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Situation analysis of health management information system in Pakistan

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SUMMARY

The importance of a health information system (HMIS) cannot be ignored because health policies and planning in any country mostly depend on the correct and timely information on various health issues. This paper has endeavored to look into the information system prevalent in Pakistan, with an emphasis on the facility based HMIS and Geographic Information System (GIS). The main methodology used was interviews with key stakeholder including government officials and donor agencies, besides the literature review of the relevant documents. The results showed that currently HMIS is generating information and its coverage is encouraging, but at the same time it needs lot of room for strengthening at various levels. The HMIS approach seems more 'data driven' than 'action oriented'; there is duplication and lack of coordination among various vertical health information systems. The factor of time lag also holds true as regards receiving of information and its dissemination is concerned. The GIS is relatively a new concept in health sector in Pakistan and consequently application is limited at present. There is a need for strengthening of the whole system with better coordination among various vertical health information systems, which can practically contribute to better decision-makings as well as save wastage of money, men and machinery.

Key Words: HMIS: Health Management Information System; GIS: Geographic Information, System; Pakistan

INTRODUCTION

Primary health care is both health *for* the people and health *by* the people, and as the Alma-Ata declaration noted, it must, therefore, "*evolve from the economic conditions and socio-cultural and political characteristics of the country and its communities*"[1]. Managers must know the environment and people with whom they work. They must be ready and willing to adapt program structures and activities to changing local conditions. Information on community needs and resources and on health related activities are essential for this evolutionary process.

Health information is information about people's health and what they, the government, and others are doing about it. It describes the incidence, prevalence, and causes of major diseases, as well as availability and effectiveness of curative activities.

Prior to independence and until the 1960s the health care delivery system in Pakistan comprised only of civil hospitals and district council dispensaries. Most of the rural population had little access to basic health facilities and services. The second five-year plan (1960-65) sought the establishment of 150 rural health centers (RHCs) in West Pakistan over a period of five years.

Basic Health Units (BHUs) started in 1980 and during 1985-86 government decided to establish one BHU in every union council. During 1991-92, government decided to provide dispensaries in all larger union councils. *At present* there are 872 Hospitals, 852 MCH centers, 514 RHCs and 5,155 BHUs spread all over the country[2].

Given the large health infrastructure in Pakistan both public and private, catering to a population of 137 million people, there had been a need to develop and establish a national health management information system which is able to collect, process, analyze and provide feedback on all health related data including information on input, process and output indicators.

Health information like skilled manpower, drugs, money, equipment, and so forth, is one of the essential ingredients of an effective health delivery system. National health managers and planners need information not only for conducting specific programs but also for assessing organizational effectiveness. It is also important that the needs of all these information users be

coordinated so that reporting burdens do not become overwhelming.

Objectives

The objectives of the study were;

1. To do a situational analysis of the Health Management Information System (HMIS) system in Pakistan, highlighting strengths and weaknesses in the system.
2. To review the present status of the GIS in the health information system in Pakistan.

MATERIALS AND METHODS

A methodological review of available literature was undertaken and data collected for almost all health information systems being currently present in Pakistan in the health sector. Published and unpublished documents including government reports, peer review journals and other literature such as local journals are a source of information for this paper.

The analysis was helped by discussion during interviews with the experts in the relevant field including government, donor agencies and private sector specialists.

Background of HMIS in Pakistan

In the modern age of management, a well-designed information system is almost a necessity and priority. In Pakistan, the old method of data collection and analysis was viewed to be revolutionalized, if the treasure of information in the health data was to be suitably utilized. This was considered as one of the national strategies during the current decade. In response to this need the Ministry of Health, Government of Pakistan, in collaboration with the provincial health departments and international agencies developed a National HMIS during 1990-93.

Between July and December 1990, a general assessment of the existing information system was performed and a comprehensive report was published in April 1991. In summary the study pointed out that existing health information systems as a rule did not provide adequate timely information for decision making neither to the health managers for systems planning and management, nor to the health workers for facility or patient management[3]. The reasons pointed out were that the overall health information systems management was weak; that indicators did not always respond to specify information required at different levels in the health system; that data collection in health facilities was poorly organized, presenting simple frequency. The flow of information was fragmented. *Most of the national health programs had their separate reporting systems, in addition to separate supervisory systems* Finally it also stated that data consolidation and processing was mostly done manually, so in addition to being time consuming, this process compounds the opportunity of human error.

The main strategy for the restructuring process as proposed by the Health Information Systems (HIS) was to use a consensus-building approach. A general consensus was reached between federal and provincial health officials to transform the existing routine reporting system in government managed first level care facilities (FLCF) into a comprehensive and integrated health management information system. The priority was given to the FLCF because they were taken as principal root to render health services for child survival.

HMIS/FLCF

The first step in the design phase was to start listing functions and activities performed in first level care facilities and at the higher level in the system, and then to define indicators for each of them. In January 1992 in a workshop on macro-design of HMIS/FLCF, a consensus was reached for;

1. Final national list of indicators
2. A set of HMIS/FLCF data collection instruments report form and report transmission procedures.
3. The data processing system
4. Feedback mechanisms
5. List of priority diseases.
6. Information on various topics could be gathered from this system. This information ranges from data on the epidemic diseases, 18-priority health problems, the drug supply and distribution position, preventive care in children under 5, preventive care for mothers (deliveries, ante-natal etc) EPI, Malaria, family Planning services, tuberculosis, ARI, CDD, and also information on the status of the instruments, equipments could also be gathered from this system. One could also compare the services of these districts within and with others or with in the facilities of the same districts[4].

Vertical Programs

Besides the main HMIS for the "First level care facility", there are other program which are running parallel with minimal linkage with each other. The main information systems are '*Lady Health Workers Management Information System*' for "National program for Family planning and Primary health care". Other vertical programs are 'Expanded Programme on Immunization' (EPI), 'Malaria Control Program', 'National AIDS Prevention and Control Programme', 'National ARI Control Programme', 'Tuberculosis Control Programme' and 'National Leprosy Control Programme'[5]. All these programs are running parallel and come under the ministry of health but they have

developed various information systems and have minimal link with each other.

Present situation of Geographical Information System (GIS) in health sector

Burrough defined GIS as "a set of tools for collecting, storing, retrieving at will, transforming displaying spatial data for a particular set of purposes. Another definition states GIS as, "a system of capturing, storing, checking, integrating, manipulating, analyzing and displaying data which are spatially referenced to the earth"[6]. A GIS is able to provide:

Quick and easy access to large volumes of data
The ability to; link one data set with another; analyse spatial characteristics of data; update data quickly and model data and access alternatives.

Output capabilities (maps, graphs, address lists and summary statistics) tailored to meet particular needs.
In August 1999, a two-day technical workshop on mapping exercise was organized by MSU and UNFPA at the request of Ministry of Health and Ministry of Population Welfare. The main objective of the exercise was to provide a thorough overview and advantages that emanates from a state of the art mapping exercise to senior officials concerned with planning and monitoring. The objective of the mapping was to reduce duplication of resources, increase coverage especially of un-served and under-served regions and establish a blue print for effective referral system at the district level, streamlining RH services and finally to utilize mapping as a tool for planning and monitoring purposes[7].

Based on the presentation and, the workshop participants agreed to support GIS to map all health and population welfare facilities in Pakistan. They also agreed to use GIS for future referral system at the district level, especially for emergency obstetric care services.

Some mapping of the health facilities has also been done in Sindh and AJK. Recently the national feedback report of the HMIS 1999 has also utilized GIS and mapping of some important disease have been done to some extent as regards the incidence and spread of some important diseases. The Ministry of Health is considering of incorporating GIS in the HMIS system in near future.

DISCUSSION

A good MIS produces complete, accurate, and timely information for managers to use as a basis for making appropriate decisions that contribute to the quality, expansion and sustainability of their programs and organizations. While the MIS design must provide the information needed to make good management decisions today, it must also anticipate the decisions the managers are likely to face tomorrow. Thus it is important to maintain flexibility in the MIS design and to link the MIS development process closely to the organization's larger strategic goals. For instance, if the program currently provides free services to the clients, the top management may foresee the possibility of adopting user fees in the future.

For information to influence management in an optimal way, it has to be used by decision makers at each point of the management spiral, for example when undertaking situational analysis, when setting priorities or when implementing a programmed activity. Information is crucial at all management levels of the health services: at the system level, at the health unit level, as well as at the patient/ client level. This means that not only policy-maker and managers need to make use of information in decision-making, but also care providers including doctors, health technicians, as well as community health workers will need it. Unless this occurs, considerable cost is involved in set-up and maintenance of HIS is difficult to justify.

It has been described as systems that provide specific information support to the decision-making process at each level of an organization. The ultimate objective of HIS is therefore not "to gain information" but "to improve action".

Applied to the health sector, it can be defined as a set of components and procedures organized with the objective of generating information, which will improve health care management decision at all levels of the health system[8]

Strengths of HMIS in Pakistan

The facility based HMIS is one of the most powerful tool for the planning and management of health services. In view of the existing vast health infra structure, spread all over the country in terms of health facilities, services, staff, drugs and supplies etc. there has been a need to establish an efficient information system responding to the information needs of various decision making levels of the health care delivery system.

Information Flow

Between July and December 1990 when the general assessment of the existing information system was performed it came out that the overall health information system management was weak, data collection in the health facilities was poorly organized and the flow of information was fragmented.

So in view of the above findings, efforts were focused on developing information system in which the information should come from the facility and districts should be actively involved and ultimately evidence based decision-making should be carried out. Bringing about the

behavior change was a challenge; at present the data is coming from 110 districts. Now the next focus is to improve quality and finally promoting use of this information to take rational decision making at the district and facility level.

Coverage

HMIS is generating tremendous amount of information, which flows directly from the peripheral health facilities to the district computer centers, then to the divisional and provincial computer cells. Ultimately the information reaches the National Health Management Information System Cell. At present almost 110 districts are sending the reports to the National HMIS Cell and the percentage of the reports received from these districts is 76%[9].

The HMIS received a big boost when the MIS of the community based Prime Minister's Programme was launched in mid 1995. Lot of valuable information collected by the Lady Health Workers (LHW) is now being compiled and processed at the district. The Federal PIU has also developed a detailed database of about 40000 LHWs now active in the field. At present 43,000 LHW are working in the community, with an additional 13,000 are being currently trained. Put together they make 56,000 and with every one covering a population of 1000, the total coverage comes to about approximately 41% of the total population of Pakistan[9]

Opportunities For Strengthening of HMIS in Pakistan

Data driven Information system

Unfortunately, health information systems in most countries are woefully inadequate in providing the needed management support. Most health care providers in developing countries equate information systems with filling endless registers with names and addresses of patients, compiling information on diseases (e.g. sex and age of patients) every week or every month, and sending out reports without ever receiving any feedback[8].

Furthermore, the data they receive are not helpful for their decision-making needs: they are unreliable, incomplete, untimely and rarely pertain to the procedures they have to perform. In other words, information systems tend to be "data – driven" instead of "action-driven". Current HIS are therefore widely seen as management obstacles rather than as tools. The reasons can be summarized in the following points:

Duplication & waste among multiple parallel health information systems

Historically, national reporting systems are rarely the result of a coordinated effort to address information needs of health planners and managers. Often, donor agencies or national programs with in the ministry of health develop their own "vertical" data collection systems mostly under pressure and with financial assistance from external donor agencies.

Designed as vertically structured *empires*, these programs substituted line managers with program directors who managed separate categories of personnel, facilitated separate training programs, and created separate "program information systems" which tended to focus on one specific disease (e.g. diarrheal diseases or malaria), a specialized service (e.g. family planning information systems), or a management subsystem (e.g. drug management information system) instead of addressing management functions in a comprehensive way[9].

Reporting and transmission with in each system is usually designed with minimal involvement of the line managers and providers of the health service. The result is that health workers are drowned in a multitude of reports to be completed every month. Since the data is not cross-referenced among the different systems, health care providers and systems managers spend a considerable amount of time on the collection of redundant and overlapping information. Elimination of duplication and waste requires a *unified system* rather than better coordination among the existing parallel structures. In Ministry of Health, despite decisions at the National level and notifications both from the provinces and the Federal Ministry, the vertical information systems like that of EPI and Malaria programs continue to exist.

Lack of information on management issues

According to the WHO Expert Committee (1994), " *many of the data recorded and reported by the health service staff are not needed for the tasks the staff perform*". Data collection tends to focus on disease reporting and only partially addresses management objectives at the health unit level or at the patient/client level. Yet data that is needed are frequently not collected. For example, appropriate indicators to monitor continuity of care to individual patients or clients are rarely included in the HIS.

The common denominator of these two observations is a lack of a consensus between producers and user of data at each level of the health care system regarding the information needed.

Poor Quality of Data

Data requirement are frequently chosen with out taking into account the technical skills of the health workers collecting the data, nor the available diagnostic equipment in peripheral health facilities. For example, at the first level of care, auxiliary health staff without laboratory or x-ray facilities is required to report on

diseases such as leishmaniasis, diphtheria and peptic ulcer. Furthermore, health workers receive little if any *training in data collection methods*, and rarely have *standardized instructions* on how to collect the data.

Another reason why data quality is low is *lack of motivation* among health services personnel. Since health services supervisors and peripheral health workers rarely receive feedback on the data reported to higher level, they have little incentive to ensure quality of the collected data and comply with reporting requirements.

Lack of timely reporting and feedback

Often the HMIS data is received late from the facilities. Similarly the data transmission from the districts to the provincial offices and then to the federal level is also delayed.

The process of transmitting, compiling, analyzing and presenting the data is usually so tedious that by the time a report is prepared, the data are frequently obsolete and decisions are often made without their input. Planners and the managers face deadlines and time constraints in their daily decision-making. Outdated information, even if of high quality, is of low value to them. Besides this, the provincial health departments are adopting different procedures for the HMIS printing. Some are getting it from the family health projects; other through SAP funds and still others have agencies like UNICEF supporting them. This creates a lot of problems, as the supplies often become irregular with a serious impact on the HMIS functioning.

Inadequate information usage

Despite the evidence that much of the generated data is irrelevant, of poor quality, redundant or obsolete, there are, nonetheless, some good data sets available. Dunn and William (1980) revealed another impediment to ensuring utilization of information: the difference in "*culture*" between data people and decision-makers, which is difficult to bridge. Consequently, planning and management staff rely primarily on "gut feelings" to formulate ad-hoc decisions rather than seek pertinent data.

Lack of universal launch of HMIS

The information collected in the districts is neither being used in the districts nor at the provincial levels. In fact the supervisors and staff is not fully trained in the concepts of information use and find difficulties in the interpretation of the HMIS-computerized feedback tables. HMIS system is still to be introduced uniformly at all the provinces. In the trained districts also, the reporting regularity and quality remains very poor. In addition the HMIS is yet to be introduced in all the non-government health facilities (local bodies and corporations) due to whose non-inclusion a lot of information is lost.

Integration of PM Program information with HMIS

Though the information system of the PM's program has close links with the facility based HMIS, there exists problems, both at the operational or supervisory levels for linking this information with the HMIS-data.

Need for refresher trainings and hiring more skilled staff

The last training in the HMIS was conducted a few years back, now, due to turnover of the managers in the last few years a need is felt to carry out small refresher courses. In many districts computer are not being used, as the computer literate staff is not present. Despite availability of some very sophisticated computer programmes, like SPSS, GIS, and EPIINFO their utilization is very low in the health sector.

Lack of *information systems* for hospitals, personnel, logistics etc.

The scope of the present HMIS is limited to the first level care facilities only i.e., BHUs, RHCs, MCH centers, dispensaries etc. It has very little (only from OPD) or no information from the hospitals personnel and logistics.

CONCLUSION

Management Information System (MIS) has been defined as a system designed by an organization for collecting and reporting information so that the organization's managers can plan, monitor, and evaluate the operations and performance in the their areas of responsibility.

The current situation of HMIS in Pakistan demands the decision makers to take initiative and introduce changes for further collaboration among various vertical health program information systems and integrate them into one system. The integrated approach will not only save the resources but will also improve the efficiency of the information system as a whole. It is also required to encourage utilization of information at the facility level by improving efficiency of the system so that the managers and health providers receive up-to-date information and make evidence based decision at the local level. Introducing GIS into HMIS is good not only for effective decision-making but also trigger of utilization of information and integration of HMIS. The use of GIS may offer significant advantages in terms of data integration, the interactive querying of the database and preparation of map output.

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