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Comparison of Immunization Coverage Status Reported through NFHS Coverage Evaluation Survey and HMIS in Maharashtra

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Abstract

Accurate health data is the most crucial factor for effective public health program evaluation, monitoring, planning, and implementation. There are many surveys conducted in India for collating information on the health status of the country, one of which is NFHS (National Family Health Survey). NFHS is a representative sample survey which collects evidence of trends in population, health and nutrition indicators including immunization status of children under five years of age. However, the public health system in India including Maharashtra is dependent on the reports generated by HMIS for assessment of immunization coverage status. There is a relatively large difference in immunization coverage estimates of NFHS-4 and HMIS reports. NFHS and HMIS both have differences in the purpose, design, and interpretation between the two. A deeper and more detailed analysis of the two systems and datasets is required to explore these differences and make evidence-based conclusions on data triangulation.

Key words: *Immunization data, NFHS, HMIS, data, comparison*

Introduction

National health programs are highly reliant on accurate and usable data for successful design and implementation, which is also crucial for identifying programmatic gaps and planning program amendments. In India, health data is commonly sourced from public health reporting system and representative surveys; less commonly from the private health sector. Multiple rounds of various health surveys like National Family Health Surveys (NFHS), District Level Household Surveys (DLHS) and Annual Health Surveys (AHS) have been conducted over past few years [(1)]. These surveys provide information on health indicators in a sample of representative individuals across the country. In spite of the availability of data collected from different surveys with overlapping goals, several gaps remain in the availability of health information in India [(2)] assess the availability of health data in the public domain, and review publications resulting from the National Family Health Survey (NFHS).

NFHS is a representative sample survey conducted throughout India. NFHS 4 which was conducted during 2015-16 included collection of information on health indicators from 29 states and six union territories. It collected evidence of trends in population, health and nutrition indicators. The health indicators focused on maternal child health and selected communicable and non-communicable diseases[(3)].

The recent evolution of National Health Mission (NHM) has provided an opportunity for the health system to gather real-time information and has gradually moved towards digitalization leading to the strengthened base of health information in Indian health system. Health Management Information System (HMIS) is an initiative launched in 2008 by NHM which is a digital

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platform for monitoring of service delivery with a focus on reproductive, maternal and child health. It captures 70 data items at sub-centers and 117 items at Primary Health Centres. HMIS has provided a platform for collection and aggregation of information which can be further analyzed and the information could be used for monitoring and thus better performance of health systems [4].

The HMIS portal primarily collects information related to Ante Natal Care (ANC) of pregnant women, deliveries and it's outcome, reproductive health and child care, especially the immunization status [5]. Reporting of immunization is an utmost important indicator to assess the health status of the population. Both NFHS and HMIS collects information on immunization from the population.

Background:

The public health systems in India including Maharashtra are dependent on the reports generated by HMIS for assessment of immunization coverage. Moreover, the information is also compared with the information obtained from the recent NFHS rounds. The information present in the public domain for access was used for this comparison. The total immunization reported by NFHS-4 (2015-16) in Maharashtra state is 56.3 % whereas the immunization reported by HMIS is 94.13%. Below is the district wise comparison of total immunization reported by NFHS-4 and HMIS report of the year 2015-16 (Table 1). The full immunization means vaccination with BCG, Measles, and three doses each of Polio and DPT/Penta in children of age-group 12-23 months.

Table 1: District wise comparison of immunization data reported by NFHS and HMIS

District	% of fully immunized as per NFHS data	% of fully immunized as per HMIS data
Ahmednagar	43.4	94.20
Akola	50.8	105.75
Amravati	(64.7)	93.95
Aurangabad	59.3	100.38
Beed	53.9	101.81
Bhandara	(81.1)	84.09
Buldhana	64.2	88.96
Chandrapur	(60.5)	96.53
Dhule	40.0	98.39
Gadchiroli	(82.0)	95.64
Gondia	74.4	84.73
Hingoli	65.9	99.25
Jalgaon	(43.2)	93.78
Jalna	70.0	94.66
Kolhapur	(46.9)	101.28
Latur	59.4	103.17
Nagpur	(76.5)	99.07
Nanded	51.1	97.14
Nandurbar	32.8	78.04
Nasik	62.3	97.77
Osmanabad	(62.7)	100.34
Parbhani	51.5	103.21
Pune	(81.0)	92.22
Raigad	(47.6)	78.34
Ratnagiri	(73.1)	91.84
Sangli	(43.4)	93.26
Satara	59.2	97.57
Sindhudurga	(80.3)	77.22
Solapur	64.9	97.28
Thane	40.9	88.01
Wardha	(76.5)	90.04
Washim	(67.9)	93.48
Yavatmal	61.6	94.95

Cont... **Table 1: District wise comparison of immunization data reported by NFHS and HMIS**

This relatively large difference in -reports of NFHS-4 and HMIS data raises several questions about the actual proportion of children in Maharashtra who are fully immunized. While this commentary is not a critique of either of the two systems, here we will try to explain factors that may be responsible for this difference and argue that the two reports are probably not comparable; instead, they have different purposes and can be complementary to each other.

Purpose

The National Family Health Surveys are nationwide surveys conducted with a representative sample of households throughout the country. They are designed to provide national, state and for the first time in NFHS-

4, district-level estimates of important indicators of family welfare, maternal and child health, and nutrition including estimates of children that are fully immunized. The NFHS rounds use standardized questionnaires, sample designs, and field procedures to collect data.

The HMIS is a regular health reporting portal in the public health system, i.e. it reports indicators related to maternal health, child health, communicable diseases and other health conditions from public health facilities as well as private facilities. Immunization status of children vaccinated at public health facilities is one of the important indicators that are regularly reported in the HMIS. The HMIS has a reporting structure that builds up from the government sub-centers to primary health centers and further to the district and state level. The HMIS includes data from all public health facilities in districts and state; thus it is not sample-based. The HMIS is an important tool that provides real-time data on health indicators and is used by government program managers as well as policymakers to understand the current health status of communities as well as design interventions to improve health programs including micro-level planning. The HMIS is valuable in identifying lacunae in program implementation and taking immediate corrective actions for the same.

Definitions

Both NFHS and HMIS follow guidelines developed by the World Health Organization wherein children are considered fully vaccinated when they have received a vaccination against tuberculosis (BCG), three doses of diphtheria, whooping cough (pertussis), and tetanus (DPT) vaccine; three doses of the poliomyelitis (polio) vaccine; and one dose of the measles vaccine by the age of 12 months. While the NHHS-3 reported both proportions of children fully immunized before 12 months of age as well as the proportion of children fully immunized at any time before the survey, the NFHS-4 state fact sheet for Maharashtra reports the only proportion of fully immunized children aged 12-23 months.

Method

The NFHS rounds are conducted at intervals that are not regular. While NFHS-1 was conducted in 1992-1993 and NFHS-2 in 1998-1999, the NFHS-3 was conducted in 2005-2006 and the NFHS-4 was conducted after an interval of 10 years in 2015-2016. The NFHS-4 round for Maharashtra gathered information from 26,890 households, 29,460 women, and 4,497 men. Indicators for child immunization was obtained from these 29,460 women as these were included in the women's questionnaire of the survey. All women were asked about vaccines received by all living children in the last five years prior to the survey. To obtain this information woman were first asked to produce vaccination cards for the children and data on individual vaccines along with the date of vaccination was recorded from these cards. If the card were not available, women were asked if their children had received vaccines and thus reported vaccination history was recorded. Data is collected over a period of approximately one year and primary reports are published within two years of data collection.

The HMIS is a regularly updated portal that records information on individual vaccines from vaccination registers maintained at government sub-centers, primary health centers, and other public health facilities. Every primary health center and sub-center are given a '*target population'*, i.e. children eligible for immunization that is estimated from census data and the actual number of eligible children immunized is calculated against the target population. Data on children immunized at other public health facilities are recorded at the primary health center where children reside. Data in HMIS is updated every month and made available to program managers. A critical component of the HMIS is monitoring and evaluation. Data in the HMIS is monitored at all levels from the sub-district level to the national level. At each level, the data is cross-verified by respective program managers and only then reported, thus ensuring the quality of the data.

Critical differences between NFHS-4 and HMIS

The NFHS rounds are sample surveys, with data collected from these sample households expected to provide estimates for the complete population. Though sample size calculations and sampling strategies have been statistically calculated to ensure adequate power and representativeness of the sample estimates, as with any sample survey, there remains an uncertainty in projecting sample data to the larger population, in this case, the complete population of the state and districts. Further, there is a time-lag between a collection of data and publishing results of the survey which can range from one to two years; while immunization trends at the national level usually are not expected to vary significantly, such a lag may not be useful to identify any acute weaknesses. The HMIS records program data on a real-time and regular basis. Data for all children

immunized at public health facilities are recorded in the HMIS and monthly reports are generated from the HMIS to facilitate calculation of number and proportion of children immunized. Thus the HMIS can inform the immunization program about monthly trends at all levels of the public health system

The NFHS surveys generate estimates at a given point of time and while trends in the status of child immunization can be statistically estimated from consecutive survey rounds. The HMIS, by virtue of its regularity of data recording, can provide relatively more accurate estimates of trends in immunization. However, calculation of the *'target population'*, i.e. all eligible children within a given area, which forms the denominator to calculate the proportion of children immunized, may have inaccuracies as it is estimated from the last census and data on new births available from government records. In addition, it is difficult to estimate in and out-migration while calculating *'target population'*. This inherent difficulty in fixing a denominator when using HMIS data is a known weakness in the system; which can be corrected to a large extent using statistical adjustments and more accurate population estimates. However, a discussion on this is beyond the scope of this commentary.

Data on individual vaccination in NFHS-4 was either recorded from vaccination cards or from mother`s recall. Further, data were recorded for all living children in the five years prior to the survey. The accuracy of data in case of unavailability of vaccination cards must be viewed with caution as mother`s recall is influenced by many factors, especially elapsed time in case of vaccinations given 3-5 years ago. While the NFHS-4 has yet to publish detailed estimates, the NFHS-3 reports that vaccination coverage for each type of vaccine and for full vaccination was much higher for children for whom a vaccination card was shown (76% for all vaccines) than for the children whose vaccination information is all based on mother's recall (24% for all vaccines). This seems to be a significant difference in the proportion of children vaccinated. However, the NFHS-3 report does not mention proportion of all respondents that had and did not have a vaccination card. If the proportion of respondents without a vaccination card was high, then there is a higher likelihood of under-reporting of vaccination, based only on maternal recall. Even among those with vaccination cards, the NFHS-3 did not report the completeness of vaccination cards as cards with incomplete information do not necessarily indicate incomplete immunization.

While all these factors do not comprehensively explain differences in immunization status between NFHS-4 and HMIS, there is enough evidence to show significant differences in the purpose, design, and interpretation between the two. Obviously, a deeper and more detailed analysis of the two systems and datasets is required to explore these differences and make evidence-based conclusions. Thus, interpreting either the NFHS-4 data or the HMIS data needs utmost caution when estimating immunization status of the complete population. At this juncture, it is advisable to not draw conclusions about the same before exploring further. A direct comparison between the two datasets would neither be appropriate nor would it generate actionable evidence. Rather, it would be more judicious and efficient to consider the two datasets as complementary to each other and apply appropriate statistical methods to use both to arrive at population immunization proportion estimates.

Conclusion

All these raise a question if actual information could be compared with the estimated one. Although this could be one possible way to compare the actual information, many comparisons could be done if raw data of both the data sets could be made available. We can also independently analyze the available health systems data and publish it responsibly in peer-reviewed journal which would give credibility to the use of health system data for various reasons and purposes. Probably data triangulation exercises including a combination of the two datasets along with an independent verification would provide the most realistic estimates of immunization coverage. Thus, we could initiate by using available data from health systems to produce credible publications to utilize the potential of such datasets for better tomorrow.

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References

1. Srivastava D. Health system monitoring using Health Management Information System (HMIS) in India and suggested enhancements to this platform. International Journal of Scientific & Engineering Research. 2015;6(9):1245–8.
2. Dandona R, Pandey A, Dandona L. A review of national health surveys in India. Bulletin of the World Health Organization. 2016;94(4):286–296A.
3. National family Health Survey [Internet]. 2009 [cited 2017 Feb 4]. Available from: http://rchiips.org/nfhs/nfhs4.shtml
4. Husain; Z, Saikia; N, Bora RS. Opportunities and challenges of health management information system in India: a case study of Uttarakhand. Munich Personal RePEc Archive. 2012;(40014).
5. Health Management Information System [Internet]. 2016 [cited 2017 Feb 4]. Available from: https://nrhm-mis.nic.in/hmisreports/frmstandard_reports.aspx