

Older age and higher parity are associated with nonuse of the partograph at Mbarara Regional Referral Hospital, Uganda

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Abstract

Objective: To determine the frequency of partograph use, the proportion of mothers with partographs completed to standard, the completeness of recorded parameters, and factors associated with nonuse at Mbarara Regional Referral Hospital (MRRH), Uganda.

Methods: A retrospective review of medical records from mothers admitted to MRRH's postnatal ward between October 2016 and March 2017. Partograph use and whether it had been completed to standard were analyzed.

Results: Of 527 study participants, 409 (77.6%) records contained a partograph, of which only 17 (4.2%) had been completed to standard. Parameters most commonly completed to standard were monitoring of cervical dilatation (n=41, 10%), fetal heart rate (n=21, 5.1%), and uterine contractions (n=18, 4.4%). Age older than 30 years (prevalence ratio 1.73; 95% CI, 1.14–2.64) and parity greater than or equal to five (prevalence ratio 1.88; 95% CI, 1.19–2.98) were associated with nonuse of the partograph. Birth outcome was recorded in 98.8% (n=404) of partographs.

Conclusion: Appropriate use of the partograph to monitor mothers in labor was extremely low; most common use was to record birth outcomes. Older mothers and those with higher parity were less likely to have their labor monitored using a partograph and should be targeted for partograph interventions.

KEYWORDS

Partograph; Uganda; Use

1 | INTRODUCTION

The partograph, a preprinted form used to record observations and monitor labor, is a low-tech and inexpensive tool.¹ In 1994, WHO recommended use of the partograph to monitor labor; in 2000 it produced the modified partograph in which the latent phase was removed to make it simpler and easier to use.^{2,3} The partograph provides health professionals with a pictorial overview of the progress of labor and maternal and fetal conditions to allow early identification and diagnosis of pathological labor so that intervention can be made if necessary. Use of a partograph is critical in preventing maternal and perinatal

morbidity and mortality.⁴ Standard fetal monitoring on the partograph is associated with good Apgar scores.^{4,5}

Although WHO recommends that all mothers in labor should be monitored using a partograph, the frequency of its use is not well documented. Furthermore, in situations where it is used, limited data exist on whether the forms are completed to standard requirements. This concern applies primarily to large maternity wards, such as those in regional referral hospitals in resource-limited settings, where large numbers of deliveries occur and many complicated cases are referred.^{6–8}

The aim of the present study was to determine the frequency of partograph use, the proportion of mothers who had partographs

completed to standard requirements, the completeness of recording of parameters on the partographs, and the factors associated with its nonuse among mothers in labor at Mbarara Regional Referral Hospital (MRRH) in western Uganda.

2 | MATERIALS AND METHODS

A retrospective review of medical charts was conducted for mothers who had been admitted to the labor ward at MRRH between October 10th 2016, and March 31st 2017. We retrieved the files and reviewed them for use of the partograph and, if present, whether it had been completed to standard.

The study was conducted at the postnatal ward of MRRH, Mbarara, which is located 250 kilometers from Kampala in southwestern Uganda. The hospital is a public facility that serves five million people, mainly from 10 catchment districts of southwestern Uganda. It also serves as a teaching hospital for Mbarara University of Science and Technology (MUST) Medical school. The department of obstetrics and gynecology at MRRH and MUST has 11 obstetricians and 32 midwives who perform over 10 000 deliveries annually, and a 24-hour operating theatre for mothers who require cesarean delivery.

Ethical clearance for the study was obtained from the MUST Research Ethics Committee (No. 22/07-16) and the Uganda National Council for Science and Technology (HS 2161). Data were retrieved by research assistants trained to handle data with confidentiality. Personal identifiers such as name, in-patient number, or address details were not collected, and new ID numbers were created to identify the files.

We included the charts of mothers at 38–42 weeks of pregnancy who had been admitted in labor to MRRH. As this was a retrospective chart review, written consent of the participants was not required.

The primary outcome variable was partograph use, which was determined by the presence or absence of the partograph in a patient's chart. The secondary outcome was parameters on the partograph that had been completed to standard, which were evaluated using criteria described by Ogwang et al.⁴ and Nyamtema et al.⁵ The criteria used in these studies were: (1) cervical dilatation monitored at least once every 4 hours; (2) fetal heart rate, uterine contractions, maternal blood pressure, and temperature monitored at least once every hour; and (3) the condition of the baby after birth recorded on the section for fetal outcomes. In these studies, parameters on the partograph that met the three criteria were completed to standard. Parameters on the partograph that did not meet the criteria were judged to be substandard. In the present study, the criteria used to determine that a partograph had been completed to standard were all three of the following, recorded from the onset of monitoring of active labor: (1) cervical dilatation recorded at least once every 4 hours; (2) fetal heart rate recorded at least once every hour; and (3) uterine contractions recorded at least once every hour.

Data were entered in Microsoft Access 2010 (Microsoft, Redmond, WA, USA) and exported to Stata version 13 for analysis (StataCorp LLP, College Station, TX, USA). Frequency distribution tables and a

graph were used to describe the study variables. Factors associated with not using a partograph were determined using the prevalence ratio (PR) and 95% confidence intervals (CIs) were calculated. We used Poisson regression with robust standard errors to estimate PRs.⁹ This approach yields less biased estimates compared with the log-binomial method. Logistic regression was not used because we were concerned that odds ratios would overestimate the strength of the association given the high prevalence of nonuse of the partograph among the women in the study. $P < 0.05$ was considered statistically significant.

3 | RESULTS

We reviewed the charts of 527 women who had been admitted to the postnatal ward of MRRH during the study period. Characteristics of the participants are shown in Table 1. Most participants were aged between 18 and 24 years, had primary level education, were married, and were multiparous.

Of the 527 participants, 118 (22.4%) did not have partographs in their charts whereas 409 (77.6%) did have them included. Among those with a partograph, the proportion of those completed to standard was only 17 (4.2%). The parameters most commonly completed to standard were cervical dilatation ($n=41$, 10.0%), fetal heart rate ($n=21$, 5.1%), and uterine contractions ($n=18$, 4.4%) (Table 2).

Most of the parameters monitored were documented in the patients' clinical notes but not in the partograph. The parameters most commonly plotted were cervical dilatation ($n=222$, 54.3%), fetal heart rate ($n=216$, 52.8%), and uterine contractions ($n=209$, 51.1%). The least recorded parameters were temperature ($n=31$, 7.6%), blood pressure ($n=62$, 15.2%), and molding of fetal skull bones ($n=64$, 15.6%). Figure 1 shows the difference between the parameters documented in the partograph versus the clinical notes. Birth outcome was recorded in 98.8% ($n=404$) of the partographs.

Bivariate analysis showed that age older than 30 years (PR 1.73; 95% CI, 1.14–2.64; $P=0.011$) and parity greater than or equal to five (PR 1.88; 95% CI, 1.19–2.98; $P=0.007$) were associated with nonuse of the partograph (Table 3). Because age and parity are highly correlated, a multiple logistic regression model with the two variables was not fitted.

Fourteen (2.7%) newborns had an Apgar score of less than 7, there were 10 (1.9%) fresh stillbirths, and 5 (0.9%) admissions to the neonatal unit. There was no association between partograph use and these adverse perinatal outcomes.

4 | DISCUSSION

Our study shows that the proportion of partographs completed to standard was extremely low, at 4.2%. Older age (>30 years) and higher parity (≥ 5) were associated with nonuse of the partograph. Cervical dilatation was the parameter most commonly completed to standard. Most monitoring of labor was done in the patients' clinical notes and not reflected in the partograph. The practice at MRRH is to

TABLE 1 Characteristics of the study participants (n=527).

Characteristics	No. (%)
Age, y	
18–24	274 (52.0)
25–30	186 (35.3)
>30	67 (12.7)
Level of education	
None	80 (15.2)
Primary	184 (34.9)
O level	182 (34.5)
A level	16 (3.0)
Tertiary	65 (12.3)
Marital status	
Not married	39 (7.4)
Married	488 (92.6)
HIV status	
Negative	479 (90.9)
Positive	48 (9.1)
Level of income per month, US\$	
0	156 (29.6)
<25	296 (56.2)
>25	75 (14.2)
Residence	
Mbarara	357 (67.7)
Other	170 (32.3)
Referral status	
Not referred	478 (90.7)
Referred	49 (9.3)
History of previous cesarean delivery	
No	491 (93.2)
Yes	36 (6.8)
Parity	
1	214 (40.6)
2–4	263 (49.9)
≥5	50 (9.5)
Cervical dilatation at the start of monitoring, cm	
≤6	336 (63.8)
>6	191 (36.2)

record progress of labor in both the patient's clinical notes and on the partograph. The most recent training on use of the partograph was 12 months prior to this study.

Older mothers and those with higher parity were less likely to have their labor monitored using a partograph. This could be due to bias among healthcare workers who may assume that being older or having a higher parity means that a woman will easily progress through labor. This assumption is misguided because although these women may progress rapidly, they are also at high risk for postpartum hemorrhage^{10,11} and need to be closely monitored.

TABLE 2 Standard of completion of different parameters for participants who had a partograph included in their record (n=409).

Parameter	No. (%)
Cervical dilatation	
Substandard	368 (90.0)
Standard	41 (10.0)
Fetal heart rate	
Substandard	388 (94.9)
Standard	21 (5.1)
Uterine contractions	
Substandard	391 (95.6)
Standard	18 (4.4)
Liquor state	
Substandard	398 (97.3)
Standard	11 (2.7)
Molding of fetal skull bones	
Substandard	404 (98.8)
Standard	5 (1.2)
Maternal blood pressure	
Substandard	408 (99.8)
Standard	1 (0.2)
Maternal temperature	
Substandard	408 (99.8)
Standard	1 (0.2)

The extremely low proportion of mothers with partographs completed to standard was much lower than in a study from Ghana, performed in a similar setting at a tertiary teaching hospital, where 25.6% of the partographs were adequately completed in accordance with WHO guidelines.¹² The proportion in Ghana is much better than in Uganda, but still far from ideal, indicating that countries in sub-Saharan Africa have much to improve to achieve the ideal. Another study performed at two tertiary health facilities in the Niger Delta region of Nigeria found that 37.5% and 32.6% of partographs had been completed correctly.¹³ These proportions are again higher than that found in our study and

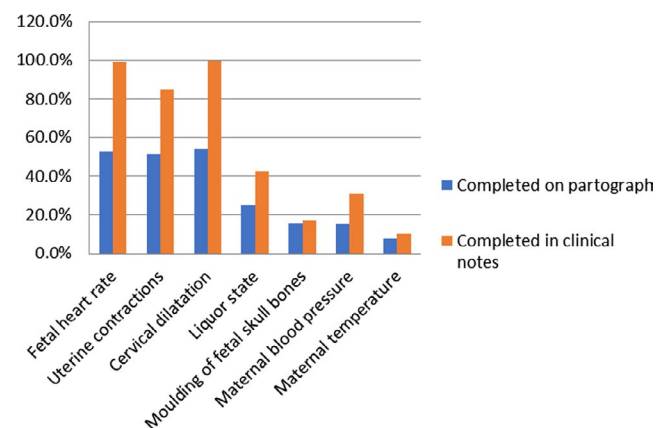
**FIGURE 1** Comparison of parameters completed on the partograph versus inclusion in participants' clinical notes.

TABLE 3 Factors associated with nonuse of the partograph.

Variable	Prevalence ratio	95% CI	P value
Age, y			
18–24	1		
25–30	1.25	0.87–1.78	0.225
>30	1.73	1.14–2.64	0.011
Level of education			
None	1		
Primary	1.24	0.72–2.15	0.439
O level	1.63	0.96–2.77	0.069
A level	0.36	0.05–2.53	0.302
Tertiary	0.97	0.47–1.98	0.927
Marital status			
Not married	1		
Married	0.97	0.53–1.76	0.915
HIV status			
Negative	1		
Positive	1.03	0.59–1.77	0.927
Level of income per month, US\$			
0	1		
<25	1.05	0.74–1.50	0.768
≥25	0.58	0.30–1.10	0.095
Referral status			
Not referred	1		
Referred	1	0.58–1.73	0.992
History of cesarean delivery			
No	1		
Yes	1.26	0.73–2.19	0.408
Parity			
1	1		
2–4	1.17	0.82–1.67	0.384
≥5	1.88	1.19–2.98	0.007
Cervical dilatation at monitoring, cm			
≤6	1		
>6	1.12	0.81–1.55	0.481

reiterate that more needs to be done to improve completion of the partograph at MRRH and across sub-Saharan Africa.

The parameters most commonly completed to standard were cervical dilatation, uterine contractions, and fetal heart rate. Of the completed partographs, 10% had monitoring of cervical dilatation completed to standard. This is much lower than reported in other studies in the region. Studies from Rukungiri in western Uganda⁴ and Dar es Salaam in Tanzania⁵ found that the proportion of standard monitoring of cervical dilatation was 75.5% and 38%, respectively. In our study, fetal heart rate was monitored to standard in 5% of completed partographs. This was comparable to the study from Rukungiri that reported fetal heart rate monitored to standard in 2% of partographs but lower

than the study from Dar es Salaam that found 14%. In the present study, 4.4% of partographs were completed to standard for uterine contractions, which was lower than the studies from Rukungiri and Dar es Salaam that reported 52.1% and 39%, respectively.^{4,5} This improved performance could be because these studies used data from more than one health unit and only used partographs that had adequate information.

The most frequently completed parameter on the partograph was cervical dilatation (54.3%), which was similar to other studies. In Rukungiri and Dar es Salaam, cervical dilatation was the most frequently completed parameter (58.1% and 97%, respectively).^{4,5} A study from Kenya also reported that cervical dilatation was the most frequently completed parameter (70%–97%).¹⁴ The least completed parameters were maternal temperature, maternal blood pressure, and molding of fetal skull bones. These findings were similar to those of other studies.^{4,5,14}

Our study has some limitations. The study was confined to one regional referral hospital in southwestern Uganda and the findings may not be generalizable to other regional referral hospitals in Uganda or private hospitals.

In conclusion, our study shows that the frequency of appropriate use of the partograph to monitor mothers in labor at a large tertiary health facility in Uganda was extremely low. Reasons for nonuse of the partograph should be examined in future studies using qualitative approaches. Interventions that improve use and completion of the partograph to standard should be tested.

AUTHOR CONTRIBUTIONS

All authors were involved in initial study design and planning. HML, HK, FB, and GM were involved in the data analysis. All authors were all involved in writing up of the manuscript and approved the final manuscript.

ACKNOWLEDGMENTS

We would like to thank research midwives Rachael Akampwera and Sylvia Kyomukama and data manager Nicholas Musingunzi.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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