

AI-Enabled Wireless Portable Cardiotocography in a High-Load Government Tertiary Hospital: A Real-World Public Health Impact Study

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Abstract:

Background: Continuous intrapartum fetal monitoring is critical for both maternal and fetal outcomes. Tertiary care government hospitals manage a substantial burden of high-risk pregnancies in India. However, timely interpretation of cardiotocography traces remains a challenge in these settings due to heavy patient inflow and workforce constraints. **Objective:** To assess the public health implications of deployment of AI-enabled wireless portable CTG systems within a high-load tertiary maternity setting.

Methods: AI-enabled, wireless portable cardiotocography (CTG) devices were deployed at a tertiary center in Bangalore, India to monitor fetal/maternal heart rates and uterine activity. These devices featured automated interpretation software and a centralized monitoring system for real-time remote surveillance. A qualitative analysis assessed the system's clinical utility and workflow impact.

Results: Among 4,135 eligible patients, the system generated >1,500 alerts for complications like fetal distress and tachycardia. These digital alerts served as a critical decision-support mechanism, enhancing nursing vigilance and facilitating prompt obstetric intervention. Healthcare providers reported improved workflow efficiency, reduced interpretation variability, and increased diagnostic confidence. Furthermore, patients reported enhanced ergonomic comfort due to the system's wireless portability.

Conclusion: Integrating digital CTG devices into public health facilities significantly augments the quality of obstetric care. By automating data interpretation and providing real-time alerts, the technology mitigates the cognitive load on healthcare personnel in high-load facilities. Furthermore, the digitization of fetal monitoring addresses systemic data gaps, providing the accurate morbidity and mortality statistics essential for evidence-based policy formulation and resource optimization.

Keywords:

AI-enabled CTG, continuous monitoring, India, intrapartum monitoring, maternal health.