

PARTOGRAPH UTILIZATION IS ASSOCIATED WITH EDUCATIONAL STATUS OF OBSTETRICS CARE GIVERS IN ILU ABA BOR ZONE, ETHIOPIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Worldwide, several thousands of mothers die every year due to pregnancy and birth related complications. Maternal deaths can be minimized by using partograph routinely. However, the level of utilization and associated factors among obstetrics care providers in Ilu Aba Bor Zone has not been studied.

OBJECTIVE: This study assessed the level of partograph utilization and its predictors among obstetric care givers working in public health institutions of Ilu Aba Bor Zone, South West Ethiopia.

METHODS: An institution-based cross-sectional study design was employed. A structured self-administered and pretested questionnaire adapted from available literature was used. In addition to descriptive statistics, logistic regression analysis was applied to assess association.

RESULTS: The level of partograph utilization among obstetrics care providers in the study area was 32.8%. Receiving on-the-job training on partograph (AOR (Adjusted Odds Ratio) = 2.21, 95%CI (Confidence Interval) = 1.19, 4.11), working in a hospital compared to working in a health center (AOR = 2.43, 95%CI = 1.01, 5.82), having BSc (Bachelor of Science) and above educational status in contrast to having Diploma (AOR = 3.12, 95%CI = 1.59, 6.12), and having partograph in a health facility (AOR= 4.19, 95%CI = 2.12, 8.29) were positively associated with partograph use.

CONCLUSIONS: Partograph utilization level was much lower than World Health Organization recommendation. On-job training on partograph, work place, educational status, and partograph availability were predictors of level of partograph utilization among the obstetric care givers.

KEY WORDS: Ethiopia, Ilu Aba Bor, maternal death, obstetrics care, partograph utilization

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INTRODUCTION

In 2015 globally, the annual number of maternal deaths was 303,000, while the approximate global lifetime risk of a maternal death was 1 in 180.¹ In the same year, approximately 99% (302,000) of the global maternal deaths occurred in developing countries, with sub-Saharan Africa alone accounting for roughly 66% (201,000) of maternal deaths. The 2016 Ethiopia Demographic and Health Survey estimated that maternal mortality ratio in Ethiopia is 412 deaths per 100,000 live births.²

Most maternal deaths are the direct result of complications arising during pregnancy, delivery, or the puerperium that includes hemorrhage, hypertensive disorders of pregnancy, sepsis, prolonged labor, and unsafe abortion.^{3,4} If a woman with prolonged or obstructed labor does not get timely and effective management, she may die of uterine rupture or infection.

Partograph is one of the simplest tools employed to prevent maternal death by helping obstetrics health care providers identify slow progress in labor early, and initiate appropriate interventions to prevent prolonged and obstructed labor.^{5,6} It can be highly effective in reducing complications from prolonged labor for the mother and for the new-born.⁷⁻⁹

Despite the invaluable and affordable significance of partograph in reducing maternal death, its utilization remains low in low - and middle - income countries.¹⁰ A study conducted in Kenya revealed that less than half (45.5%) of nurses duly completed partograph training, while elsewhere in South Africa, four fifths (79.4%) routinely used partograph.^{11,12} Similarly, studies in other parts of Africa showed that the use of partograph by health care providers is below World Health Organization (WHO) recommendation for its routine usage.¹³⁻¹⁵ Even though Ethiopia has set the Sustainable Development Goal target of reducing maternal mortality to 199/100,000 in 2030,¹⁶ the use of partograph to prevent maternal death is still low in various parts of the country.¹⁷⁻¹⁹

Different factors could hinder routine and proper utilization of partograph. For instance, a systematic review conducted in 2014 revealed that professional skills, clinical leadership and quality assurance, and the organizational environment within the wider provision of obstetric care were barriers to partograph use.¹⁰ According to a cross sectional study in Nigeria, factors affecting utilization of partograph were little or no knowledge of the partograph, non-availability, shortage of staff, and the fact that it is time-consuming to use.²⁰ Getting on-the-job training, being knowledgeable on partograph, and having favorable attitude towards partograph were positively associated with partograph utilization in a study conducted in Central Ethiopia.²¹

Little has been known about partograph utilization and its determinants among obstetrics care providers working in public health institutions found in Ilu Aba Bor Zone, South West Ethiopia. Local health authorities pointed to maternal deaths as one of health problems of the study area. Hence, this study aimed at assessing the level of partograph utilization and associated factors among obstetric care givers in the study area. Eventually, this study will be substantial to reduce maternal mortality by encouraging partograph utilization among obstetrics care givers through tackling factors that hinder partograph utilization. This study will also provide base line information for managers and researchers.

METHOD

Study Area

The study was conducted in selected public health institutions in Ilu Aba Bor Zone, South West Ethiopia, with Mettu as its capital, situated 600 kilometers southwest of Addis Ababa. Ilu Aba Bor Zone spans an altitude of 1,500-2,000 meters above sea level, hosting 2 hospitals, 41 health centers, and 273 health posts, employing 840 health professionals, including 590 obstetrics care providers.

Study Design and Period

An institution-based cross-sectional study was conducted from July 1 to August 30, 2020.

Population

The source population was comprised of all obstetrics care givers in public health institutions of Ilu Aba Bor Zone. The study population included selected obstetrics care givers in randomly chosen public health institutions.

Eligibility Criteria

Included were 587 obstetrics care givers working in labor and delivery during regular duty hours. Excluded were 3 care givers on long-term leave or sick.

Sample Size Determination

Sample size was determined using a single proportion formula, based on a 40.2% partograph utilization rate in Central Ethiopia²¹, a 95% confidence interval, and a 0.05 margin of error. The initial sample size of 369 was adjusted to 227 due to the small source population, and, after factoring in a 10% non-response rate, the final sample size became 250.

Sampling Technique

Twenty-seven health facilities (26 health centers and 1 hospital) were randomly selected from the 2 hospitals and 41 health centers in Ilu Aba Bor Zone. Sample size was allocated proportionally, and obstetric caregivers were randomly selected using a lottery method.

Operational Definitions

Educational Status: Diploma refers to a College Diploma, while BSc and above include Bachelor's, Master's, or Doctor of Philosophy degrees.

Public Health Institution: Government-operated health centers and hospitals.

Obstetric Caregivers: Health professionals overseeing labor follow-up and delivery services.²²

Partograph Utilization: Routine use of partograph for all laboring mothers.²²

Data Collection Procedure and Instruments

A self-administered questionnaire, validated with a Cronbach's alpha of 0.89, was adapted from existing

literature.²³⁻²⁵ It covered socio-demographic/professional characteristics and partograph utilization. Data collection involved three Health Officers supervised by two Master of Public Health professionals.

Data Quality Assurance

The questionnaire was translated into Afaan Oromo, pretested at Bilo Karo health center, and refined. Data collectors and supervisors underwent two days of training. Questionnaire completeness/clarity were ensured, and principal investigators visually checked for incompleteness.

Data Processing and Analysis

Data were coded, entered into EpiData 3.1, and analyzed using SPSS version 24. Descriptive and analytical statistics were employed. Bivariate logistic regression identified associations, with variables ($p < 0.2$) considered for multivariate analysis. The Hosmer-Lemeshow goodness of fit test assessed model fitness. Odds Ratios with a 95% Confidence Interval measured associations, with significance set at $p = 0.05$.

Ethical Considerations

Mettu University's Ethical Review Committee approved the study. Permission was obtained from Ilu Aba Bor Zone Health Department. Participants were informed of the study's purpose, procedures, risks, and benefits, with written consent obtained. Confidentiality was maintained by excluding personal identifiers, adhering to ethical standards per the 1964 Helsinki Declaration.

RESULTS

Socio-demographic and professional characteristics

Two hundred forty-one obstetrics care givers participated in the study, yielding a response rate of 96.4%. The mean age of the participants was 28.86 years (standard deviation= ± 3.48 years). Most (56.8%) of obstetric care givers were female. Almost

half (50.6%) of the obstetrics care givers had more than five years of service. According to respondents, almost all (94.6%) of them had attended less than 10 deliveries per day, and the majority (92.5%) of them said that there were less than four birth attendants per a working day (Table1).

Table 1: Socio-demographic and professional characteristics among obstetric care givers in Ilu Aba Bor Zone, southwest Ethiopia, 2020 (n = 241).

Variables	Category	Frequency	
		Number	Percent
Sex of respondent	Male	104	43.2
	Female	137	56.8
Educational status	Diploma	96	39.8
	BSc (Bachelor of Science) and above	145	60.2
Work place	Health center	207	85.9
	Hospital	34	14.1
Profession	Midwifery	89	36.9
	Other	152	63.1
Service year	<2	40	16.6
	2-5	79	32.8
	>5	122	50.6
Regularly working department	Delivery	35	14.5
	Other	206	85.5
Learned about partograph academically	No	32	13.3
	Yes	209	86.7
On-the-job training on partograph received	No	130	53.9
	Yes	111	46.1
Number of deliveries per day	<10	228	94.6
	≥ 10	13	5.4
Number of birth attendants per working day	<4	223	92.5
	≥ 4	18	7.5
Partograph available	No	106	44.0
	Yes	135	56.0

Utilization of partograph

Although 181 (75.1%) of all obstetric care givers used partograph in labor management, only 79 (32.8%) of all obstetric care givers used partograph routinely. Regarding recording labor activities information on partograph, 65.1%, obstetric care

givers had recorded the information on partograph about cervical dilatation every 4 hours, 57.3% recorded fetal heart beat every 30 minutes, and 42.7% recorded maternal pulse rate every 30 minutes (Table 2)..

Table 2: Utilization of partograph among obstetric care givers in Ilu Aba Bor Zone, southwest Ethiopia, 2020 (n = 241).

Variables	Category	Frequency	
		Number	Percent
Use partograph in labor management	No	60	24.9
	Yes	181	75.1
Partograph use frequency	Routinely	79	32.8
	Sometimes	102	42.3
Uterine contraction plotted half hourly	No	68	28.2
	Yes	113	46.9
Initial cervical dilatation plotted	No	22	9.1
	Yes	159	66.0
Membrane intactness recorded	No	68	28.2
	Yes	113	46.9
Cervical dilatation plotted every 4hr	No	24	10.0
	Yes	157	65.1
Descent plotted every 4hr	No	68	28.2
	Yes	113	46.9
Fetal heart beat recorded every 30 min	No	43	17.8
	Yes	138	57.3
Color of liquor recorded	No	68	28.2
	Yes	113	46.9
Maternal blood pressure monitored every 4 hours	No	69	28.6
	Yes	112	46.5
Maternal pulse rate monitored every 30 minutes	No	78	32.4
	Yes	103	42.7
Action taken based on partograph	No	6	2.5
	Yes	175	72.6

Of the 60 obstetric care givers that do not use partograph, the top three reasons for not utilizing partograph were lack of partograph (56.7%),

poor managerial support (45.0%), and absence of training of health professionals (33.3%) (Figure 1).

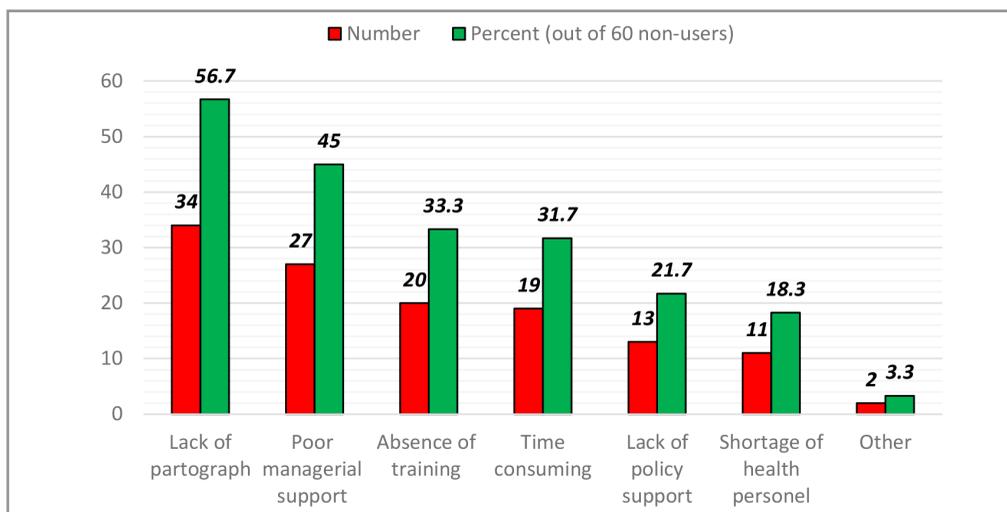


Fig 1: Reasons for not using partograph among obstetric care givers in Ilu Aba Bor Zone, southwest Ethiopia, 2020 (n = 60).

Factors associated with partograph utilization among obstetric caregivers

Using bivariate logistic regression analysis, the following ten variables were associated with partograph utilization: service year, on-job training on partograph, work place, educational status, regularly working department, profession, partograph availability, learning about partograph academically, number of deliveries per a day,

and number of birth attendants per a day. However, only four variables (on-job training on partograph, work place, educational status, and partograph availability) were significantly associated with partograph utilization during multivariable analysis at p-value less than 0.05 with Hosmer and Lemeshow goodness of fit $p=0.867$ (Table 3).

Table 3: Multivariable analyses for factors associated with partograph utilization among obstetric care givers in Ilu Aba Bor Zone, southwest Ethiopia, 2020 (n = 241).

Variables	Category	Utilization of partograph		Adjusted odds ratio (95% CI)	P-value
		No	Yes		
On-job training on partograph received	No	100 (76.9%)	30 (23.1%)	1	0.012
	Yes	62 (55.9%)	49 (44.1%)	2.21(1.19-4.11)	
Work place	Health center	151(72.9%)	56 (27.1%)	1	0.047
	Hospital	11 (32.4%)	23 (67.6%)	2.43 (1.01-5.82)	
Educational status	Diploma	79 (82.3%)	17 (17.7%)	1	0.001
	BSc and above	83 (57.2%)	62 (42.8%)	3.12(1.59-6.12)	
Partograph available	No	90 (84.9%)	16 (15.1%)	1	<0.001
	Yes	72 (53.3%)	63 (46.7%)	4.19(2.12-8.29)	

This study found that those obstetric caregivers who received on-job training on partograph were almost two times more likely to use partograph compared to those who did not receive on-job training (Adjusted odds Ratio (AOR) = 2.21, 95% Confidence Interval (CI)= 1.19, 4.11). Obstetric care givers who were working in a hospital were more likely to use partograph than those who were working in a health center (AOR = 2.43, 95%CI = 1.01,

5.82), while having BSc and above educational status had tripled likelihood of using partograph in contrast to having Diploma educational status (AOR = 3.12, 95%CI = 1.59, 6.12). The study revealed that those participants who had partograph in their health facility were almost four times more likely to utilize partograph compared to those who had no partograph (AOR = 4.19, 95%CI = 2.12, 8.29).

DISCUSSION

This study involved obstetrics care givers working in selected public health institution of Ilu Aba Bor Zone to determine level of partograph utilization and associated factors. Eventually, it was found that only one third (32.8%) of participants were using partograph routinely as WHO recommendation, and on-job training on partograph, work place, educational status, and partograph availability were factors associated with partograph utilization. Although the effort is not enough, the government of Ethiopia is committed to reduce maternal mortality significantly by developing National Reproductive Health Strategy for the years 2016-2020, which identifies the routine use of partograph as one of the priorities.²⁶ Local health authorities have offered training on partograph use for some obstetric caregivers.

The level of partograph utilization routinely in this study is lower than those studies conducted in Tigray Region, Northern Ethiopia (73.3%),²³ and in the Eastern Province of Rwanda (41.22%).²⁷ The reason for higher partograph utilization in Tigray Region might be because of more participants with in service training about partograph. Similarly, more obstetrics caregivers in the study done in Eastern Province of Rwanda received training on partograph than this study, which obviously increase knowledge about partograph that in turn boost the tendency to use the chart. Moreover, difference in study area and population might be the reason for the discrepancy.

Lack of partograph, poor managerial support, absence of training of health professionals, being time consuming, lack of policy support, and shortage of health personnel were reasons for not utilizing partograph among obstetrics caregivers that were not utilizing the partograph. These reasons were in agreement with other studies conducted in Ethiopia and South Africa.^{12,24,28} This study revealed that those obstetric caregivers who received on-job training on partograph were almost two times more likely to use partograph compared to those

who did not receive on-job training. This finding was in line with other studies conducted in the Ethiopia, Kenya and Rwanda.^{11,21,27} The association between on-job training on partograph and use of partograph might be because training increase knowledge and attitude of participants about partograph that could in turn increase partograph use. On-job training enhances the competency and knowledge of obstetric caregivers in using partograph. This training likely covers the interpretation of various parameters on the partograph, enabling caregivers to make informed decisions during labor and delivery.

Obstetric care givers who were working in a hospital were more likely to use partograph than those who were working in a health center. This association was also observed in the study done in Hadiya Zone, Southern Ethiopia.¹⁹ This could be because of the higher chance of access to information, infrastructures and training among obstetrics caregivers that work in hospitals, that are usually located in urban area, compared to participants who were working in a health center. Obstetric caregivers in hospitals may find it easier to access the necessary resources for employing partograph effectively. Moreover, the presence of skilled support staff in hospitals can positively influence the utilization of partograph.

Those obstetrics caregivers with BSc and above educational status were three times more likely to use partograph in contrast to those with Diploma educational status. This finding is in agreement with studies carried out in East Gojam Zone, Northern Ethiopia.²⁴ This association might be due to the fact that participants with BSc and above educational status have more comprehensive and elaborate knowledge about partograph compared to those with Diploma, and that will increase their possibility of using partograph. Individuals with tertiary education typically undergo comprehensive education, and are generally more aware of and inclined to adhere to established protocols and guidelines.

Furthermore, this study revealed that those participants who had partograph in their health facility were almost four times more likely to utilize partograph compared to those who had no partograph. The finding is in line with studies conducted in Ethiopia as well as in Nigeria.^{20,29} This might be because a higher availability of partograph in the health facilities of obstetrics caregivers increases exposure and willingness of partograph use. When partograph is readily available in health facilities, obstetric caregivers can easily access them when needed. Due to the employment of cross-sectional study design, this study has weakness of not showing the temporal cause effect relationship between the partograph use and associated factors. Since self-administered questionnaires were used, there could be possibility of social desirability bias. Moreover, it would have been better to include obstetrics caregivers of private institutions in the study.

CONCLUSION AND RECOMMENDATIONS

This study found out that partograph utilization among obstetric care givers working in public health institutions found in Ilu Aba Bor Zone was very low. On-job training on partograph, work place, educational status, and partograph availability were factors associated with partograph utilization among the obstetric care givers. Therefore, the authors recommend concerned bodies to strive in order to achieve WHO recommendation of routine partograph use among obstetric care givers. Accordingly, efforts should be exerted to make partograph and infrastructures available in health facilities. Moreover, providing on-job training and academic development opportunity to obstetric care givers is anticipated to increase partograph utilization.

Abbreviations

AOR: Adjusted odds ratio; **BSc:** Bachelor of Science;
CI: Confidence Interval; **WHO;** World Health Organization

DECLARATIONS

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Authors' contributions

G.A.T., F.T.C. and E.N.G. conceived the study, developed the tool, coordinated data collection, carried out the statistical analysis, and drafted the manuscript. All authors were involved in designing the study, data analysis and interpretation. All authors read and approved the final manuscript.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this article.

Competing interests

The authors declare that they have no competing interests.

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