Researchers use AI to reduce intrapartum stillbirths and early neonatal deaths in Malawi

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Sub-Saharan Africa has a high maternal death rate and an even higher stillbirth and neonatal death rate. Baylor College of Medicine and Texas

Children's Hospital have a longstanding maternal neonatal health project in Malawi, in partnership with Baylor's Children's Foundation Malawi and the Malawi Ministry of Health.

Their efforts in using artificial intelligence augmented continuous electronic fetal monitoring (AI-CEFM) has assisted with successful deliveries among mothers and newborns in Malawi. Their findings were published in the *British Journal of Obstetrics and Gynecology*.

"In Malawi, there is a shockingly high maternal death rate, with about 1 in every 200 women dying around the time of delivery, and even higher levels of early neonatal death and stillbirth rate, ranging between 2 to 6 percent of all babies during the time of delivery, either in the womb or outside the womb," said Dr. Jeffrey Wilkinson, professor and vice chair of Global Women's Health in the Department of Obstetrics and Gynecology at Baylor and director of the global women's health fellowship program at Texas Children's.

PeriGen Inc., which makes the AI-CEFM system, partners with thousands of health professionals in the United States to promote safe outcomes for mothers and babies. The deployment of this technology in Malawi is the first of its kind, offering promising results for future opportunities in low-income settings.

Fetal monitoring is standard in high-income settings but very limited in low-income countries like Malawi due to low midwife-to-patient ratios, so it is difficult for midwives to monitor babies in the womb. Researchers focused on whether intrapartum stillbirth and early neonatal death could be reduced by instituting AI fetal monitoring, looking at their outcomes six months before and after the implementation.

"There is reason to believe it helps with the low nurse-to-patient ratio because the initial interpretation of the fetal monitoring strip is done by

AI and it doesn't require this huge background of knowledge and experience with fetal monitoring," Wilkinson said.

The fetal monitoring looks for signs of compromise in the fetus before delivery, generally in the form of hypoxia or acidosis. This can lead to stillbirth or severe birth asphyxia, which can result in early neonatal death. Early identification of fetal heart rate changes can prompt intervention, which might include operative delivery, preventing both intrapartum still birth, early neonatal death or long-term problems with the baby related to brain damage related to the birth asphyxia.

"Having the confidence to know you can safely monitor babies in a full labor ward is reassuring. The AI augmented fetal monitoring system helps to mitigate the age-old problem of high nurse-to-patient ratio, which is a barrier to quality care," said Dr. Chikondi Chiweza, co-director of the Baylor Malawi Area 25 Project and co-first author of the research letter. "One neonatal death is a 100 percent still birth rate in the eyes of that poor woman. We should actively try whatever means necessary to reduce the statistic."

By training staff to use this system, dramatic decreases resulted in intrapartum stillbirths, stillbirths that occur during labor and in neonatal deaths. This resulted in about a 75 percent reduction in intrapartum still births and early neonatal deaths, with a small increase in cesarean deliveries.

"Artificial intelligence augmented fetal monitoring, along with enhanced quality of care, has the potential to create a paradigm shift in the care of women and babies in low-income settings. I am very encouraged by these preliminary results," said Dr. Michael Belfort, professor and chair of the Department of Obstetrics and Gynecology at Baylor and OB/GYN-in-chief at Texas Children's Pavilion for Women.

"Adopting the use of artificial intelligence to inform healthcare providers about the fetal condition has proven to be the best quality improvement strategy in preventing birth asphyxia and still births in this setting," said Dziwenji Makombe, head nurse matron at the Area 25 Hospital in Malawi.

At the Area 25 Community Hospital where the project is being deployed in the nation's capital, Lilongwe, the team saw 7,500 deliveries last year and are projected to deliver around 8,000 babies this year. According to Wilkinson, this is the first time this system has been employed on the African continent, where stillbirths and early neonatal deaths are quite common (especially in low-income countries). They hope to scale this to other centers to make a difference on rates of these tragedies.

"Healthcare systems, international agencies and funders have made very little progress in the reduction of stillbirth and early neonatal death in low-income countries," Wilkinson said. "Until quality of care is emphasized and technology is introduced in a contextually appropriate manner, babies will continue to die around the time of delivery with the suffering of women, families and society that comes along with these preventable deaths."

More information: Chikondi Chiweza et al, Can artificial intelligence-augmented fetal monitoring prevent intrapartum stillbirth and neonatal death in a low-income setting: An observational study?, *BJOG: An International Journal of Obstetrics & Gynaecology* (2022). DOI: 10.1111/1471-0528.17321

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