was to assess the pooled prevalence and associated factors of partograph use of by reviewing the finding of available studies. The pooled prevalence of partograph use in Ethiopia was 59.9%.

The use of partograph for all laboring mothers is recommended by the WHO as a means to monitor and record maternal and fetal well-being; as it can identify maternal or fetal distress and abnormalities in the progress of labor that require further action, including referral. This can reduce complications from prolonged labor for the mother: obstetric fistula, postpartum hemorrhage, sepsis, uterine rupture, and its sequelae; and for the infant: death, anoxia, and infections [51-53]. Thus, the use of partograph in this study was low.

The findings of the current study is lower than studies in South Africa[54] accounted for 79.4%, Ghana [55] 87%, Gambia 78%[56], and Uganda [57] 69.9%. The differences between these findings might be due to difference in level of knowledge of obstetric care provides and different strategies in partograph implementation; as in Ghana obstetric care providers received specific training in the use of partograph[58], 83.8% trained in South Africa[54], and the application of improving partograph use in Uganda through training, coaching and mentoring [59]. Moreover, in the studies of Gambia, Uganda, and South Africa; the participants were only midwives and doctors by profession, where as this study included all obstetric care providers including nurses, health extension workers, public health officers, and IESOs.

The prevalence of partograph use in this study is higher than the study done in Rwanda [60] 41.22%, Cameroon [61] 32.4%), and Nigeria[62] 37.5%. The possible reason might be the Federal Ministry of Health has set targets and working for facility delivery coverage at 90% and to enable all health centers to use partograph, and to provide all BEmONC functions[63].

The finding of this meta-analysis revealed that, midwives were 3.97 times more likely to use partograph compared to other obstetric care providers. This result agrees with studies conducted in Nigeria[64] and South Africa[65]. This might be justified by midwives to have more chances of being assigned in labor wards and consequently received training on partograph, which might in turn have improved their knowledge, skill, and attitude to use partograph than others.

In this study, obstetric care providers who supervised were 3.21 times more likely utilized partograph than their counterparts. The possible reason could be due to the availability of well-designed and coordinated programs like the strength of mentorship and supportive supervision of obstetric care providers may affect the use of partograph. Thus, effective utilization of obstetric care provider's knowledge advancement through refresher training, including practical demonstration, supportive supervision, and on-site partograph audits by trained supervisors, should also be prioritized[57, 66, 67].

Obstetric care providers who received Basic Emergency Obstetric and Newborn care training were 2.9 times more likely to use partograph than who did not received. This finding is in line with a study done in Malawi[68], and Nigeria[69]. The reason might be receiving Emergency Obstetric and Newborn care training to capacitate obstetric care providers to interpret the components of partograph, to follow best practices during childbirth, to use partograph as a decision-making tool.

Obstetric care providers who had adequate knowledge on partograph were 2.5 times more likely to utilize partograph than their counterparts. This result was supported by other studies[70] and [69]. The possible reason might be the knowledge that enables them to understand what critical progress of labor will occur and decide on alternatives such as referral and caesarian section which encourage obstetric care providers to use partograph as a decision-making tool.

Additionally, obstetric care providers who received on-the-job refresher training on partograph were 5.7 times more likely to use partograph compared to those who did not received. This result in supported by a study in Tanzania[71]. The possible reason might be health care providers who received on-the-job refresher training on partograph had better knowledge, skills, and confidence about partograph use, which in turn improves its use.

Partograph utilization was 2.12 times higher among obstetric care providers who had a favorable attitude as compared to those who had an unfavorable attitude. This is in agreement with the studies done in Nigeria[52]. The possible reason might be having a favorable attitude towards partograph might come after having knowledge about partograph that may influence partograph use.

According to this study, obstetric care providers who have been worked at health centers were 3.5times more likely to use partograph compared to hospitals. The possible explanation might be the majority of the obstetric care providers working in health centers received on-the-job refresher training on partograph, BEONC training, and frequent supervision as compared to those working in hospitals[72]. The other reason might be health center obstetric care providers use partograph as a guide to take early action, to have adequate evidence, and to refer to higher health institution, which might increase its use.

Limitation

Since it is the first systematic review and meta-analysis, it is taken as strength. The included articles were restricted to the English language only; this is a limitation of the study as it missed studies published in local languages. This review has not registered online.

Conclusion

The overall pooled prevalence of partograph utilization among obstetric care providers in Ethiopia low. Therefore, supportive supervision, providing Basic Emergency Obstetric and Newborn Care training, on-the-job refresher training on partograph, and promoting midwifery profession are strongly recommended to increase the use of 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 the corresponding author on reasonable request.

Competing interests

All authors declare that they have no competing interests

Funding

No funding was obtained for this study

Authors' contributions

Both authors (AAA) and (BFZ) contributed to all the process from conception of the research protocol to the reading and approval of the final manuscript.

Correspondence goes to AAA

Acknowledgment

N/A

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. BL., S., *Effect of Partogram Use on Outcomes for Women in Spontaneous Labour at Term: RHL Commentary*. The WHO Reproductive Health Library. World Health Organization, Geneva, 2009.
3. ICF., C.S.A.C.E.a., *Ethiopia Demographic and Health Survey 2016*. Addis Ababa, Ethiopia, and Rockville, Maryland, USA, CSA and ICF, 2016.
4. Organization, W.H., *Reduction of maternal mortality : a joint WHO/UNFPA/UNICEF/World Bank statement*. . World Health Organization, 1999.
5. Ali, A. and B.A. Masakhwe, *WHO midwifery education module 3 Managing prolonged and obstructed labour*. Training Course in Sexual and Reproductive Health Research, 2010.
6. Organization, W.H., *Making pregnancy safer: the critical role of the skilled attendant: a joint statement by WHO, ICM and FIGO, in Making pregnancy safer: the critical role of the skilled attendant: a joint statement by WHO, ICM and FIGO*. WHO, 2014.

7. Harrison, M.S., et al., *Maternal Mortality from Obstructed Labor: A MANDATE Analysis of the Ability of Technology to Save Lives in Sub-Saharan Africa*. Am J Perinatol, 2016. 33(9): p. 873-81.
8. Mathai, M., *The partograph for the prevention of obstructed labor*. Clin Obstet Gynecol, 2009. 52(2): p. 256-69.
9. Asibong U, O.I., Agan TU, Oku A, Opiah M, Essien EJ, et al. , *The use of the partograph in labor monitoring: a cross-sectional study among obstetric caregivers in general hospital, Calabar, Cross River state, Nigeria*. . Int J Women's Health, 2014. 6: p. 873.
10. Kayiga, H., et al., *Improving the quality of obstetric care for women with obstructed labour in the national referral hospital in Uganda: lessons learnt from criteria based audit*. BMC Pregnancy Childbirth, 2016. 16(1): p. 152.
11. Kabakyenga, J.K., et al., *Individual and health facility factors and the risk for obstructed labour and its adverse outcomes in south-western Uganda*. BMC Pregnancy Childbirth, 2011. 11: p. 73.
12. in *Reproductive, Maternal, Newborn, and Child Health: Disease Control Priorities, Third Edition (Volume 2)*, R.E. Black, et al., Editors. 2016, © 2016 International Bank for Reconstruction and Development / The World Bank.: Washington DC.
13. EA., F., *Primigravid labour. A graphic statistical analysis*. . Obstet Gynecol, 1995. 6: p. 567-89.
14. *World Health Organization partograph in management of labour. World Health Organization Maternal Health and Safe Motherhood Programme*. Lancet, 1994. 343(8910): p. 1399-404.
15. Mathai, M., *The partograph for the prevention of obstructed labor*. Clinical obstetrics and gynecology, 2009. 52(2): p. 256-269.
16. Levin, K. and J. Kabagema, *Use of the partograph: effectiveness, training, modifications, and barriers –a literature review*. Washington, DC, United States Agency for International Development, Fistula Care, EngenderHealth, 2011. 28.
17. Organization, W.H., et al., *Pregnancy, childbirth, postpartum, and newborn care: a guide for essential practice*. 2003: World Health Organization.
18. Organization, W.H., *Managing complications in pregnancy and childbirth: a guide for midwives and doctors*. 2017: World Health Organization.
19. 1994., W.M.h.a.s.m.h.p.G.W.
20. 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.
21. Mukasa, P.K., et al., *Uterine rupture in a teaching hospital in Mbarara, western Uganda, unmatched case- control study*. Reprod Health, 2013. 10: p. 29.
22. 1994;343:1404., W.W.H.O.p.i.m.o.l.l.
23. Leven THA, S.R.E.o.p.u.o.o.f.w.i.s.l.a.t.C.D.S.R.
24. Moher, D., et al., *Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement*. Public Library of Science Medicine, 6 (6), e1000097, 2009.

25. Moher, D., et al., *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement*. PLoS Med, 2009. 6(7): p. e1000097.
26. Downes, M.J., et al., *Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS)*. BMJ open, 2016. 6(12): p. e011458.
27. Viera, A.J. and J.M. Garrett, *Understanding interobserver agreement: the kappa statistic*. Fam med, 2005. 37(5): p. 360-363.
28. Sendeku, F.W., G.G. Azeze, and S.L. Fenta, *Perinatal asphyxia and its associated factors in Ethiopia: a systematic review and meta-analysis*. BMC pediatrics, 2020. 20(1): p. 1-11.
29. DerSimonian, R. and N. Laird, *Meta-analysis in clinical trials*. Control Clin Trials, 1986. 7(3): p. 177-88.
30. Huedo-Medina, T.B., et al., *Assessing heterogeneity in meta-analysis: Q statistic or I2 index?* Psychol Methods, 2006. 11(2): p. 193-206.
31. Higgins JP, A.D., *Assessing risk of bias in included studies*. *Cochrane handbook for systematic reviews of interventions*: . Cochrane book series, 2008: p. 187–241.
32. Egger M, D.-S.G., Altman D., *Systematic reviews in health care: meta-analysis in context*. John Wiley & Sons, 2008.
33. 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.
34. 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.
35. 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).
36. 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.
37. 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.
38. 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.
39. 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.
40. 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.
41. 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.
 42. 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.
 43. 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.
 44. Kitila, S., *Utilization of Partograph during Labour and Birth Outcomes at Jimma University*. Journal of Pregnancy and Child Health, 2014. 01.
 45. Daniel Bekele, K.B., Leta Hinkosa et al. Partograph Utilization and Associated Factors among Graduating Health Professional Students in Asella Referral and Teaching Hospital, Ethiopia, 2016. Research & Reviews: A Journal of Computational Biology. 2017; 6(2): 12–18p.
 46. 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.
 47. 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).
 48. Haile, Y., et al., *Partograph Utilization and Associated Factors among Obstetric Care Providers at Public Health Facilities in Hadiya Zone, Southern Ethiopia*. 2020.
 49. 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).
 50. Guesh Welu Gebreslassie, D.A.W., Natneal Etsay Assefa, Berhanu Gebresilassie Gebrehiwot, Senait Gebreslasie Gebremeskel, Betell Berhane Tafere, Gdiom Gebreheat, Tesfay Tsegay Gebru, Dessalegn Kiros, Kidanemariam Berhe Tekola, Tsehaynesh Gidey Welesamuel *Utilization of the partograph and its associated factors among obstetric care providers in the Eastern zone of Tigray, Northern Ethiopia*. The Pan African Medical Journal., 2019.
 51. Liljestrand, J., *Strategies to reduce maternal mortality worldwide*. Current opinion in Obstetrics and Gynecology, 2000. 12(6): p. 513-517.
 52. 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, 2012: p. 125-132.
 53. Shinde, K.K., V.B. Bangal, and R.K. Singh, *Study of course of labour by modified WHO partograph*. IJBAR, 2012. 3(5): p. 291-6.
 54. Maphasha, O.M., et al., *Use of the partogram by doctors and midwives at Odi District Hospital, Gauteng, South Africa*. South African Family Practice, 2017. 59(2): p. 82-86.

55. Anokye, R., et al., *Use and completion of partograph during labour is associated with a reduced incidence of birth asphyxia: a retrospective study at a peri-urban setting in Ghana*. Journal of Health, Population and Nutrition, 2019. 38(1): p. 12.
56. Burama Badjie, C.-H.K., Meei-ling Gua, Kuan-Chia Lin, *Partograph use among midwives in the Gambia*. 2013.
57. Ogwang, S., Z. Karyabakabo, and E. Rutebemberwa, *Assessment of partogram use during labour in rujumbura health Sub district, Rukungiri district, Uganda*. African Health Sciences, 2009. 9(2).
58. Floyd, L., *Helping midwives in Ghana to reduce maternal mortality*. African Journal of Midwifery and Women's Health, 2013. 7(1): p. 34-38.
59. care, F., *Improving partograph use in Uganda through coaching and mentoring*. New York: Fistula Care/EngenderHealth. . 2013.
60. Bazirete, O., N. Mbombo, and O. Adejumo, *Utilisation of the partogram among nurses and midwives in selected health facilities in the Eastern Province of Rwanda*. Curationis, 2017. 40(1): p. e1-e9.
61. Sama, C.B., et al., *Knowledge and utilization of the partograph: A cross-sectional survey among obstetric care providers in urban referral public health institutions in northwest and southwest Cameroon*. PLoS One, 2017. 12(2): p. e0172860.
62. Opiah, M.M., et al., *Knowledge and utilization of the partograph among midwives in the Niger Delta Region of Nigeria*. Afr J Reprod Health, 2012. 16(1): p. 125-32.
63. Health, F.D.R.o.E.M.o., *Health Sector Transformation Plan, 2015*, Federal Democratic Republic of Ethiopia Ministry of Health Addis Ababa, Ethiopia.
64. 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.
65. 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.
66. Nwaneri, A., et al., *Evaluation of Factors Affecting the Utilization of Partograph by Nurses/Midwives in Primary/Secondary Health Facilities in Enugu Metropolis*. Gynecol Obstet (Sunnyvale), 2017. 7(8): p. 3.
67. Khan, A.N.S., et al., *A cross-sectional study of partograph utilization as a decision making tool for referral of abnormal labour in primary health care facilities of Bangladesh*. PloS one, 2018. 13(9): p. e0203617.
68. 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.
69. 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. .

70. 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.
71. SALAMA, N.S., I.M. ABD ALLAH, and M.F. HEEBA, *The partograph: knowledge, attitude, and utilization by professional birth attendances in Port-Said and Ismailia cities*. The Medical Journal of Cairo University, 2010. 78(2).
72. Tiruneh, G.T., et al., *The effect of implementation strength of basic emergency obstetric and newborn care (BEmONC) on facility deliveries and the met need for BEmONC at the primary health care level in Ethiopia*. BMC Pregnancy and Childbirth, 2018. 18(1): p. 123.

Figures

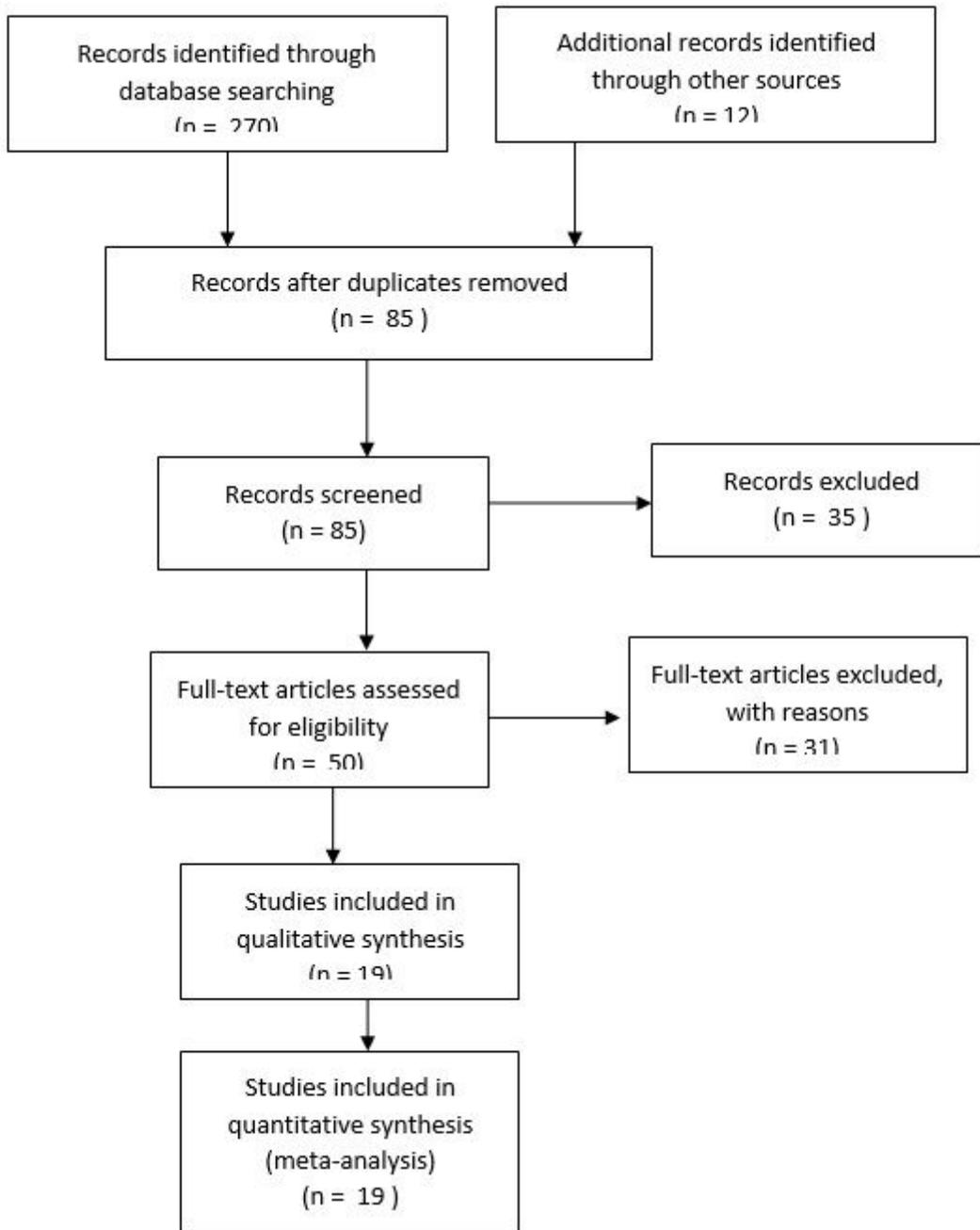


Figure 1

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.

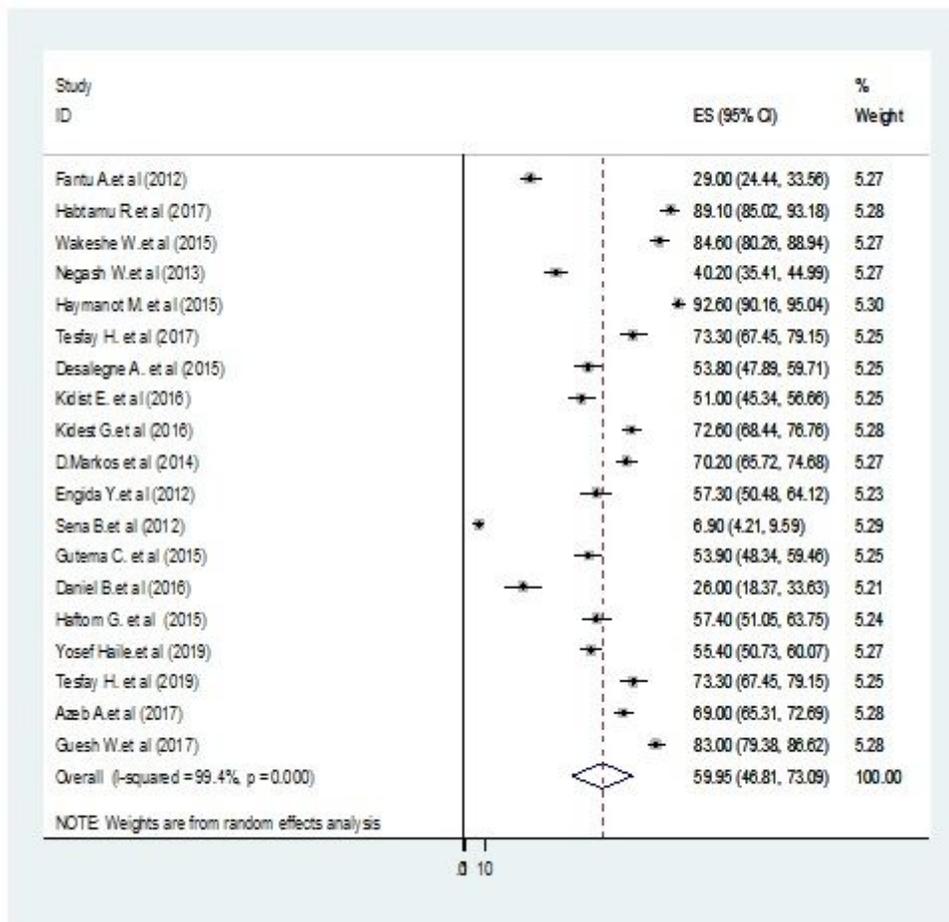


Figure 2

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

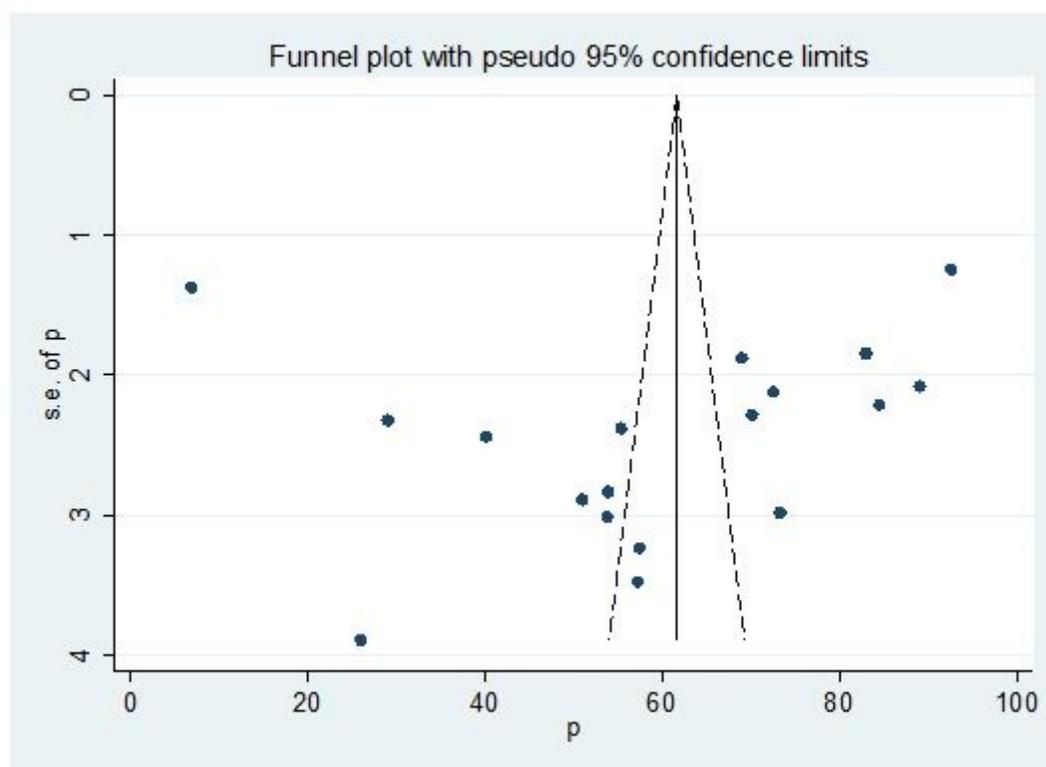


Figure 3

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

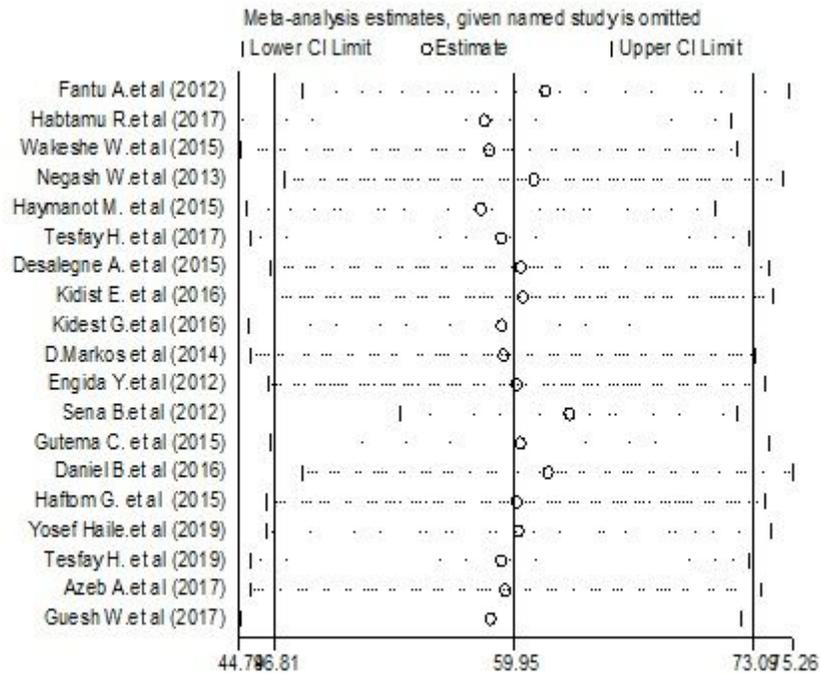


Figure 4

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

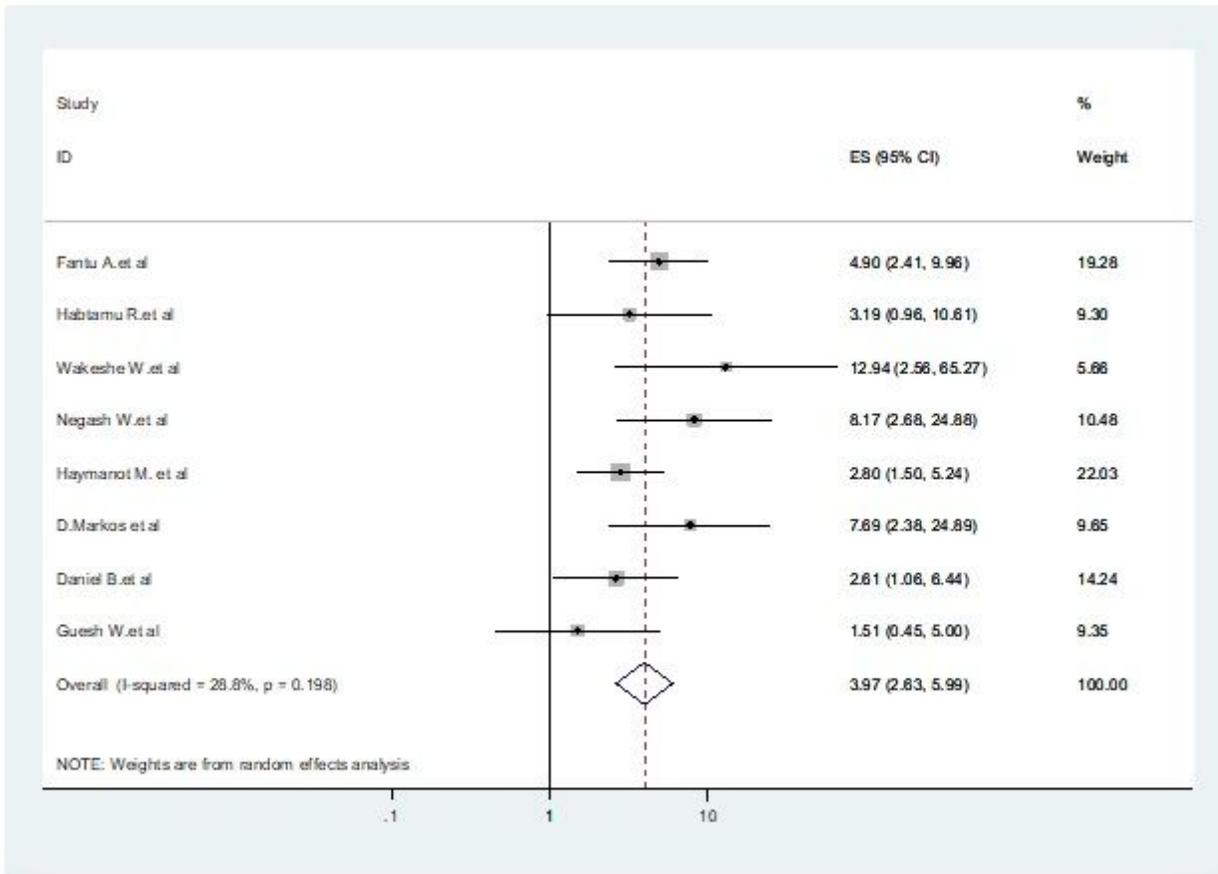


Figure 5

Association between midwifery profession and partograph utilization in Ethiopia, 2020

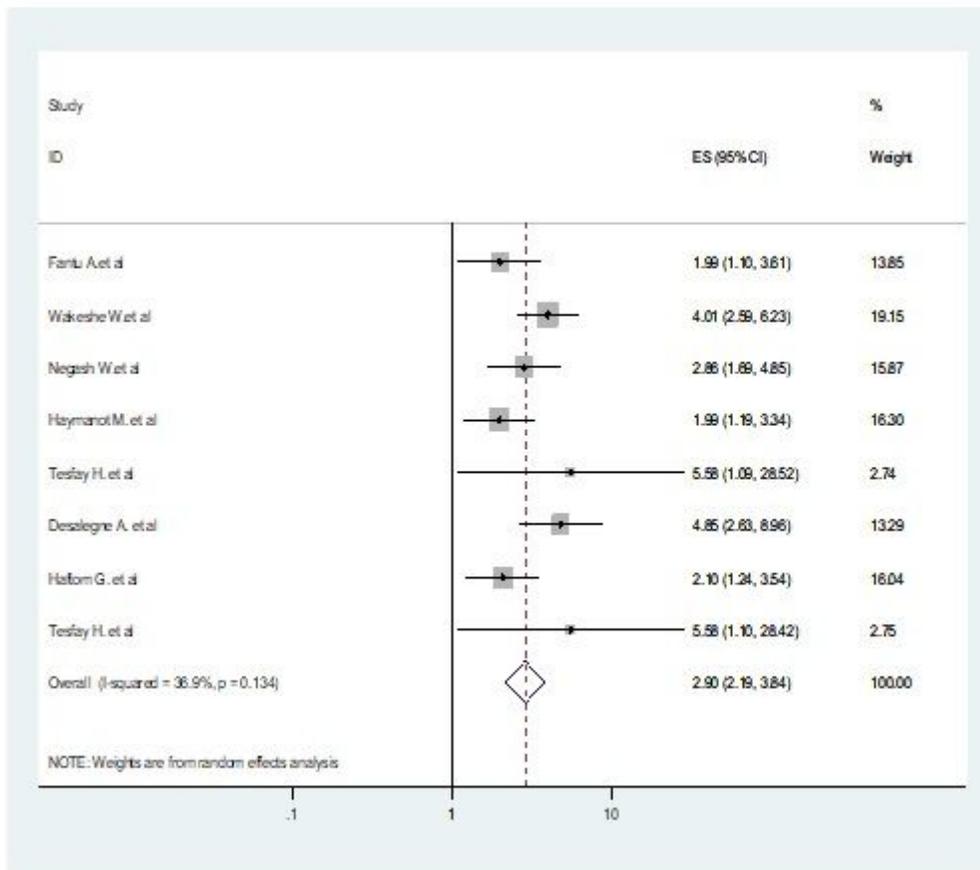


Figure 6

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

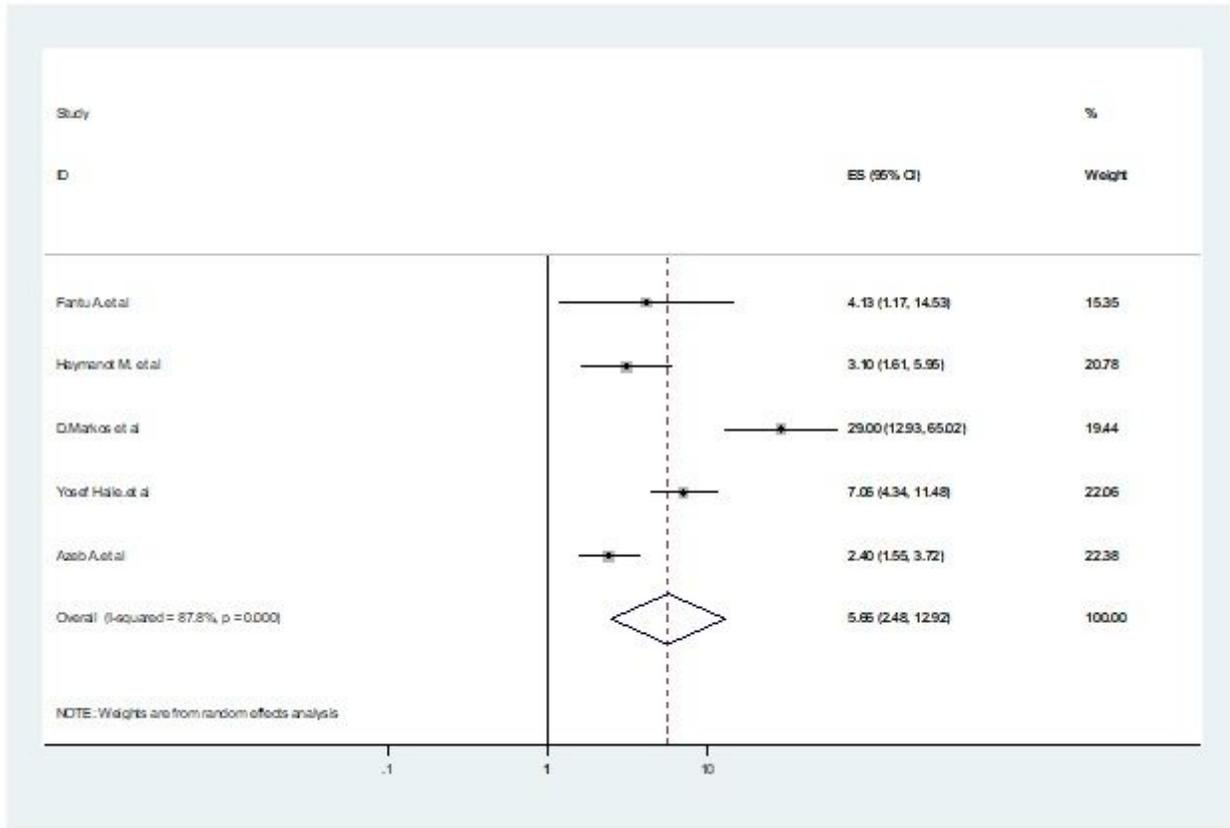


Figure 7

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

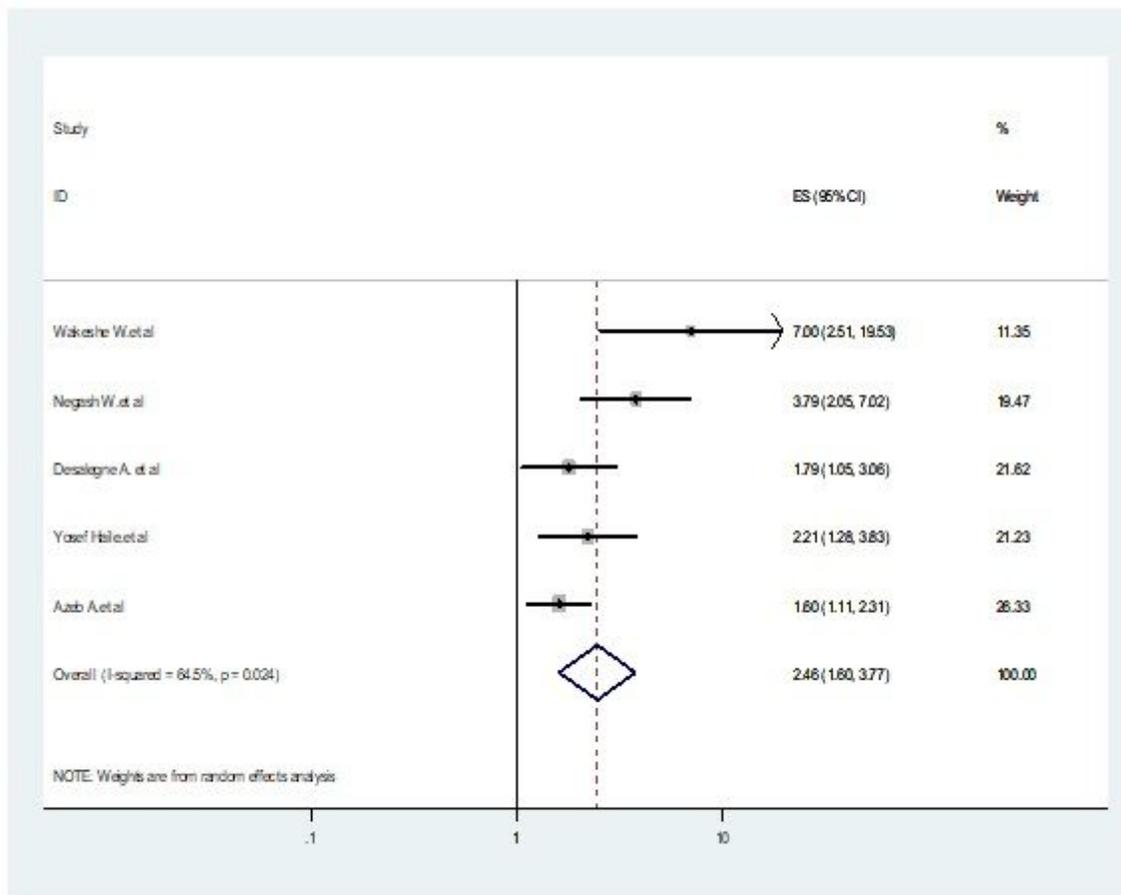


Figure 8

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

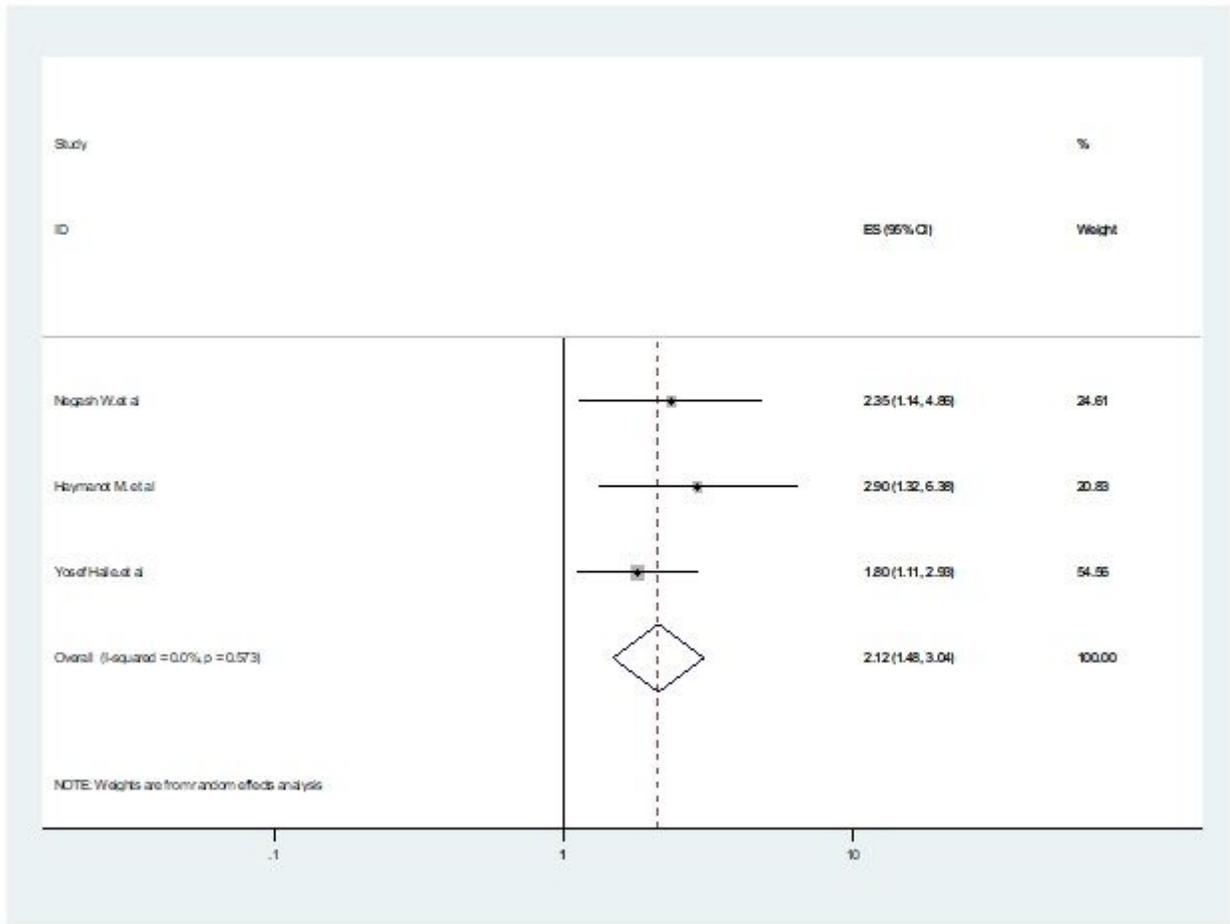


Figure 9

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

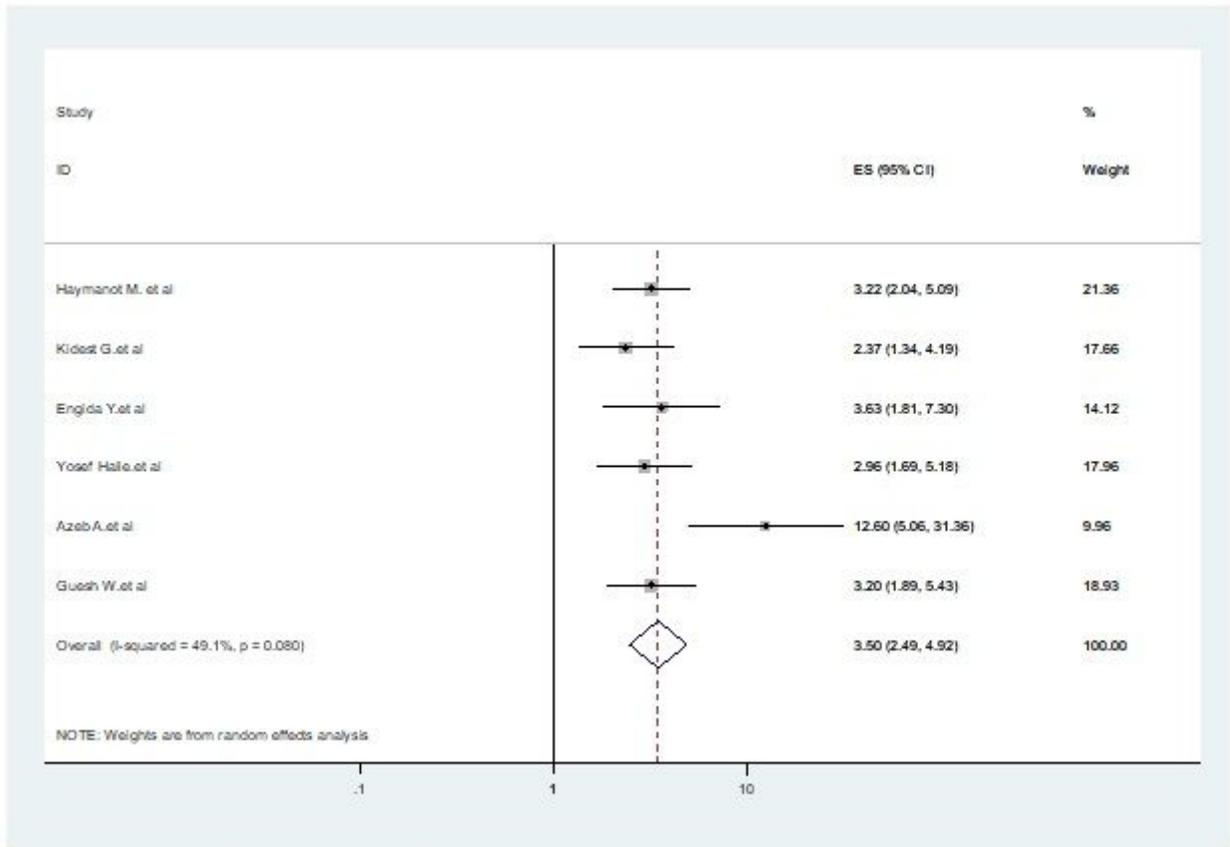


Figure 10

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

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [prismachecklistforpartographuse.pdf](#)
- [partooonOSscore.pdf](#)