



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research  
Vol. 11, Issue, 09, pp.6789-6794, September, 2019

DOI: <https://doi.org/10.24941/ijcr.36100.09.2019>

INTERNATIONAL JOURNAL  
OF CURRENT RESEARCH

## RESEARCH ARTICLE

# UTILIZATION OF PARTHOGRPH AND ASSOCIATED FACTORS AMONG OBSTETRIC CARE PROVIDERS IN PUBLIC HEALTH INSTITUTIONS, BUNO-BEDELE ZONE SOUTHWESTERN ETHIOPIA

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### ARTICLE INFO

#### Article History:

Received 20<sup>th</sup> June, 2019

Received in revised form

25<sup>th</sup> July, 2019

Accepted 29<sup>th</sup> August, 2019

Published online 30<sup>st</sup> September, 2019

#### Key Words:

Partograph, Knowledge,  
Use, Obstetric care givers,  
Public health institution.

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Citation: Abdanur Mohammed, Girma Tasew and Mohammed Seid, 2019. "Utilization of partograph and associated factors among obstetric care providers in public health institutions, buno-bedele zone southwestern Ethiopia", *International Journal of Current Research*, 11, (09), 6789-6794.

### ABSTRACT

Proper utilization of partograph contributes to reduction of maternal deaths during labor. This cross-sectional study was designed to assess the magnitude of utilization of partograph and factors associated with its utilization among obstetric caregivers in public health institutions of Buno-Bedele Zone, South Western Ethiopia from February- March 2017. The data in this study was collected using Key informant face to face interview and structured questionnaires among the samples of 362 obstetric care givers. Logistic regressions analysis was carried out to assess associations of independent variables with the outcome variable. Reported magnitude of partograph utilization reveals 32.2%, participant Working department, level of education, in-service training and knowledge on partograph utilization (AOR=0.102, 95% CI 0.037,0.279), (AOR= 0.272, 95% CI 0.137,0.540), (AOR=1.943, 95% CI 0.858,4.401), (AOR=. 150 95% CI. 065, 0.345) were significantly associated with partograph utilization respectively. Reported partograph utilization in the area was low, despite the recognition of high maternal mortality as a major public health issue in the study area. Pre-service and on job training on partograph use, continuous monitoring, supervision and staff motivation could improve the utilization of the tool.

## INTRODUCTION

**Background:** Globally, and Sub-Saharan Africa there were 210 maternal deaths per 100,000 live births in 2013 respectively and Maternal mortality ratio continues to be the major index of the widening discrepancy in the level of care and the outcome of reproductive health between the advanced and developing countries (Fawole *et al.*, 2012; WHO, 2014). Averting maternal and neonatal mortality has been complicated due to the multifactorial nature of these deaths in resource-limited settings with struggling health systems. The successes of interventions have been affected by the limited availability of services, poor access to care, and lack of knowledge by community members and health care providers. These issues are most pronounced in Sub Saharan Africa where the lifetime risk of dying from childbirth is 1 in 20 compared to 1 in 2400 in developed countries like the United States (Kayongo *et al.*, 2012). Obstructed labour is one major cause of maternal mortality and usually results from neglected prolonged labour. Prolonged labour may also lead to atonic postpartum haemorrhage, maternal exhaustion and dehydration, uterine rupture and obstetric fistulas (WHO, 2014). Prolonged labor that can be detected early and managed using partograph, is a leading cause of death among mothers

and newborns in the developing world (UNFPA,2011). The 2013-world health organization (WHO) report showed that over 289,000 mothers died globally, of which developing countries accounted for 99% and sub-Saharan Africa region alone accounted for about 62% (WHO, 2004). The majority, 70% of death cases, occurred due to obstructed labor and ruptured uterus (WHO 2014). Prolonged and obstructed labor is one of the five major causes of maternal death which was responsible for 8% of all maternal deaths (WHO, 2014). An estimated 6.5 million women in the world have obstructed labor each year (2–15 cases/1000 births). It is the most common cause of complications like death and fistula. Approximately, 2–5% of women who experience a prolonged or obstructed labor can develop fistula (USAID Fistula Center 2014). WHO report showed that the global maternal deaths resulted from complications of pregnancy and childbirth, especially, in developing countries. From survive childbirth, at least 8 million develop serious morbidities and a further 50 million suffer minor complications (WHO, 2013). Out of the causes of deaths and complications, obstetric hemorrhage and obstructed labor are common causes and easily preventable by using partograph (Khan *et al.*, 2011). Senegal and Mali indicate that the most common reported causes of maternal death were postpartum hemorrhage. Furthermore, obstructed labor was the cause for maternal death (Briand *et al.*, 2012).

Partograph is a universal tool for monitoring progress of labor. It is a pre-printed paper form on which labor progress observations are recorded (Lavender, 2008). It was initially introduced by Philpot; and endorsed by WHO as simple and accurate instrument for early recognition of complications of labor. It gained popularity since 1970's and today most labor and delivery wards use it. As many partographs have been developed that of WHO is arguably the most popular and serves as a standard both in developed and developing countries. The aim of the partograph is to provide a pictorial overview of labor to alert care providers to deviations in labor progresses, maternal and fetal wellbeing (WHO, 1994). If used effectively it helps to ensure careful monitoring of the woman in labor, avoids unnecessary interventions, recognizes and responds to complications in a timely manner all of which can help to prevent maternal and neonatal morbidity and mortality. It also serves as an "early warning system" and a simple method valuable in preventing prolonged and obstructed labor, those are sources of many maternal deaths and disabilities such as infection, obstetric fistula and nerve injuries, as well as stillbirths, neonatal deaths due to asphyxia and long-term disabilities (Javed *et al.*, 2007). The maternal mortality in Ethiopia is high despite the recognition of maternal mortality as a major public health issue (WHO/ UNICEF/ UNFPA, 1990). In Ethiopia, maternal mortality ratio is estimated at 676/100,000 live births (EDHS, 2011), and 412 deaths per 100,000 live births in the 2016 (EDHS, 2016). Similarly, the present study area was also expected to high maternal mortality despite the deficiency in recorded data. Therefore the present study was intended to assess the magnitude of utilization of partograph and factors associated with its utilization among obstetric caregivers in the study area.

## MATERIALS AND METHODS

**Study area and period:** The study was conducted in all public health facilities (Health centers and Hospital) in Buno-Bedele Zone Oromia regional state Western Ethiopia from February 20-March 20/2017. Buno-Bedele is one of twenty zones in Oromiya Region found 480 KM away from Addis Ababa with total population of 1.59 million. Out of them, females constitute 49.5% and 82% of the population were living in rural area (Zonal health office statistic 2015). Bedele Zone constitutes 10 district, one City administration and 322 kebeles. With regard to health facility, there were one zonal Hospital, 30 Health Centers (primary health care units), & 322 Health posts. According to 2016 Oromiya Regional Health Bureau report, the number of obstetric health care providers working in public health facilities in the area were 362.

**Study Design:** Institution based Cross-sectional study design using quantitative method was conducted

**Source of population:** The source population was comprised of all obstetric health care providers working in public health institutions (Health centers and Hospital) who were working in maternity unit in Buno-Bedele Zone. These include midwives, nurses, doctors or specialists and public health officers.

**Sampling technique and sample Size Determination:** The sample size required for the study was estimated by calculating sample size for first objective using single population proportion formula  $n_0 = (Z_{1-\alpha/2}^2 \cdot P(1-P)) / d^2$ . where n is the sample size, z is the standard normal deviate set at 1.96 (for

95% confidence level), and p is the estimate of the proportion of target population who use partograph (assumed to be 29% as obtained from study done in Amhara region western Ethiopia on Knowledge and utilization of the partograph among health professional). Sample size for associated factors was calculated using online ep-info calculation the largest and the final sample size was 316 that was calculated for 1st objective. Adjustment for a 10% rate of non-responses was yielded a final sample size of 348.

**Sample Size Calculation for the 1st objective (magnitude of utilization of partograph):** In Amhara region by Fantu. et al, 2013 Partograph utilization P=29%

$$n = (Z_{\alpha/2})^2 \cdot p(1-p) = (1.96)^2 \cdot X(0.29 \times 0.71) = 0.716 = 316$$

(0.05)<sup>2</sup> 0.0025

**Sample Size calculation for the second Objective (factor associated with partograph utilization):** Double population proportion formula was used to determine the sample size for the factors associated with partograph utilization. Sample size was calculated for some of the factors associated with partograph utilization obtained from different literatures by using the online Stat calculation of Epi Info statistical software version 7 with the following assumptions:

- Confidence level = 95%
- Power = 80%
- The ratio of unexposed to exposed almost equivalent to 1

Generally, sample size had been calculated for the first, and the second objectives and the largest sample size was found to be 316 from the 1st objective. Non-response rate 10% = 32+ 316 total sample size was 348, but since the total available obstetric care providers 362 in the area is manageable the investigator took all.

### Data Collection methods

**Data collection instruments:** A pre-tested and structured questionnaire was used for data collection. The prepared questionnaire was translated into local language Afaan Oromo then it was again returned back to English version by other person for consistency checking. The instrument was pretested on 5% similar study participants who were working in other health facilities (Toba Health center). Findings from the pretest were used to modify the instrument. The questionnaire was designed to obtain information on the socio demographic, professional characteristics of obstetric care providers, about partograph utilization. To measure the magnitude of partograph utilization requesting the participants whether they have been using partograph for the last delivery they conducted or not.

**Data Processing and Analysis:** The data were analyzed using SPSS statistical software version 20. Descriptive statistical analysis and Bi-variate analysis were used to see the association between each independent variable and the outcome variable by using binary logistic regression. All variables with p-value  $\leq 0.25$  were taken into the multivariable model to control for all possible confounders. The odds ratio was used as the primary measure of strength and direction of the relationship between the independent variables. Odds ratio along with 95% CI was estimated to identify factors associated with partograph utilization using multivariate analysis in the

logistic regression. Level of statistical significance was declared at  $p\text{-value} \leq 0.05$ .

## RESULTS

**Socio-demographic Characteristics of study participants:** Out of totally available 362 Obstetric Health Care Providers, 348 of the participants accepted the invitation to participate in the study, making a response rate of 96%. Thirty five (10%) of the participants were enrolled from hospital, and 313 (90%) were from health centers. The majority, 215 (62%) of the participants were males. The mean and standard deviation of the participants' age were 27 and  $\pm 8$  years respectively. Nearly three-fourth, 253 (72.7%) of the study participants were nurses in their profession, the midwives and the public health officers follow by 48(14%) and 42(12.1%) respectively. Majority of the study participants were from OPD department, 129(37.1%), followed by the maternal and child health care department (FP and ANC) 123(35.3%). Two third, 228(66%) of the study participants were diploma in their level of education and the rest 120(34%) were degree and above (Table 1).

**Table 1. Socio-Demographic Characteristics of the Study Participants in Buno- Bedele zone Western Ethiopia, March 2017, (n=348)**

	Categories	Frequency	Percent
Sex	Male	215	61.8
	Female	133	38.2
	Single	201	57.8
Marital status	Currently married	142	40.8
	Divorced	5	1.4
	Orthodox	143	41.1
Religion	Protestant	62	17.8
	Muslim	118	33.9
	Catholic	25	7.2
Ethnicity	Oromo	319	91.7
	Amhara	19	5.5
	Tigray	10	2.9
Age in year	20-24year	115	33
	25-29year	112	32.2
	30years and above	121	34.8
Working place	Hospital	35	10.1
	Health center	313	89.9
	Delivery room	77	22.1
Working department	FPand ANC	123	35.3
	OPD	129	37.1
	Other	19	5.5
Qualification	Nurse	253	72.7
	Midwifery	48	13.8
	Public health officer	42	12.1
Level of education	GPor MD	4	1.1
	Specialis	1	0.3
	Diploma	228	65.5
Service year	Degreeand above	120	34.5
	0-2year	145	41.7
	3-5year	105	30.2
Training	6year and above	98	28.2
	Inservice	86	24.7
	Pre service	65	18.7
	Not trained	197	56.6

**Utilization of Parthograph:** Out of 348 obstetric care providers interviewed, only 113 (32.2%) utilized parthograph to monitor women in labour in public health institutions found in Bubo-Bedele zone, Oromiya Regional state Western Ethiopia. Of the total participants, 49(36.8%) of the female and 64(29.8%) of the males were reported to use parthograph routinely. Majority of the participants, 20(57%) enrolled from hospital had reported utilizing parthograph to monitor laboring mother and only 93(29.7%) of the participants enrolled from

health center utilize the parthograph. The majority 35(73%) of Midwives and more than half 24(57.1%) of Public Health officers were utilize Parthograph to monitor women in labour. More than half, 58(56%) of the participants with Degree and above level of education and 177(62%) of the participants with Diploma level of education were not utilize parthograph. (Table 2).

**Table 2. The utilization of parthograph among obstetric care givers Buno- Bedele zone (n=348) Western Ethiopia, March 2017**

Variable	Category	Utilization of parthograph			
		Utilize		Not utilize	
		No	%	No	%
Age	Female	49	36.8	84	63.2
	20-24year	45	39.1	70	60.9
	25-29year	34	30.4	78	69.6
	30year and above	34	28.1	87	71.9
Work place	Health center	93	29.7	220	70.3
	Hospital	20	57	15	43
Department	Delivery room	43	69.4	19	30.6
	FPand ANC	14	20	56	80
	OPD	52	31	113	68.5
Level of education	Other	4	7.8	47	92
	Diploma	66	38	177	62
	Degree and above	47	44	58	56
Profession	HO	24	57.1	18	42.9
	Nurse	49	19.4	204	80.06
	Midwifery	35	73	13	27
Service year	0-2year	28	34.6	53	65.4
	3-5year	30	24.4	93	75.6
	6year and above	55	38.2	89	61.8
Training on parthograph	In service	37	64.9	20	35.1
	Pre -service	56	61.5	35	38.5
	Not trained	20	10	180	90
Overall level of knowledge	Good knowledge	52	34	101	66
	Poor knowledge	25	13	170	87

### Factors Associated with parthograph utilization

**Factors associated with pantograph utilization during Bi-variable Logistic Regression Analysis:** In bivariate analysis the factors found to be significantly associated with parthograph utilization were; health facility they were working, qualification, level of education, working department, service year, knowledge of parthograph and parthograph training, but age and sex of the participants were not significantly associated (Table4).

**Results of Multivariable Logistic regression analysis:** P value  $\leq 0.25$  was used to screen variables need to be entered into multivariable logistic regression model. From the variables entered to the model, participant level of education, working department, knowledge of parthograph and training were shown significant association with parthograph utilization. However, service year, work place, profession of the participants were not significantly associated with parthograph utilization. Obstetric care providers who were at diploma level were 73%less likely to utilize parthograph compared to those who were at degree level and above (AOR = 0.272, 95% CI 0.137, 0.540).The participants working at departments of FP and ANC, and OPD were also less likely associated with utilize parthograph than those working at Delivery room (AOR = 0.102, 95% CI 0.037, 0.279) and (AOR=0.172, 95% CI 0.075, 0.395) respectively. In this study, participants who got In-service training on parthograph had nearly 2 times more likely to utilize parthograph than participants who got pre-service training(AOR=1.943,95%CI 0.858,4.401),and participants who were not trained on parthograph were 86% less likely to utilize parthograph

Table 4. Factors associated with parthograph utilization during bi variable logistic regression analysis among obstetric care providers in Buno- Bedele zone (n=348) Western Ethiopia, March 2017

Variable	Category	Utilization of parthograph				COR with 95%CI	P value
		Utilize		Not utilize			
		No	%	No	%		
Sex	Male	44	38.9	171	73	0.727(0.460, 1.148)	0.171
	Female	33	29.2	100	43	1	
Age	20-24year	28	36.4	87	32.1	1.645(0.954, 2.838)	0.074
	25-29year	22	28.5	90	33.2	1.115(0.634, 1.963)	0.705
	30year and above	27	35	94	34.6	1	0.167
Work place	Health center	93	82.3	220	93.6	0.31(0.156, 0.646)	0.002
	Hospital	20	17.7	15	6.4	1	
Department	Delivery room	31	40.2	55	20.3	1	0.000
	FPand ANC	33	42.8	96	35.4	0.110(0.050, 0.245)	0.000
	OPD	10	12.9	109	40.2	0.203(0.108, 0.383)	0.000
Level of education	Other	3	3.9	11	4.05	0.038(0.012, 0.119)	0.000
	Diploma	35	45.5	193	71.2	0.460(0.285, 0.742)	0.001
Profession	Degree and above	42	54.5	78	28.7	1	
	HO	12	15.5	30	11.07	1	
Service year	Nurse	36	46.7	217	80.07	0.180(0.091, 0.358)	0.000
	Midwifery	24	31	24	31	2.019(0.835, 4.880)	0.119
Training	0-2year	63	81.8	90	33.2	0.855(0.484, 1.509)	0.589
	3-5year	11	14.2	93	34.3	0.522(0.307, 0.888)	0.016
Knowledge of parthograph	6year and above	3	3.8	88	32.5	1	
	Pre-service	37	32.7	20	8.5	1	
Knowledge of parthograph	In-service	56	49.6	35	14.9	1.156(0.581, 2.302)	0.679
	Not trained	20	17.7	180	76.6	0.069(0.037, 0.130)	0.000
Knowledge of parthograph	Good knowledge	52	34	101	66		
	Poor knowledge	25	13	170	87	0.537(0.327, 0.882)	0.014

Table 5. Factors associated with parthograph utilization during multivariable logistic regression analysis among obstetric care providers in Buno- Bedele zone (n=348) Western Ethiopia, March 2017

Variable	Category	Utilization of parthograph				AOR with 95%CI	P value
		utilize		Not utilize			
		No	%	No	%		
Department	Delivery room	31	40.2	55	20.3	1	0.00
	FP and ANC	33	42.8	96	35.4	0.102(0.037, 0.279)	0.00
	OPD	10	12.9	109	40.2	0.172(0.075, 0.395)	0.00
	Other	3	3.9	11	4.05	0.067(0.018, 0.242)	0.00
Level of education	Diploma	35	45.5	193	71.2	0.272(0.137, 0.540)	0.00
	Degree and above	42	54.5	78	28.7	1	
Profession	HO	12	15.5	30	11.07	1	
	Nurse	36	46.7	217	80.07	0.606(0.221, 1.660)	0.330
Service year	Midwifery	24	31	24	31	0.646(0.099, 4.217)	0.648
	0-2year	63	81.8	90	33.2	0.775(0.356, 1.688)	0.521
Training on parthograph	3-5year	11	14.2	93	34.3	0.656(0.319, 1.346)	0.250
	6year and above	3	3.8	88	32.5	1	
Knowledge of parthograph	Pre-service	37	32.7	20	8.5	1	
	In-service	56	49.6	35	14.9	1.943(1.658, 4.401)	0.010
Knowledge of parthograph	Not trained	20	17.7	180	76.6	0.139(0.070, 0.278)	0.00
	Good knowledge	52	34	101	66	1	
Knowledge of parthograph	Poor knowledge	25	13	170	87	0.15(0.065, 0.345)	0.00

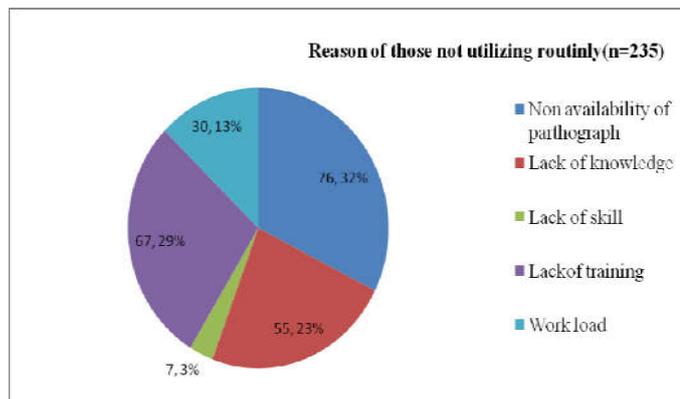


Figure 1. Identified reasons for non-routine usage among obstetric care givers, Buno- Bedele zone Western Ethiopia, March 2017

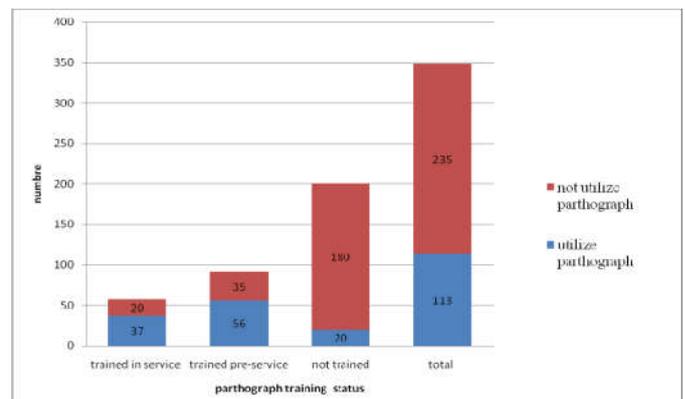


Figure 2. Parthograph training status of study participants

compared to those who got pre-service training on partograph utilization (AOR=0.139, 95% CI 0.070, 0.278) (Table 5). Those providers who had poor knowledge about partograph were about 85% less likely to utilize partograph than those who had good knowledge (AOR= 1.50 95%CI.065, 0.345).

## DISCUSSION

The magnitude of partograph utilization was found to be (32.2%). This finding is consistent with study of South West Nigeria (32.3%), but lower than the studies of Addis Ababa (57%) (Yisma *et al.*, 2013), Benin (98%) (Azandegbe *et al.*, Gambia (78%) (Burama *et al.*, 2013) and South Africa (64%) (Matibe *et al.*, 2013). These differences might be due to differences in the place of the study that may be explained with different strategies in partograph implementation, different levels of knowledge and attitudes of care providers towards partograph utilization. The other possible explanation could be the difference in the data collection procedure, sample size and time gap since, as time goes on, there is a change in policy, strategy and improvement in implementation of the partograph. However, it was higher than the findings of the Amhara region (29%) (Fantu *et al.*, 2013), Ethiopian Hospitals (13%) (Getachew *et al.*, 2011), Nigeria (8.4%), and (9.8%) (Fawole *et al.*, 2008). The likely explanations for this dissimilarity might be difference in sample size, hospital policies, set up, study subjects, negligency of care providers. Also this could be supported by the study conducted in eight Ecuador hospitals indicated as there was a difference in utilization level of partograph not only among countries but also among types of health facility. Having poor knowledge about partograph was the other factor that significantly associated with partograph utilization in this study. Those providers who had poor knowledge about partograph were about 85% less likely to utilize partograph than those who had good knowledge. This is consistent with study done in general hospital, calabar, cross River state Nigeria, that were knowledge of partograph and partograph utilization had significant relationship that 85.4% of participants that did not use partograph were not knowledgeable about partograph (Asibong, 2013).

This implies that, having knowledge about partograph is important to implement partograph during labor. This study finding also agreed with study conducted in West Shoa Zone, Ethiopia obstetric care providers those who had good knowledge about partograph were 7 times more likely to utilize partograph than those who had poor knowledge (Wakeshe, 2015). Also in North Shoa Zone, Central Ethiopia those who were knowledgeable on partograph were about 4 times more likely to utilize partograph than the non-Knowledgeable (AOR=3.79, 95% CI: 2.05, 7.03) (Wakgari *et al.*, 2015). This study is inconsistent with study conducted in Asmara Orotta Integrated National Referral Maternity Hospital that there is no significant relationship among Knowledge attitude and Practice (Woldemichael, 2015). This observation may be explained by the fact the small sample size that would compromise its distribution in the logistic regression model. In this study pre-service training was the other variable associated with partograph utilization. Participants who got pre-service training on partograph had nearly 2 times more likely to utilize partograph than participants who got in-service training, and participants who were not trained on partograph were 86% less likely to utilize partograph compared to those who got pre-service training on partograph utilization. This finding is

consistent with similar study conducted in Ethiopia Amhara region that obstetric care providers who received on the job training on partograph were about 3 times more likely to utilize partograph than those who had not received on- job training (Wakgari *et al.*, 2013), and also agree with study conducted in Amhara region, Ethiopia that, obstetric care givers who got prior training was associated with giving at least half of the correct responses of knowledge of components of partograph (Abebe *et al.*, 2013). This might be due to the fact that, obstetric care providers who received pre-service training had better knowledge about partograph than others that in turn improves their partograph utilization. The other variable that significantly associated with partograph utilization in this study was working departments, the participants working at departments of FP and ANC, were 90% and those working at OPD (83%) were less likely associated to utilize partograph than those working at Delivery room and respectively. This finding was in line with the study conducted in East Gojjam Zone, Amhara Regional State, where Obstetric caregivers who were working at antenatal and family planning ward usually were 4.94 and 2.61 times more likely to have good partograph utilization than those who were routinely working in outpatient department, respectively (Zelellw *et al.*, 2016), and also in line with Study conducted in North Shoa Zone, Central Ethiopia, those who were midwives by profession were about 8 times more likely to have a consistent utilization of the partograph than general practitioners (AOR=8.13, 95% CI: 2.67, 24.78) (Wakgari *et al.*, 2015) similarly consistent with study conducted in public health institutions in northwest and southwest Cameroon that, obstetric care providers working in Maternal and Infant Welfare Clinics were about 4 times more likely than those working in Regional/District Hospitals to have good knowledge on the partograph (Babila, 2017). This could be due to Clinical application of the partograph improves with years of experience in the maternity unit.

In this study participants level of education was factor associated with partograph utilization, obstetric care providers who were at diploma level were 73% less likely to utilize partograph compared to those who were at degree level and above. This finding also consistent with result of study in South West Nigeria Partograph use was reported significantly more frequently by respondents in tertiary level compared with respondents from primary/secondary level of care (82.4% vs. 19.3%;). Only 37.3% of respondents who were predominantly from the tertiary level of care could correctly mention at least one component of the partograph (Fawole *et al.*, 2008). This finding was not agree with the survey conducted in Nigeria that the majority of utilizers (65%) were junior professional (Umezulike *et al.*, 1999), and resent study conducted in South Africa that, Despite lack of statistical significance, more nurses than doctors had better skills and knowledge of the partograph (Maphasha *et al.*, 2017). These differences might be attributed to differences in study area, which might be explained by differing strategies and commitments in implementing the health policy at the various levels throughout the country and different levels of knowledge of the obstetric care providers towards partograph. In addition, the differences in study participants might have a difference in attitude towards partograph.

## Conclusion

Reported partograph utilization in the area was low, despite the recognition of high maternal mortality as a major public health

issue in the country. Participant Working department, level of education and pre-service training and knowledge on partograph utilization were factor affecting utilization. This will affect proper identification of the fetal, maternal and labour condition which will farther affect maternal and fetal outcome

### Recommendations

The following recommendations were made from the findings of this study: All obstetric health care providers should be given adequate in-service training on partograph utilization and continuously monitor partograph utilization of the health facilities. Specific supervision and monitoring on partograph utilization should be conducted regularly Need to support and strengthen maternal and child health programs in the area

**Acknowledgement:** The authors would like to thank Haramaya University for financial support. Our great gratitude is also goes to individual respondents from different districts of Buno Bedele Zone Health offices particularly the study villages for facilitating the study. Last but not least, We thank the data collectors, supervisors, study participants, without whom the research would not be done.

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