USAID FROM THE AMERICAN PEOPLE

Maternal and Child Survival Program

MercyCorps

Hati Kami

NURTURING THE MOTHER CHILD DYAD

WEST JAKARTA, INDONESIA

Lessons Learned Through a Study on Mobile Data Collection

February 2015

INTRODUCTION

In developing countries, Health Information System (HIS) data are often not useful for management decision-making because they are inaccurate, lack timeliness, or are unrelated to priority tasks of local health personnel.[i] While HIS data are often not used by local providers and managers, data collection and reporting can impose a significant burden on those collecting the data, detracting from time spent delivering services. These problems are commonly linked to onerous paper-based systems.

With the great increase in mobile phone use in developing countries, the use of mobile phones for improving health information (m-Health) has become a fast growing topic of inquiry with pilot studies ranging from the use of mobile phones for community health surveillance, to provider-client contacts and service statistics compilation and reporting.[ii] These pilots generally report positive outcomes in implementing m-Health [iii, iv, v, vi,] but problems in implementation are either not mentioned or are referred to only tangentially. The purpose of this paper is to present the range of implementation problems encountered in attempting to establish an m-Health system in Indonesia.

The project originally started as Operations Research (OR) intervention in two urban sub-districts in West Jakarta Municipality of Jakarta Province, Indonesia.   The intervention included community surveillance and service data reporting. The study was to compare the quality, timeliness and use of mobile phone data with the existing paper-based system. However, The OR had to be abandoned due to pre-existing problems in the comparison group and problems in the implementation of a mobile phone intervention. In this paper we focus on the problems hindering the implementation of the mobile phone based system.

THE PAPER-BASED SYSTEM

The Indonesian Ministry of Health (MoH) uses a paper-based Local Area Monitoring and Tracking (LAMAT) system to monitor coverage of maternal and child health (MCH) services. The system includes: collection and reporting of MCH service provision data by public and private health care providers and; the collection of household data by community volunteers.

Public Health Centers (PHCs) are responsible for compiling service provision data generated at the PHC, as well as service provision data collected by lower level facilities (i.e. Growth Monitoring Clinics) and private providers within the PHC catchment area, to generate the monthly LAMAT report. Although important in determining levels of health coverage, private providers are only nominally included in the paper-based system. They are not furnished with official reporting forms, and their reporting is not monitored. Private providers report only when and if they wish, and even then usually in an idiosyncratic format. The household data collected by community volunteers focused on pregnant women, newborns, children < 5, etc. The data is supposed to provide denominators for coverage indicators at the population level as well as at the individual level to furnish providers with information on the health needs of specific

households. Providers are supposed to check the LAMAT database to identify what services individuals require and to follow up to ensure these are provided.

LAMAT includes 14 paper-based registration books and forms to be completed by health providers and compiled by PHCs every month in order to generate the monthly MCH-LAMAT report.[vii] PHCs are often staffed by only one midwife who delivers almost all MCH services. She also bears the additional burden of manual data collection, analysis and reporting.

Most PHCs do not meet the reporting deadline and, even if the deadline is met, the reports often have many errors and are returned to the PHC for re-checking and re-calculation. As a result, information on MCH program performance is rarely available on time and is not used in the regular planning activities at the sub-district level. Problems with the community surveillance system --- especially the lack of individual identifiers --- also severely limited the usefulness of the data collected by volunteers.

In an attempt to address the issues related to manual data collection of MCH LAMAT indicators and improve the quality of data and its analysis at the PHC level, a computer software program (*Kartini*), designed to manipulate data and generate reports, was developed and introduced by the MoH, UNICEF, and USAID in 2009. In 2010 the use of *Kartini* was temporarily discontinued for several reasons: technical problems such as data entry and analysis protocols that were too complicated for most of health staff; cost of the system as the software requires the use of stand-alone server-computer with high memory capacity and; frequent freezing of the system as the amount of data being stored increases.[viii]

THE MOBILE – BASED DATA COLLECTION SYSTEM

Mercy Corps, in consultation with the Jakarta Provincial Health Office (PHO), developed mobile data collection tools using Datadyne's EpiSurveyor open source mobile technology platform. Electronic forms were adapted from the LAMAT guidelines. In the intervention area, community volunteers and private midwives were trained and mentored to collect data using the electronic forms built into basic mobile phones; Mercy Corps provided basic mobile phones for each of the ten private midwives participating in the study. The total number of volunteers was 420 and most had their own phones; Mercy Corps provided phones that were to be shared among volunteers who did have their own phones. In an attempt to avoid the problems found in the *Kartini* system, collected data were sent to the sub-district PHC where staff downloaded the forms and then uploaded them to Episurveyor's cloud database. The data were transferred to Microsoft Excel Worksheets, which were pre-formatted into the standard LAMAT reporting form.

Implementation issues:

Training:

The first step in implementing the mobile-based data collection system was refresher training in LAMAT for all sub-district PHC staff in charge of MCH reporting and private midwives. Staff of both sub-district PHCs attended the 2-day training, but only half (5) of the private midwives attended and the other 5 had to be coached individually at their clinics.

Mercy Corps developed training modules for the community volunteers and health providers. These modules consisted of an overview of LAMAT, the mobile-based data collection system and operational guidelines. These training modules were found to be too complicated for many participants. Mercy Corps revised the original text-heavy technical guidelines and created a picture-based, step-by-step data input pocket guide in order to be more simple and clear in describing the steps of the mobile phone data collection system.

Mercy Corps designed an ICT component for data processing and held a three-day training for staff of the intervention PHC. They were further coached on a monthly basis to generate MCH LAMAT and other MCH reports.

Private midwife reporting:

All 10 private practice midwives in the intervention area were expected to report data through the mobile system on a regular basis. All midwives reported irregularly with no more than six reporting in any one time period.

The mobile data collection system used electronic forms based on LAMAT guidelines and similar to standard midwifery medical records, but private midwives used their home-developed sub-standard client registry books, which did not contain all required data to complete the electronic forms. Midwives often needed to revisit households to find missing information, causing delayed reports.

Due to time constraints, half of the private midwives relied on their assistants to complete the mobile forms, which caused quality control problems and led to gaps in MCH services reporting in the absence of these assistants.

Physical documentation of paper-based data was still considered essential for back-up of mobile data; this contributed to the burden of double reporting and some users mentioned that they experienced trouble sending the data, while others expressed concern that there could be problems with the technology in the future.

Community Volunteer Reporting:

Lack of a unique identifier for household registration for key MCH target groups made it difficult for volunteers to track homes and resulted in duplicate visits and duplication of data entries. As a solution, Mercy Corps created a sticker to place in the front of each house indicating a previous visit. However, without a unique identifier, volunteers were required to enter names of those being registered and some used nicknames or misspelled names, which further contributed to duplication of entries and reducing the accuracy of the mobile phone based system. Duplicate reporting also occurred due to low network speed which led volunteers to resubmit forms they believed had not been successfully submitted.

PHC Data Analysis and Reporting:

An existing informatics staff in the intervention PHC helped process electronic data from the mobile-based data collection system into reports but there was still a heavy reliance on technical support from Mercy Corps for processing and reporting. The PHC had concerns about the

sustainability of the mobile system given the need for continuing Mercy Corps assistance, and attrition among health workers trained in the system.

Systems Issues:

In 2013, Datadyne replaced Episurveyor with a new application, Magpi. During Datadyne's migration of episurveyor to Magpi, most users experienced difficulties with platform malfunctions. Common problems included not being able to log into their episurveyor e-forms, and being unable to send completed forms stored in their mobile phones to the PHC, forcing them to re-copy forms manually. Mercy Corps provided technical support to reinstall software, at which point some phones owned by the community volunteers were found to be incompatible with the updated technology.

Preparing reports required adequate computers, WIFI, and electricity, which were not always accessible.

DISCUSSION

Implementing an m-health system requires that many problems related to training, infrastructure, software platforms, and the ability to understand and use the new system without on-going technical assistance have to be addressed. The usefulness of a health information system depends on many factors, and is not determined only by the type of reporting system, whether mobile phone or paper based. We found usefulness constrained by problems inherited from the existing paper-based system, especially the lack of important data and the willingness and ability of some health workers to report.

BIBLIOGRAPHY

[i] JH, L. (2003). Data Flows in Health Information System: An action research study of reporting routine health delivery services and implementation of computer databases in health information systems. Oslo: University of Oslo, Department of Informatics.

[ii] Wilson, T. (2000). Human Information Behavior. *Informing Science, 3(2).* Retrieved from http://inform.nu/Articles/Vol3/v3n2p49-56.pdf , 49-55.

[iii] Tomlinson M, Solomon W, Singh Y, Doherty T, Chopra M, Ijumba P, et al. The use of mobile phones as a data collection tool: a report from a household survey in South Africa. BMC Med Inform Decis Mak. 2009;9:51. Available online from: [PMC free article] [PubMed]

[iv] Blaschke S, Bokenkamp K, Cosmaciuc R, Denby M, Hailu B, Short R. Brooklyn, NY: UNICEF Malawi, UNICEF Innovations, Mobile Development Solutions; 2009. Using mobile phones to improve child nutrition surveillance in Malawi. Available from: https://sipa.columbia.edu/sites/default/files/UNICEFFinalReport_2009_0.pdf [cited 27 July 2014].

[v] Lozano-Fuentes S, Wedyan F, Hernandez-Garcia E, Sadhu D, Ghosh S, Bieman JM, et al. Cell phone-based system (Chaak) for surveillance of immatures of dengue virus mosquito vectors. J Med Entomol. 2013;50:879–89. Available online from: [PMC free article] [PubMed]

[vi] Charles S. Hall, Edward Fottrell, Sophia Wilkinson, and Peter Byass. Assessing the impact of mHealth interventions in low- and middle-income countries – what has been shown to work? Global Health Action. 2014; 7: 10.3402/gha.v7.25606. Published online Oct 27, 2014. doi: 10.3402/gha.v7.25606

[vii] Syahrizal et al. (2010). Pedoman Bidan Koordinator (Guidance for Coordinating Midwife). Jakarta: Ministry of Health.

[viii] Liesman et al. (2011). Equipping and Strengthening LAMAT: Local Area Monitoring of Maternal and Newborn Health in Indonesia.