Information and Communication Technology (ICT) applications and risks in the Health Industry

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Author Note

This document is a report on the modern applications and risks of Information and Communication Technologies used in the Health Industry created as an assignment for the course ICT during the spring semester of 2021.

Abstract

While the term ICT and its correlation to the health industry exist for more than two decades, it's now urgent during the pandemic of Covid-19 to revisit the advantages and the disadvantages of telemedicine as it's what we need in this era of social distancing and digital reforming. From homecare applications to storing and processing huge amounts of medical information with Cloud computing and Big data, ICT applications within the healthcare industry promise the revolusiation of the field but not without the upcoming risks.

Keywords: Information and Communication Technology, ICT, Telehealth, eHeath, Health, Electronic Health Records, Cloud, Big Data, Telesurgery

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In this report, we will discuss the modern applications of Information and Communication Technologies in healthcare as well as the risks that might entail the integration of modern solutions in an outdated healthcare system.

Applications

The uses of ICT within the health industry are numerous and mutually contribute to the reformation of the healthcare system, which seems to bend under the presence of the pandemic.

Hospital Management Systems

Starting with Hospital Management Systems, ICT helps the management to improve patient's safety and satisfaction. Furthermore, the hospital gets in touch with the latest technology trends in the medical field and has knowledge of population health and statistics while simultaneously is up to date with the government mandates on track. The use of ICT and Serious Games can help decrease costs by reducing the time required to process data and manage paperwork. Finally, the implementation of telemedicine reduces the number of patients in waiting rooms causing less pressure which improves the efficiency of the working staff.

Electronic Health Records

Another important application is the digitalization of health records. Electronic Health Records (EHRs) have been replacing the outdated paper records while creating new job positions for technicians as well as medical billers and coders. EHR contribute to quality patient care by immediately informing the treating physician of potential allergies or medicine intolerances. Additionally, EHRs provide invaluable data to clinical researchers,

helping to advance medical knowledge and therefore the development of treatments for common health problems. A consistent health IT system can provide insights into how widespread an outbreak is, enabling preventative measures, such as increased vaccine production, to be implemented far more quickly. To end up with, patients gain the ability to track their own health condition and can easily get a second opinion from any medical practitioners around the globe.

Cloud Computing and Big Data

Healthcare collects and stores huge amounts of data every single second resulting in the need for expandable, cost-effective and safe storage solutions. Cloud computing is the technology that enables safe storage of an enormous amount of data efficiently without the limitations and expenses of additional hardware or servers. Because of the increased reliance on EHR systems, Cloud storage protects against the loss of sensitive information with strong backup and recovery services. While the Cloud is an invaluable tool for medical research and sharing medical information, the importance of analyzing this data weighs upon a popular digital term known as "Big Data". When processed by data experts, this information can help reduce healthcare costs, predict epidemics, avoid preventable deaths, reduce healthcare waste, develop new treatments and overall improve quality of care and life.

Homecare

To continue, ICT in homecare features a respectable impact on people living with chronic illnesses. Many studies point out that communication between healthcare professionals and patients was significantly improved with the utilization of ICT applications while making it easier for the patients to monitor and manage their symptoms daily. Telehealth systems in the form of online and mobile tools are already creating possibilities for reduced hospitalization and better home care. Conclusively, healthcare professionals can

become more flexible and able to address the differing needs of patients resulting in more individual-centred care.

mHealth Apps

In the previous paragraph, we referred to mobile tools facilitating people in need of chronic care. Mobile app technology is not new to the medical field, surprisingly the healthcare app market is one of the fastest-growing in mobile application development. While "mHealth" apps are one of the most inexpensive ways to contribute to the health landscape, they seem to provide notable services to patients and medical experts. There is a wide variety of mobile health apps ranging from medication management, medical reference and diagnostics to women's and mental health.

Health Education

In the context of education, ICT can help raise awareness among the public about communicable diseases, health status, prevention measures as well as recent diagnostic and therapeutic procedures. Additionally, easy access to medical research and online seminars can create a workforce of highly informed and well-rounded medical practitioners that will increase the quality of diagnostic methods and expand their soft skills.

Telesurgery

It's known that many ground-breaking technological improvements came from the needs of the military, telesurgery is no different. The term telesurgery refers to the concept of remote surgery, an operator controls the direction and force of millimeter-scale robotic manipulators in order to achieve complex tasks. The primary purpose of robotic surgery is to provide the access to surgery without geographical or time constraints. It's safe to say that advances in robotics could allow surgeons to perform distant operations in a secure manner from anywhere in the world.

Risks

Even though ICT solutions implemented in the healthcare industry seem to have numerous advantages modernisation always comes with a cost. From a people point of view, the use of ICT cannot replace a face-to-face encounter with a medical expert, the need to meet in person with the doctor will always be there and in many cases, it will lead to a better diagnosis. With the rise in popularity of telehealth systems comes the increase of impersonal patient-doctor interactions. Additionally, hospital and medical staff need the training to keep up with the new technologies implemented which is expensive and sometimes the staff itself is resistant or fearful of using ICT. More specifically, according to studies, there is a gap of knowledge about the usage of ICT solutions to meet the needs of people with chronic illness.

Technology-wise the risks include susceptibility to network hackers, patients' medical history and private information should be kept at all times confidential for both ethical and legal reasons. Even though the health care system network is adequately equipped with security measures, network hackings are still possible to occur. Furthermore, the theft of patient records is a common criminal activity, stolen health credentials go as high as 10$ each in the black market, which is approximately 10 or 20 times the worth of credit card numbers. The data contained on these records can be used to create fake IDs, purchase medical equipment or drugs and submit false insurance claims. To end up with, even though a central point for all data information can be extremely useful, the appearance of connectivity or bandwidth problems may result in serious repercussions, even cost patients' lives.

Conclusion

Information and Communication Technologies appear to gain ground in the health industry for the past two decades. The applications of ICT seem to be reforming for the medical landscape particularly throughout the outbreak of Covid-19. Even though the advantages are unquestionable, it's important that we embrace those changes with highly trained medical experts as well as focus on preserving the privacy and quality of service for patients around the globe. Conclusively, with strong network infrastructure, skilled technical staff in hospitals and improved accessibility for patients, ICT applications could revolutionise the medical field.

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