

## Abstract

### Design and development of an integrated mHealth platform to improve kangaroo mother care in Kenya

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**Background and Significance:** There are 15 million preterm births a year. Premature babies suffer the highest rates of newborn mortality, occurring primarily in low/middle-income countries (LMICs). Neonatal hypothermia (low body temperature) is a life-threatening complication, which is prevented by Kangaroo Mother Care (KMC), but in Kenya, a profound shortage of health workers and lack of resources are barriers to KMC. Our international team has developed an integrated platform (educational and data collection apps + biomedical device) to improve the implementation of KMC in health facilities.

**Methods:** From August 2020 – February 2021, a multi-disciplinary team from the United States and Kenya utilized agile development (weekly scrum meetings) and human-and user-centered design techniques to develop high-fidelity wireframes (Figma) of Android apps which are designed to integrate with a patented self-warming biomedical device (US10390630B2; NG/PT/IC/2016/053394) that utilizes wireless sensors to track KMC babies, continuously monitor infant vital signs, and display physiological data on mobile phones/tablets.

**Results:** High-fidelity wireframes have been developed for two user interfaces of an integrated app, NeoRoo. The NeoRoo-Family app is for KMC parents; the NeoRoo-HealthWorker app is built for nurses and doctors. NeoRoo-Family provides parental caregivers with: (a) automated monitoring of key vital signs for their baby; (c) ability to alert a clinician as needed; (c) tracking of KMC metrics and goals, such as number of hours of skin-to-skin care completed in a week; and (d) educational resources for evidence-based newborn care. The NeoRoo-HealthWorker app interface enables clinicians to: (a) simultaneously track breathing, heart rate, temperature, and oxygen saturation for multiple KMC infants in real-time; (b) review each infant's past clinical history and vital signs trends; (c) receive automated and parent-generated alerts; (d) support harmonized dissemination of key educational messages to families.

**Conclusions:** By providing education, continuous thermal support, and integrated, automated vital signs monitoring for premature babies, via the NeoRoo mHealth platform, we hope to better equip parents and health workers in Kenya to: (1) prevent hypothermia; (2) automatically monitor vital signs in newborns; (3) track key KMC metrics; (4) promote more effective task-sharing among KMC teams. On-going work includes participatory design interviews and a usability assessment.

Implementation of health education strategies, interventions and programs Public health or related nursing  
Public health or related research