Digital Health Care Future and Digital Health Characteristics in Saudi Arabia's Healthcare Facilities

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Abstract

Background In many nations, the usage of digital health in the healthcare industry is not common. Hospitals, medical institutions, medical colleges, and other healthcare providers' approval is a critical prerequisite for the smooth deployment and adoption of digital health across all healthcare sectors. Digitalization is affecting every facet of daily life. Given the changing environment, health practitioners in all professions need to acquire new competencies. Aim This study assesses how prepared and capable digital healthcare is to change in accordance with vision 2030. Methods This study examines the facilities used by the government and the private sector in Saudi Arabia, the country's eastern province. utilizing a variety of data sampling techniques, such as the department of information technology in the chosen regions and a questionnaire that was distributed in physical copy for completion. Many healthcare facilities, both private and public, participated in the questionnaire completion process at various levels. The data collected through questionnaires were clarified. Furthermore, four digital health characteristics were also analyzed in descriptive. Some open-question physical interviews were also used to collect data. Several groups were interviewed, each giving their views and sampled in written form.Results Several facilities were evaluated and asked for their thoughts on digital healthcare transformation. facilities, both public and private, in proportion. Depending on the kind and quality of the facility, different care was provided. Interoperability has the lowest minimum, whereas personal-enabled health has the highest median. Governance and interoperability have the highest maximums, whereas predictive analysis has the lowest. Different opinions from various age groups were observed in the open-ended interviews, where almost 67% of the population chose digital healthcare. Overall implementation rates were found to be strong, and private healthcare facilities scored higher overall on digital transformation than governmental hospitals Conclusion Using digital health indicators, the article has examined the adoption of digital health in several healthcare facilities located in Eastern Saudi Arabia. Because digital health care increases service efficiency, healthcare facilities that use it provide dependable and prompt medical services. This data will support the provision of telemedicine services, remote monitoring, and online illness management information. Knowing which indicators are used the most and which require more attention in the healthcare institutions of the Eastern Province could also be helpful. Furthermore, so that they may make improvements, strategic health planners may find it useful to concentrate on comprehending the reasons behind the government facilities' lower rating in the Governance and Workforce dimensions.

Keywords: *Digital health, healthcare facilities, health characteristics, patient care*

Introduction

By offering high-quality patient care, digital health care is anticipated to improve Saudi Arabian citizens' health standards. It will also offer extensive research and medical education across a wide range of specialties. The majority of nations have recently started utilizing digital

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techniques to improve health care efficiency. This article therefore advocates for the implementation of those strategies in Saudi Arabia. The fact that 80% of Saudi Arabians already operate digitally and understand the value of technology in running the country's healthcare system is driving up interest in the country's technological adoption. It has been shown that some health services, such food and nutrition and physical fitness, can be shared online because many people can access the websites. These services do not need to be administered by a physical doctor.

Additionally, roughly 75% of customers are ready and willing to use digital healthcare technologies to follow up on their health and medical records. This will help people keep an eye on, comprehend, and take charge of their health. Paperwork will be eliminated by computerized systems since they are easy to maintain, take up less storage space, and provide simple backup options that reduce the possibility of data loss. Through the use of virtual self-care technologies, people in remote areas will be able to receive medical services like consultations from anywhere thanks to digital healthcare. With digital hospitals having a complex ecosystem, integrated technology will allow patients to connect with information throughout the hospital. This will make it possible to offer the right resources at the right moment. Customer wait times in the hospital waiting area will be shortened since fewer patients receiving less urgent check-ups will be in the queue; only serious instances, like casualties, would require physical attention. The necessary information and training will be provided to medical partners and future and present students of medicine in order to support the system as needed when it comes to digital health care. In order to raise the standard of patient care, this paper seeks to bring the government's attention to the advantages that digital healthcare offers the nation's health sector.

Background

Globally, the health industry has undergone a significant upheaval thanks to digital healthcare. Technology has made diagnosis accuracy, patient care, treatment, and workflow more efficient and successful. Significant improvements in health will be discussed. With regard to vision 2030—which centers on the workforce and healthcare information systems, among other things—the report attempts to evaluate Saudi Arabia's preparedness for implementing digital healthcare. The World Health Organization released a global plan to transition to digital healthcare technology in order to provide all citizens with access to high-quality, cost-effective healthcare services. This compelled nations to develop the infrastructure necessary to support digital healthcare. Many countries have adopted this; for example, Catalonia in Spain is credited for adopting it from Europe in 2009 (Atalay Mert et al., 2022). This made it possible for the medical staff to exchange clinical data from various healthcare providers.

During the coronavirus pandemic, it proved to be highly effective since it made controlling the virus easier due to less needless hospital visits. For Saudi Arabia to realize its goal of providing high-quality, reasonably priced healthcare, a robust digital healthcare infrastructure is required (Atalay Mert et al., 2022). One of the biggest obstacles to the transition to digital health care is the absence of an integrated information technology infrastructure. Solutions, such automated patient care and computerized health records, are being put into practice to get past this obstacle. Since 2015, Saudi Arabia has made significant strides toward implementing digital healthcare (Akefi Ghaziani, 2021). A little amount of research has noted the improvement, examining how the nation is prepared to transition to this technology in accordance with its healthcare vision plan.

The research findings indicate that the successful implementation and operation of healthcare technology are contingent upon several elements, including organizational focus, member willingness and effort, and resource availability. Saudi Arabia has reached a higher level of digital health maturity than other nations (Phyu, 2021). This is evident in a number of primary dimensions, the Global Digital Health Index Platform being used to arrive at important areas such as governance, workforce, and leadership (Diamant et al., 2022). The nation has started implementing a number of digital healthcare initiatives in various hospitals (Diamant et al., 2022). MoH observes ongoing advancements following the building of infrastructure and improvements in healthcare quality. This study assesses how prepared and capable digital healthcare is to change in accordance with vision 2030.

Method

This research consists of a study of government and private facilities used in the country's eastern province, Saudi Arabia. Using different methods of sampling data, such as a questionnaire, which was given hard copies to be filled by the department of information technology and sampling technique in the selected regions. A good number of health facilities took part in filling out the questionnaires, all at different levels, both in private and public facilities. Healthcare facilities type, private or public, and health facilities level, primary, secondary and tertiary, make up the independent variable. Workforce, governance, interoperability, and person-enabled health are the dependent variables. The transformation score for each facility is the outcome variable. General questions regarding the facility and digital transformation were the main sections of the questionnaire. Simple knowledge questions about the characteristics were posed to specify the level and type of health facility.

In digital transformation, indicators were measured in scale depending on the implementation rate. The features of organizational health facility, structural, and semantic interoperability are in the first dimension. The second comprises workforce and governance Person-enabled health is in the third dimension: it has several indicators. Predictive, personal and operational analytics and in the fourth dimension. The data collected through questionnaires were clarified. Furthermore, four digital health characteristics were also analyzed in descriptive. Some open-question physical interviews were also used to collect data. Several groups were interviewed, each giving their views and sampled in written form.

Results

Several facilities were assessed and gave their view on digital healthcare transformation. Both private and public facilities proportionally. The level of care varied depending on the type and level of the facility. Table 1 shows the digital transformation. Personal-enabled health has the highest median and interoperability with the lowest minimum. Predictive analysis has the lowest maximum, governance and interoperability registering the highest maximum. From the open-question interviews, different views were noted from different age groups, where about 67% percent of the citizens opted for digital healthcare.

Table 1: Four Digital Health Characteristics.

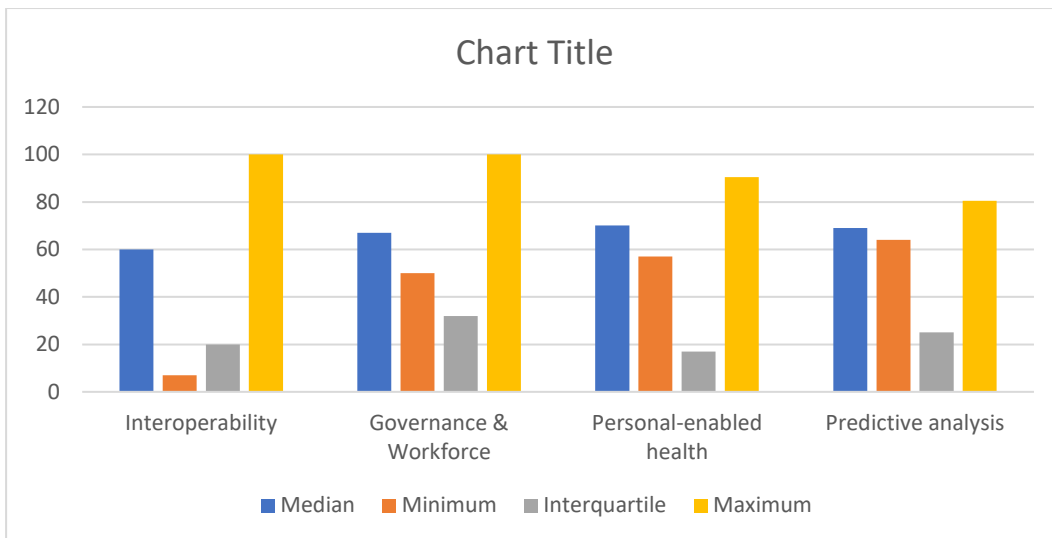|	Interoperability	Governance & Workforce	Personal enabled health	Predictive analysis
median	60	67	70.1	69
minimum	7	50	57	64
interquartile	20	32	17	25
maximum	100	100	90.4	80.5

Figure 1: The Figure above Shows a Graph Chart Representing the Four Digital Health Characteristics.

Discussion

The study aimed to investigate and contact an assessment of the road to digital healthcare in Saudi Arabia, where health facilities need to adopt the technology in medicine students' future and current together with medical staff for better patient care. This was done with the final score on the different methods used in data collection (Mehawej et al., 2022). HIMSS DHI was used to assess and focus on the digital dimensions: governance, interoperability, workforce, and personal enabled health. Governance and workforce registered the highest score among others (Mehawej et al., 2022). The lowest mean score was in the interoperability dimension and the highest in two dimensions, governance and workforce, and the predictive analytics dimensions. On the other hand, tertiary hospitals in the study had the lowest mean score in the person-enabled health dimension. Interestingly, there was no significant relationship between the digital transformation dimensions and facility type.

However, the mean score of the dimensions is higher in private healthcare facilities in the study compared to government healthcare facilities. The 'Governance & Workforce' dimension got the highest mean score compared to the other dimensions will, in turn, manage different health systems processes, such as electronic health records, health insurance payment processes, and systems evaluation. The lack of governance or low implantation of governance in digital health systems will lead to the inefficient implementation of strategic and smart investment decisions. In Saudi Arabia, a governance program has been implemented among healthcare facilities to achieve the 2030 vision (Ding et al., 2022). This program enforced policies that enabled patients to be more active in managing their care (Ding et al., 2022). It also publicly advertises the different applications designed by the MoH and ensures the confidentiality and security of their data (Ding et al., 2022). These could be some of the reasons this dimension achieved such a score.

Further, the attention given by MoH to make sure that all these changes are value-based could also contribute to the high score. On the other hand, the study findings have shown that implementing interoperability as a distinctive aspect of digital health transformation is relatively

low compared to the other dimensions of digital health indicators. The Interoperability dimension received a low mean score in implementation rate, especially at the secondary governmental healthcare facilities (Pavletic et al., 2021). This could result from having the data go through multiple systems, which increases the possibility of errors and incomplete data (Pavletic et al., 2021). Privately owned hospitals have a higher implementation and adoption rate than their public counterparts.

In concordance, Alghamdi18 believed that the difference in interoperability between public and private healthcare facilities could be attributed to the higher adoption of Electronic Health Records in general and Personal Health Records in particular, which increases their interoperability score based on the rapid assessment (Bjarnadóttir et al., 2022). Also, the limited interoperability implementation can be traced back to other reasons, including the cost of initiating and maintaining the technical infrastructure, privacy and security of the data being exchanged, and regulatory agencies involvement.

The study found there is a greater chance for interoperability in national health systems supported by a national governing body in terms of financially sponsoring the initiatives and regulating the health information exchange between different organizations. What we have seen in this study, however, is the opposite, with public hospitals scoring relatively lower in interoperability (Bjarnadóttir et al., 2022). This can be attributed to having more pressing public health priorities than the private sector, which could limit funding of Health IT initiatives (Bjarnadóttir et al., 2022). Alghamdi18 concluded that cost is a major barrier to implementing EHRs and Health IT in the Saudi public healthcare system. Other factors include high maintenance costs, lack of technical skills and capabilities, perceived security and privacy threats, and resistance to new technology.

Furthermore, having to assume responsibility for population health is the same factor that makes the private sector less invested in interoperable technical infrastructure for public health purposes, as suggested by Persons (Dean et al., 2022). In addition, the Person-Enabled Health dimension is similar to the Interoperability dimension, where private facilities got a higher implementation rate than governmental facilities (Dean et al., 2022). Similar efforts are needed in private and public hospitals to attain digital transformation in healthcare facilities. On the other hand, the study findings have shown that implementing interoperability as a distinctive aspect of digital health transformation is relatively low compared to the other dimensions of digital health indicators.

The interoperability dimension received a low mean score in implementation rate, especially at the secondary governmental healthcare facilities. This could result from having the data go through multiple systems, which increases the possibility of errors and incomplete data. Privately owned hospitals have a higher rate of implementation and adoption than their public counterparts (Martín-Santana & Melián-Alzola, 2022). Tertiary hospitals score lowest in person-enabled health (Martín-Santana & Melián-Alzola, 2022). This could be due to these hospitals treating patients with the most severe cases. Thus, they do not need to focus on personalizing patient care and overall wellness and how it could be achieved. Supporting that, a study conducted in two tertiary hospitals in Nigeria and South Africa revealed that healthcare workers perceived that using person-enabled health, such as health, might be negatively disruptive while engaging with patients.

Thus, it is important to consider the type of work activity and the contextual factors that might negatively affect digital transformation, such as the type of healthcare facility. In future studies,

it is recommended to identify the barriers that hinder the implementation of digital transformation in tertiary hospitals. However, efforts are being made to improve such a critical area of the healthcare system by stressing the importance of collecting and using the data to ensure a better outcome for the population (Isken & Aydas, 2022). The highest total scores reported for digital health capacity in this study, as assessed by the DHI Rapid Assessment tool, were reported by private healthcare facilities (Isken & Aydas, 2022). Private facilities are commonly more technologically advanced compared to governmental healthcare facilities (Isken & Aydas, 2022). This could be a result of the resources private hospitals have, especially large ones, which allow them to allocate a considerable amount of funding to advance their digital health status.

In contrast, governmental facilities in the study have lower total digital, which could be due to more financial, organizational, and regulatory challenges compared to private facilities (Shaw, 2022). However, this is changing now with Vision 2030, which aims to improve the needed indicators to ensure a digital health transformation (Janajreh et al., 2022). Also, the baseline needed for such transformation, which is Governance and Workforce, is one of the highest-scored dimensions in the current study. The population structure of Saudi Arabia, being made up of more youths, opted for digital health care since they are more familiar with the internet as the world is shifting to a digital mode of operation. This shows a real possibility of achieving digital health transformation across Saudi healthcare facilities shortly.

Conclusion

The paper has discussed the digital health transformation in multiple healthcare facilities across Eastern Saudi Arabia using digital health indicators. Health facilities incorporating digital health care offer reliable and timely medical services as it boosts the efficiency of services. This information will help in providing online disease management information, remote monitoring, and telemedicine services. It was found that there are high implementation rates in general, and the total digital transformation score in private healthcare facilities was higher compared to governmental hospitals.

The study showed that from all the dimensions, 'Governance & Workforce' was the highest implemented dimension, while 'Predictive analytics' was the lowest implemented dimension. This study's findings could help policymakers understand the digital health transformation level in Eastern Saudi Arabia. It could also help in knowing which indicators are the most applied in the Eastern Province's healthcare facilities and which need more attention. Moreover, the result of this study could help strategic health planners to focus on understanding why the governmental facilities got a lower rate in Governance and Workforce dimension, so they can improve it.

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