Technology is playing a critical role in the fight against maternal and neonatal mortality in the Dar es Salaam region

In this case study, Dimagi describes how adopting the mobile application mLabour has led to improvements in the quality of care provided to women and newborns during labour and delivery.

HDIF case study
Molly Canty, Dimagi
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Staff from Waebrania Maternity Home and FACGBF Maternity Home with their mLabour training certificates

Introduction

Dimagi is an award-winning social enterprise that delivers an open-source software technology, CommCare, aimed at improving the efficiency and quality of impact-driven work globally. In 2016, the Human Development Innovation Fund (HDIF) awarded Dimagi a grant to address gaps in the quality of facility-based intrapartum care in Tanzania through CommCare's mobile-based application, mLabour. Dimagi has adapted and validated mLabour as a mobile solution that improves the quality of care provided to women and newborns during labour and delivery. The partnership to make this possible included FHI 360, the Association of Private Health Facilities in Tanzania (APHFTA), Private Nurses and Midwives Association of Tanzania (PRINMAT), CSK Research Solutions, and eight private health facilities in and around the Dar es Salaam region.

The innovation opportunity

Many countries have made significant strides in reducing maternal and neonatal mortality rates. However, despite early progress, Tanzania's preventable mortality remains high at 556 deaths per 100,000 live births, and has improved little since 2000.[1,2] In low-income countries, the poor quality of facility-based care and insufficient vital indicator tracking during labour and delivery are two of the highest contributing factors. Careful labour management has been shown to reduce the risk of complications, such as postpartum haemorrhage, sepsis, uterine rupture, obstetric fistula, and intrapartum foetal deaths.[3] Effective labour management can also minimise unnecessary surgical interventions by enabling skilled birth attendants (SBAs) to better diagnose when caesarian surgery is required.[4] The partograph, a paper-based labour management tool recommended by the World Health Organization, supports early detection of abnormal labour progress and is widely accepted as best practice for improved labour management and monitoring. However, despite evidence that the paper-based partograph can improve vital indicator tracking and adherence to clinical protocols, the tool's complex graphing components and inadequate partograph training result in low uptake and incorrect use for real-time monitoring of labour and delivery.[5] Additionally, the paper partograph is often completed after, rather than during delivery, undermining its objective to provide real-time decision support.[6]

The innovation

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[1] Oza, S.; Cousens, S.N. and Lawn, J.E. (2014) 'Estimation of Daily Risk of Neonatal Death, Including the Day of Birth, in 186 Countries in 2013: A Vital Registration and Modelling-Based Study', *The Lancet Global Health* 2.11: e635–e644.
[2] Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) [Tanzania Mainland]; Ministry of Health (MoH) [Zanzibar]; National Bureau of Statistics (NBS); Office of the Chief Government Statistician (OCGS) and ICF (2016) *Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS) 2015–16,* Dar es Salaam, Tanzania and Rockville ML: MoHCDGEC, MoH, NBS, OCGS and ICF.
[3] World Health Organization (1994) *Preventing Prolonged Labour: A Practical Guide – The Partograph.* Part I: Principles and Strategy, Part II: User's Manual, Part III: Facilitator's Manual, Part IV: Guidelines for Operations Research, Geneva: WHO.
[4] *Ibid.*
[5] Asibong, U.; Okokon, I.B.; Agan, T.U.; Oku, A.; Opiah, M.; Essien, E.J. and Monjok, E. (2014) 'The Use of the Partograph in Labor Monitoring: A Cross-Sectional Study Among Obstetric Caregivers in General Hospital, Calabar, Cross River State, Nigeria', *International Journal of Women's Health* 6: 873.
[6] *Ibid.*

mLabour seeks to address the challenges of the paper-based partograph by automating the partograph's multiple graphing components, as well as providing real-time decision support from the time a woman is registered at the facility as being in labour to the time she and her newborn are discharged. A nine-month evaluation of mLabour led by FHI 360 in collaboration with Dimagi and CSK Research Solutions revealed a statistically significant 22 per cent increase in adherence to clinical protocols when using mLabour compared to the paper partograph.

Beyond these clear improvements in clinical protocol adherence, the evaluation also revealed that SBAs who use mLabour rated the tool highly and noted it as a marked improvement over the paper partograph. A 25-question quantitative usability survey, adapted from the validated, customisable health IT usability scale, was administered at both midline and endline and asked SBAs to rate mLabour in four different categories: quality of work life, perceived usefulness, perceived ease of use, and user control. Additionally, at endline 15 SBAs participated in in-depth interviews to better understand their perceptions around management of the tablets, administration and training, patient interactions, time and efficiency, and utility of electronic data collection.

One hundred per cent of respondents to the survey stated that they either agreed or strongly agreed that mLabour was a positive addition to health-care service delivery and that it is an important part of clinical management for women.

Quantitative endline results indicate that SBAs rated mLabour at 4.6 out of 5 overall. Quality of work life was particularly high, with 100 per cent of respondents stating that they either agreed or strongly agreed that mLabour was a positive addition to health-care service delivery and that it is an important part of clinical management for women.

"There were so many challenges with the manual partograph, but mLabour is easier to use, less disruptive to our work, and the midwives are more comfortable."
Manager of Nursing Services, Kairuki Hospital

SBAs feel that their patients also experience benefits of the mLabour tool. One SBA commented: "They saw that we were caring for them more compared to the beginning. In the beginning, once you have examined her, you can be late to come back on time as required. But now, you cannot be late because the tablet reminds you." The study team also conducted in-depth interviews and quantitative surveys with women who gave birth at the facilities using mLabour. The results revealed broad support for the use of digital tools and that women were overwhelmingly satisfied with their interactions with SBAs. The greatest change occurred in the proportion of women reporting that her SBA asked if she had a question, increasing from about half of women at baseline to 9 out of 10 at endline. This change indicates that SBAs are focusing on patient-centred care, perhaps due to prompting from the tool and the increased frequency of patient interactions encouraged by the automatic reminders.[7]

mLabour has been so well received, in part, because of the user-centred approach to adapting and implementing the tool. The tool is based on a prototype designed in India and was

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[7] Keyes, E.B.; Dal Santo, L.; Canty, M.; Flaming, A.; Jacobson S.; Kahabuka, C. and Plourde, K. (2019) 'Mixed-Methods Evaluation of a Digital Tool to Support Skilled Birth Attendants During Labour and Delivery: Effect of mLabour Use on Adherence to Clinical Protocols and Patient Experience of Care in Tanzania', manuscript submitted for publication.

subsequently adapted to the Tanzanian context through a series of in-depth focus group discussions, interviews with SBAs, and close partnerships from the onset of the project. This adaptation methodology has fostered an environment of open feedback and instilled a sense of ownership amongst the SBAs who use mLabour.

The breakthrough

Initially, three facilities were trained as part of the nine-month evaluation that launched in September 2017. After three months, midline results revealed an 18 per cent improvement in adherence to clinical protocols and SBAs rated mLabour 4.5 out of 5 in terms of overall usability compared to the paper partograph. Based on these positive midline results, five additional facilities opted to implement mLabour and were subsequently trained in April 2018. Both the training prior to the launch of the September 2017 evaluation and the training in April 2018 took place over the course of three days and were conducted in Swahili by National Trainers, all of whom are highly experienced midwives. Feedback on both trainings was largely positive, though some SBAs indicated the training could have been longer and incorporated more practice sessions.

However, implementing and using mLabour has not been without challenges. The original training plan did not account for high staff turnover at several of the implementing facilities, which can impact usability for individual SBAs. Of the 44 clinical staff at eight facilities who had been trained on using mLabour, 12 have since left their posts, and several facilities have hired staff who have not been formally trained on using mLabour. This scenario could have resulted in improper use of the tool, harming quality of care as measured by adherence to clinical protocol. Additionally, SBAs who were not trained may have opted to not use mLabour and continue with the paper partograph.

In response to the challenges that arose due to staff turnover, three facilities independently led and designed on-the-job trainings; however, this required considerable time investment and thoughtful approaches to staffing and scheduling in order to be successful. The Sunshine Muslims Volunteer Health Center (SMV) trained new staff by pairing them with formally trained SBAs during each shift and together they used mLabour to track real patients in active labour. Other facilities would use quiet periods at the clinics to spend in-depth time with the tool. At Waebrania Maternity Home, the clinic manager is the only person still working at the facility who was formally trained on using mLabour. She and the midwives who work with her spent time together learning the tool, also using the content to enhance clinical skills. These midwives quickly grew comfortable with mLabour and can now each appropriately use it independently throughout the course of labour, delivery, and immediately postpartum. In both cases, SBAs utilised the mLabour training manual, which was provided to facilities in hard copy and is also available digitally in the mLabour application.

Learning

mLabour is a user-friendly tool that SBAs feel positively impacts their ability to manage labour wards and provide improved quality of care to the women who labour and deliver at their health facilities. Most SBAs responding to the usability survey and participating in the in-depth interviews noted that they were adequately trained to safely and appropriately incorporate mLabour into their work. An additional comment from some noted that longer trainings would have increased

their comfort, especially regarding training others.

Planning for refresher trainings and managing trainings for staff turnover is essential. On-the-job training has proven successful in facilities having the resources to structure such a programme and who felt comfortable enough with mLabour to conduct further training. In future deployments, we recommend a longer initial training that includes sessions on how to effectively train new facility staff. If there are other barriers to on-the-job training, such as limited resources, a plan for refresher training needs to be established. For example, facilities in Tanzania can work with the National Trainers who conducted the initial trainings to re-engage for refreshers.

Training needs will look different for various facilities, so a plan should be in place at the onset of implementation. While mLabour has been well received and usability has been high, sustainability will rely at least in part on the continued comfort with using the tool and a plan to address challenges in training new staff.

Contact details

Dimagi
585 Massachusetts Ave, Suite 4, Cambridge, MA 02139
Email: info@dimagi.com
Website: https://dimagi.com/sectors/intrapartum-care/