

Health and Medical Information Science and its Potentiality in Indian Education Sector

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ABSTRACT

Health is considered as one of the major priorities of each and every individual, organization, institutions and Government. The advancement of health and medical services have reached from infancy to the development phase. Today, several tools and technologies are being practiced for the modernizing of medical and health services, where information technology (IT) is one of them, to support healthcare sectors directly and indirectly in achieving quality health care. The affiliation and interaction between medical science and information science creates so many new domains and nomenclature, such as; Health Informatics, Medical Informatics, Medical Information Science, Health Information System and so on. These domains offer many possibilities and opportunities of Health and Medical based Information Science education programs to create a workforce to assist healthcare providers in managing hospital and population based health information system. This paper deals with the benefit and advantages of health and medical information science and also the opportunities and possibilities of related educational program in the Indian Education Sector

Keywords: Health, Medicine, Medical Information Science, Informatics, Education Sector, UGC, AICTE, Education Policy, Health System, Indian Education, Universities

Health Information Science (HIS) or Medical Information Science (MIS) is one of the most important domains in the field of interdisciplinary Medical Science to support the healthcare providers in promoting the health of the individual and the community. This is applicable to all

the institutions offering health and wellness program to the community, such as; hospitals, specialty clinics, diagnostics centers, clinical care units, counseling and rehabilitation centers etc. [02, 09, 11]. The application of this domain is mainly for easing the in-house documentation and information system building, as well as facilitating the communication between various sections of the medical unit, among medical unit and medical unit with various other stakeholders electronically. The term Medical Informatics and Health Informatics look very similar and close and many a times used interchangeably, but Health Informatics represents the wider aspect and deals with the building

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of computerized information system for promoting the medical documentation and communication processes of complete healthcare domain whereas Medical Informatics enable information system support to one or more sub-domain of health care. Medical and Health Information Science, on the other hand deals with the computerized and manual Information System Infrastructure building and promotion. [14, 19]. *Figure-1*

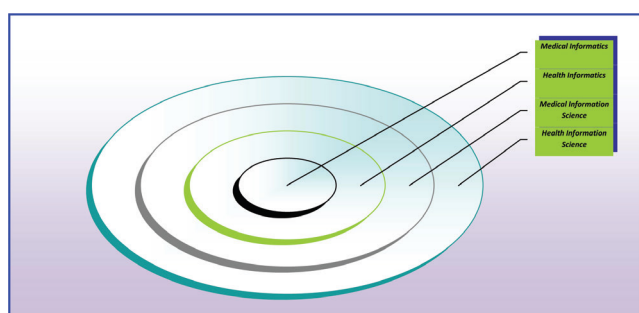


Fig. 1: Showing Medical and Computing interdisciplinary domain from large to smaller manner

The objective of this paper is to understand the concept of health systems, including standard nomenclature for information processing and also the requirement of healthcare providers in developing various applications to support complete health management processes. This paper is an attempt to assess the potentiality and scope of Health Information Science, Health Informatics and related full-fledged, semi and elective educational program in Indian scenario.

Indian Education Systems

India is one of the leading educational community in the world with so many organizations and institutions related to education, training and research [06, 18]. The Indian higher educational system is constituted with so many organizations irrespective of their size and the types of training offered, such as:

- Colleges of UG and PG level;
- University;
- Polytechnic;
- Research Centre;
- Training and Educational Institutions and so on.

Among colleges and universities, special and domain based are also important, like Health and Medical University, Technological and Engineering Education, Agricultural University and so on [02, 09]. As far as, the number is concerned, such are as follows:

- 600+ Universities, with state, central, private and deemed affiliation
- 25000+ Colleges and Institutions offers courses on Bachelor Degree and higher
- 50+ Institute of National Importance, like IIT, NIT, IIM, and IEST and so on
- 200+ Higher learning and Research Centre for conducting advanced and applied multidisciplinary research.

Medical Education and Information System Requirement

In India, the Medical Education is offered with an initially Bachelor of Medicine and Bachelor of Surgery (MBBS) Degree with 5+ year duration. The Postgraduate (PG) degree comes with Doctor of Medicine (MD) and Master of Surgery (MS) nomenclature (Table.1) whereas beyond PG, there are super-specialty such as a Doctorate in Medicine (DM) or Master of Chirurgical (MCh) with Medicine and Surgical focus. The Medical Council of India (MCI) is the parent organization that monitor and control Medical Education and Training Centre in India. Though in most of the States, a separate State Medical Clinical exists, to oversee the functions of the institutions offering such graduate, postgraduate and super-specialty program.

Table 1: Some common Medical Degrees of higher level

Specialized PG-Medical	Specialized PG-Medical
MD-Anesthesiology	MD-Pathology
MD-Anatomy	MD-Radio diagnostics
MD-Bio Chemistry	MD-Radio Therapy
MD-Community Medicine	MD- Physiology
MD-Dermatology	MS-General Surgery
MD-Forensic Medicine	MS- Gynecology
MD-General Medicine	MS-Orthopedics

Modern healthcare practice is much more dependent on various IT enabled applications such as; hospital information system, electronic health records, decision support system, mobile health application, etc. to support the health care providers and administrator in managing the institutional information and also assist them in streamlining the information flow within and outside the organization. In many instances, these applications fail to provide complete support due to poor development strategies and knowledge of the development team about healthcare domain. To avoid such failure, the institution should encourage and involve specialized professionals those who have the knowledge of Health, IT and Management and capable of designing and developing various general and specialized IT application in health and medical domain as well as taking the research projects related to; in-house computation and information systems, operational and medical system intelligence, patient and medical unit communication, public health information infrastructure building and so on. [20, 23] These specialized areas or domain is termed as Health Informatics / Medical Informatics / Clinical Informatics,

etc. that opens many avenues to the medical and non-medical graduates to choose this as a career, acquire the specialized knowledge and serve the nation in developing, automating and strengthening country health information system.

Possibilities in Education Sector

The possibilities of launching computing and information system related medical education, such as Health Informatics / Medical Informatics / Clinical Informatics, etc. can be seen initially as an interdisciplinary program that can start with UG or PG program such as MBBS, MD, MS or higher degrees such as DM, MCh, DNB etc. where these subjects can be kept as an elective or compulsory paper. Such elective or compulsory paper may also be included in the non-medical programs such as B.Sc-IT, MCA, MSc-IT, MSc-IS, MTech-IT/CSE, BTech-IT/CSE, MS-Computing and so on [24, 26], if it is difficult to start a full-fledged MIS or HIS program under various departments of a technical or engineering institution. (Table. 2)

Table 2: Depicted Possible Department and Specialized MIS and Allied Programs

MIS and Health Informatics Possibilities in IT Department	MIS and Health Informatics Possibilities in CSE Department	MIS and Health Informatics Possibilities in ECE Department
BSc-Information Technology [Health Informatics]	BSc-Computer Science/CSE [Health Informatics]	BSc-ECE [Health Informatics]
MSc-Information Technology [Health Informatics]	MSc- Computer Science/CSE [Health Informatics]	MSc- ECE [Health Informatics]
BTech-Information Technology [Health Informatics]	BTech- Computer Science/CSE [Health Informatics]	BTech- ECE [Health Informatics]
MTech-Information Technology [Health Informatics]	MTech- Computer Science/CSE [Health Informatics]	MTech- ECE[Health Informatics]

Apart from Elective, specialization may be started and offered in such degree and mainly with the computing and information system discipline. These nomenclature is to be treated as domain based and sectoral degrees.

Another approach may be offering Health Informatics and Medical Information Science as a full-fledged degree program. Table.3.

Table 3: Depicted possible nomenclature and degrees as full-fledged manner with Health Informatics/ MIS nomenclature

A MIS program related to Health Informatics –PG Level	A MIS program related to Health Informatics –UG Level
MSc- Health Information Science MTech- Health Information Science MBA-Health Information Management PGDM- Health Information Management PhD/DSc-Health Information Management/ Health Information Science/Health Informatics/ Medical Informatics	BSc- Health Information Science BTech- Health Information Science BBA-Health Information Management

Hence, in all such situations, education institutions are expected to have good infrastructure, including laboratory facilities and specialized faculties to deliver the module included in the program. For the first approach, interested organization can recruit Guest and Part-time resource person to deal with the subjects related to Health Informatics. In computing and information related programs, the course director or authority may facilitate Bio and Information related faculty member from the other institutes. Similarly, in Medical institution, the authority may recruit some Part-time or Guest lecturer, having computational skill and medical knowledge. In another approach, the specialized institutes may recruit professional and faculties from the other institute or as Adjunct professor to teach the modules of the program. For the third approach, an organization may recruit full time faculty member for the subjects [21, 27]. Hence this way educational infrastructure or HIS or allied field may be build and developed.

Findings

The UG and PG programs of Health Informatics or Health Information Sciences is not very common in India and it is at the stage of infancy where only a few institutes are offering such program but with various nomenclature such as PG Diploma in Medical Informatics, M.Sc. Health Informatics, Diploma in Health Informatics, 6-Month Certificate Program in Medical Informatics etc.

The planning and initiative for the promotion of Health Information System is very much limited; though some activities started with the National Rural Health Mission, Central Bureau of Health Intelligence, Ministry

of Health and Family Welfare and other disease registry organizations at the national and local level. [19]

Suggestion

- For better and sophisticated medical information system building, it is very much essential to start Health Informatics/ Health Information Science related programs depending upon need and capacity;
- Initially HIS or Health Informatics program may be started as an optional or elective paper and gradually depending upon infrastructure, organization may go for the specialization in related program or full-fledged degree or postgraduate program;
- Related and allied department may join hands for introducing related program or institutional development.
- It is required to have national approach and leadership, to make the health information system as an integral component of healthcare system, in managing the individual and population health data in the provision of quality health care. This approach would be seen as an opportunity to initiate the specialized program in Health Informatics or Health Information Sciences and generate maximum number of specialized professionals, who will make available the patient and community data to the fingertip of healthcare professionals and managers in achieving health for all. (Fig.2)

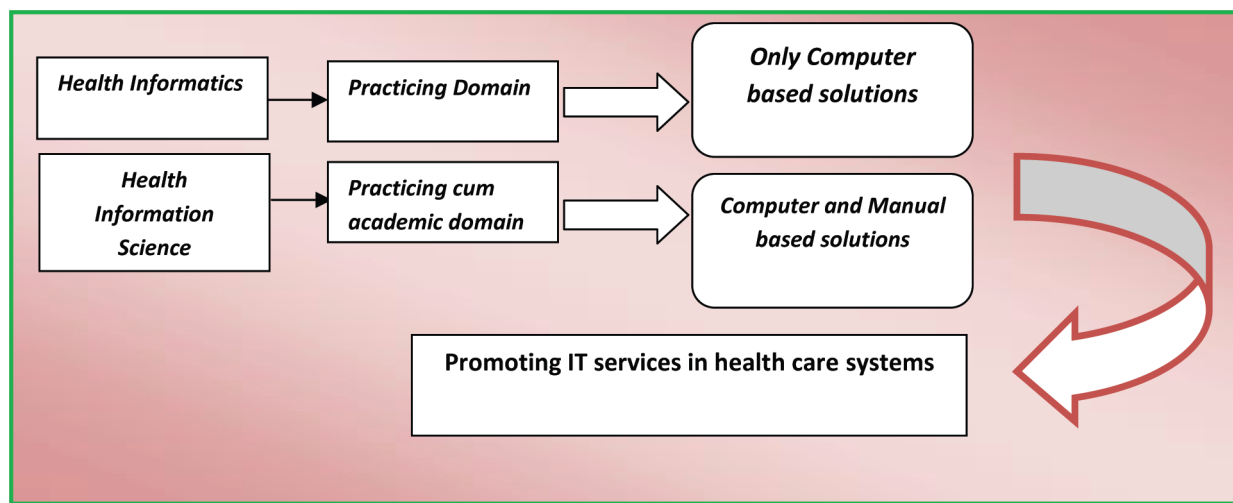


Fig.2: Promoting Medical Information Services and Technology towards the Better Health world

CONCLUSION

Health and Medical Information System are considered to be an essential in providing complete health care to the community. These systems not only included the Healthcare IT applications, but also the processes, which can be implemented in medical colleges and associated hospitals, health clinics, paramedical centers, diagnostic centers to assist various stakeholders such as physician, allied health professionals, patients, caregivers, third party payers, public health authorities etc. to capture, disseminate and manage the individual and population health data. These institutions also utilize these applications for integrating various biomedical equipment's and tools to capture and disseminate patient data for diagnosis and treatment. This can only be done by the group of professionals who are specialized in health informatics and related areas. Many Asian and European countries have already recognized Health Informatics or Health Information Science as a major domain to streamline the institution and population based health information processes. Moreover, the medical universities there, have included Health Informatics as a module in their UG and PG curriculum. They also offer many specialized UG, PG and PhD programs related to Health Informatics or Health Information Science. India is also not far behind, the recent development in the field of medical technologies and integration of these technologies

into the health information system has created a tremendous opportunity and necessity to have such program in place to generate professionals who can contribute effectively to health care system. To do so, Indian educational Institutes both medical and non-medical has to take initiative to start Health Informatics or Health Information Science related program which ultimately improves the information processes and health outcome.

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