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# The Role of Healthcare Information Technology (HIT) in Health Care Level of Pakistan: A Literature Review

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**Abstract:** *This paper illustrates the debate and initiatives concerning the role of Healthcare Information Technology (HIT) at the Healthcare level in Pakistan. This paper reviewed the recent literature on Healthcare Information technology (HIT) to explore the role of the healthcare actors' level and healthcare delivery level. The purpose of this study is to look at the expanding role in the form of the reduced burden of diseases by the improvement of efficiency and quality of healthcare such as saving the time of patients and doctors and more affordable healthcare to overall and reduced healthcare costs, and this is all by Health Information Management System (HIMS), Telemedicine and Mobile and electronic Health in the context of Pakistan; this search identified 1025 results, 85 of which were considered on the base of abstract and conclusion but most specified article related to the objective of this paper are 45 articles in which five on the efficiency of healthcare, three on the equitable healthcare, six on the lower healthcare costs, 15 on reducing the burden of diseases, and nine on the components of Healthcare IT. The main challenges of adopting Healthcare IT and suggestions are discussed.*

**Key Words:** Healthcare Actors, Healthcare Information Technology (HIT), Health Care Levels, Burden of Diseases

## Introduction

The term healthcare refers to the maintenance and improvement of physical, mental, and social health, especially through the provision of medical services, which include 4Ps actors such as patients, providers, payers, and public health. These block the role of technology, which will be presented in this paper. With the passage of time, the world has advanced in every department, but one department has reached every department, which is information technology (IT). The word technology is the combination of software and hardware devices; the Department of Healthcare has also reached at the touch of a button with the help of modern technology because the technology is putting more power in the hands of consumers/patients are learning to combat disorders by harnessing the body's own ability to heal and growth, providers and researchers are learning to diagnose and new treatment of diseases through the significant services of technology such as IT, computers, databases, websites, mobile, communications, wearable health technology and artificial intelligence in healthcare. According to WHO, "Health technology" as defined by WHO is the set of techniques, drugs, equipment, and procedures used by healthcare professionals in delivering medical care to individuals and the system within which such care is delivered. (WHO, 1998) The combination of healthcare and information technology (IT) illustrates the holistic management of health information across computerized systems and the secure exchange of information used by patients/consumers, providers, government and quality entities, and insurers. Health IT has played a significant role in advanced patient monitoring and tracking, healthcare reach in the

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remote areas of the country, addressing the scarcity of healthcare providers such as doctors, nurses, and hospitals, and the sensitization related to the importance of health, awareness, and information about the disease management such as vaccination, hygiene maintenance, a healthy lifestyle could be spread easily through IT and digitalization of patient health records through the role of Healthcare IT. On the other side, British economist E.H. Schumacher suggested adequate technology. Lee and associates (2018) The World Health Organization (WHO) established the definition of appropriate technology in December 1989. The WHO defines appropriate technology as techniques, methods, and equipment that are supported by science, tailored to the needs of the local environment, acceptable to users and recipients, and maintainable with locally available resources (Ren et al., 2015). Simply put, appropriate technology contributes to national goals and makes the most economical use of a nation's natural resources, such as capital (hospitals, machinery), labor (doctors, nurses), and skills. When machinery and/or equipment are involved, they should also be easy to operate and maintain. This technology was first used in low- and middle-income nations in the 20th century, but in developed nations, face recognition technology and digitalization have brought healthcare to the fingertips of the public in the 21st century. Unfortunately, a lack of funding and resources prevents poor nations from offering high-quality healthcare IT services. (Din and others, 2017) Pakistan's healthcare system is perpetually in turmoil, and the country has a poor income. Health technologies play a major role in health systems; yet, in Pakistan, the healthcare system exhibits inadequate infrastructure, inadequate record-keeping, and restricted utilization of health information technology(Bano & Kumar, 2017). In addition to the health IT application itself, cofactors, including policies, process re-engineering, training, organizational and human resource restructuring, and change management, should always be considered when discussing health IT. In Pakistan, the healthcare system operates on three levels, incorporating various public health interventions. The primary healthcare model is founded on Basic Health Units (BHUs), Rural Health Centers (RHCs), and Dispensaries. Secondary care consists of first and second-referral facilities that offer acute, ambulatory, and inpatient care through Tehsil Headquarter Hospitals (THQs) and District Headquarter Hospitals (DHQs). Tertiary care includes teaching hospitals (Punjani & Associates, 2014). This is the state of healthcare in Pakistan, and according to Khan (2019), the country's healthcare system is going through a difficult time because of a number of issues, including clinical errors, a lack of data tracking and monitoring, difficulty maintaining massive manual medical records, and inaccessibility of healthcare in both rural and urban areas. The function of health IT in the three levels of healthcare delivery is illustrated in this study.

The six building components of the healthcare system framework are, according to the WHO, financing, medical products and technology, information, leadership, human resources, and service delivery (Punjani et al., 2014). This paper discusses the role of health information technology from a broad perspective. By using health IT in primary, secondary, and tertiary healthcare settings, the healthcare system will be able to provide data about healthcare, and this data will indicate where resources will be used most effectively, such as in hospitals, among medical professionals, including doctors, nurses, paramedics, and outreach staff like female health workers. Additionally, new and advanced technology will be introduced, with the most important chronic and burden diseases being taken care of first. This will help Pakistan lower its healthcare costs and the burden of disease.

## Role of Healthcare IT to Reduce the Burden of Diseases and Reduce Healthcare Costs

President Barack Obama of the United States announced in January 2009 that within the next five years, all medical records in the country would be electronic, thanks to immediate investments made to ensure this goal of improving healthcare quality while cutting costs. This will eliminate bureaucracy and lower the cost of costly medical testing. By lowering the fatal medical errors that are common in the healthcare system, it will save lives. However, Pakistan's health profile is exemplified by its rapid population increase, high rates of newborn and maternal mortality, and dual burden of communicable and non-communicable diseases. One contributing cause to these statistics is the absence of health information technology (IT) involvement in the healthcare system. More than 80% of Pakistan's health system's budget is spent on pharmaceuticals and medical supplies (Kumar & Bano, 2017), while only a relatively small percentage is spent on electronic and digital systems for primary, secondary, and tertiary care.

The burden of diseases is divided into two categories by the World Health Organization (WHO): non-communicable diseases (NCDs) and communicable diseases (CDs). The primary categories of non-communicable diseases (NCDs)/chronic diseases, such as cancer, diabetes, chronic respiratory conditions, and cardiovascular diseases (CVDs), that place the most burden on industrialized and developing nations have been recognized by the World Health Organization (WHO) in its 2016 global profile. The global profile of the 2016 World Health Organization (WHO) has pointed out types of CDs /Infectious diseases such as HIV, Hepatitis, TB, and malaria (communicable, maternal, perinatal, and nutritional conditions) that contribute the greatest burden in low and middle countries and lowest burden in developed countries but Covid-19 of 2020 has contributed as infectious disease globally burden.

The profile of Pakistan's communicable and non-communicable diseases in 2016 of World Health Organization according to it Pakistan has 35% CDs and 58% NCDs estimated according to CDs and NCDs deaths. Global shifting of disease burden from communicable to non-communicable diseases (NCDs) has led to a large proportion of deaths in developed and developing countries, but Pakistan has both large proportions of deaths due to CDs and NCDs. The World Health Organization (WHO) reported some essential NCD medicines and basic technologies to treat major NCDs, the number of essential NCD medicines reported as "generally available" in 2017, the four medicines out of 10 in Pakistan, and the number of essential NCD technologies reported as "generally available" 2017 the technologies four out of 6 in Pakistan. However, Pakistan is very behind in terms of electronic and digitalized technology that caters to the needs of advanced and complex surgeries. Lack of consistency, lack of horizontal integration at any level, and lack of indicator weighting for NCDs are the issues with these health information systems. Inaccurate or delayed reporting, poor quality and dependability, data analysis, and the utilization of data for evidence-based decision-making are other problems. Important deficiencies include the absence of data from small GP clinics and the private sector, as well as the unreliability of the death registry caused by NCDs. The role of health information technology (IT), such as the Health Information and Management System (HIMS), can help reduce the prevalence of chronic diseases (NCDs) and infectious diseases (CDs). The HIMS system shows how health records are managed at three different levels of healthcare. It replaces manual and computerized health records with electronic medical records (EMRs), which include free-text notes from healthcare providers and medical images/imaging data, administrative insurance claims, patient registries, population health surveys, medical research, including genetic studies, and data from digital apps and wearable devices, among other sources. In the end, this lowers the main risk factors that raised Pakistan's disease burden and boosts the effectiveness of district headquarters hospitals (DHQs), rural health centers (RHCs), headquarters hospitals (THQs), and basic health units (BHUs), as well as the quality of care provided.

The Health Ministry of Pakistan developed the HMIS in 1991–1992, but sadly, the system isn't very effective. Owing to poor healthcare spending and a lack of clear policies for integrating cutting-edge technology into the healthcare system, Pakistan is attempting to improve HIMS with the help of the WHO. At the moment, 77 districts and 80 trained individuals from a total of 134 districts routinely report activities linked to health (Nizar & Chagani, 2016). However, in most of the healthcare delivery systems of public and private sectors, the HMIS is non-functional. Telemedicine refers to long-distance patient care and the provision of remote clinical services via real-time two-way communication between patient and health care provider, using electronic audio and visual means. It deals with the major contribution of remote areas burden disease; telemedicine reduces it and some other factors such as the unwillingness of doctors to work in rural areas, overcoming the scarcity of paramedics and hospital beds, providing treatment at par with the metropolitan facilities, and facilitating healthcare accessibility and affordability healthcare to all rural and urban areas. Other technologies, such as telemedicine and the idea of e-health, have been introduced as pilot programs to reduce the burden of sickness in rural Pakistani areas like Baltistan and the Education Foundation, with technical support from Comsats (S. Nishtar, 2006). The Ministry of Health's recent focus on technology-assisted health information archival for the development of management information systems—which will link information from all of Pakistan's districts—is also a progressive step since it will influence technology to improve disease surveillance. Furthermore, a lot of work is being done by the Aman Foundation's telehealth contact center to provide medical services, particularly to the nation's impoverished population (Punjani et al., 2014). Among the IT resources currently available in Pakistan's health sector are the medical information system (MIS) for patients, the

biometric attendance system for doctors and other paramedical staff, the online bank card payment system for treatments, computers, the internet, and smartphone-based doctor appointments (Wasay & Associates, 2014).

Digital health innovations are already transforming primary care and driving health systems toward a more integrated, people-centered approach to providing healthcare services. These technologies, which enable telemedicine, remote care, and mobile health, can help enhance the patient experience by bringing hospital environments into people's homes. The key to this trend is the availability of services like home monitoring (blood pressure, medication adjustments, blood, and urine testing), electronic sensors that allow for the measurement of vital signs, and activity tracking to help staff monitor patients who are at risk of falling, and point-of-care diagnostic testing for conditions like diabetes, HIV, and malaria that can quickly analyze results and serve as a crucial treatment guide (WHO 2015). Pakistan needs this kind of technology to advance its economy and lessen the burden of disease. This century has seen a significant advancement in the development of assistive and medical technologies. For example, 3-D printing is revolutionizing the manufacturing of medical equipment, orthotics, and prostheses. Hendricks, D. (2017) states that mobile and electronic health, which includes free-text notes and medical imaging data from healthcare providers, especially in primary care, can help patients with low-cost acute and chronic disease screening and early diagnosis at a lower risk of complications. In the Chronic Care Model, the role of Health IT is to move ambulatory care from acute, episodic, and reactive encounters to proactive, planned, and individualized long-term care with the aid of advancements in information technologies and telecommunication infrastructures (Dzenowagis, J. 2018). Other functions of Health IT include managing acute flare-ups of diseases, preventing more complications related to the disease, minimizing treatment-related risks, identifying triggers of transition, and identifying subpopulations most likely to benefit from coordinated care. The primary reason for the deceleration of economic progress is the prevalence of illnesses. The state of health plays a significant role in the economy. Economic growth and human well-being are correlated with the productivity and efficacy of the labor force, which is enhanced by good health (Punjani & Associates, 2014).

## Challenges to Adopting Healthcare IT and Suggestions in Pakistan

After studying and analyzing the literature review the main challenges are facing in Pakistan in terms to adapt the healthcare information technology the basic challenge is the lack of proper infrastructure in primary and secondary level to early diagnose and screen of the diseases and lack of proper platform to consumers or patients to utilize the Healthcare IT and its components such as telemedicine and mobile Health and other is no proper policy for second is very low awareness about health IT due to this behavior of people towards healthcare information technology is a very pathetic especially at rural area to overcome this challenge the healthcare professionals such as doctors and nurses should be encouraged the use of health IT, third is very low Interoperability at national and state level to improve this policy should be demonstrated to ensure the secure exchange of information , fourth is the insufficient fund allocation on the Healthcare Information technology in hospital settings or health sector by Pakistan economy to advance Healthcare IT, fifth is scarcity of trained manpower in healthcare IT such as our medical colleges are not well advanced to train paramedical staff. Sixth, Pakistan is a country where multiple languages are spoken; therefore, to overcome this challenge, Health apps and websites that are included in Healthcare IT should be available in the regional languages of Pakistan. Last but not least is the Information technology (IT) industry, which makes user-friendly applications for consumers, patients, and providers or healthcare professionals. Large integrated health systems with chronic disease management teams and call centers will have fewer barriers to the adoption of enabling technology; however, clinicians in small practices will have greater challenges (Young & Nesbitt, 2017).

## Conclusions

Healthcare gaps and weaknesses can be filled by electronic and digitalization in the healthcare system of Pakistan because the literature identified the crucial development of Health IT in the healthcare system in terms of low health expenditure, in terms of few public and private setups which are well equipped with high-class technology that caters the need of advanced surgeries and transplantation to reduce the burden of disease and lower health care costs. There is a critical need to address the substantial challenge

associated with adopting health IT. Health IT has been successfully used to control a variety of healthcare costs, such as to avoid duplicate testing for adverse/disadvantageous drug events to conserve providers' time and effort by having information more easily accessible and in terms of cost savings associated with increased efficiency or productivity metrics. The implementation of health IT in the health sector can potentially increase efficiency, transparency, and accountability.

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