Bridging Data and Decisions: The Amakomaya Journey Toward AI Enabled Clinical Decision Support Systems in Nepal

Abstract

Digital health tools are essential for improving maternal and primary health care in low resource settings. This paper presents the 14-year journey of Amakomaya, a digital health initiative from Nepal. It began as a mobile app to empower and educate pregnant women and after long journey the initiative shifted into an AI enabled clinical decision support tools (CDST) for frontline health workers.

Based on implementation experience and lesson learn from several years of work in the community, this case study shows how user centered design, alignment with national digital systems, and adoption of digital public goods by community is successful. It highlights lessons for scalable, sustainable, and people centered digital health systems in low resource setting.

1. Introduction

Nepal has reduced maternal mortality over the past two decades. However, major challenges remain in grassroots community. Unequal access to technology services, limited health worker technical capacity, lack of financial expenses for Local government and existing numbers of fragmented health information systems are challenges for Nepal. Free open source and Digital public goods may play an important role in improving access to care, especially for local level government who are facing lots of difficulties to get rid from vendor locked software system and get well documented knowledge and skill transfer system.

In this context, Amakomaya stands out as one of Nepal's longest running digital maternal health initiatives. It has continuously evolved based on user feedback, government priorities, and health system needs.

2. Origin of the Amakomaya Initiative (2011)

Amakomaya started in 2011 as an Android based maternal health education app for pregnant mothers and family members. For the proof of Concept (PoC) the initiation was started with the Internet Society (ISOC) Next Generation Leadership award. In 2013 this concept is scaled-up with the grant award from ISIF Asia. The app is targeted for pregnant women and their families and Nepali local language have been used for Audio and Video content to address literacy barriers.

Key features included:

- Pregnancy information by stage (audio, video, text)
- Automated ANC reminders
- Early detection of danger signs
- Guidance on referrals to nearby health facilities

The main goal is simple: provide lifesaving information directly to mothers so they could make informed decisions at home and could instantly access to health facility and health workers. So this app is directly contributing to reduce the 3-delayes those often happen during pregnancy period in low-middle income countries like Nepal.

3. Expansion to Community Health Workers and Facilities

Once the app has been used by numbers of mothers in rural and urban areas there is the motivation of connecting data of these mothers to nearest health facilities, from where they get health services. This was one of the strong milestone of Amakomaya app shift from mother's app to health workers space. The platform expanded from a mother focused app to a community linked health system. New features in the app allowed health workers to log in and access mothers data who are nearby their service coverage area.

These features included:

- Real time tracking of registered pregnancies
- Alerts for high risk cases
- Tools for home visit planning and follow up

These features are important and helpful for Female Community Health Volunteers (FCHVs) and frontline workers. Health works could early know the mothers who have danger sign. Between 2014 and 2016, Amakomaya care app for health workers was deployed in 150 health facilities in Myagdi, Kaski, Rasuwa, and Makwanpur.

4. Digitization of Service Registers and HMIS Reporting (2017)

Health workers could access detail personal and as well as health data of mother and infant in the app. Health workers want to use this app in place of paper base service register. The app have also supported to digitize the maternal and newborn care paper based service register in health facility. The app ca be used either in web-based version in computer or mobile app version in tablets. At the end of the month health workers could produce monthly aggregated HMIS 9.3 report and can push in the DHIS2 server in one click. This has hugely reduced health worker's workload for generating monthly routine report. Before digitization health workers saw clear inefficiencies in:

- Maintaining paper registers
- Manually preparing HMIS 9.3 reports

In 2017, Amakomaya received support from the Pierre Fabre Foundation (France). This funding supported to pilot Amakomaya app in 19 health facilities in Syangja district.

New features included:

- Digital ANC, PNC, and newborn registers
- Automatic routine report generation
- Long term tracking of mothers and babies
- Empowering pregnant mothers with content and data from health facility

This pilot was well received by the Ministry of Health and Population (MoHP) and partners such as WHO Nepal, UNICEF Nepal, and USAID/SSBH. With the funding support from external development partners the Amakomaya pregnant mother tracking and child immunization tracking was expanded to 5 districts (Dadeldhura, Nawalparasi, Mugu, Dang, Surkhet, and Kaski)

5. National Scale Up and Recognition (2017–2019)

By 2019, Amakomaya had become one of Nepal's strongest digital maternal and newborn tracking systems. It routinely monitored:

- Pregnancy milestones
- Completion of ANC and PNC visits
- Infant immunization status

The platform expanded to more than 300 health facilities across several provinces. It gained national recognition as a reliable digital solution for maternal and child health.

6. COVID 19 Pandemic: Dual National Responsibilities (2020)

6.1 COVID 19 Information Management Unit (IMU)

During the COVID 19 pandemic, the MoHP asked Amakomaya to support the national response. Amakomaya reused the mother tracking features to develop the COVID 19 Information Management Unit (IMU) for MoHP

The IMU supported:

- Case surveillance
- Clinical and laboratory data
- Vaccine registration and QR code certificates

More than 8,500 health institutions used the IMU nationwide, making it one of Nepal's largest emergency digital health systems.

6.2 Remote Maternal Support Call Center

COVID 19 lockdowns disrupted routine ANC and PNC services. To address this gap, Amakomaya launched a toll free maternal support call center from April 2020. Trained midwives operated the service with support from UNFPA and the Midwifery Association of Nepal.

Key achievements included:

- Around 450 calls per day during lockdown
- Direct coordination with government hospitals and ambulances

- Close collaboration with MoHP and the Family Welfare Division

During this period, Amakomaya handled two national roles at once: pandemic data management and maternal emergency support.

7. Post COVID Challenges and Strategic Realignment

After COVID 19, several system wide challenges became clear:

- Lack of data standards
- Poor interoperability between many systems running in many LLGs
- Data privacy and security concerns
- High engineering and maintenance costs

After COVID-19 Amakomaya also faced lack of funding from external development partner and lots of overburden cost required numbers of technical engineers to manage Amakomaya call center, Amakomaya app, Care app and COVID-19 system. Due to the lack of funding organization have experience difficulty retaining engineers and limited system documentation challenges for knowledge transfer to new engineers. As a result, leadership decided to migrate the Amakomaya care app that have been used by health workers to Digital Public Goods with the name of Amakomaya eRecord. Previously developed logic and algorithm have been used in this new system. The experience and learning from previous work shifted to value added services in the eRecord and improve sustainability and reduce monthly cost.

8. Shift Toward eRecord and AI Enabled CDST

Now under Amakomaya institution there are only two apps running. The first app is original Amakomaya app for the pregnant mothers. The features of this app have been advanced to next steps. As per original goal it is providing as much as possible audio, video and text based content in areas covering from sexual reproductive health (SRH), maternal and newborn care, Family planning, and mental health related with pregnancy. The backend of this app is officially managed by Amakomaya Call center and assisted by Midwifes. Mothers who are register in this are also can communicate with Call center from multiple channels such as WhatsApp, Viber and Facebook messenger. Midwife share important messages related with maternal care and newborn care via Facebook reels and Tiktok videos. The app has community features so all the mothers have opportunity to discuss among and between mothers in their concerns topics. Every week Call center organize live session via TikTok channel.

The second app is Amakomaya eRecord, the Digital Public Good based on DHIS2 Capture app designed to digitize all the basic health services in health facilities and support front-line health workers with AI-enabled Clinical Decision Support Tool. This app is only used by front lien health workers of health facilities, data manager of health division of Local Level Government.

Amakomaya have introduced FHIR profile to exchange data between eRecord app and Amakomaya app used by mothers. So mothers can access approved data from health facilities.

9. Tokha Municipality Case Study

With financial support from GIZ, and IHIMS/MoHP, Amakomaya have implemented the eRecord with AI enabled CDST in Tokha Municipality.

Key results included:

- Standard digital clinical records
- Decision support based on clinical guidelines
- Reduced clinical errors
- Real time access to data for planners and managers
- Alignment with national interoperability standards such as DHIS2 and FHIR

This implementation marks a major milestone in the Amakomaya journey. It shows a full transition from community education to AI supported clinical decision making within government systems.

The finding of the study is available in **following article --→**