
# ROLE OF INFORMATION TECHNOLOGY IN MEDICINE.

**Hashimkhojaeva Manzura[1]**
**Sadikova Nigora[2]**
[1-2]Tashkent University of Applied Sciences
https://doi.org/10.5281/zenodo.7428331

Annotation :Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise. Today information technology is used in wide range of fields and one of the upcoming fields is of Medical Science, which is known as Health Information Technology (HIT).

Keywords: information technology, confidentiality, computer, medical science

Health information technology (HIT) is the application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making. HIT, technology represents computers and communications attributes that can be networked to build systems for moving health information. Let's have a brief glimpse at the background of the information technology in medicine.

Worldwide use of computer technology in medicine began in the early 1950s with the rise of the computers. In 1949, Gustav Wagner established the first professional organization for health informatics in Germany. Health informatics also called Health Information Systems is a discipline at the intersection of information science, computer science, and health care. It concerns with the resources, devices, and methods required for optimizing the acquisition, storage, retrieval, and use of information in health and biomedicine.

Health informatics tools include computers, clinical guidelines, formal medical terminologies, and information and communication sytems. It is applied to the areas of nursing, clinical care, dentistry, pharmacy, public health, occupational therapy, and (bio)medical research.

Specialized university departments and Informatics training programs began during the 1960s in France, Germany, Belgium and The Netherlands. Medical informatics research units began to appear during the 1970s in Poland and in the U.S. Since then the development of high-quality health informatics research, education and infrastructure has been a goal of the U.S., European Union and many developing economies.

Use of IT in Medical Education. With the development in IT, there has been a significant change in medical education all over the world. The changes is that majority of the medical students are computer literate these days. New information on medical topics is readily accessible via the Internet and handheld computers such as palmtops, personal digital assistants (PDA). Information Technology can assist medical education in various ways such as in college networks and internet. Computer-assisted learning (CAL), Virtual reality (VR), Human patient simulators are some options. With the help of college networks and Internet, the medical students as well as the teachers may stay in contact even when they are off college.

Rapid communication can be established with the help of e-mails and course details, handouts, and feedbacks can be circulated easily. Many medical schools these days use online programs such as "Blackboard" or "student central" to underline and coordinate their courses. Such programs allow speedy access to information and quick turnaround of evaluation and messaging, and allow all tutors, assessors, and students at any site to look at the curricular context of their own particular contribution. Similarly, the Internet provides opportunities to gain up-to-date information on different aspects of health and disease and to discuss with colleagues in different continents via net conferencing. Free access to Medline, various medical journals, online textbooks and the latest information on new development in medicine also encourages learning and research.

CAL is considered as an enjoyable medium of learning and very suitable for conceptually difficult topics. Interactive digital materials for study of histopathology, anatomy and heart sounds are used widely. Development of anatomical three dimensional atlases of various internal organs using computed tomography and magnetic resonance imaging are very illustrative and help the students to understand the subject matter clearly.

Another development is of "Advanced Life Support" (ACLS) simulators and Haptics "the science of touch" simulators are used in medical education to develop various clinical skills such as ECG interpretation, appropriate intervention such as ABC, drugs, injections, defibrillation without working on a real patient. These days, highly sophisticated simulators "virtual reality" with highly advanced medical simulation technologies and medical databases are available in the advanced medical schools that expose the medical students to the vast range of complex medical situations. It can emulate various clinical procedures such as catheterization, laparoscopy, bronchoscopy etc. With new technology, the students can virtually go inside each and every organ and see how they actually look like from outside as well as from inside.

Information technology has been very helpful to the healthcare sector. One example of a significant advancement that IT has provided to hospitals is the development of electronic medical records (EMR). This technology can convert medical information into a single database. Not only does this technology reduce paper costs, it allows healthcare providers to access pertinent patient information such as medical history, medications, insurance information, etc with just the click of a mouse. EMRs hold great promise in the clinical arena. The ability to care for patients with a record that is integrated with laboratory and pharmacy information, and provides point of service information regarding preventive services, diagnosis, treatment, and follow up represents a dramatic advance in patient care. Improving and measuring quality would be instantly improved if all clinicians used EMRs. For example, it would be easy to prompt clinicians that their patient with diabetes needs an eye examination or a hemoglobin A1C level. Drug prescribing patterns of individual clinicians could be carefully evaluated and compared to established standards. In fact, computer based clinical support as part of an EMR has been shown to improve physician performance and patient outcomes.

Reducing medical errors has become a priority all over the world. Specifically adverse drug events are an important source of injuries in hospitalised patients. In response to the need to improve patient safety, computerised physician order entry (CPOE) systems have become increasingly more common. In general, CPOE systems force physicians to write all orders online. These systems have the capacity to verify that written orders are correct, that is, based

on a patient profile, they can automatically check the dose and contraindications of a specific drug. They have been shown to dramatically reduce serious medication errors.

Computerized provider order entry (CPOE), formerly called Computer physician order entry, can reduce total medication error rates by 80%, and adverse (serious with harm to patient) errors by 55%. A 2004 survey by Leapfrog found that 16% of US clinics, hospitals and medical practices are expected to be utilizing CPOE within 2 years. Recent study says that CPOE adoption reduced drug errors and concluded that CPOE could substantially reduce the annual number of those errors if widely implemented. In addition to electronic prescribing, a standardized bar code system for dispensing drugs could prevent a quarter of drug errors. Consumer information about the risks of the drugs and improved drug packaging (clear labels, avoiding similar drug names and dosage reminders) are other error-proofing measures.

There is no argument over the influence of IT in medicine and education. But there are still many areas which need to be improved before we could utilise IT to its full extent. Last but not the least, however advanced the technology gets, it can never replace the interaction the doctors and students require with the patient and the clinical judgments which make great doctors. So, in the pursuit of modern technologies, we should be careful that the doctor patient relationships do not get overlooked.

While information technology refers to the usage of computers and telecommunications and other systems to store, retrieve and share information, HIT, refers to the secure use of technology to manage health-related information.

The most common examples of healthcare information technology are e-prescriptions, electronic health records (EHRs), and other tech tools that help patients meet health goals such as managing blood sugar levels or quitting smoking. Information technology has paved the way for more accurate EHRs/ EMRs that help patients gain quick and easy access to various healthcare facilities. Additionally, it has given patients more control over their health through various mobile apps and information platforms.

Healthcare information technology's primary purpose is to maintain privacy while improving patient care. HIT enables medical professionals to not only take better care of patients but also improve their communication with patients.

A few examples of Health IT are:

- Computerized disease registries
- Consumer health IT applications
- Electronic prescribing
- Electronic medical record systems such as EMRs, EHRs, and PHRs
- Telehealth

The goal of using information technology in healthcare is to enhance the overall health of the people by improving the quality of care provided to the patients.

Healthcare information technology is significant because it:

- Helps in delivering more accurate, actionable, and accessible information related to a patient's health that can be customized to meet the individual's needs.
- Allows better and faster decisions related to health risks that affect an individual as well as the public.
- Supports communication between patients and healthcare professionals and helps in decision-making.

- Helps build networks of social support for both patients as well as healthcare professionals.
- Improves awareness among patients as well as the general public about health-related matters that can lead to positive outcomes.

Uses of information technology in healthcare. Information technology is being used in numerous ways to improve patient safety, healthcare delivery, and communication between healthcare providers and patients. One of the most remarkable applications of HIT is patient records and data management.

Previously, paper charts were used to maintain patients' records that were easily lost, misinterpreted, or damaged. IT has helped healthcare professionals track patient's records easily and securely. A medical professional can add pharmacy records, X-rays, test results, and even vital signs to the virtual chart that is easy to read, share, and check against other records.

Also, an entirely new discipline known as nursing informatics has been formed by combining IT and clinical care. This discipline combines the practice of nursing with IT management and helping people with a passion for science and data in the service of medical patients and improving healthcare. With increased demand in technology, this field is gaining more popularity day by day.

According to a survey by the Robert Wood Johnson Foundation, it was found that nurses who use IT are more likely to spot medical errors. As less time is spent on documenting patient care, nurses can get more time to spend on patient care. Also, as more and more people are getting insured and seeking quality care, the demand for information technology that can help track patients' records accurately and improve healthcare is only going to grow.

As the HIT field expands, it will create more jobs for IT professionals in hospital settings. From medical transcriptionists, medical coding specialists, clinical IT consultants, and healthcare system analysts, roles in the field of healthcare are growing every year. Apart from creating jobs, IT will stay relevant for hospital administrators and policymakers to increase their volume, speed, and quality of service in the care centers.

Telehealth will gain more popularity. As more and more doctors, specialists, and health systems are providing telehealth services, it will gain more prominence in near future. For example, a senior citizen recovering from post-acute care could avail of on-camera consultation without the need for traveling. Regardless of the user's condition or age or familiarity with the concept, telehealth will gain wider adoption soon.

Artificial Intelligence will improve diagnosis and other processes. AI tools such as chatbots and wearables are helping patients take better control of their own care. Artificial Intelligence is being used to maximize hospital efficiency, develop personalized drugs, create treatment protocols, to perform patient monitoring, and care administration. Using complex machine learning algorithms, AI helps emulate human intelligence in analyzing and comprehending complex medical data.

Leading healthcare institutions such as the Mayo Clinic and the UK's NHS have developed their own AI algorithms to analyze vast amounts of healthcare information that can lead to far-reaching changes in the fields of disease prevention and early diagnosis.

Information technology (IT) has, in the last few decades, become so well assimilated into healthcare delivery systems that few doctors can imagine a day without using the computer or the network. Two areas of medical practice have been particularly revolutionised by computer technology: the acquisition and storage of electronic medical records, and the

accessibility and rapid transmission of healthcare information over the Internet. This issue of the Journal showcases two essays by authors who grew up in this IT age. Their knowledge and familiarity with the technology is not surprising, but their ability to appreciate and discuss some of the ethical problems and hazards faced in adopting IT in a profession based on human interaction is certainly commendable.

One of these authors is spot-on in suggesting that the ethical scale be calibrated before embarking on a debate, and she used the Hippocratic tradition to assess if the use of IT is beneficial or potentially harmful to medicine. Another set of compass useful in such an evaluation is the document by the Hastings Centre in 1996, which reiterated the goals of medicine in a simple yet inclusive manner: prevention of disease and injury, promotion and maintenance of health, relief of pain and suffering, care and cure of those with malady, avoidance of premature death, and pursuit of a peaceful death. IT must therefore be applied as an instrument subject to the goals of medicine, and appraised in the context of whether it promotes or impedes the attainment of these medical goals. This standardisation will also answer the question of whose benefit is of primary concern. Medicine is a profession concerned with preserving and improving patients' lives. The considerations are thus obvious; the approach has to be patient-centred, and not merely for the convenience of the healthcare providers or administrators. In general, it is difficult to deny the benefits of a more efficient information management system. However, at a less macroscopic level, such generic benefits cannot be assumed for all healthcare delivery systems. Confounding factors such as technical competency of staff, acceptance and adoption by doctors and patients, and intrinsic design-related features can impair rather then facilitate medical care and doctor-patient relationship in some settings. As a worse quality of care is inconsistent with the goals of medicine, the use of IT in such systems or institutions can be considered unethical. It is clear therefore that the use of IT in medicine should always be based on whether the benefits to patients exceed the anticipated hazards, and whether risks to patient's privacy and confidentiality can be reduced to an acceptable level through regulation and education. A related issue raised by Ng relates to who should bear the added cost of implementing IT.

The debate on the safe and appropriate use of IT in medicine will continue to evolve as the capabilities of the technology are progressively being developed at a hurried pace. Only by returning to the fundamental precepts of medical ethics can we continue to meet new challenges posed by new inventions in order to preserve the ideals and aspirations of the profession, and society

## References:

1. Yeo CJJ. Ethical dilemmas of the practice of medicine in the information technology age. Singapore Med J 2003; 44:141-4.
2. Ng EST. Ethical dilemmas of healthcare delivery in the information technology age. Singapore Med J 2003; 44:145-8.
3. The goal of medicine: Setting new priorities. Hasting Center Report, special supplement Nov-Dec 1996.
4. Dansky L. Electronic medical records: are physicians ready? J Healthcare Management 1999;44:454-455.

5. Blum E. Paperless medical record not all it s cracked up to be. AMNews Feb17, 2003 [online]. Available at: http://www.ama-assn.org/sci-pubs/ amnews/pick_03/bica0217.htm. Last accessed: 11 Feb 2003.
6. Joint Commission on Accreditation of Healthcare Organisations (JCAHO). Protecting personal health information - overview of the challenges (2000).