

Full Length Research Paper

Partograph use among skilled birth attendants in selected counties, Western Kenya

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Participants was 35.3 (standard deviation: 7.1) years. The demographics (98%), foetal heart rate (80.5%), temperature, pulse and respiratory (74.5%) and maternal blood pressure (73.2%) section of the partograph were the most charted. The least charted sections were foetal descent (19.5%), cervical dilatation (21.5%) and uterine contractions (24.8%). Use of the partograph was associated with the female gender with a 58% (aOR: 0.42. 95% CI: 0.19-0.91) lower odds compared to male nurses. The findings highlight a persistent gap in the use of the partograph in Kenya despite the recent countrywide BEmONC training. There is a need for enhanced on-job training for nurses and midwives on the use of the partograph but also a need to explore the possibility of using the electronic partograph that are effective in reducing adverse foetal outcomes and improve adherence to labour care and strengthen routine support supervision to review nurses-midwives in the use of the partograph. In low resource setting, the completion rate of partograph is low despite heavy investment in training of healthcare workers on Basic Emergency Obstetric and Neonatal Care (BEmONC), which promotes the use of partographs to monitor the progress of labour. In Kenya, the rate of caesarean section, instrumental delivery and APGAR score less than 7 at 1 min has increased. Therefore, this study determined the extent of use of partograph as a tool for monitoring the progress of the mother and the foetus during labour in selected Western counties in Kenya. This cross-sectional study was conducted in Kisumu and Vihiga counties in Western Kenya between May and June 2019. Validated self-administered questionnaires and checklists were used to collect data from participants and randomly chosen participant-filled partograph. Sample characteristic and extent of use of partograph were described using frequencies and percentages while factors associated with partograph use were assessed using multivariable logistic regression. Statistical significance was set at $p < 0.05$. Out of 149 participants, 104 (69.8%) were female, 144 (96.6%) were nurses, 52% worked in health centres, 37% had worked for seven or more years and trained on BEmONC within 1 to 2 years.

Key words: Partograph, labour, antenatal care, skilled birth attendance, Kenya.

INTRODUCTION

Globally, the maternal mortality rate (MMR) fell by nearly 44% from 385 maternal deaths per 100,000 live births in

1990 to an estimated 216 deaths per 100,000 live births in 2015 (WHO, 2015). A majority of the maternal deaths

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occur in low-and middle-income countries, with sub-Saharan Africa accounting for 66% of the maternal deaths. Specifically, Nigeria and India accounted for over one-third of all maternal deaths worldwide in 2015 (WHO, 2015).

Kenya saw a significant drop in MMR from 605 in 2010 to 510 in 2015 while the deliveries by skilled birth attendants increased from 44% in 2008-2009 to 62% in 2014 besides, that health facility deliveries increased from 43 to 61% (Kenya National Bureau of Statistics, Ministry of Health, National Council for Population and Development, 2014). The improved maternal health indicators have been attributed to the training of healthcare workers in maternal and newborn healthcare, improved in-service training, continuous supply of obstetric basic and emergency equipment and supplies, improved referral systems and periodic monitoring and evaluation among other interventions. However, MMR remains very high and there exist in-country disparities in the rate of maternal deaths. For example, 15 out of 47 counties account for three-quarters of MMR in Kenya with Mandera at 3795 deaths while Kisumu and Vihiga counties are at 597 and 531 maternal deaths per 100,000 live births, respectively (Kenya National Bureau of Statistics, Ministry of Health, National Council for Population and Development, 2014).

The use of the partograph, an inexpensive graphical tool designed to provide a pictorial overview of labour, is one of the cost-effective interventions to promote maternal and child health especially in low resource settings. Friedman (1956) designed the partograph to improve maternal and neonatal outcomes and its use has contributed to reduced undesirable maternal and child outcomes (Friedman, 1956). In 2000, the World Health Organisation (WHO) introduced the composite partograph, which was later modified with the removal of the latent phase and active phase beginning from 4 cm dilatation (Dalal and Purandare, 2018). The partograph is recommended for routine monitoring of the first stage of labour to assist the skilled birth attendant to identify slow progress of labour and hence prevent prolonged labour and its complication including atonic postpartum haemorrhage, ruptured uterus and obstetric fistula. The partogram has a 4 h action line from the alert line, that denotes the timing of intervention for prolonged labour and recommends earlier intervention to allow for referral and thereby reduce the maternal mortality (Dalal and Purandare, 2018).

Training health care workers on partograph use increases their knowledge on the use of partograph. In one study, among fourth-year students, the mean score on partograph use increased from 20% pre-test to 85% post-test (Andarieh et al., 2014). Despite the increase in knowledge on partograph use, the findings show inadequate knowledge about the partograph among these students. In this regard, during Basic Emergency

Obstetric and Neonatal Care (BEmONC) training, partograph use is promoted to improve the management of labour and emphasize on decision-making regarding early interventions. Partograph helps providers identify prolonged labour and know when to take appropriate actions when used appropriately. However, in Ghana, out of 809 partograph assessed for completeness of parameters, the highest score was the assessment of contractions at 60.2% while the lowest was assessment of moulding at 32.5% (Opoku and Nguah, 2015). The study found that foetal heart rate was 80% recorded while 46% did not have the cervical dilation well recorded. Similarly, in Ethiopia, out of the 420 partographs reviewed in five health facilities, the completion rate for foetal heart rate, cervical dilatation, uterine contraction, state of liquor and maternal blood pressure was at 30.7, 32.9, 20.7, 26.9 and 18.6%, respectively. The study found very low completion rate signifying potential poor management of labour and hence indicating the need for a pre-service, on-job training and periodic supportive supervision.

In Kenya, similar gaps have been observed in the completion of partographs (Githae et al., 2019; Sigei, 2019; Maina et al., 2017), despite countrywide training of healthcare workers on BEmONC, which promotes the use of partographs to monitor the progress of labour. The country has seen a 25% increase in caesarean section rate (Ogutu et al., 2017), instrumental delivery and APGAR score less than 7 at 1 min (Shikuku et al., 2018). Besides, there is a paucity of evidence on the use of partograph in Kenya. Therefore, it is paramount to determine the extent of use of partograph and its associated factors in Kenya.

METHODOLOGY

Study setting

The study was conducted in two purposively chosen counties (Kisumu and Vihiga) out of the 47 counties of Kenya. The two counties in western Kenya were selected purposively due to their higher maternal mortality ratios (MMR) which are above the national average. Vihiga county covers an area of 563 km² and has a population of 554,622 people (Health Policy Project, 2015), while Kisumu covers an area of 2085.9 km² and has a population of 968,909 people (Health Policy Project, 2014).

Study design

A cross-sectional study design was used to determine the extent of use of partograph by skilled birth attendants and its associated factors in selected counties in Western Kenya between 1 May and 30 June 2019.

Study population and sample

The study population included all skilled birth attendants (nursing,

medical and clinical officers) in Kisumu and Vihiga counties. Out of the possible 350 skilled birth attendants (SBAs) (208 in Kisumu and 97 in Vihiga), 150 SBAs (104 in Kisumu and 46 in Vihiga) were sampled for the study. Participants were informed of the study through the county Ministry of Health office and during the monthly or biweekly facilities continuous professional development meetings. Participants who were available at the time of the study and consented to the study were included while those on-leave or who did not consent were excluded from the study.

Data collection tools and techniques

Data on partograph use was collected using a validated self-administered questionnaire and checklist. Each section of a partograph filled by a participant was reviewed for completeness and the data recorded in the checklist. Data were collected between 1-23 May 2019 in Kisumu and 1-23 May 2019 in Vihiga counties.

Statistical analysis

Data were cleaned, double-entered to a worksheet and imported into Stata 13.1 for analysis. Sample characteristics and the use of partograph were described using frequencies and percentages. Factors associated with the use of partograph by skilled birth attendants were assessed using univariate and multivariable logistic regression. All variables were considered useful and were included in the multivariable model. Statistical significance was considered at $p < 0.05$.

Ethical considerations

The Institutional Research and Ethics Committee No. 0003147 and National Council of Science, Technology and Innovation approved the study No. NACOSTI/P/19/78748/28845. The Minister of Health in Vihiga and Kisumu counties and Moi University permitted the study. Participants provided written consent and all data were serialized to maintain confidentiality.

RESULTS

Respondent characteristics

Out of 149 participants, 104 (69.8%) were female while 144 (96.6%) were trained nurses. The mean age of the participants was 35.3 (standard deviation: 7.1) years. More than half (52%) worked in health centres with the rest working in dispensaries which are level two care facilities with 37% of the participants have worked for seven or more years and trained on BEmONC within 1 to 2 years (Table 1).

Partograph use

The most charted sections of the partograph were demographics (98%), foetal heart rate (80.5%), TPR (74.5%) and maternal blood pressure (73.2%). The least charted sections were foetal descent (19.5%), cervical

dilatation (21.5%) and uterine contractions (24.8%) (Table 2).

Association between knowledge and practice on the use of partograph

In the multivariate analysis, the odds of effective use of partograph were 58% (aOR: 0.42. 95% CI: 0.19-0.91) lower among female nurses compared to male nurses (Table 3).

DISCUSSION

It was found that the overall partograph use was 44% with demographics, foetal heart rate, TPR and maternal blood pressure section of the partograph being the most complete while foetal descent, cervical dilatation and uterine contractions being the least completed. Female nurses-midwives were associated with statistically significant lower odds of use of partograph compared to male nurse and midwives.

Overall, a low level of use of partograph, which is consistent with previous studies in other regions of Kenya was found. For example, in Bomet County, only about a quarter of the partographs were completed (Sigei, 2019) while only 44.5% were completed in Embu County (Githae et al., 2019). Also, the finding is consistent with those in the neighbouring countries of Tanzania (38.7%) (Peter et al., 2020) and Congo (43.4%) (Mwembo-Tambwe et al., 2020), but slightly lower than the 60% in Ethiopia (Ayenew and Zewdu, 2020). The use of partograph has been noted to be time-consuming (Githae et al., 2019) and complex (Lavender et al., 2011). A study among student nurses found that the poor use of partograph could be attributed to the disconnect between theory and practice due to misalignment of teaching and practical and sub-standard teaching, negative role models in the clinical settings and shortage of midwives (Lavender et al., 2011). Moreover, the use of partograph remains poor despite good knowledge among nurses and on the importance of partograph (Githae et al., 2019; Lavender et al., 2011). Also, a high number of pregnant women, congestion in labour wards, poor availability of tools and equipment to monitor labour and mother's state at presentation have been identified as barriers to effective partograph use (Mukisa et al., 2019; Qureshi et al., 2010).

In this study, it was found that most partographs were partially completed with the demographics (98%), foetal heart rate (80.5%), TPR (74.5%) and maternal blood pressure (73.2%) sections of the partograph being the most completed. The previous study in the Nairobi Metropolitan found that contraction, foetal heart rate and cervical dilatation were recorded in 30 to 80%, 53 to 90%

Table 1. Sample characteristics.

Parameter	Frequency (n)	n (%)
Age, mean [standard deviation], years	35.3 [7.11]	
Sex		
Male	45	30.2
Female	104	69.8
Profession		
Medical officer	1	0.7
Clinical officer	4	2.7
Nurse	144	96.6
Education		
Bachelors	33	22.2
Higher diploma	24	16.1
Diploma	89	59.7
Certificate	3	2.0
Facility levels		
Health centre	77	52.0
Dispensary	62	41.9
Others	9	6.1
Years of experience		
1-2	19	12.8
3-4	38	25.5
5-6	37	24.8
7 and above	55	36.9
Years since last BEmONC training		
1-2	66	44.3
2-3	50	33.6
3-4	23	15.4
Above 4 years	10	6.7

Table 2. Partograph.

Parameter	Yes (%)	No (%)	Total [n (%)]
Demographics	98.0	2.0	100.0
Foetal heart rate	80.5	19.5	100.0
Moulding	31.5	68.5	100.0
Cervical dilation	21.5	78.5	100.0
Descent	19.5	80.5	100.0
Uterine contractions	24.8	75.2	100.0
TPR	74.5	25.5	100.0
Maternal blood pressure	73.2	26.9	100.0

and 70 to 97% of the partographs, respectively (Qureshi et al., 2010). Contrary to the present finding, the

aforementioned study found that maternal parameters were minimally recorded (Qureshi et al., 2010). Similarly,

Table 3. Association between knowledge and practice on the use of partograph.

Parameter	cOR (95% CI)	p-values	aOR (95% CI)	p-values
Knowledge levels				
Not knowledgeable				
Knowledgeable	0.83 [0.42, 1.62]	0.568	0.78 [0.37, 1.64]	0.509
Age				
Age, years	1.00 [0.95, 1.04]	0.912	1.03 [0.95, 1.11]	0.439
Sex				
Male				
Female	0.48 [0.23, 0.98]	0.043	0.42 [0.19, 0.91]	0.028
Profession				
Nurses				
Medical and clinical officer	0.43 [0.04, 4.21]	0.468	0.86 [0.06, 12.5]	0.915
Education				
Bachelors/masters				
Higher diploma	0.56 [0.19, 1.65]	0.296	0.36 [0.11, 1.21]	0.098
Diploma	0.67 [0.30, 1.49]	0.327	0.61 [0.24, 1.53]	0.291
Certificate	0.47 [0.03, 5.71]	0.554	0.36 [0.02, 6.65]	0.489
Facility levels				
Health centre				
Dispensary	1.08 [0.55, 2.13]	0.813	1.40 [0.61, 3.21]	0.428
Years of experience				
1-2				
3-4	1.38 [0.45, 4.18]	0.574	1.49 [0.45, 4.95]	0.519
5-6	1.05 [0.34, 3.21]	0.935	1.25 [0.34, 4.59]	0.734
7 and above	0.84 [0.29, 2.45]	0.763	0.77 [0.18, 3.36]	0.730
Years since last BEmONC training				
1-2				
2-3	0.52 [0.24, 1.10]	0.087	0.45 [0.19, 1.08]	0.074
3-4	0.77 [0.30, 2.00]	0.590	0.60 [0.17, 2.10]	0.426
Above 4 years	0.67 [0.17, 2.58]	0.557	0.69 [0.12, 4.05]	0.677

in Congo, about half of the partographs had recorded maternal, foetal-adnexal and postpartum parameters (Mwembo-Tambwe et al., 2020). In this study, foetal descent, cervical dilatation and uterine contractions were the least recorded parameters, which differ from findings from the Nairobi Metropolitan study (Qureshi et al., 2010), but similar to findings in Uganda (Mukisa et al., 2019). Studies have reported variations in the completion rate of different parameters of the partograph (Sigei, 2019; Mwembo-Tambwe et al., 2020; Mukisa et al., 2019; Qureshi et al., 2010; Hagos et al., 2017). One explanation

for these variations could be the retrospective filing of the partographs (Lavender et al., 2011). In Congo, only 3% of postpartum parameters were completed (Mwembo-Tambwe et al., 2020), which could also explain variation in completion of the partograph.

The use of partograph was associated with significantly lower odds among female nurses-midwives compared to male nurse-midwives. The present finding is similar to that in Tanzania where female nurses had reduced odds of partograph use and male nurses had a high level of use of partographs compared to female nurses (48.4% vs

31.8%) (Peter et al., 2020). However, in Ethiopia, use of partograph was high among male than female nurses (84.1% vs 82%) but female nurses were two-folds more likely to use partograph than male nurses (Gebreslassie et al., 2017). The sex disparity in the use of partograph could not be explained, but there is an increasing number of males joining the nursing and midwifery profession which could explain the difference. Further studies are needed to explore the gender differences in the use of partograph in Kenya.

In the present study, almost all nurses had been recently trained on BEmONC which could be attributed to the absence of association between levels of knowledge, education, years of experience and training with the use of partograph. Other studies have found the use of partograph to be associated with the level of education (Peter et al., 2020), health professional cadre (Peter et al., 2020), and knowledge of partograph (Githae et al., 2019; Sigei, 2019; Maina et al., 2017). However, even in these studies, good knowledge of partograph did not necessarily translate to its use indicating that the use of partograph could be associated with other unmeasured parameters such as attitude, availability of equipment, workload and number of staff, which have previously been identified as possible reasons for poor partograph use in Kenya (Muthusi et al., 2019). Regarding attitude, one study found that only one-fifth of nurses with a positive general attitude towards partograph used it compared to slightly more than a quarter among those with a negative attitude (Githae et al., 2019).

One of the study limitations was that assess could not be made to whether the partograph use contributed to decision making. However, a previous study in Congo found that decision making based on partograph was only 18.4%. Also, the nurse-midwives filing the partograph could not be observed, hence we could not ascertain whether they were filed prospectively or retrospectively. Only one random partograph per nurse was chosen for review, which might have been the partograph that was either completely or incompletely filled which may overestimate or underestimate the effective use of partograph.

Conclusion

The study findings show that effective use of partograph is low in the Western region of Kenya, with less than half of all partographs completed. The completion rate for individual parameters of the partograph varied with maternal parameters and foetal heart rate being the most recorded while cervical dilatation and uterine contraction being the least recorded despite their importance in the monitoring of labour. Our findings also showed that the sex of the nurses is associated with the use of the partograph. Our findings highlight a persistent gap in the

use of partograph in Kenya despite the recent countrywide BEmONC training for nurses-midwives that emphasized the importance of using partograph for labour monitoring. There is a need for enhanced on-job training for nurses-midwives on the use of partograph but also a need to explore the possibility of using the electronic partograph that is effective in reducing adverse foetal outcomes and improve adherence to labour care (Sanghvi et al., 2019). Also, as part of routine support supervision, there is a need to review the use of partograph to increase their effective use.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ABBREVIATIONS

APGAR, Appearance, pulse, grimace, activity and respiration; **BEmONC**, basic emergency obstetric and newborn care; **KDHS**, Kenya Demographic and Health Survey; **MMR**, maternal mortality rate; **SBAs**, skilled birth attendants; **WHO**, World Health Organization.

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