



CICF Learning Series

Electronic Partograph

Lessons on Feasibility and
Acceptability from Western
Kenya

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Summary

The partograph is a useful tool in managing labour and - when correctly used - can help birth attendants detect abnormal labour progression and make timely decision on interventions. However, its use is generally low in Kenya especially in lower level health facilities. In some cases, health workers use the partograph as a data tool – often filled in after the birth - rather than a clinical decision support tool during the labour process. Save the Children undertook an implementation research study in Bungoma County in Kenya to test whether a digital version of the standardised World Health Organisation (WHO) partograph is feasible and acceptable in public sector facilities and whether it could result in increased proportion of labour monitored using a partograph. The pilot study found that the e-partograph is feasible and acceptable by health workers, but broader health system gaps constrain its functionality and use by birth attendants. This evidence brief highlights key findings and recommendations.



Health worker being mentored on use of epartograph

The partograph is a useful tool in management of labour. It helps birth attendant to monitor progress of labour, detect deviation from normal and intervene in time thus ensuring safe delivery.

Introduction and Context

In Kenya, the number of women that die from pregnancy and birth-related causes is still high, despite increased investments to ensure that maternal health services are improved and that more women receive skilled assistance at birth. Data from the 2014 Kenya Demographic and Health Survey shows that the maternal mortality ratio was 362 deaths per 100,000 live births during the seven-year period preceding the survey¹. The rate varies significantly between the different counties and is worse in resource-poor settings where deliveries by skilled healthcare workers are low. One study estimated that obstructed labour and haemorrhage directly account for about three quarters of maternal deaths at 34% and 44% respectively².

Interventions and tools that help health workers detect whether labour is progressing well and make timely decisions in the birth process are critical and can make the difference between life and death for mother and baby.

The partograph is one such tool, used to manage the labour process and help attending staff to detect and make decisions to intervene, ensuring a safe delivery. In 2014, WHO endorsed the partograph as an essential tool in the management of labour³. Subsequently, Kenya adopted the standardised WHO partograph and the Ministry of Health recommended its use in all delivery units. A paper version of the tool is currently in use in facilities around the country.

The Problem

The use of the partograph to monitor labour has been low in Kenya. The 2010 Kenya Service Provision Assessment study found low use of the partograph in facilities, ranging from about 25% in lower level facilities to only 56% in larger hospitals⁴. A study in a sample of facilities in Western Kenya found that only 46% (506/1099) of the births had been monitored using partograph, and only 1.6% (n=8) of the partographs assessed were filled completely⁵. Further, incorrect completion of the partograph and lack of timely interpretation of the results impeded its usefulness⁶. The low use was attributed to unavailability of the printed copies, high staff workload, forgetting, and lack of knowledge on interpretation of the findings and treatment options - aggravated by negative attitudes among staff and conflict about their roles in filling the partograph. In addition, some mothers come to facilities at the second stage of labour, making use of the partograph unnecessary.

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Methods

A proof of concept study funded by the UK’s Department for International Development through the County Innovation Challenge Fund, was launched in 2017 in Bungoma County by Save the Children International (SCI), to test whether digitising the partograph would overcome the barriers and challenges related to the paper-based version, and increase its timely use for decision-making in the labour process. The pilot project was based on the hypothesis that a digital application on a tablet or smart phone (e-partograph) would be more attractive to healthcare workers and encourage routine use, and reduce errors in graph plotting, allowing for instant notifications in case of maternal or foetal distress, and make it easier to intervene in time.

Development of the electronic partograph

Save the Children worked with software developers to develop an Android-based application for an electronic version of the standardised WHO partograph, using open source software to ensure it would be easy and cost-effective for use in many facilities⁷. The development process was iterative: prototypes were created, tested with end users and modified repeatedly to achieve a product that was user-friendly.

The final product was in two versions – a mobile-based and a web-based version to allow for user flexibility. It enabled the user to systematically enter data that was automatically populated into a graphical format. It had an in-built alert system which was triggered by entry of any clinical parameters beyond the predefined normal range for each client. These alerts enabled the health worker to effectively monitor labour and take critical

decisions if a problem arose. The application also allowed for multiple users and cases, and had time stamps to ensure that it could not be filled retrospectively. In addition, the device allowed for monitoring of labour by different levels of staff and allowed the user to make referrals and access the case records at the referred facility.

In the pilot project, the application system was backed-up by a server, where case data was uploaded for use in monitoring, reporting and decision-making. Internet connectivity in the pilot healthcare facilities was provided through WiFi installed in the ward. The data entered by the user (staff attending to the woman in labour) was synchronized to three other people – the nurse in charge, the reproductive health coordinator and the web application administrator. Unique usernames were created for all midwives who were using the system. However, the application allowed different staff to monitor the same client in labour, so that when there was a shift change, a new member of staff only needed to log into the system to continue monitoring the client seamlessly. The following chart illustrates the work-flow on the e-partograph:

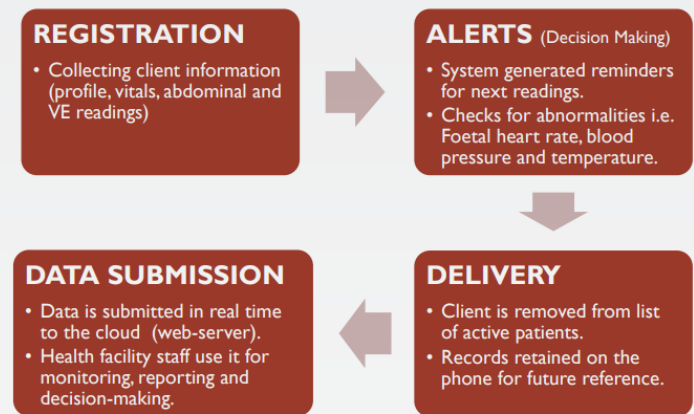


Figure 1: Flow chart showing the process of using ePartograph to monitor labour, collect and report data

Over the period March to December 2017, SCI tested the use of the e-partograph in 15 facilities in Western Kenya, with 15 other facilities serving as comparison sites. The facilities were chosen purposively, in consultation with the County Health Management Team (CHMT) in Bungoma. The intervention entailed providing facilities with the digital devices with the e-partograph and setting up the support system (server and WiFi) and building the capacity of health care workers and managers at all levels on how to use the innovation and to promote its use. Each facility was given the electronic partograph loaded onto an Android-based tablet for the web-based version. Save the Children trained 124 health care providers in the use of the application. By April 2017, the trained providers had started to correctly use the e-partograph to manage labour complications. Facility supervisors reported that it helped in targeted mentorship with healthcare workers, and that because it was not very complicated, it was easy to train staff on the job⁹.

Implementation Research

Save the Children commissioned an external evaluation in March 2018, to evaluate whether the e-partograph pilot had been successful in achieving the anticipated outcomes. The specific research questions were:

- a) Did the use of the e-partograph result in an increased proportion of labour monitored using the partograph (contrasting intervention and comparison sites)?

- b) Did the use of the e-partograph in the 15 implementation sites improve maternal and newborn birth outcomes through improved and more efficient decision making, as compared to sites using paper partograph?

The e-partograph evaluation was part of a larger cross-sectional study assessing interventions to improve maternal and neonatal care in SCI's Bungoma County demonstration project. Data was collected from 18 facilities, purposively selected to include one main public health facility and either a private or faith-based mission facility from each of the nine sub-counties where the demonstration project was implemented. Six of these facilities were among those that had been provided with the e-partograph devices. The study used data from a review of health facility records, including patient files and the maternity ward register. The quantitative data was compared to data collected at baseline in 2016. Further data was collected through qualitative interviews with 47 key informants, including health facility in-charges, nurses in maternity wards, and CHMT members. A facility assessment was conducted using a semi-structured checklist. Ethical clearance for the study was obtained from Maseno University in 2016.

Key Findings

Mixed perceptions of the digital partograph

The e-partograph was well received by some of the healthcare staff and stakeholders in the local facilities, who saw it as relevant, easy to use and adopt at a wider scale. On the other hand, there were some other health workers who perceived the digital tool as complicated to fill and likely to add to an already heavy workload. Health workers also reported instances where clients did not always understand what the clinical staff were doing on the devices, and misconstrued the staff as being negligent and irresponsible.

Slight increase in overall partograph use but low utilisation of the digital version

The results show slight improvement in the proportion of deliveries that were monitored and documented using either the paper or e-partograph, from 46% at baseline in 2016 to 54% at end line. However, this increase is not attributable to the digital partograph but rather the intense focus and supervision facilitated by the project across both intervention and comparison arms.

An interesting finding was a lower than anticipated utilisation of the digital partograph in the intervention arm where both digital and paper partographs were used concurrently. Only 4% (306) of the 6996 live births in these facilities were monitored using the e-partograph, compared to 51% (3579 births) in which a paper version was used. This finding was surprising as it contradicted the positive review by users of the digital partograph. The evidence emerging from interviews with health care workers suggests that use of partograph (whether digital or paper) was influenced by the work environment and factors within the wider health system including workload, provider skills and attitudes, infrastructure and availability of essential equipment and supplies.

Completeness was better for e-Partograph as compared to paper version

The study compared the proportion of partographs correctly and completely filled in. The study found that where it was used, the e-partograph was correctly completed in majority of the cases - 81% (931) - as compared to only 27% of paper based partographs.



Health care worker using the epartograph to monitor labour at Lunakwe dispensary

Discussion

The evaluation of the pilot study found that, contrary to expectations, introduction of the digital partograph had not led to any significant increase in the proportion of deliveries that were monitored and documented using a partograph in the study facilities. However, where it was used, in the majority of the cases it was correctly filled, compared to the paper partograph. While these results show that the e-partograph is feasible and acceptable to some users in the local facilities, its potential effectiveness in practice may have been undermined by limitations in implementation, and failure to fully address issues that dog the use of the paper version, including lack of motivation of staff to use it, suggesting they did not fully appreciate its value in the management of labour. Lack of integration of labour monitoring data in the health information system for the facility may also have contributed to its limited use.

The findings from this study are at odds with evidence from research conducted in other contexts that suggest that compared to the paper version, the digital version of the partograph can lead to improvements in user rate. For instance, a study in Bangladesh found that the user rate of partograph was significantly higher among e-partograph than the paper version, and that completion rate was higher with the e-partograph than with the paper partograph¹⁰. In Tanzania, the majority of birth attendants in a study completed each of four e-partograph tasks—registering a client, entering first and subsequent measurements, and navigating between screens—with ease or increasing ease, and demonstrated confidence in using the tool¹¹.

More research is needed, to build the evidence base around the digital partograph, and document more rigorously whether it has any effect on improving outcomes on maternal and neonatal health, given its stated advantages over the paper version.

Conclusions and Recommendations

The results from this study do not show clear evidence that digitising the partograph would result in an increased proportion of labour monitored using e-partograph or improved birth outcomes. However, one key conclusion is that health workers' use of the partograph is influenced by gaps and challenges in the wider health system including adequacy of the staffing in the labour ward, provider skills and attitudes, availability of essential equipment and supplies among other factors. To improve monitoring of labour and generally intrapartum care therefore requires comprehensive interventions targeting health systems strengthening to holistically address the issues that affect healthcare workers' ability to provide quality care.

Footnotes

- ¹ WHO estimates show that in 2015, MMR in Kenya was 510 deaths per 100,000 live births (with a range of 344-754) <http://apps.who.int/gho/data/node.country.country-KEN>
- ² National Council for Population and Development. 2015. Reducing Maternal Deaths in Kenya. Policy Brief No 46
- ³ World Health Organisation. 2014. WHO recommendations for augmentation of labour. Geneva [Active phase partograph with a four-hour action line is recommended for monitoring the progress of labour].
- ⁴ MOH (2011). Kenya Service Provision Assessment Survey 2010.
- ⁵ Save the Children International, Kenya. A Baseline Report on Pre-Intervention Status of Kangaroo Mother Care and Use of WHO Partograph to Improve Quality of Care for Maternal and Newborn Services. 2016.
- ⁶ Save the Children International. 2018. Endline Evaluation of Increasing access to quality care for preterm and low birth weight babies in Kenya through Kangaroo Mother Care, and improving the monitoring of labour using a mobile-based electronic -partograph in Bungoma County, Western Kenya.
- ⁷ http://sched.ws/hosted_files/2017ict4dconference/79/ICT4D2017%20Digital%20Partograph%20Presentation.pdf
- ⁸ Innovation Project Profile: <https://www.mnhcicf.org/portfolio/project/electronic-partograph>
- ⁹ <http://chs.uonbi.ac.ke/sites/default/files/chs/chs/epartograph%20ppt%20KNHUoN%20Conference%20-%20Copy.pdf>
- ¹⁰ Aminur Rahman, Sadika Akhter, Monjur Rahman, Fatema Ashraf, Parveen Fatima, Farhana Dewan, Emdadul Haque, Suman Kumar Das, Iqbal Anwar. 2016. e-Partograph, an innovation to improve use of partograph: Preliminary findings from two tertiary level public hospitals in Bangladesh. Poster presented at the Fourth Global Symposium on Health Systems Research, 2016, Vancouver.
- ¹¹ Litwin, L., Maly, C., Khamis, A.R. et al. Use of an electronic Partograph: feasibility and acceptability study in Zanzibar, Tanzania. BMC Pregnancy Childbirth (2018) 18: 147. <https://doi.org/10.1186/s12884-018-1760-y>



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