Development and pilot of mHealth application to improve the treatment, monitoring and supply chain management for acute malnutrition

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Background

Community-based management of acute malnutrition (CMAM) is a proven approach in the treatment of acute malnutrition. However, the effectiveness of CMAM programmes is undermined by a variety of factors, including poor adherence to clinical protocols, inaccurate record keeping and weak supervision systems. Currently, paper-based systems are most widely used for patient records, summary reporting and stock management.

World Vision initiated the development of a mobile application for CMAM in 2013. The application was contextualized and launched in Niger in 2014, followed by Chad, Mali and Kenya in 2015, in collaboration with International Medical Corps and Save the Children.

CMAM mHealth Application Features

An android-based mobile application (app) for CMAM was developed to provide health workers with case management tools and a job aid, including response-triggered decision tree algorithms, automated referral initiating and tracking, integrated media to support counselling, automated reporting and supply chain monitoring. The application is an open-source mobile solution, built on the CommCare platform. The application was designed to address key challenges identified in CMAM programming.

Table 1: CMAM mHealth application features

Issues/Challenges	CMAM mHealth App Solution / Feature
Complex treatment protocol and low protocol adherence	Response-triggered decision tree algorithms
Low literacy, numeracy of health workers and language barrier with local population	Text, voice, and pictures prompt health workers along the treatment protocol
Difficulties in tracking an individual during treatment and between different treatment programmes	Automated referral initiation and tracking • Automatic reminders for follow-up • Referral notifications
Infrequent, inconsistent counselling on improved nutrition, health and hygiene practices	Integrated multimedia for targeted counselling
Paper based system slow, unresponsive and poor quality—not available for decision makers	Real-time monitoring through automatic generation of reports
Unresponsive stock management system: frequent stock outs of therapeutic and/or supplementary food at health facilities	Reminders and alerts to supervisors and supply chain

Deployment

The application was deployed to 54 health facilities across 4 districts (Chad: Bitkine, Abdi; Mali: Tominian; Niger: Maradi), and 1 county (Kenya: Wajir). A total of 146 health workers were trained on the application.

Evaluation

To assess the impact of the CMAM mHealth application, evaluations were conducted in Chad, Niger, Mali and Kenya over the period of July to October 2016. The main objectives were: to identify the effects of the app on health workers' performance; to assess the acceptability and competence of app users; and to capture lessons learned from the deployment and use of the app among field level stakeholders. Final evaluation reports will be available in late 2016. In addition, Save the Children is conducting a cluster randomized control study in Wajir, Kenya comparing quality of care and the completeness, timeliness and quality of reporting provided by the health workers using the traditional paper-based tools and the mHealth application on tablets. Results of the study should be available by mid 2017.

Preliminary Feedback from Users

Improved clinical protocol adherence

Health workers reported that the application assisted with the administration of the clinical procedures for CMAM, through providing a useful job aid, and step-by-step process. The application was considered particularly useful to health workers with limited formal training in CMAM.

Improved health worker-beneficiary interaction

Health workers also reported that the application assisted in effective communication with the beneficiaries. For example, if the application advised that admission was not required (based upon clinical or anthropometric criteria), then caregivers would accept this diagnosis without questioning the health worker.

Beneficiary acceptance

Beneficiaries appreciated the counselling and education messages that were provided through the application, in their local language.

Limitations of mobile device and network coverage

The application was difficult to work with on a small-screened device and, in some cases, limited battery power was problematic, despite the provision of solar chargers. Tablets, rather than mobile phones, are better suited for the application. Network coverage was also limited in some areas.

Key Lessons Learned

Key lessons learned during implementation include: developing a single set of 'global specifications' for a CMAM mhealth application is not feasible given the notable differences between the national protocols in West Africa versus Kenya; country contextualization is complex and time consuming; field testing and re-testing with end users is vital; working with a technology partner who specializes in mhealth in low-resource settings is beneficial, including the provision of in-country support and timely remote support; data migration and data ownership issues should be discussed at program inception; piloting the application within weak CMAM services in some countries affected the uptake of the application; and finally, while evidence generation is important, it is a challenge to integrate within the app development and piloting process.

Outstanding Issues and Next Steps

Opportunities for future deployment should be considered in the following contexts:

1. National deployment in line with the national digital health strategy, linked to the government Health Management Information System (HMIS). This issue is critical for scalability and sustainability of the application.
2. In humanitarian settings where there is no national HMIS or digital health platform available, deployment may be primarily led by NGOs supporting CMAM implementation.

Several future priorities have been identified for the application:

- Expanded use of application in current countries, linking the application to HMIS and national mHealth platforms
- Develop monitoring and reporting standards based on use of individual child data
- Capacity building to support uptake and use of application, e.g. performance reports, supervision functions
- Use of application in CMAM Surge work
- Multiple child health focused apps on an integrated platform (e.g. GMP, iCCM)
- Link application to other platforms (e.g. CMAM report, WV CMAM database)

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