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# STUDIES IN ICT AND HEALTH INFORMATION SYSTEM

**Lata Suresh*, Surya Nath Singh****

**Abstract** *More effective use of diminishing resources is required to provide the best possible services to the users. This required the improved decision-making processes of a Library Management Information System (LMIS) to provide systematic information. Librarians and information professionals as well as information centres and libraries (ICLs) are playing a crucial role in the communication of proper, pinpointed information to proper users at right time for their right decision making. Consequently, there is an urgent corresponding need for a global health information and library system, and it is of course the health library and information science professional who are required to play a justified role to create need based specialized subject oriented network/system. The present paper is an attempt to review literature in this area. This literature review presents a brief survey of the materials that have been selected as part of the research project. Many studies are found to be conducted in developed and developing countries. But in Rajasthan very few studies have been conducted hence this work will be a significant contribution the field of Health Information System in Rajasthan. Bibliography is presented according to the literature review. These include previous exercises to map ICT in the health sector in developing countries, white papers, technical reports, research reports on the aspects of ICT and public health, policy issues-related, and evaluations in this area.*

**Keyword:** *Information Technology, HMIS, Bibliometric Study, Health Information, ICT in Health*

## INTRODUCTION

Any research study requires getting the advantages of the work that has been done in the past as a result of constant review. The literature published or unpublished in various forms on the problem investigated is one of the prime steps to move forward in any research study. The initiative taken up for healthcare programmes required the support of information systems for their effective implementation.

### Need of Designing the HMIS System

The user population of health scenario is very vast in India. Health professionals use different types of information as per their needs. The existence of library is meaningful, when its collection (printed/digital) is relevant to the requirement of its users. Information sources and services play a very important role to meet needs of the user commodity. The present study aims to suggest a model for Health Information and Library System of the Rajasthan State. The goal of the model is to have a free flow of information to the users engaged at different health care centres/services/institutes and also to the general masses even at grass root level. The proposed network of Health Information systems will also not only supports the State Government in implementing Health for All but also Health Information for ALL. ICT has the potential to impact upon many aspects of the health sector. The ability of communities to access health services is influenced by wider information and communication processes, mediated by ICT.

Accurate information provides a foundation for sound decision making. Where public health is concerned, the difference between good decisions and poor decisions can mean the difference between life and death. The lack of reliable information on the causes of sickness and death is a major obstacle for any attempt to improve the health of people in developing countries. Health information is essential to track the health needs of populations, to guide the design and implementation of health programmes, and to assess what works and what does not

### Health Information

*"No man in an island, Entire of itself*" a famous quotation by John Donne can be applied equally to libraries of these days for networking and building partnerships. The term Health Information has been defined in different ways. In many countries, the term interpreted to mean health statically, epidemiological and other health oriented data used in the planning and management of health services by the decision makers and administrators.

According to WHO " *Health Information is information that contributes to knowledge and understanding that, in turn, provide part of the basis for making decisions in developing and managing services to improve health and health care. It also recognizes the three components of health information as (i) Management and operational information, (ii) Health Statistics, (iii) Health Literature.* Health Information is information about people's health and what they, the government and others are doing about it.

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It describes the incidence, prevalence and causes of major diseases as well as the availability and effective of curative activities. In primary health care, it particularly concerns preventive health activities and the community to improve environmental conditions.

## Online Literature

To get more good references on this subject area an online literature search was carried out and found many references in this context. The said research features a comprehensive literature review on ICTs in the health sector in developing countries. This was drawn from a comprehensive search of: international and local health, development and ICT databases, both database and 'handsearching' of the libraries of key NGOs, Ministries of Health and International Agencies utilizing the extensive connections of the consortium with these organizations, and a Knowledge mapping process using the Scientists for Health Research and Development (SHARED) knowledge management platform.

## Health Informatics World Wide

This site is an extensive gateway to health informatics information on the Internet including telemedicine. Access to specific links is by subject or country. The site also contains information on upcoming meetings and conferences and a list of international organisations. It is maintained by the Medical Informatics Department of the Frieburg University Hospital. URL is http://www.hiww.org/. The range of information and communication technologies is broadening and new advances are finding useful applications in the health sector. However, their deployment in developing countries is often hampered by barriers such as low connectivity and ICT literacy. 'Older' media such as radio remain comparatively more accessible and reliable, proving their continuing relevance as strategic tools for health communication. New technologies are replacing the old, there is strong evidence of technological convergence, for example, online broadcasting reaching wider audiences and Internet content being repackaged for other media listeners. Technological solutions in developing countries should be responsive to local needs and priorities and consistent with the available enabling environment, infrastructure and capacity. The analysis and case studies highlighted in this list support the idea that combining new and older technologies enhances local ownership and maximises the impact of ICT in the health sector.

**Issues in Health Information ( Unpublished), May 2005,76 p. World health Organization:** This paper identifies the core indicators and other primary needs for building an equity-sensitive HIS, considers the current opportunities for improvement, suggests core equity stratifies, and provides recommendations for strategically increasing the availability of equity-oriented data.

Almost 20 year ago health information and literature was felt an important aspect by WHO. A meeting of Librarians, heads of research institutions and administrators from the countries of the Region met in New Delhi to discuss various issues related to biomedical research and health information and literature. It was at this meeting, held in August 1979, that the "Health Literature, Library and Information Services or (HELLIS)" Network of the South-East Asia Region was born. Since then, the WHO South-East Asia Regional Office has been supporting various activities aimed at achieving the objectives of the HELLIS Network. This has been done by supporting meetings, training courses, and through production of information management tools, such as National Union Lists of Serials, and Index Medicus for the South-East Asia Region (IMSEAR). The HELLIS Network has also successfully collaborated with the Health Systems Research (HSR) Network to provide countries with the required HSR reports. Similarly, links have been established with the ESCAP-POPIN Network

**eGovernment for Development :** Public sector health information systems IDPM Manchester: is a regularly updated website that provides an online resource of case studies, cost/benefit analyses, guidance materials, and training workshop guide for public health information systems in developing countries. World Health Organization (WHO) on global observatory for ehealth focuses on some of the findings of a global survey on eHealth carried out by the Global Observatory for eHealth (GOe), concerning the needs for eHealth tools and services. The survey found that WHO Member States would welcome an active involvement of WHO in the development of generic eHealth tools, while particularly non-OECD members would benefit from guidance on eHealth issues. It also found that needs vary even among OECD countries, and that existing eHealth tools and services should be better known. The report also recommends that WHO should actively intervene in the provision of generic tools (eg, drug registries, patient record systems, health professional directories), facilitate access to existing tools, promote knowledge exchange, provide eHealth information and promote eLearning programmes .

## International Studies

Mcconnell, H. in his study on International efforts in implementing national health information infrastructure and electronic health records published in World Hospital and Health Services looks at some of the national initiatives for developing an information infrastructure for healthcare as well as some of the challenges presented by these very

different approaches around the world. He also reviews briefly the many organisations looking at international standards relating to eHealth and to implementation of electronic health records.

The book titled Connecting people for a Better World. Lessons, innovations and perspectives of ICTs in development by Weigel, G, Waldburger, D eds, *Berne, Swiss Agency for Development and Cooperation (SDC), and, Global Knowledge Partnership* published in the year 2004 aims to make the wealth of knowledge compiled during the ICT4D Forum available to a wider audience. It is also intended to stimulate interest and awareness beyond the core ICT circles, and especially to reach those development organisations which are still skeptical about ICT4D because of its perceived technical focus.

In the United States, a survey of physicians found that in late 2007/early 2008, only 4% had a fully-functional electronic health records system in operation; a further 13% had a basic system. 83% of respondents had no system: Catherine M. DesRoches, Eric G. Campbell, Sowmya R. Rao, Karen Donelan, Timothy G. Ferris, AshishJhaet. al., "Electronic Health Records in Ambulatory Care – A National Survey of Physicians", *New England Journal of Medicine* 2008; 359: 50-60. Ashish K. Jha, Catherine M. DesRoches, Eric G. Campbell, Karen Donelan, Sowmya R. Rao, Timothy G. Ferris et. al., Use of Electronic Health Records in U.S. Hospitals", *New England Journal of Medicine* 2009; 360: 1628-1638, at 1631. In a national survey of hospitals conducted in 2008, 12% of hospitals had implemented electronic clinicians' notes across all hospital units, 17% of hospitals had introduced a computerized system for the ordering of medications. Overall, only 2.9% of hospitals had a "comprehensive electronic-records system implemented across all major clinical units". A further 7.9% had introduced a basic electronic records system that included electronic physicians' notes and nursing assessments in at least one department. Odhiambo-Otieno' George W and Odero, Wilson WO in their study evaluated the criteria for assessing the design, implementation and impact of DHMIS in the management of the District Health System (DHS) in Kenya. They stressed the availability and adequacy of both technical and human infrastructure must be ascertained up-front.

Carol C. Diamond, Clay Shirky, "Health Information Technology: A Few Years of Magical Thinking?" *Health Affairs* 2008; *27, no. 5:* w383-w390, at w383. The authors state: "[e-Health] is a tool, not a goal. Success should not be measured by the number of hospitals with computerized order entry systems or patients with electronic personal health records. Success is when clinical outcomes improve. Success is when everyone can learn which methods and treatments work, and which don't, in days instead of decades."

In Australia, the National E-Health Transition Authority (NEHTA) a not-for-profit company established by Australian government's aim is to "lead the uptake of e-health systems of national significance". NEHTA's role includes acting as the conduit for communication between the developers and implementers of e-health standards, and publishing its recommendations in a national catalogue of e-health standards. Its role also includes delivering a number of specific foundation services for e-health in Australia, including a national Healthcare Identifier Service and a secure messaging service. Christos Ilioudis and George Pangalosa proposed a framework for an institutional high level security policy for the processing of medical data and their transmission through the internet and propose the basic security requirements that must be addressed to use the Internet to safely transmit patient and other sensitive health care information. It has been based on a detailed study of the related recommendations from the more-significant security and standard groups, mainly from the EU countries, USA, and Canada.

Ilioudis C, Pangalos G proposed security policy and technical approaches have been based on an extensive study of the related recommendations from the security and standard groups both in EU amid USA and other related work and experience. The results have been utilized in the framework of the Intranet Health Clinic project, where the use of the Internet for the transmission of sensitive Health Care information is of vital importance. Geiger BF, O'Neal MR, Firsing SL 3rd, Smith KH, Chandan P, Schmidt A, Jackson JB, briefed about the limited sources of information on health information and training needs among persons with disabilities, a collaborative group of Alabama researchers, educators, and clinicians was formed to implement a statewide needs assessment with support provided by the Alabama Council for Developmental Disabilities and the National Network of Libraries of Medicine. Gibbons MC. (Ed)(2007) in eHealth Solutions for Healthcare Disparities stated that there has been an increasing interest in wellness activities, information and resources in addition to disease oriented information and resources**.** Brownstein, John S**,** Freifeld, Clark C**.** B.S. and Madoff, Lawrence C. in their paper digital disease detection — harnessing the web for public health surveillancestates that the Internet has become a critical medium for clinicians, public health practitioners, and laypeople seeking health information. Data about diseases and outbreaks are disseminated not only through online announcements by government agencies but also through informal channels, ranging from press reports to blogs to chat rooms to analyses of Web searches. Gavnani, etal revealed that the changing environment of mobile technology and social networking sites has pressured on medical library and information science education to develop new curricula, revise the syllabuses of existing

curricula and adopted new tools to practice. Davidoff and Florance, 2000 ; (Task force , 2003) stated that on the part of physicians to find, assess and apply information in their daily decision making have created an environment for library and information science professionals to play a vital role in storage, retrieval, appraisal, management, summarizing and delivery of timely and reliable health information at the point of care.According to Medical Library Association,( 2007). The health sciences librarian believes that knowledge is the sine qua non of informed decisions in healthcare and the health sciences librarian serves society, clients, and the institution, by working to ensure that informed decisions can be made. Detlefsen (2004) presented an introduction to the distance education program at the University of Pittsburgh's library and information science school and described a model program linking the biomedical library at Vanderbilt University with the School of Information Sciences at Pittsburgh. Gavnani strongly suggested to create change in the syllabuses of academic medical library and information science education in developing countries in general and Iran in particular to empower and prepare them to play their significant role in dissemination of right information to right person at right time, to support patient safety and improvement in healthcare outcomes. Davidoff and Flofrance in an editorial of the *Annals of Internal Medicine* opened a new horizon for medical librarianship with the concept of "informationist". Wilson, T.D. in his study describes the issues of user studies and information needs within the context of information science.

## Indian Scenario of Health Information

The user population of health scenario is very vast in India. Health professionals use different types of information as per their requirements and needs. The existence of library is meaningful, when its collection (printed/digital) is relevant to the requirement of its users. Information sources and services play a very important role to meet needs of the user commodity. In India it was found that till 1960 only few studies on information needs and uses were published. Only citation pattern on information sources on health and its related areas were taken for study. Singh, Ibohal indicates that from 1963 onwards a number of publications in this regard significantly increased. In the year 1966 only the Annual Review of Information Science and technology (ARIST). Today the study on Information system is an essential part in any subject area and it is considered as an important area of research in the Library science field. In the year 1970 abundant studies were conducted in various parts of the country. Murthy studied about the utilization of Soviet Scientific information in India through periodical. A literature survey was undertaken by Gupta on the subject Medical Information System in Rajasthan. Htar in his study proposed a plan to establish a biomedical and Information network in the south-east Asian region. Report of the working group on Health Information Networks proposed that sharing of information between scientists and end users has obvious benefits. Medical education needs to take full advantage of the power of ICT. In 1980s there were several studies carried out on Health Information Systems. Ghosh exposed the difficulties of the libraries and information professionals as well as scholars who are attached to the neuroscience research centre for selecting the relevant information for their study as well as difficulties in finding the major journals for information needs. Hiramani in his study divulged that Television is the most effective means of communication as compared to any other media for transmitting the information. Ramesh Kumar revealed that the scientific journals are the most desired and widely used information guide to the scientists and healthcare professionals for acquiring the specific information and getting updated themselves. Srivastava et al in their series of study on community participation in expanded programmes on immunization in Rajasthan, Orissa and Maharatsra reported that communities are well aware about children's immunization programmes. Banerjee, S.L. et al in their study conducted at Himachal Pradesh and Uttar Pradesh in 1990 revealed that the use of computers at the district or at the directorate level besides being advocated for computerization should also be used to perform sophisticated analysis of the data to arrive at more realistic information than at present. Pandita, Naina stated that National Medical Library is the hub of medical resources in the country and provides wide and efficient library and information services to health professionals in India, including several online journals. Singh, Ibohal and Lahiri presented an outline of Health Information Network (HEALINET) programme in Manipur for awareness among the people as well as health science professionals. Mehla, highlighted the role of National medical Library of India and suggested to strengthen the HELLIS Network. Rawat proposed the design of an effective and library and information network in the country for disseminating the health information resources to the medical professionals. Singh, Ibohal in his study suggested participating Regional Institute of Medical Sciences in the networked programme such as INFLIBNET and HELLIS to solve the problems of scarcity of resources faced by the medical students of Imphal. Agarwal and Khan designed a structure of Network in which National Medical Library, regional library and local libraries may be included to quench the thirst of information in no time to the users.

Taher and Gupta carried out a users study and discussed the pattern of tools used for the information at St. John Medical College Library at Bangalore. Bhatt, in one of his study based on health science information identified following parameters of HIS (i) Health Science Libraries and Information centres (ii) National Medical Library, (iii) National Institutions engaged in providing library and information Services in

their respective fields in health sectors (iv) Indian sources of health literature and information and (v) the user population of the health science information.

Mohan in his study felt the urgent need for the establishment of a library and information system for the practitioners. Giridhari, categorized the health care service and information needs of the different users into three respective groups

i. Information for primary health care services to serve 90% of the population
ii. Information for secondary health care services to serve 9% of the population
iii. Information for tertiary health care services to serve 1 % of the population

Halkar, in his study analysed the health information emerged in some important daily news papers during January to March in the year 2000 at the National Documentation center of the National Health and Family Welfare. He stated these press clippings on health plays a vital role in dissemination current health information and related areas. The study reported that English news papers The Times of India, The Hindu and The Indian Express covers more health related news items.

Siva et al in 1984 evaluated the health education programme and also observed the community's awareness at Chingelpet district and Madras city. He revealed that the 81 % of the community people and 75% of patients were not aware of leprosy they were superstitious about the causation of this disease. The study carried out by IIHMR (2010) stated that the awareness level in now much higher in the community. This is due to the information that is being generated through media and the other sources of information.

## How ICT help in HMIS Process

ICT has the potential to impact almost every aspect of the health sector. In public health, information management and communication processes are essential, and are facilitated or limited by available ICT.In addition, beyond the formal health sector, the ability of impecunious communities to access services and engage with and demand a health sector that responds to their priorities and needs, is prominently influenced by wider information and communication processes, mediated by ICT.

## Impact and evaluation of ICTs in health

Impact data for ICTs in development and in ICTs in health specifically, is still a major challenge. There is a growing need of documentation about case studies and pilot projects, but a distinct lack of macro analysis that shows impact. Impact is closely related to monitoring and evaluation; the development of evaluation methodologies for ICTs in development and in health is a small field with only a few documents, but the area is receiving increased attention.

## INDIAN STUDIES IN HMIS

In India, the health information exists at various levels, forms and systems. There is a wide variety of data that is collected by number of agencies mainly government both at the central and state level through routine data collection and also periodic sample surveys. While various initiatives at strengthening of health information systems is underway, challenges continue in terms of reliability, relevance, timeliness, harmonization as well as quality of data. ( http://www.whoindia.org/en/Section2_1522.htm).

Mony PK, Nagaraj C. discussed that theIncreased advocacy for and awareness of a uniform coding system together with adequate capacity building of physicians, coders and other allied health and information technology personnel would pave the way for a valid and reliable health information management system in India. Strengthening the recording and reporting systems for health monitoring is a basic requirement for an efficient health information management system.

According to Wadhwa S, Saxena A, Wadhwa B information technology has created a need for developing an innovative knowledge-based healthcare system, which can effectively meet global healthcare system demands and also cater to future trends. They also proposed a system of HMIS that is fully compatible with future technical, social, managerial and economical requirements.

Ramani KV. in his paper discussed the design and development of a management information system (MIS) to plan and monitor the delivery of healthcare services in government hospitals in India.

Anand Krishna, Baridalyne Nongkynrih, KapilYadav, Satyavir Singh and Vivek Gupta evaluated the effectiveness of a computerized Health ManagementInformation System in rural health system in India and stated thatComputerization has enabled implementation of a good system for service delivery, monitoring and supervision in health care sector.

## OBSERVATION

The literature review identified the user study is the centre point in almost all the papers and studies done so far. Media is the key source that provided awareness among the general masses hence the newpaper collection in the health science libraries should be subscribed based on the users demand and requirements. More work has been done in other countries as compared to India in Health Information Systems.

## CONCLUSION

Information and communication technology(ICT) can improve access to health services and promote health equity, quality and efficiency. Effective use of ICT depends on the existence of the required infrastructure. Basic and reliable ICT infrastructure that covers each and every country is also a prerequisite. Ehealth should be used to promote health equity as well as to improve access for susceptible and remote populations rather than being a tool to benefit only the wealthier sections of the society.India's dynamic IT sector has shown that the country has what it takes to adopt fresh ways of thinking. A new generation of creative thinkers and doers is emerging in fields like management, communications, distribution, and finance. In the health sector too, new initiatives like NRHM, have opened up fresh space for the government to innovate. Health for All programme cannot be effective and implemented unless accurate information is made available at all levels and to every individual.

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