Health system monitoring using Health Management Information System (HMIS) in India and suggested enhancements to this platform

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Abstract – This paper is an attempt to highlight features of Government of India's e-portal, HMIS (Health Management Information System) & comparison with some of the existing data collection processes used in health sector. Global practices and steps required to be taken for strengthening health MIS are also highlights of this paper. There is also emphasis on how an effective MIS increases the efficiency of senior and middle level health officials thereby facilitating planning and policy making decisions based on factual information.

Index terms – HMIS (Health Management Information System), MDG (Millennium Development Goals), IMR (Infant Mortality Rate), MMR (Maternal Mortality Ratio), Coverage, Effectiveness.

1. INTRODUCTION –

India's % total expenditure on health care to GDP is in the range of 1.2% over the last four years, while China spends around 3.1% of its GDP on health sector [1] despite both countries catering to a population of more than 1.25 billion people & having similar demographics. Out of total health care expenditure in China, around 0.7% goes for development and maintenance of Health Information Systems which have played a significant role in the overall improvement of health services in China.

In terms of Critical Health Indicators, China is fast closing its gap with Developed Countries. In contrast, India still has a long way to go with respect to critical health indicators even with some of its neighbors. Following tables depicts the scenario very well;

Country	MMR (Maternal mortality per 1,00,000 live births) 2013 [3]	IMR (Infant Mortality per 1000 live births) 2015 [2]
India	**190**	**37.9**
China	32	9.2
Japan	6	2
Bangladesh	170	30.7
Bhutan	120	27.2
Pakistan	170	65.8
Sri Lanka	29	8.4

In order to improve Critical Health Indicators & to achieve Millennium Development Goals (MDGs) i.e. 109 MMR and 27 IMR by 2015 [4], India needs an efficient & robust Health Information System. India has over 192,000 government health facilities across the country and to merely track monthly performance of these facilities is itself a daunting task.

Following are some of the existing programs run by the Government of India for data collection in health sectors:

1.1. **Census:** In India, census has been providing comprehensive and regular information on population characteristics, fertility, mortality, literacy, education, economic activity etc. since 1872. Frequency of census in India is every ten years and it is based on complete enumeration of the country's population.

1.2. **Sample Registration System (SRS):** The Sample Registration System (SRS) is a large-scale demographic survey for providing reliable annual estimates of birth rate, death rate and other fertility & mortality indicators at the national and sub-national levels. It became fully operational during 1969-70. The SRS since then has been providing data on a regular basis. At present, SRS is operational in 7,597 sample units (4,433 rural and 3,164 urban) spread across all States and Union territories and covers about 1.5 million households and 7.52 million population.

1.3. **Civil Registration System:** Under this system, recording of births and deaths are being done on continuous basis by ORGI. It was initiated under Registration of Birth and Death (RBD) Act, 1969 of Government of India. On the basis of this data, an annual report is compiled every year which provides data on total number of births and deaths in India.

1.4 National Family Health Survey (NFHS): The NFHS is a large scale, multi-round survey conducted in a representative sample of households throughout India. It was launched by Ministry of Health & Family Welfare (MOHFW) in 1991. Its principal objective was to provide national and State level estimates on fertility, mortality, family planning and other key health indicators. So far three surveys have been conducted under NFHS and fourth is in progress. NFHS-1 was conducted in 1992-93, NFHS-2 in 1998-99 and NFHS-3 in 2005-06.e)

1.5 **District level Household and Facility Survey (DLHS):** To generate district level data on utilization of services provided by Government, a rapid household survey was initiated in all the districts by MOHFW. First round of DLHS was conducted during 1998-99, second round was done in 2002-04 and third round took place in 2007-08.

1.6. **Annual Health Survey (AHS) –** To collect core vital and health indicators at district level and to map changes therein on annual basis, Annual Health Survey was initiated in 2010-11. Three rounds of AHS have been conducted during 2010-11, 2011-12 and 2012-13.

The common limitation of all the above mentioned programs for data collection on health sectors is that they provide data for analysis with a substantial time lag (up-to 3-4 years) & surveys are done at irregular intervals, while for taking proactive & planned policy measures, regular time series (i.e. over a continuum of time period) data on service delivery and performance indicators is desired. Lack of timely availability of data hampered the decision-making process, potentially leading to poor outcomes in mother and child health indicators. The government felt an immediate need to facilitate planning and policy making based on factual information/data and to reduce the margin of error in overall reporting process.

In view of this, a web-based portal namely "Health Management Information System (HMIS)" was launched in October, 2008. It was conceived and developed by Statistics Wing of Ministry of Health & Family Welfare, Government of India [5]. Initially, HMIS was designed to capture district consolidated information across the country, later in view of seeking information for micro level planning, provision for capturing performance data of individual health facilities was introduced in 2011. To strengthen it further, the portal was augmented in March, 2014 by introducing SAS based analytical features on SharePoint platform.

2. SALIENT FEATURES OF HMIS -

It is the first system of the country that has initiated capturing monthly data on service delivery, with special focus on reproductive, maternal and child health. Funds were provided by the Government of India to establish the necessary infrastructure at National and grass root level. Salient features of HMIS are;

- ✓ Web based portal
- ✓ Unique formats for different level facilities
- ✓ Captures around 70 data items at Health Sub Center(HSC) level, 117 data items at Primary Health Centre (PHC) level and 137 items at CHC, SDH and DH level [6]
- ✓ Offline and online data uploading facility
- ✓ Captures performance related monthly data
- ✓ Provision of uploading infrastructure data such as HR, clinical facilities, medicines etc. on annual basis
- ✓ Data available in public domain
- ✓ Availability of customized reports based on service delivery, infrastructure and survey data

3. HIERARCHICAL STRUCTURE FOR HMIS –

HMIS is an initiative under National Rural Health Mission of Ministry of Health & Family Welfare, Government of India. It is completely funded and supported by the Government of India. Overall administration of HMIS including software development and management lies with the Government of India while data compilation and uploading task is being done by State Governments. The hierarchical structure for administration of HMIS is as follows;
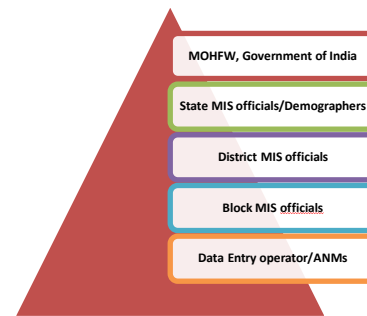
4. FLOW OF DATA IN HMIS –

HMIS has the provision of uploading "facility level data", however data entry points in most of the States are block CHC/PHC. All government health facilities are divided under five categories i.e. DH, SDH, CHC, PHC and Sub center. At the 5th of the following month, compiled data of the previous month is expected to be uploaded on HMIS through nearest data entry point. Funds are being provided by Government of India for hiring Data entry operators, block, district and State MIS officials. Flow of data in HMIS portal is as under;
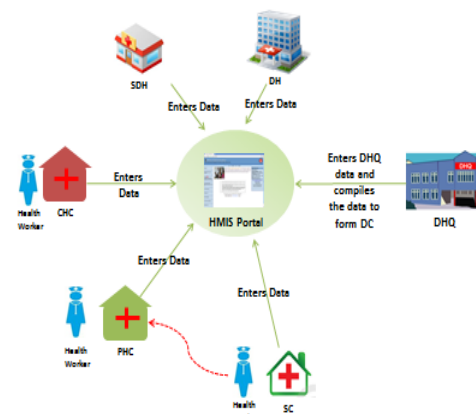
5. KEY REPORTS OF HMIS –

The HMIS has various types of reports based on nature and periodicity of generation. Some of the following standard and analytical reports available on HMIS portal are very

useful for providing valuable inputs to policy makers and planners;

5.1 Min-max and Range wise report: This report assesses the performance of government health facilities on the basis of number of institutional delivery, C-section, Out Patients (OPD), In Patients (IPD), Major operations and minor operations.

5.2 **Factsheets**: National and State level factsheets are generated by triangulation of HMIS, Census, Rural Health Statistics and District Level Health Survey (DLHS) data. It provides a comparison among various available data sources in India.

5.3 **Score-cards/dashboards**: This report ranks the performance of districts across country and districts within States/UTs on the basis of 16 Reproductive Maternal and Child Health (RMNCH) indicators. Variation in ranking across two consecutive years is also depicted to highlight progress/decline in performance of districts over the years.

5.4 **Star rating of CHCs –** In this report, star rating of CHCs is done by analyzing service delivery performance vis-à-vis infrastructure available with the CHCs. This report is completely based on HMIS monthly and annual infrastructure data uploaded by States/UTs.

6. ACHIEVEMENTS OF HMIS –

Before development of HMIS, Ministry was having only paper based health system performance data provided by States. These reports were compiled on annual basis. HMIS has brought in a radical change by providing monthly web-based dynamic data to the Ministry and States. This has not only reduced the time lag but also provided an effective tool for monitoring the system on monthly basis. Over a period of time, HMIS data is being widely utilized by National and State Governments for monitoring of facilities, policy planning and decision making.

Some of the major achievements of HMIS are summarized as under;

- ✓ HMIS data has been playing a pivotal role in reviewing the performance of States/UTs during annual Programme implementation plans (PIPs),
- ✓ Programme Divisions have been utilising HMIS data for fixing targets for key programs under National Health Mission (NHM),
- ✓ HMIS has provided a very robust and effective platform for regular monitoring of health facilities and officials as well,
- ✓ HMIS has become a sole source of information related to individual health facilities for all purposes. No other MIS platform in India provides such exhaustive information regarding Government Health facilties.

7. CHALLENGES FOR EXISTING HMIS –

In spite of nearly 94% coverage of government health facilities and huge efforts put in by National and State Governments particularly in terms of manpower, data of HMIS is neither close to the National survey figures nor to the estimated values. Though it is one of the largest MIS across the globe, still quality and usability of data remain its areas of concerns. Since existing data does not have desirable quality, its utilization in designing policies and making decision at district or local level planning is nominal. Data usage will be optimized only when this can be used for local level planning like load assessment at the health facilities, medicine inventory/stock management, assessment of performance of facilities vis-à-vis its infrastructure. Major challenges for National HMIS of India are summarized as under;

a)   At present, paper based recording system exist across India which contributes to duplication, compilation and data entry errors.

b)   India is a vast country with 217780 health workers/ANMs [7]. Training/orientation of all health workers on data element understanding and data entry formats is a herculean task. Lack of time to time training of health workers including data entry operators and MIS officials result in poor data quality.

b) Government hospitals in major cities have incorporated IT software in their payment and billing system, however, integration of IT in clinical system is still far away.

c) Poor integration of diverse software systems within hospital impedes inter-hospital information exchanges and creates problem in consolidation of data.

d) HMIS is a centrally funded program and State or local governments have lesser stake for development of IT infrastructure required.

e) Poor coverage and reporting of private sector hospitals is also one of the major impediments for success of HMIS.

8. SUGGESTED ENHANCEMENTS FOR HMIS -

For Information Systems to benefit service delivery and hospital management, an effective overall IT planning at hospital/health facility level is essential. Implementation requires not only strong project management skills but also attention to end user requirements. For this following measures are required to be taken;

- ✓ Digitization of all Government Hospitals by implanting a comprehensive "Hospital Information System" with the aim to consolidate data of all departments at one point. This initiative will lead to availability of real time data of all the facilities which will further resolve most of the issues related to data quality.
- ✓ Setting up of MIS standards at par with global MIS standards developed by World Health Organization (WHO) or Canadian Institute for Health Information (CIHI) for ensuring data quality and reliability. These standards will

provide clear directions/guidelines for data collection, compilation, integration and uploading on the portal

✓ Development of online and interactive "Digital Training Manual" for training and regular updates of all concerned officials including data entry operators and ANMs

✓ Diverse investment for creating high end infrastructure to meet the long term need

✓ Requirement at State/district and local level need to be given due consideration

✓ Designing of standardized training module for all concerned officials

✓ Active involvement of private sector as it is playing a crucial role especially in urban sector

✓ Gap analysis like load vs deployed manpower, requirement vs availability of beds and medicines, disease specific load should be regularly analyzed on the basis of administrative data.

✓ Integration of various health information systems should also be thought of for developing a common platform.

9. EXPECTED OUTCOMES –

More robust and effective HMIS will not only strengthen monitoring system of the health sector but also fetch long term results in overall improvement of implementation of health related programs. It will be having far reaching results in developing information system needed by State/District/hospital administration for local level planning. Integration with various other software will reduce the burden of maintaining parallel software and duplication of processes like data entry, validation etc. One stop solution for all data requirement is the need of the hour for effective and real time monitoring. An efficient and dynamic HMIS will surely put an impetus to the monitoring of National Health Programs in achieving MDG goals.

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