

## Research

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# Use of the Partogram in the Bamenda Health District, North-West Region, Cameroon: A Cross-Sectional Study

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### ABSTRACT

**Background:** The partogram is an effective instrument in the follow-up of labor. It enables timely diagnoses of abnormalities and helps in decision-making.

**Objectives:** This study was carried out to 1) establish and compare the proportion of labor cases followed up with the partogram in primary and secondary healthcare facilities in the Bamenda Health District and 2) appraise the attitudes of the health workers towards the partogram and how those attitudes impact outcomes.

**Methods:** A cross-sectional study was carried out in which 383 files were reviewed and 42 questionnaires were administered to health workers. The information extracted from the files focused mainly on the number of partograms used and the standard criteria under study were: cervical dilatation, station, the state of the amniotic fluid and maternal temperature monitored every four hours. Maternal blood pressure, pulse rate and Fetal Heart Rate (FHR) were monitored every hour. Each of the parameters was judged as correctly filled if they met the above criteria; as not correctly filled if the criteria were not met; and as not filled if no information was recorded. Statistical analysis was with Epi-Info™.

**Results:** The results showed that 223(58.2%) deliveries were followed up with the partogram, only 4(1.0%) of which had all the parameters filled to standard. Two hundred and six (86.2%) deliveries in the Bamenda Regional Hospital and 17(11.8%) in the primary healthcare facilities were followed up with the partogram. Forty (95.2%) health workers agreed that the partogram was useful in following up labor.

**Conclusions:** The health workers had a positive attitude towards the partogram, but on the whole it was incorrectly used. The instrument was for the most part unavailable, and even where it was, poor supervision and absence of guidelines on its use led to poor diagnoses. We recommend that supportive supervision and regular in-service training be encouraged; and that partograms and guidelines be made available.

**KEYWORDS:** Partogram; Maternal mortality; Labor; Perinatal mortality.

### BACKGROUND

The partogram is a graphic representation of the progress of labor. It enables clinicians (midwives and doctors) to plot cervical dilatation, frequency, intensity and duration of uterine contractions, maternal condition (pulse rate, blood pressure and temperature), fetal condition (fetal heart rate and the state of amniotic fluid), descent of the fetal head and other features that aid the progress of labor.<sup>1,2</sup>

The first person to use a graph to follow up labor was Friedman in 1954.<sup>1</sup> Following studies in Zimbabwe to fully utilize midwives where there was a shortage of doctors, the

alert line<sup>3</sup> and then the action line<sup>4</sup> were added to the original cervicograph developed by Friedman. Since then, studies have shown that the partogram is a useful tool in the management of labor, especially in developing countries.<sup>5</sup>

Following results of a large multicentre randomized trial in South East Asia, WHO recommended the use of the partogram in all labor wards.<sup>5</sup> In the procedure, the action line is drawn 4 hours to the right of the alert line to denote the time of intervention in cases of obstructed labor. Where there are inadequate facilities, early intervention is recommended to allow for referral.<sup>6</sup>

The partogram is widely used in African countries to monitor the progress of labor and the fetal and maternal condition during labor. Drouin et al in 1979 in Yaoundé, Cameroon, showed that the use of the partogram reduced perinatal deaths by 10/1000 births.<sup>7</sup> The use of the alert and action lines offered accurate and reliable guidelines for the detection of abnormal labor.<sup>3,4</sup> Doh et al, 1989 reported a maternal mortality rate of 33 per 100,000 births in the University Teaching Hospital Yaounde, which at the time was considered one of the lowest in Africa. They concluded that, among other factors, the use of the partogram contributed significantly to this low rate.<sup>8</sup>

Appropriate use of the partogram requires skilled health workers, especially midwives,<sup>6,9</sup> who have a positive attitude towards its use. The partogram tools must also be available at all times and at all levels of healthcare facilities, especially given that over 95% of reported stillbirths and neonatal deaths occur in less developed countries.<sup>10,11</sup>

In 2005, it was estimated that in sub-Saharan Africa women have one chance in 22 of dying during childbirth. In the developed world, that chance is 1 in 8000.<sup>12</sup> According to the WHO 2012 statistics for Cameroon, the maternal mortality ratio was 690/100,000 births, a far cry from the 170/100,000 births target set by the Millennium Development Goals.<sup>13</sup>

The use of the partogram has been shown to be important in reducing maternal and neonatal deaths. Dohbit et al in 2010, working in hospitals around Yaoundé, found that the staff caring for women in labor had satisfactory knowledge of the partogram, and more than 83% of them desired additional training in its use.<sup>14</sup>

Since the introduction of the partogram in Bamenda in 2003, no study has been carried out to assess the extent of its use. It was also observed that the use of the partogram was infrequent and sometimes in-appropriate.

The aim of this study was to 1) establish and compare the proportion of labor cases followed up with the partogram in primary and secondary healthcare facilities in the Bamenda Health District and 2) appraise the attitudes of the health workers towards the partogram and how those attitudes impact outcomes.

## MATERIALS AND METHODS

### Study Design and Study Area

This was a health-facility-based observational cross-sectional study in the Bamenda Health District (BHD), North-West Region (NWR), Cameroon during the period 1<sup>st</sup> to 30<sup>th</sup> April 2013.

The BHD is an urban and semi-urban area with one main hospital (Bamenda Regional Hospital (BRH)) that functions as the referral hospital, and many public, lay private and mission health facilities. With its roughly 337,036 inhabitants, it has 17 health areas and covers a total surface area of 560 square kilometers.

The maternity service of the BRH has a capacity of 90 beds: 10 beds in the delivery room and the post-natal ward, and 40 beds in the General Obstetrics and Gynecology Section and a Neonatal Intensive Care Unit (NICU) attached to the labor room under the charge of a pediatrician; and an antenatal care unit and a family planning unit.

The staffing levels are low compared to the staff ratio recommended by WHO. The labor room numbers 12 nurses who work in two shifts, day and night, with an average of 3 nurses per shift. The maternity ward has one general practitioner and two obstetricians, and handles about 3360 deliveries per year. The obstetrician does emergencies and cesarean sections. All the other health facilities are primary care centers.

### Study Population and Sampling

**Study population:** All files filled in all the health facilities of the BHD in the 12 months preceding the study were exploited, as were all the personnel (doctors, nurses and midwives) of the maternity wards of the different health facilities in the Bamenda Health District who accepted to participate in the study. A total of 3 obstetricians, 4 general practitioners, 7 midwives and 28 nurses participated in the study.

Were excluded from the study files of women who came to the hospital already in the second stage of labor and those who came for elective cesarean section or with an obvious indication for cesarean section.

**Sample Size Estimation:** The proportion of files with partograms filled to standard was about 40%, with a 5% chance of error and a 95% confidence interval.<sup>15</sup> A minimum of 369 files was required for study.

The month, April 2013, was selected by simple random sampling from the period May 2012 and June 2013 preceding the study. All the files filled during the month of April in the selected health facilities were analyzed. A total of 383 files were reviewed out of 446.

**Study procedures:** After obtaining administrative and ethical approvals, the doctors, midwives and nurses were contacted in their places of work and made to sign an informed consent form. The questionnaires were then administered to the participants who were given two weeks to fill and deposit in a box left in the office of the head-nurse. We paid regular follow-up visits to the healthcare facilities in order to ensure a high response rate.

Access to the files was obtained by a written authorization from the Director of the Hospital and Heads of the different Health Institutions involved. Information from the files was collected using a pre-designed data collection form.

The relevant information obtained from the files focused on the number of partograms used and labor variables (frequency, duration and intensity of uterine contractions, cervical dilatation, station, fetal heart rate, state of the amniotic fluid, maternal blood pressure, pulse rate and temperature) were recorded. Cervical dilatation, station, state of the amniotic fluid and maternal temperature were monitored every four hours. Maternal blood pressure, pulse rate and FHR were monitored every hour. Each of the parameters was judged as correct if they met the above criteria; not correct if the criteria were not met, and inexistent if no information was recorded.

#### Data Management and Analysis

The questionnaires were crosschecked for completeness and coded to ensure participant's confidentiality. We entered and analyzed the collected data into Epi Info™ version 7.1.1.14. Continuous variables were described using means, medians, standard deviations and interquartile ranges. Absolute and relative frequencies were used to describe categorical variables.

The predictor variable was the number of deliveries carried out in the selected healthcare facilities during the month of April 2013 while the outcome was the number of partograms filled and the number filled to standard. The standards that were adopted in this study included cervical dilatation, station, state of the amniotic fluid and maternal temperature monitored at least once every 4 hours, fetal heart rate, maternal blood pressure and pulse rate monitored hourly. The different sections of the partogram were judged to be standard if the parameters met the above criteria, substandard if the above criteria were not met, and not monitored if they were not filled.

We also studied as predictor variable: level of the health facility while the outcome variables were the number of partograms filled.

Furthermore, we studied as predictor variable the number of health workers who took part in the study, while the outcome variable was the number of health workers who considered the partogram to be a useful tool in the monitoring of women in labor and the number of health workers who desired to have more training in the use of the partogram. Finally, we also studied as predictor variables the availability of partograms

in the health facilities, availability of guidelines on the use of the partogram, in-service training in the use of the partogram, supervision by the service heads, and the attitude of the health workers towards the use of the partogram. The outcome variable, for its part, was the use of the partogram to monitor women in labor. Chi squared, Risk ratios and *p*-values were computed with Epi Info™. *P*-values <0.05 were considered to be statistically significant.

#### Ethical considerations

Before carrying out the study, ethical approval was obtained from the Institutional Review Board of the Faculty of Health Sciences (IRB/FHS), University of Buea, Cameroon. Administrative approval was obtained from the North West Regional Delegation of Public Health and from the Heads of the different Institutions included in the study. Participants signed an informed consent form before taking part in the study and information obtained was confidential.

#### RESULTS

##### The Use of the Partogram

The partogram was used in only 3 of the 7 selected healthcare facilities. Three hundred and eighty-three files were reviewed, representing the number of deliveries in the selected healthcare facilities that met our criteria. One hundred and forty-four (37.6%) were from primary healthcare facilities while 239(62.4%) were from the secondary healthcare facility. Two hundred and twenty-three (58.2%) deliveries were followed up with the partogram. Only 4(1.0%) had all the parameters in the different sections of the partogram recorded to standard.

##### Parameters of the Progress of Labor

**Table 1:** Of the 383 files reviewed, parameters of the progress of labor were recorded in 220(57.4%). Cervical dilatation 155(40.5%), station 144(37.6%) and uterine contractions 138(36.0%) were monitored to standard. Only 113(29.5%) deliveries had parameters of the progress of labor monitored up to standard.

One hundred and sixty-three (42.6%) cervical dilatations, 165(43.1%) stations and 175(45.7%) uterine contractions were not recorded on the partogram.

##### Parameters of fetal monitoring

In 167(43.6%) deliveries, the fetal heart rate was not recorded on the partogram. One hundred and twenty-nine (33.7%) deliveries had fetal heart rate monitored to recommended standard while in 87 (22.7%) deliveries the monitoring of the fetal heart rate was substandard.

In 356 (93.0%) deliveries, the state of the liquor was not recorded on the partogram. Only 16 (4.2%) deliveries had

	Not Monitored N (%)	Substandard Monitoring N (%)	Standard Monitoring N (%)	Total=383
Variables				
Progress of Labor				
• Cervical dilatation	163(42.6%)	65 (17.0%)	155(40.5%)	383(100%)
• Station	165(43.1%)	74 (19.3%)	144(37.6%)	383(100%)
• Uterine contractions	175(45.7%)	70 (18.3%)	138(36.0%)	383(100%)
• Overall monitoring	163(42.6%)	107(27.9%)	113(29.5%)	383(100%)
Fetal Monitoring				
• Fetal heart rate	167(43.6%)	87(22.7%)	129(33.7%)	383(100%)
• State of liquor	356(93.0%)	11(2.9%)	16 (4.2%)	383(100%)
• Overall	167(43.6%)	201(52.5%)	15 (3.9%)	383(100%)
Maternal Monitoring				
• Blood pressure	201(52.5%)	135(35.3%)	47(12.3%)	383(100%)
• Pulse	261(68.2%)	88(23.0%)	34(8.9%)	383(100%)
• Temperature	357(93.2%)	07(1.8%)	19(5.0%)	383(100%)
• Overall	201(52.5%)	174(45.4%)	08(2.1%)	383(100%)

Table 1: Recording of the Parameters of Labor.

that state recorded to recommended standard.

Overall, only 15 (3.9%) deliveries had fetal monitoring recorded to standard.

**Parameters of Maternal Monitoring**

**Table 1:** Maternal blood pressure, pulse and temperature were not recorded in 52.5% (201/383), 68.2%(261/383) and 93.2%(357/383) deliveries respectively. Blood pressure, pulse and temperature were recorded to standard in 12.3%(47/383), 8.9%(34/383) and 5.0%(19/383) deliveries respectively. Furthermore, only 2.1%(8/383) deliveries had all the parameters of maternal monitoring recorded to recommended standard.

**Figure 1:** The progress of labor was monitored according to the recommended standard in 29.5% of the files as compared to 3.9% for the fetal monitoring and 2.1% for the maternal condition.

**Figure 2:** Only about 1% of the files had partograms that were filled to standard. 57.2% were substandard. The partogram was not used at all in 41.8% of the files.

**Comparing The Use of the Partogram in Primary and Secondary Healthcare Facilities**

**Table 2:** Of the 383 files reviewed, 144 were from primary healthcare facilities and 239 from secondary healthcare facilities.

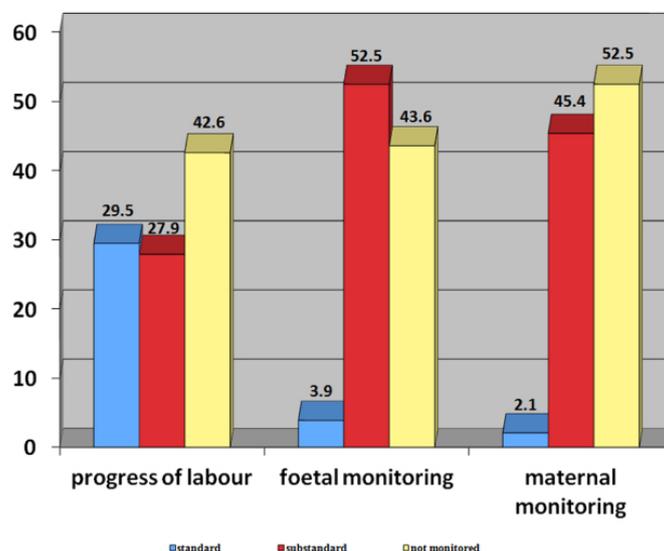


Figure 1: Distribution of the filling of the different sections of the partograph.

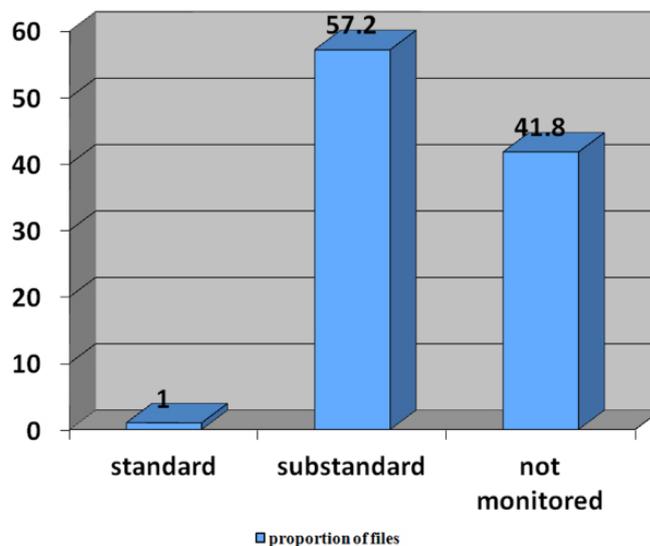


Figure 2: Distribution of evaluation of deliveries followed up with the partograph.

	Primary N (%)	Secondary N (%)	Total N (%)	X <sup>2</sup>	P value
<b>Partogram used</b>					
Facility				204.42	<0.01
Yes	17 (11.8%)	206 (86.2%)	223(58.2%)		
No	127 (88.2%)	33 (13.8%)	160(41.8%)		
Total	144 (100%)	239 (100%)	383 (100%)		
<b>Progress of labor</b>					
	N=144	N=239	N=383	202.73	<0.01
Standard	7(4.9%)	106(44.4%)	113(29.5%)		
Substandard	9(6.3%)	98(41.0%)	107(27.9%)		
Not monitored	128(88.9%)	35(14.6%)	163(42.6%)		
Total	144(100%)	239(100%)	383(100%)		
<b>Fetal monitoring</b>					
				195.0	<0.01
Standard	4(2.8%)	11(4.6%)	15(3.9%)		
Substandard	12(8.3%)	189(79.1%)	201(52.5%)		
Not monitored	128(88.9%)	39(16.3%)	167(43.6%)		
Total	144(100%)	239(100%)	383(100%)		
<b>Maternal monitoring</b>					
				125.60	<0.01
Standard	3(2.1%)	5(2.1%)	8(2.1%)		
Substandard	13(9.0%)	161(67.4%)	174(45.4%)		
Not monitored	128(88.9%)	73(30.5%)	201(52.5%)		
Total	144(100%)	239(100%)	383(100%)		

Table 2: Distribution of partographs filled and comparison of quality of completed partographs in the primary and secondary healthcare facilities.

Only 11,8%(17/144) of women in primary healthcare facilities were followed up with the partogram during labor as opposed to 86.2% (206/239) in secondary healthcare facilities.

There was a significant difference in the proportion of deliveries for which parameters of the progress of labor were monitored to standard in the primary 4.9%(7/144) and secondary 44.4%(106/239) healthcare facilities ( $P<0.01$ ). Only 2.8%(4/144) and 4.6%(11/239) of deliveries in the primary and secondary healthcare facilities respectively had parameters of fetal condition monitored to standard ( $P<0.01$ ). Standard monitoring of parameters of maternal condition was 2.1% for both primary and secondary healthcare facilities ( $P<0.01$ ).

Up to 79.1%(189/239) and 67.4%(161/239) of

deliveries in the secondary healthcare facilities had substandard monitoring of parameters of fetal and maternal conditions as opposed to 8.3%(12/144) and 9.0%(13/144) in the primary healthcare facilities, respectively.

### Characteristics of the Health Workers

**Table 3:** Of the 42 health workers who responded to the questionnaire, 15(35.7%) were from the secondary healthcare facilities while 27(64.3%) were from primary healthcare facilities. Fifteen (35.7%) of them were in the age range 20-30, 15(35.7%) between 30 to 40 years, 8(19.1%) between 40 to 50 years and 4(9.4%) were above 50 years. Majority of the participants, 29(69.1%), were female. Most of the participants, 28(66.7%), were nurses; 7(16.7%) were midwives, 4(9.4%)

	Nurses	Midwives	General practitioners	Obstetricians	Total
BRH	9	3	1	2	15
CMA Nkwen	5	1	1	1	8
God's will maternity	0	1	0	0	1
Mendankwe IHC	5	0	1	0	6
Ntanhah IHC	3	0	1	0	4
PHC Ntamulung	4	1	0	0	5
St Blaise clinic	2	1	0	0	3
Total	28	7	4	3	42

Table 3: Qualification of the health workers.

were GPs while 3(7.1%) were obstetricians.

The BRH, the only secondary healthcare facility, had more qualified staff than any of the primary healthcare facilities.

#### Attitudes of the health workers towards the use of the partograms

**Table 4:** 40/42(95.2%) of the health workers attending to women in labor thought that the partogram was necessary in the follow up of women in labor. 2/42(4.8%) of the health workers did not see the partogram as a useful tool in the follow up of women in labor. They thought that the partogram was cumbersome and entailed filling in too many time-consuming details. Thirty-four (81.0%) desired more training in the use of the partogram.

Overall, the health workers had a positive attitude towards the use of the partogram.

#### Factors Affecting the Use of the Partogram

**Figure 3:** Of the 42 health workers who responded to the questionnaire, 30(71.4%) said they knew how to use the partogram; 10(23.8%) said they had difficulties using it, and 2(4.8%) did not know how to use it at all. Of the 40 who could use it though with difficulty, 37(92.5%) said they learnt to use the tool while still in school; the others (7.5%) learnt to use it in seminars and workshops.

The Figure shows that of the 40 health workers who knew how to use the partogram, only 25% of them used it always. 22.5% used it most of the time while 12.5% rarely used it. Up to 45% of these health workers did not use the partogram to follow up any woman in labor.

**Table 4:** Seventeen (56.7%) health workers, all from primary health facilities, blamed the non-utilization of the partogram on its unavailability. Two (6.7%) said the partogram took too much time while 3/30(10%) said they had difficulties using it. Eight (26.7%) gave other reasons for not using the partogram, among which were shortage of staff, especially during night duty shifts when sometimes one person had to attend to more than one woman at a time.

**Table 5:** Only 19/42(45.2%) health workers admitted that they had regular supervision from the service head. Supervision was prompted by the 4.6 fold increase in the relative risk (RR=4.6, 95% CI=2.1-10.0) that the partogram will be used in the follow-up of women in labor. All the 19 health workers who admitted to being supervised by their service heads were using the partogram. Of the remaining 23, only 5 (21.7%) were using the partogram.

Nine (21.4%) health workers said they had had in-service training on the use of the partogram. In-service training was found to be associated with a 2.2 increase in the relative risk (RR=2.2, 95% CI=1.5-3.2) of using the partogram. All those

Level of Health Facility			
Variables	Primary N =27	Secondary N=15	Total
Partogram necessary in monitoring labor?			
Yes			
No	25(92.6%) 2(7.4%)	15(100%) 0.0(0%)	40(95.2%) 2(4.8%)
Do you Desire more Training on partogram?			
Yes	23(85.2%)	11(73.3%)	34(81.0%)
No	4(14.8%)	4(26.7%)	8(19.1%)
Reason why partogram is not used (n=30)			
Partogram not available	17(56.7%)	0(0.0%)	17(56.7%)
It takes too much time	2(6.7%)	0(0.0%)	2(6.7%)
Difficulties using it	3(10.0%)	0(0.0%)	3(10.0%)
Others	3(10.0%)	5(16.7%)	8(26.7%)
Total	25(83.3%)	5(16.7%)	30(100%)

Table 4: Attitude of health workers toward the partogram and reasons why partogram are not used.

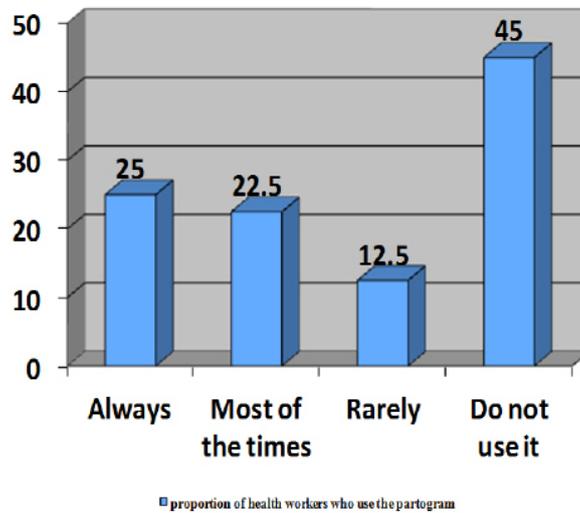


Figure 3: Proportion of Healthcare workers who use the partogram.

	Do you use the partogram?		Total	RR	95% CI
	Yes	No			
Supervision?				4.6	(2.12-10)
Yes	19(100%)	0(0.00%)	19(100%)		
No	5(21.7%)	18(78.3%)	23(100%)		
Total	24(57.1%)	18(42.9%)	42(100%)		
In-service training?				2.2	(1.5- 3.2)
Yes	9(100%)	0(0.00%)	9(0.00%)		
No	15(45.5%)	18(54.5%)	33(100%)		
Total	24(57.1%)	18(42.9%)	42(100%)		

Table 5: Relationship between supervision, in-service training and the use of the partogram.

who had had some form of in-service training were using the partogram. About half (45.5%) of those who had never received any in-service training were using the partogram.

We also noticed that there were no guidelines on the use of the partogram in any of the healthcare facilities.

**DISCUSSION**

This study was carried out to see the proportion of deliveries followed up with the partogram in the primary and secondary healthcare facilities, and how the attitudes of the health workers and other factors impact the use of the partogram.

**The Use of the Partogram**

The partogram was used in 3 out of the 7 healthcare facilities selected for this study. This tool was completely absent in the other 4 healthcare facilities. This was comparable to results by Ogwang et al in Uganda where they found that 4 out of the 8 facilities considered in their study were using the partogram.<sup>16</sup> On the other hand, our results contrasted with those reached by Vikumitsi in Buea in 2012 where only 1 out of 7 health facilities was using the partogram (A. G. Vikumitsi, MD, unpublished

date, 2012).

Many, i.e. 58.2% of the deliveries were followed up using the partogram. The study in Buea found that 70% of the deliveries in the Buea Regional Hospital were followed up with the Partogram, though the utilization rate for the Buea Health District as a whole was not calculated. This was similar to results by Ogwang et al in Uganda in 2008 in which they reported an overall utilization rate of 69%.<sup>16</sup> Azandegbe et al in a survey in Benin reported a high utilization rate of 98%.<sup>17</sup>

There was a high proportion of unrecorded parameters on the partogram. Only 1.0% of the files had all the parameters of labor recorded up to standard. In a study to assess the knowledge and utilization of the partogram in the Niger Delta Region of Nigeria, Opiah et al found that standard filling of the partogram was done in 32.6% and 37.5% of the files in the two healthcare facilities studied.<sup>18</sup> This difference could be explained by the fact that their study was done in tertiary hospitals, unlike ours, which was done in primary and secondary healthcare facilities. A similar study carried out in secondary and tertiary hospitals in Malawi reported standard utilization of the partogram in 3.9% cases.<sup>19</sup> Parameters of the progress of labor were relatively well monitored compared to the other sections of the partogram.

Cervical dilatation, station and uterine contractions were well monitored in 40.5%, 37.6% and 36.0% of the files respectively. Ogwang et al<sup>16</sup> and Yisma et al<sup>20</sup>, working in Uganda and Ethiopia respectively, also found that cervical dilatation was relatively well monitored compared to the other parameters of labor; 42% and 30.7% of partographs, respectively. Another study carried out in Tanzania reported that cervical dilatation was monitored in 97% of the cases.<sup>21</sup> The preferential recording of parameters of the progress of labor may suggest that health workers prioritize documentation of the parameters of the progress of labor over parameters of the maternal and fetal conditions, which is not correct.

The fetal heart rate was monitored based on recommended standard in 33.7% of files as opposed to the state of the amniotic fluid, which was well monitored in only 4.2% of the files. The overall monitoring of the fetal condition was up to standard in only 3.9% of the files. The study in Ethiopia found a similar result with 32.9% of fetal heart rate monitored to recommended standard although they did not assess recording of the state of the liquor.<sup>20</sup> This was contrary to the study in Uganda where only 2% of the partograms had fetal heart rate recorded according to recommended standard.<sup>22</sup> Nyamtema et al in Tanzania found that the FHR was monitored in 94% of the cases but up to 91% of these were substandard.<sup>21</sup> This difference could be due to a difference in the health system policy or simply due to the time gap between this study and the study in Uganda that was carried out from May-June, 2008.

Maternal blood pressure, pulse rate and temperature were monitored to standard in 12.3%, 8.9% and 5.0% respectively. This was similar to the results from the study in Uganda where maternal blood pressure was recorded to standard in 10% of the partograms. The study in Ethiopia found that maternal BP was well monitored in 18.6% of the files.<sup>20</sup>

Two hundred and nineteen (57.2%) deliveries had an overall substandard monitoring of the parameters of labor and 41.8% of the deliveries were not followed up with a partogram at all. As shown by Drouin et al in 1979, the use of the partogram reduces perinatal deaths and allows early detection of abnormal labor.<sup>7</sup> Several other studies have shown the effectiveness of the partogram in reducing unnecessary interventions during labor and in improving maternal and neonatal outcomes (A. G. Vikumitsi, MD, unpublished date, 2012).<sup>9,16,21,23</sup> Doh et al, working in the University Teaching Hospital in Yaoundé, found a maternal mortality rate of 33 per 100,000 births over a period of five years, which was considered one of the lowest in Africa, and concluded that the use of the partogram contributed greatly to this low rate.<sup>8</sup> For the partogram to be used as a tool for the timely diagnoses of abnormal labor, all the parameters should be recorded and to the recommended standard. Substandard recording of the parameters of labor means that there is a discontinuity in the follow-up of patients in labor and many abnormalities can be missed or not diagnosed on time. Accurate and timely diagnoses will lead to accurate timely intervention

and to better outcomes.

This study also found that there was better documentation on the parameters of labor in the secondary than in the primary healthcare facilities; 86.2% and 11.8% respectively. This was however expected because secondary healthcare facilities have more resources and better supervision than primary healthcare facilities. Furthermore, in secondary healthcare facilities, there is a good mix of skills where nurses and midwives work with doctors and obstetricians who can promote knowledge transfer and so improve the performance of the staff. Similar results were found by Fawole et al in South West Nigeria in 2009.<sup>24</sup>

#### Attitude of the Health Workers Towards the Partogram

The participants in this study included 28(66.7%) nurses, 7(16.7%) midwives, 4(9.4%) general practitioners and 3(7.1%) obstetricians. This was similar to ratios in the study carried out in Buea in 2012 where 64.1% were nurses and 5.1% general practitioners (A. G. Vikumitsi, MD, unpublished date, 2012). However, the study in Buea had more midwives (28.2%) and fewer obstetricians (2.6%). Dohbit et al in Yaoundé had similar proportion of midwives and nurses (42.4% and 45.5% respectively) and more obstetricians (7.6%) than general practitioners (4.5%).<sup>14</sup>

Forty (95.2%) health workers admitted that the partogram was necessary for the proper monitoring of women in labor. Vikumitsi in the Buea Health District in 2012 and Dohbit et al in Yaoundé in 2010 found similar results where 92% and 94.8% of the health workers respectively said the partogram was useful in following up labor.<sup>14</sup> This is in line with the findings that the partogram has been shown to be an effective tool for monitoring labor and identifying women in need of an intervention.<sup>5</sup> Thirty-four (81.0%) of workers expressed the desire to have more training on how to use the partogram. A similar result was obtained by Dohbit et al in Yaoundé in 2010 where 96.55% of nurses and 62.5% of doctors desired to have more training on the use of the partogram.<sup>14</sup> The study in Buea reported that 92% of the health workers were willing to have more training on the use of the partogram (A. G. Vikumitsi, MD, unpublished date, 2012). This can be taken to mean that the health workers admit to the fact that their knowledge of the partogram may not be enough to enable them to use it appropriately. This likelihood is reflected in the number and use of the partograms in the monitoring of labour: most of the parameters are either not monitored to standard or not even monitored at all.

#### Factors Affecting the Use of the Partogram

In this study, it was realized that partograms were available in only 42.9% of the health facilities. Most (56.7%) of the participants said unavailability of the partogram meant that they could not use it to monitor women in labour. This result was higher than the results reached in the study in Buea where only 17.9% of the health workers gave unavailability of the

partogram as a reason for not using it (A. G. Vikumitsi, MD, unpublished date, 2012). Dohbit et al found that 25% of doctors and 39.7% of nurses were not using the partogram because of its unavailability.<sup>14</sup> Similar results were found by Opiyah et al in Nigeria where more than 50% of the health workers acknowledged the unavailability of the partogram in their labour room.<sup>18</sup> The study in Uganda also found unavailability of the partogram as one of the factors affecting its use.<sup>16</sup>

Inadequate training of the staff was found to be another reason why the partogram was not used. Although 92.5% of the participants said they had formal training in the use of the partogram, 81.0% of them expressed the wish to have more training. Similar results were found by Dohbit et al<sup>14</sup> Although the health workers had good theoretical knowledge, their practical knowledge was inadequate as most of the parameters were not recorded to standard. Most of them had never had any form of in-service training since they started working.

There was a significant relationship between supervision by the service heads and the use of the partogram (RR=4.6; 95% CI=2.1-10.0). About 45.2% of the health workers admitted to having regular supervision from their service heads. Bosse et al in Tanzania and Ogwang et al in Uganda also reported that health workers lacked follow-up and supervision and this impacted on the number and quality of the partograms used.<sup>16,22</sup> In this study, the BRH had the highest number of deliveries followed up with the partogram (86.2%), and more supervision and qualified staff than any of the other healthcare facilities.

Just as in results found by the studies in Uganda and Tanzania,<sup>16,22</sup> none of the health facilities had guidelines on the use of the partogram.

#### Limitations of the Study

The study did not analyze biochemical data such as urinalysis and medications and fluids administered during labor but involved review of records already filled and as such may not give a real picture of what is practiced since filling the partogram does not necessarily mean actually using it to monitor the progress of labor. Furthermore, there might also be recall bias in collecting the information and the cross-sectional nature of the study done in one part of Cameroon may not reflect what happens in other regions of the country.

#### CONCLUSIONS

Our results showed that 58.2% of deliveries were followed up with the partogram. Most (57.2%) of the deliveries had substandard recording of the parameters of labor and only 1.0% was monitored to the recommended standards. More deliveries were monitored with the partogram in the secondary healthcare facility (86.2%) than in the primary healthcare facilities (11.8%). Majority of the health workers (95.2%) had a positive attitude towards the use of the partogram. The factors

affecting the use of the partogram in the monitoring of labor include: Unavailability of the partograms, inadequate training of the health workers in the use of the partogram, lack of supervision and lack of guidelines on the use of the partogram.

#### RECOMMENDATIONS

Health facilities should have a constant supply of partograms together with guidelines on how to use them. Equally, supportive supervision by the service heads and the head nurses of the labor room should be a standard procedure in maternities. There is need for constant in-service training and seminars on the use of the partogram to improve the practical skills of the health workers. Finally, there is need to strengthen the health system policy to make the use of the partogram compulsory in all health facilities offering delivery services.

#### COMPETING INTERESTS

We declare that we have no competing interests.

#### AUTHORS CONTRIBUTION

TOE contributed in the project conception, analysis and interpretation of data, and writing of the manuscript. He is the corresponding author. ENN and ENE contributed in data collection, analysis and interpretation, and proofread the manuscript. WT and GEHE proofread the manuscript. All authors proofread and agreed on the final version of the manuscript.

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