

Abstract

Zindagi Mehfooz (Safe Life) Digital Immunization Registry: Leveraging Low-Cost Technology to Improve Immunization Coverage and Timeliness in Pakistan

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Abstract

Background: Despite free access to vaccines through the Expanded Program on Immunization (EPI) in Pakistan, only 54% of children receive all basic vaccinations. The global success of mobile health (mHealth) technologies, particularly, Digital immunization registries (DIRs), offers immense potential for comprehensive improvement in immunization programs. In 2012, we developed and piloted Zindagi Mehfooz (Safe Life; ZM) Digital Immunization Registry, an Android phone-based platform that enables vaccinators to digitally enroll and track the immunization status of their catchment population while allowing real-time access to data and easy generation of monitoring reports. Leveraging cutting edge mHealth technology, ZM includes features such as identification through quick response barcodes, interactive SMS reminders, decision support systems for routine/catch-up immunizations, real-time workforce tracking, predictive analytics for identifying high-risk children and customized report generation for monitoring. In 2017, ZM was scaled up, in collaboration with EPI, across the entire Sindh province and is currently being used by 1589 government vaccinators in 1296 basic health facilities.

Objective: We evaluated the ZM Registry in terms of improvement in immunization coverage and timeliness. The primary outcome of interest was fully immunized child (FIC) coverage in children under 2 years of age, ie, a child who has received one dose of Bacillus-Calmette-Guérin (BCG), three doses each of OPV and Pentavalent immunizations, and one dose of Measles vaccine. The secondary outcomes of interest included the Pentavalent-3 coverage rate and dropout rate between BCG and Measles-1 vaccine.

Methods: The provincial scale-up commenced in October 2017, and as of July 2018, over 700,000 children between 0-2 years have been enrolled in the Registry. At enrollment, the caretaker's information, child's bio-data, and immunization history are recorded and a unique Quick Response (QR)-code sticker is provided for identification. For the follow-up immunization visits, 3 SMS reminders are sent to parents for each vaccination. At the follow-up immunization, the child's history is retrieved on the phone by scanning the QR-code, and the vaccination record is updated accordingly. Data exported from the ZM DIR records was used to calculate the coverage rate for children enrolled in the Registry and the outcomes were compared with the coverage estimates from the most recent demographic survey (MICS 2014) to determine the impact of the Registry.

Results: Full immunization coverage of children (12-23 months) increased significantly from 35% as reported in MICS 2014 to 45% for children enrolled in ZM. Pentavalent-3 coverage of children enrolled in the Registry showed a 7% increase (from 53% reported in MICS 2014 data to 60% for children enrolled in the Registry). The dropout rate from BCG to Measles 1 vaccine was 24% as per the MICS 2014 figures and only 4% for children enrolled in the Registry.

Conclusions: ZM demonstrates the potential of DIRs to improve immunization outcomes within low-resource settings by enabling better child tracking, efficient data monitoring and most importantly a higher retention rate for completing all the recommended immunizations. The evidence base generated through the evolution of ZM over the years has also facilitated global replication and can be leveraged to achieve universal immunization coverage in underserved regions.

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KEYWORDS

immunization; mobile health; digital immunization registry

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