Perspective

Digital Health and Future of Healthcare in Pakistan

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Abstract:

In today's fast paced world, the use of Information Technology (IT) in dispensing quality healthcare forms a cornerstone for the development of any health system. While the standard of Medical Education and training is quickly gaining impetus within Pakistan, we are severely lacking in use of digital platforms and electronic records to aid the process of healthcare delivery. There's no dearth of talent in Pakistan; in the field of Medicine or IT. However, there is a considerable lack in the understanding of how IT can revolutionize healthcare delivery. We see that there is an urgent need for the governmental institutions and the private sector medical institutions to recognize the importance of digital health in making medical practice more effective, efficient and error proof; so that Pakistan can shake off the burden of a centuries old and obsolete system of healthcare delivery. Here, we propose our roadmap vision for development of digital health systems in Pakistan and propose basic initiatives that must be taken at the grass roots level to expedite this process.

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Introduction:

Digital Healthcare is a broad arena that combines Information Technology (IT) with the service and practice of healthcare delivery. The utilization of online services, algorithms, virtual consultation setups, mobile phone applications and e-platforms for the relaying of medical care is rapidly gaining popularity and common usage in the west and in giant healthcare systems of countries like China and the UK. With the emerging dilemma of healthcare costs and the lack of easy access and quality provision of healthcare all over the world, the need for a transparent and well developed system for dispensing care to all strata of the population in an affordable and convenient manner is more urgent than ever. The purpose of all such online systems is mainly to cut down costs of the health system in managerial and overhead expenses while simultaneously utilizing IT advancements for better and more personalized medical consultation and caregiving for patients. While the world turns towards these innovations and technological advancements to aid in the field of health,

Pakistan lags behind. While the challenges of setting up an adequate and trustworthy digital medicine environment in a developing country like Pakistan are many, it is not an impossible task. If these challenges are overcome through collective effort and the process of IT reformation of health started as the first step, the future of healthcare delivery and patient care in Pakistan would be greatly transformed; and the pathway towards equal and easy access to quality healthcare be made easier than ever before.

What could a Potential Digital Healthcare System in Pakistan look like?

Primarily, one of the first conceptualizations in the process of Health Information Technology (HIT) is the development of a cloud-based Electronic Health Record (EHR). While traditional EHRs (in-house EHRs) have been adopted by many private and Armed Forces-led institutions through creation of a local electronic database of patient health records, the current system is lacking in two main respects. Firstly, the

government hospitals still lack the widespread use of computer databases and many hospitals use written records of patient files and histories as part of official record keeping. In light of the high patient density in government hospitals all over the country, this has contributed significantly to stagnation of efficient healthcare delivery. Secondly, even the institutions and hospitals that do use EHRs do so through creation of a local electronic library instead of utilizing a cloud-based system where the data from all such health institutions could be uploaded into a cloud and accessed, integrated, utilized for research purposes as needed. Such a cloud-based system has several advantages over in-house electronic record keeping. The most important: it eliminates the need for maintenance of internal servers, continued backup and quality assurance by the private or government health care institution itself. The whole task of management and quality control gets relegated to the service provider ensuring easier regulation and a better flow of information between institutions. The assurance of patient confidentiality and privacy of patient files also becomes a burden of the service provider. This collective control makes data handling and inter-institutional communication far more effective than it currently is.

Second, the digital health revolution in Pakistan could be potentially visualized by considering the advancements in this regard in the developed countries. The systems so far developed include support systems for medical decision making (using algorithms derived through mining of clinical databases), mobile apps for health support and monitoring, biometric sensors connected to the particular healthcare facility, and telemedicine which includes but is not limited to virtual / online consultations. Since, these systems have created a market for HIT (Healthcare Information Technology) in these countries, IT developers and tech experts have an incentive for the rapid development and introduction of newer technologies into the electronic market in order to aid the job of the traditional health care provider; essentially making his job easier and more efficient[1].

Thirdly, in the ICU and critical care setting, the use of algorithms to develop survival prediction and prognostication models could completely revolutionize the process of predicting outcomes such as life expectancy and life quality in the critically ill patient. This process, despite being an important part of health care provision, is outdated and insensitive to individual context in the current scenario. With further development of HIT, we could start proposing and then developing systems such as Patient-Reported Outcomes (PROs) or electronic Patient Reported Outcomes (ePROs) as precise tools to measure patient-centered variables and thus develop more individualized prognoses for each patient[2].

Fourthly, online healthcare would become an easily accessible service if platforms for creation of an integrated online health system were created. In fact, such systems already exist and more have come into the picture in recent times. An example is the initiative of Shifa4u which is a platform that links medical providers with patients and third party players making the process of availing and ordering healthcare facilities more efficient. There is a strong need to develop more of such integrative healthcare ecosystems and to recognize the role these platforms could play in improving health provision.

Digital Healthcare in light of the COVID-19 Pandemic:

The Covid-19 pandemic brought the importance of digitalizing healthcare and effectively utilizing technology in the field of dispensing medical care into sharp and poignant focus. Some of the initiatives that were developed and soon came into common usage included:

1. Continued surveillance of Covid-19 high risk passengers entering countries from high risk areas using digital systems[3].

2. Creation of national and international online systems that converged information from WHO and the CDC to track Covid-19 statistics in real time[3].

3. Development of Apps that could track a patient's exposure and risk.

4. Vast emergence of online services for Covid-19 screening.

5. The use of telemedicine for management of non Covid-19 cases.

Many of these systems, especially online Covid-19 screening and non Covid-19 management emerged in Pakistan too and their success even at minimal level signals that the development of online systems like these is very much possible with the right mindset and intentions. Although, less efficient than the parallel systems of digital healthcare in the developed world, countries like Pakistan recognized the imminent need for health based IT infrastructure and realized its significance in transformation of healthcare delivery.

Challenges in Implementing Digital Healthcare in Pakistan:

Even though the need for developing HIT is fast being recognized and efforts in this direction have already begun both by private parties and the government health sector, we have a long way to go. The specific environment of Pakistan showcasing a high illiteracy rate, general lack of health awareness, poverty and inequitable distribution of healthcare resources makes this process especially challenging. The specific challenges that have to be addressed before this process can take central importance and make healthcare provision easier and efficient, are as follows:

1. Lack of electronic health records in many health practices and facilities

2. Shortage of primary and specialist physicians

3. Inadequate technology exposure during training

4. Lack of price transparency

5. Poor patient engagement and education

6. Poorly integrated health system

7. Underutilization of telemedicine Services

Why use Digital Medicine to Address Healthcare Issues in Pakistan?

Despite the challenges that Pakistan faces in implementation of a digital healthcare system, there is more reason than one for why this is the way forward both for improvement in patient care and cost reductions in healthcare provision.

First and foremost, there is a significant population of emerging IT developers who need an incentive to work on profitable and beneficial ideas. Government incentives would further attract the younger generation of IT

developers to direct their ideas towards development of platforms that could link health providers with patients. These platforms could also integrate discount offers, marketing and purchase offers of pharmaceutical companies and NGOs to make the communication with private and governmental health institutions easier.

Other Factors that make HIT the way forward include:

1. Desire for accessibility to advanced healthcare markets

2. High social media usage

3. Digital convenience

In addition, the need for Health Information Technology (HIT) development becomes even more evident when we recognize that health is the only field where digitalization and IT utilization lack severely. There are numerous other fields and services that operate through authentic and well documented online networks and apps such as Uber car services, Food Panda food delivery services etc. These are used by a large percentage of the population, have been adapted by developers to provide services that are affordable for different income groups and have, over time, earned the trust of the masses. These services are also being battered by developers each day according to the growing demand and in relation to regulated feedback systems. If such a detailed and effective system could be employed for food delivery, it is entirely possible albeit challenging, to develop such digital platforms for the provision of medical care and consultation.

Benefits of a Digital Healthcare System in Pakistan:

The development of Telemedicine services, online health ecosystems and cloud-based EHRs, amongst others, offer several benefits:

1. Improvement in Healthcare affordability

2. Healthcare accessibility

3. Healthcare education

4. Improvement in women's health

5. Mobilization of the youth

6. Generation of employment

7. Preventive care and decrease in hospitalizations

8. Integrated setups that would connect labs, imaging centers, pharmacies, healthcare systems, insurance companies, ancillary services and physicians/ physician groups

In light of the above discussion on the benefits of Artificial Intelligence (AI) and its use in medical care, (Figure 1), please see below our proposed roadmap for the digitalization of healthcare in Pakistan.

Other important prerequisites include:

1. Data and interoperability

2. Reimbursement

3. Patient and Doctor's adaptability

4. Government legislation

The obstacles to this initiative are many but with the right mindset and approach, this feat can be accomp-
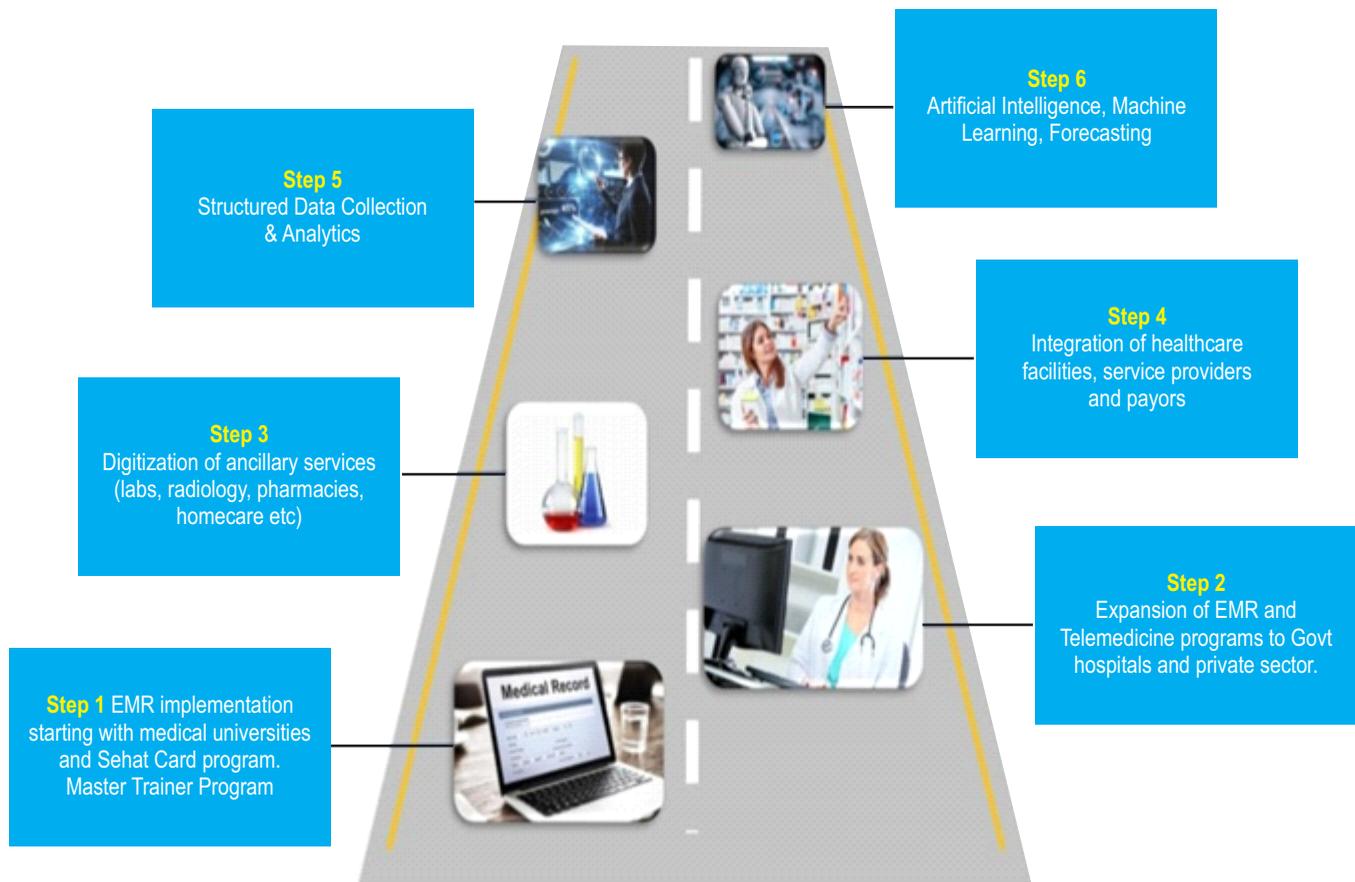

Figure 1: *Roadmap to Digital Healthcare system in Pakistan*

Requirements of a Connected Healthcare Model:

Governments and developers as well as innovators in the field of HIT need to realize that there are a set of prerequisites that must be met before Healthcare Digitalization becomes the norm in Pakistan. It is important to recognize these requirements beforehand so that necessary steps can be taken to remove each obstacle in the path of efficient and effective health care delivery.

Firstly, technology development at par with the requirement for such a task is needed on a priority basis. The government and the concerned health authorities need to take affirmative action in expediting the said process.

lished in Pakistan as well. The key is to incorporate it at the medical school undergraduate and postgraduate level so that medical students and fresh graduates alike are well versed with digital health care by the time they become a part of the mainstream health system. In this regard, Figure 2 below, illustrates our key recommendations for a smooth transition towards digitalization of the health care system.

Conclusion:

It is evident that Pakistan faces an imminent need to transform its healthcare system. This need emerges both from lack of affordability and a lack of adequate distri-

Key Recommendation for Electronic Medical Records Implementation at national level (Step 1)

- EMR System is the backbone of digital healthcare infrasturcture.
- EMR Adoption by physicians and healthcare providers is the key and would need to be done in stages.
- Key Barriers to adoption: Financial incentives / Tax Related Concerns / Lack of implementation at educational institutes.
- Recommended Initial Implementation Steps:
- 1. It is very essential to set minimum standards for approved EMR systems based on features like security & interperability / integration (HLA-7)
- 2. Mandate EMR implementation at educational institutes for medical students / Post-Graduate students and affiliated hospitals.
- 3. Digitize Sehat Card Program: Mandate in-network hospitals to send patients files electronically (atleast scanned)
- 4.Digitization of National Public Health Programs such as Polio, Hepatitis.
- 5. Financial Incentives / Tax Breaks for Early technology adopters.

bution of health Services in terms of quality, quantity as well as access. In such circumstances, it is important to recognize that old and primitive methods of dispensing medical care will not only hamper the process of overcoming these issues but will also create more managerial and overhead issues for facilities and practices as patient load and hospital crowding increases. Thus, the important tool of information technology must be brought on board for the efficient managing of records, easy access to patient files, integrated cloud-based systems, telemedicine facilities, online healthcare platforms and programs and apps developed specifically for predicting individualized patient outcomes and aiding medical decision making. Such systems are the best and most appropriate way forward for Pakistan to come at par with other countries in terms of healthcare provision. It is also the need of the hour if the specific issues of healthcare provision for the Pakistani population are to be addressed.

Salient Points:

1. The use of IT is indispensable in providing quality healthcare.

2. Health Information Technology (HIT) through the development of a cloud-based Electronic Health Records (EHRs) can be the first step in digital healthcare in Pakistan.

3. Covid-19 pandemic helped in realizing the importance of technology and digital healthcare.

4. Challenges in implementing digital healthcare in Pakistan are manifold, though benefits are indisputable and long-lasting.

5. Governments, HIT developers, healthcare providers, medical schools and patients; all have to work together to remove each obstacle in the path of efficient and effective healthcare delivery.

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