Exploring Linkages between Routine Health Facility (HMIS) data and Surveys: Early Lessons from the PMA2020 Project

Elizabeth Omoluabi, Retha Luus, Ime Asangansi, Nancy Steigler, Kayode Fasominu

Background

Delivering on Africa's data revolution involves finding innovative ways of assessing and triangulating the increasing amounts and complexity of population and health data generated from various sources. Routine data produced by health facilities have the potential to enable a more frequent approach to monitoring health service utilization and health outcomes. Health management information systems (HMIS) are an essential foundation for evidence-based decision-making within public health systems but in most developing countries, they mostly provide count data e.g. number of vaccines provided, without the denominator of the target population that needs to be vaccinated. Consequently, they need to be linked to household/community level data from censuses or surveys to transform their count data to meaningful indicators of service delivery. Surveys can provide the numerator and denominator numbers for service delivery indicators. Surveys can also serve as data quality checks to the national HMIS. PMA2020 supports regular low-cost, rapid-turnaround, nationally-representative surveys using mobile technology to gather, analyze, and disseminate family planning and related health information at both household and facility levels. This paper explores ways in which the PMA2020 data can effectively triangulate some of the National HMIS data in the area of family planning in Nigeria.

Hypotheses

The main objective of this research is to explore the possibility of using PMA2020 survey data to verify Nigeria's routine Health Management Information System and vice versa. Our hypotheses are as follows:

1. Does the PMA2020 have the potential to assess the National Health Management Information System?
2. Can we triangulate Nigeria's HMIS data with PMA2020 survey data?
3. How many data points in the PMA2020 can we match with the HMIS?
4. What are the challenges in trying to compare information from these two different data sources for the same health facility?

Methodology

The PMA2020 Nigeria survey is a series of smartphone assisted electronic data collection surveys of fertility, family planning, water and sanitation. Kaduna State baseline survey adopted a two-stage stratified sampling technique whereby a sample of enumeration areas (EAs) was drawn from the state sample frame, a subset of the national census sample frame. Early in its planning FP2020 identified seven facility-based indicators for tracking progress in the delivery of services. As a result PMA2020 designed an SDP survey to accompany the household (HH) and eligible female (F) survey, have a probability sample and cover both public and private sectors. The selection of health facilities is based on the probability sample of enumeration areas (EAs). The SDPs thus represent facilities accessible to the female population in the EA. In trying to match our survey data with the HMIS, we limited analysis to public sector facilities because the private sector is hardly represented in the HMIS. We then started by assessing the health facility information in the PMA2020 dataset, looking at consistency of FP information before doing the same for the HMIS dataset. The aim is to undertake a 3-way evaluation: evaluating the FP information in each survey individually; evaluating the HMIS with the PMA2020 survey and evaluating our survey with the HMIS.

Preliminary Results

Focusing on Kaduna State's family planning service delivery, we were able to successfully identify 74% of the government health facilities and 67 of the variables in the PMA2020 survey data that could be matched in the Kaduna State HMIS (Table 1). Variables include whether FP was offered and the various methods offered. PMA2020 had 67 unique variables including GPS coordinates that could be matched with the HMIS dataset. Among methods, we were able to match implants, IUD, injections, oral pills, male condoms, female condoms and emergency contraception. We had to recode a number of the HMIS variables to make them comparable to those in the PMA2020 data. For example, the HMIS does not separate male sterilization from female sterilization, therefore we had to combine them into a new variable in the PMA2020 dataset. A running average was used to smooth the HMIS data for April to June 2014 to take account of irregularities in monthly reporting. We then matched the health facilities found in both datasets before comparing the levels reported for September/October 2014 in the PMA2020 survey with that of an average month in the HMIS. Some variables did not exactly match and could not be recoded. For example, stockout of FP commodities in the HMIS is reported per month whereas the PMA2020 reports stockout in the last three months.

Knowledge contribution

The importance of routine data collection systems cannot be overemphasized, especially in resource strapped environments. Being able to assess the quality of these systems through rapid turnaround surveys like the PMA2020 constitutes a major breakthrough in reproductive health research. Our research enables us not only to evaluate the HMIS data but also those of the PMA2020 while offering the possibility of having a larger set of variables for the same health facilities by joining both files. The first part of our research has culminated in the successful identification of 67 family planning variables in the PMA2020 that can be matched with the Nigerian Health management information System. We shall analyse the quality of the data in the DHIS (timeliness, completeness, accuracy and consistency) and thereafter undertake triangulation with PMA2020 data.

A major challenge encountered in trying to match HMIS data with that of the PMA2020 is that of variations in the names of health facilities. While a few of these were spelling errors during PMA2020 fieldwork, the majority of cases corresponded to a difference between the official name of the facility and how it is identified in the HMIS. Unfortunately, the Nigerian HMIS has not recorded the unique identification numbers of the health facilities in its database[1]. Matching can thus only be done by facility name, combined with the Local Government Area and Ward name, a long, painful process. The HMIS database has some duplicate names for the same facility with data being reported sometimes for one or the other within a given period.

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[1] We are aware that the process of assigning unique identification numbers to Nigeria's health facilities has started but somehow got suspended

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Variables in the PMA2020, Kaduna	Variables in the HMIS, Kaduna state	Comment/rule
LGA	LGA	
facility name	organisationunitname	
fp_offered	na_fp_offered	Indirect validation. If facility offers at least one method, validate yes (include all options)
methods_offered	na_methods_offered	List PMA methods, match with HMIS per facility (Sterilization, implants, iud, injectables,pills, male condom, female condom, EC). Combine male and female sterilization
offered_male_ster		Create new variable in PMA2020 = offered_total_ster: (offered_male_ster and offered_fmale_ster)
offered_fmale_ster		Create new variable in PMA2020 = offered_total_ster: (offered_fmale_ster and offered_fmale_ster)
offered_implants	implant	
offered_iud	iucd inserted	
offered_injectables	injections	
offered_pills	persons given oral pills	
offered_male_condom	condom distribution sachet - male	
offered_female_condom	condom distribution sachet - female	
offered_ec	stock out of emergency contraception	If no stockout, then count as offered
counseled_female_ster	Sterilization total	
counseled_male_ster		
counseled_implants	implant	
counseled_iud	iucd inserted	
counseled_injectables	injections	
counseled_pills	persons given oral pills	
counseled_male_condom	condom distribution sachet - male	
counseled_female_condom	condom disttribution sachet - female	Merge (offered_male_ster and offered_male_condom)
counseled_ec	stock out of emerg contraception	If method offered in HMIS, assume method counselled
provided_female_ster	Sterilization total	
provided_male_ster		If method offered in HMIS, assume provided
provided_implants	implant	

provided_iud	iucd inserted	
provided_injectables	injections	
provided_pills	persons given oral pills	
provided_male_condom	condom distribution sachet - male	
provided_female_condom	condom disttribution sachet - female	
provided_ec	stock out of emerg contraception	
prescribed_female_ster		
prescribed_male_ster	Sterilization total	
prescribed_implants	implant	
prescribed_iud	iucd inserted	
prescribed_injectables	injections	
prescribed_pills	persons given oral pills	
prescribed_male_condom	condom distribution sachet - male	
prescribed_female_condom	condom disttribution sachet - female	
prescribed_ec	stock out of emerg contraception	If method offered in HMIS, assume prescribed
implant_insert	na_implant_insert	Not available in HMIS but indirect verification. Eg non-zero or zero (in either system) should coincide
implant_remove	na_implant_remove	Not available in HMIS but indirect verification. Eg non-zero or zero (in either system) should coincide
iud_insert	na_iud_insert	Not available in HMIS but indirect verification. Eg non-zero or zero (in either system) should coincide
iud_remove	na_iud_remove	
visits_female_ster		
visits_male_ster	Sterilization total	
visits_implants_total	implant	
visits_iud_total	iucd inserted	
visits_injectables_total	injections	
visits_pills_total	persons given oral pills	
visits_male_condom_total	condom distribution sachet - male	
visits_female_condom_total	condom disttribution sachet - female	Compare visits with relevant methods provided
visits_ec_total	stock out of emerg contraception	
visits_implants_new	implant	
visits_iud_new	iucd inserted	
visits_injectables_new	injections	
visits_pills_new	persons given oral pills	
visits_male_condom_n	condom distribution	

ew	sachet - male	
visits_female_condom _new	condom disttribution sachet - female	
visits_ec_new	stock out of emerg contraception	
stock_injectables	na_stock_injectables	Stock out in HMIS is one month, whereas it is 3 months in PMA. Inform HMIS to include Male Condom, pills, injectbales
stock_pills	na_stock_pills	
stock_male_condoms	na_stock_male_condoms	
stock_female_condom s	stock out of female condoms	
stock_ec	stock out of emerg contraception	
locationlatitude	NA	
locationlongitude	NA	Match facility name on HMIS with PMA
locationaltitude	NA	Adapt altitude for HMIS per corresponding facility on PMA

Introduction

Eight global health agencies including the Gates Foundation, the UN, WHO and Global Fund have since 2010 demanded for timely and reliable "statistics that accurately track health progress and performance, evaluate the impact of health programs and policies, and increase accountability at country and global levels"[2]. They recognise that these statistics must come from at least four main sources: censuses, population vital registration, surveys, health management information systems (HMIS) and administrative systems.

HMIS according to the eight agencies, "continue to perform poorly in terms of data quality, timeliness, and use in decision-making. There are exceptions, and several disease-specific information systems have benefited from intensive technical quality control and financial inputs, including those for outbreak disease surveillance, eradication programs (for example against polio), tuberculosis, HIV/AIDS, and immunization coverage."

Nigeria finally joined the party in 2013 when the National Council of Health adopted the DHIS2-based National HMIS as the national platform for data reporting from all facilities in Nigeria. Apart from Nigeria, DHIS2 is operational in 46 other countries including DRC, India, Ghana, Niger, Uganda, all PMA2020 countries.

In Nigeria National reporting has increased from less than 5% in 2012 to over 62% of all health facilities in 2014.

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Even when we resolve some of these issues, HMIS data often represents only the tip of the iceberg, missing a substantial amount of important health and demographic events in the communities.

HMIS Mobile is a mobile (android platform) application designed to help health workers in the filling and sending of facility reports via the GSM network instead of paper. It allows for monthly data entry. Data sets collected include: antenatal care and pregnancy outcomes, mortality and births, family planning, immunization, nutrition and growth monitoring, community outreach services and facility utilization. It is being piloted in Katsina and Yobe states by DFID and the state Ministries of Health.

District Health Information System 2 (DHIS2) – also allows for the creation of individual patient records for certain categories of patient eg children under five years of age and pregnant women who live in the catchment area.

There is as yet no policy to integrate ICT health initiatives with DHIS2[3].
One project that has successfully integrated DHIS2 is the Cross River Health and Demographic Surveillance System, which links data collected by CHWs on mobile phones with the NHMIS[4]. It

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[2] Chan M, Kazatchkine M, Lob-Levyt J, Obaid T, Schweizer J, et al. (2010) Meeting the Demand for Results and Accountability: A Call for Action on Health Data from Eight Global Health Agencies. PLoS Med 7(1): e1000223. doi:10.1371/journal.pmed.1000223
Published January 26, 2010
http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1000223

[3] United Nations Foundation, 2014
[4] Ime ASANGANSI, Bruce MACLEOD, Martin MEREMIKWU, Iwara ARIKPO, David ROBERGE, Brian HARTSOCK, Ideba MBOTO, 2013, Improving the Routine HMIS in Nigeria through Mobile Technology for Community Data Collection Journal of Health Informatics in Developing Countries, Vol. 7 No. 1, 2013

linked the data through a functionality that allowed data export to the state and national HMIS platform, the District Health Information System (DHIS2).