

A review of progress and impact of health management information system (HMIS) in public health care system of India

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Abstract

The Government of India's initiatives in public health have recorded noteworthy successes over time. Unfortunately, Indian health system is still ranked 118 among 191 Who Health Organization (WHO) member countries on overall health performance (WHO, 2000). One of the reasons is poor management of health programs. In *DHIS* it is found that included poor data quality, the unfulfilled promise of integration and a continuing weak culture of information use. Some key strategies identified to address these challenges included the promotion of decentralization of information to support decentralized action, the adoption of a data warehouse approach and strengthening collaborative networks. In *MCTS* it is found that unreliable internet and electricity availability, lack of dedicated data entry personnel, and a shortage of consumables such as MCTS registers in conclusion There was an urgent need to create data processes and supervision guidelines that complement existing workflows and service delivery priorities. Health staff should be trained to implement these guidelines. MCTS outputs, such as service delivery planning tools, should replace existing tools once data quality improves. In *HMIS* there was a very strong bias with policy makers (though slowly disappearing) on the use of computers. Cost escalation of major projects by 50% to 100% delays of programs by 2 to 5 years, non- achievement of objectives of programs are the common features of the projects. This means that the billions of public money invested in this programs are producing (has produced) half or less than half the results. By employing computers, by building databases, by monitoring effectively and by improving the planning ability to focus and attack issues, we will be able to reduce the wastages, time delays and save few billions in the minimum. **Conclusion:** The Health Information Systems like DHIS, MCTS, HMIS, have definitely improved the Public health system in India but still lagging in desired objectives like proper, adequate and quality data collection, timely reporting etc. The most important part is to train the health workers at gross root level to generate more efficient data production in these health information systems.


Key Words: DHIS, MCTS, HMIS.

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INTRODUCTION

The Government of India's initiatives in public health have recorded noteworthy successes over time.

Unfortunately, Indian health system is still ranked 118 among 191 Who Health Organization (WHO) member countries on overall health performance (WHO, 2000). One of the reasons is poor management of health programs. Health management requires the monitoring of the health status of the population, provision of services as to the coverage and utility, drugs stock and consumption patterns, equipment status and availability, finances, and appointment of personnel on a regular basis. This requires timely and accurate information from various sources, so as to help health service managers to recognize weakness in health service provision and take actions that will improve service delivery. In other words, the development of an effective information system is a necessary precursor to managerial improvement

(Bodavala, 1998). Health Information System integrates data collection, processing, reporting and use of information for decision making for necessary improvement of health services. The Health Management Information System (HMIS) is designed to assist in management and planning of health program (WHO, 2004). WHO has led down 5 major components of evaluation pertaining to HMIS, these are data generation and report compilation, data utilization, computer hardware and software, training, and monitoring.¹ A health management information system (HMIS) is a process whereby health data are recorded, stored, retrieved and processed for medical decisions making. It broadly includes managerial aspects of any organization such as planning, organizing and control of health care facilities at country as particular and world as a globe.² It has been observing globally that very less number of computerized HMIS is operational and working properly to deliver the health care services.³⁻⁴ If HMIS is introduced then the data collected will have more values and better information and ultimately meaningful decision can be acquire. It will also improve access to health care and its services.⁵ Many of the evaluations have also looked at the utility of HMIS can act as a tool for overall development of health organization^{6,7}. Health Care is one of the most important dependencies for economic sustainability and growth of a country. India as compared to other developing nations spends slightly higher amount in the health sector. While India has made significant strides of economic growth in the last two decades, there is a steep growth of health spending alongside. It is improved mainly due to increase incidence and prevalence of diseases. Growth rate of human resources and hospitals significantly lags the disease incidence rate, and hence the gap in demand versus supply is widening at an alarming pace. Most of the health awareness education camps are still being conducted in old manner therefore more technical and professional ways to be applied to educate population⁸. Health Information System Programme, India (HISP) is a nonprofit NGO that has been established to design, development, implementation and institutionalization of health information systems for the public sector health care in India. At initial stage HISP India activities were initiated in a very small scale in 2000 with University of Oslo support and today HISP India has a Memorandum of Understanding at the national level and also with various states in the country to carry out these activities.¹⁰ Major contribution of HISP in health care sector of India is it developed open source software District Health Information Software – 2 (DHIS2), to support the routine health information systems in the states. Further, HISP engaged in its support and institutionalization in India.

WHO has been accepted DHIS2 as a key component of their Public Health Information Toolkit. Presently more than 20 states in India, has introduced DHIS2. In the developing countries, this is certainly one of the largest implementation of open source software for health information systems.¹¹ The best review of can be done by reviewing the Various components of it like DHIS, MCTS, HMIS software's presently working in public health department of India respectively.

MATERIAL AND METHODS

DHIS: (District Health Information System)

DHIS 2 is the preferred health management information system in 47 countries and 23 organizations across four continents. DHIS 2 helps governments and health organizations to manage their operations more effectively, monitor processes and improve communication. DHIS 2 is typically used as national health information systems for data management and analysis purposes, for health program monitoring and evaluation, as facility registries and service availability mapping etc. in rural communities. With DHIS 2 you can capture data on any type of device, including desktops, laptops, tablets, smart phones and feature phones. Most solutions work-offline, enabling improved reach in locations with poor connectivity. DHIS 2 provides a wide range of solutions based on HTML5, SMS and Java.¹²

The key functionalities offered by DHIS2 include¹³

Comprises of a tool kit of modules to develop an IHIA, Data layer – platform and database independent, can inter-operate and collate disparate types of aggregate data (services, human resources, infrastructure, aggregate patient data and others), fully equipped to handle data validation, import survey data and many others. Application layer – through its ability to easily define new datasets, indicators, and create reports, new applications can easily be created and deployed – for example, integration of with HMIS applications for School Health, IDSP and many others. Presentation layer – strong reporting functionalities for pre-defined and ad-hoc reports, executive dashboard for bird's eye view of key indicators, data visualize and analyzer for health status and data quality analysis. Integrated with GIS for map based representations, Deployed – “in the cloud or in the basement” – online and offline, accessible through mobile, and other means, Multi-language enabled, currently available in more than a dozen national and international languages, Integrated with various other party applications like for health, Name Based Tracking, Open Health GIS, and outputs exportable to enable processing in EpiInfo, Excel, SPSS and various others. Web API allows integration with other databases and supports the development of an “Integrated Information

Portal. SundeepSahay¹⁴ Has assessed the progress. He noted in areas of data coverage and found that some sporadic examples of information use were present and enhancements in capacity and infrastructure were accumulating, challenges still remained Key ones included poor data quality, lack of regular training program, unavailability of internet facility in rural part, the unfulfilled promise of integration and a continuing weak culture promotion of decentralization of information to support decentralized action, the adoption of a data warehouse approach and strengthening collaborative networks etc. Achieving this however, requires some structural interventions such as the broad basing of education in public health informatics, institutionalization of a cadre of public health informatics staff within the Ministry of Health, and promoting the use of software which is open source and based on open standards such that widespread local use is supported.

RESULTS

MCTS

The Mother and Child Tracking System (MCTS) is a centralized web-based application launched by the Ministry of Health and Family Welfare in India in December 2009 to provide reliable data for effective decision-making through name-based tracking of each client.¹⁵ More than 4.06 crore pregnant women and 3.3 crore children have been registered in the system since its inception.¹⁶ Few experiences of MCTS implementation have been documented in the states of Gujarat (e-Mamta),¹⁷ Tamil Nadu (Pregnancy and Infant Cohort Monitoring and Evaluation System-PICME),¹⁸ Rajasthan,¹⁹ and Chhattisgarh. A study by Pallavan Nagarajan *et al* found Lack of appropriate training, overburdened data entry operator (DEO) and auxiliary nurse midwife (ANM), poor Internet connectivity, slow server speed, and frequent power failures were revealed as major limitations for the effective implementation of MCTS. Nearly 18% of the clients reported receiving short message service (SMS) and only 6% could understand the SMS in conclusion MCTS has led to accountability and improved supervision of health workers, apart from empowering the community. A Study by Rajiv Gera *et al*²⁰ done a Data Quality Assessment (DQA) to evaluate data quality and an assessment survey to identify implementation challenges. The survey comprised semi-structured questionnaires for health staff in the sampled districts, observation checklists and survey investigator notes. Purposive sampling was used for selecting two districts in each state and two blocks in each district. For the DQA, 45 mothers who became pregnant and 84 children born within the stipulated timeframes were randomly sampled. They found DQA overall performance

numbers were 34% for pregnant women and 33% for children in the Rajasthan study areas, while UP's performance numbers were 18% for pregnant women and 25% for children. Weaknesses in the MCTS' data completeness accounted for much of this performance shortfall. The beneficiary profiles for Rajasthan were largely incomplete, and the MCTS in UP struggled to register beneficiaries. Shared challenges in both states were the absence of clear processes and guidelines governing data processes, and the lack of systematic monitoring and supervision frameworks for MCTS implementation. As a result, Front Line Health Workers (FHWs) were overburdened with data documentation work, and there were long delays in data capturing. FHWs and block level health officials were not adequately trained in using the MCTS. UP staff reported unreliable internet and electricity availability, lack of dedicated data entry personnel, and a shortage of consumables such as MCTS registers. In conclusion there was an urgent need to create data processes and supervision guidelines that complement existing workflows and service delivery priorities. Health staff should be trained to implement these guidelines. MCTS outputs, such as service delivery planning tools, should replace existing tools once data quality improves.

HMIS

Health management requires the monitoring of the health status of the population, the provision of services as to the coverage and utility, drugs stocks and consumption patterns, equipment status and availability, Finances, personnel on a regular basis. This requires timely and accurate information from various sources. Accurate, relevant and up-to-date information is essential to health service managers if they are to recognize weakness in health service provision and take actions that will improve service delivery. Accordingly, the development of effective information systems is a necessary precursor to managerial improvement.²¹ A health information system. (HIS) is a process whereby health data (input) are recorded, stored, retrieved and processed for decision-making (output). Decision making broadly includes managerial aspects such as the planning, organizing and control of health care facilities at the national, state and institution levels and clinical aspects which can be subdivided into

- Providing optimal patient care,
- Training of medical personnel to generate appropriate human resources
- Facilitate research and development activities in various fields of medicine.²²

Table 1: Term health management information systems is generally used to describe the following subsystems
Various sub- components/sub-systems of Health Information System²³

Epidemiological surveillance	Identification/notification of diseases and risk factors, Investigation, follow-up, control measures
Routine service reporting	Hospital/health center based indicators on performance of the various services
Specific program reporting	Various programs in operation in a particular country, typically include; Reproductive child health, AIDS, MALARIA, TB, LEPROSY, Integrated Child health and many other programs under different departments, names
Administrative systems	Account and financial systems, Drugs management (procurement, storage and delivery), Personnel management, Asset management (equipment/buildings etc) Maintenance system
Vital registration	Birth, deaths, migration etc.,

Way back in 1983, Indian Journal of Public Health commented in the editorial on the need for HMIS in India. “A good health service superstructure can be built only on a solid base provided by the reliable health statistics collected through a well organised infrastructure”.²⁴ The several inadequacies in the HMIS system make it very unreliable and undependable. HMIS Means Database: Technology of computing has developed extensively in the last decade. Health Industry has progressed from private networks running server/client based proprietary programs to Internet based applications which are platform independent, accessible anywhere, user friendly, cheap and universally available. Every sector either in developing countries or developed countries has begun using the extensive availability and cheaply managed web based systems. Unfortunately, the Public health management is the last one to employ the technology. It is common practice in developing countries the priorities in the health sector are set by government, in the light of political pressures. In a sustainable system for health-care policymaking and planning, the major role of new computerized technologies for the improvement of national health-care policy making and planning, the major role of new computerized technologies for the improvement of national health care and for socio-economic development should be understood²⁵ There is a very strong bias with policy makers (though slowly disappearing) on the use of computers. Cost escalation of major projects by 50% to 100% delays of programs by 2 to 5 years, and hence non- achievement of objectives of programs are the common features of the projects. This means that the billions of public money invested in this programs are producing (has produced) half or less than

half the results. By employing computers, by building databases, by monitoring effectively and by improving the planning ability to focus and attack issues, we will be able to reduce the wastages, time delays and save few billions in the minimum. Computers certainly do not cost not more than couple of millions.

CONCLUSION

The Health Information Systems like DHIS, MCTS, HMIS, have definitely improved the Public health system in India but still lagging in desired objectives like proper, adequate and quality data collection, timely reporting, use of information etc. The most important part is to train the health workers at gross root level to generate more efficient data production and regular reporting in these health information systems.

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