DIGITAL TRANSFORMATION AND ITS IMPACT ON THE HEALTHCARE SYSTEMS IN THE HOSPITAL OF NAJRAN

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Abstract

This study examines the digital transformation in the healthcare sector, focusing on the Hospital of Najran. It explores how the integration of digital technologies—such as electronic health records (EHRs), telemedicine, artificial intelligence (AI) diagnostics, and mobile health applications—has revolutionized patient care, data management, and operational efficiencies. The paper analyzes the impact of these digital initiatives on patient outcomes, healthcare delivery, and the overall healthcare ecosystem in Najran. It discusses the challenges encountered during this digital shift, including cybersecurity threats, the digital divide, and resistance to change among staff. Furthermore, the study highlights the strategies employed by the Hospital of Najran to mitigate these challenges, promote digital literacy, and ensure a smooth transition to a more digital-centric healthcare model. The findings underscore the importance of digital transformation in enhancing healthcare accessibility, reducing costs, and improving the quality of care, setting a precedent for healthcare institutions in similar regions.

Keywords: Digital Transformation**,** Healthcare Systems**,** Hospital of Najran**,** Electronic Health Records (EHRs)**,** Telemedicine**,** Artificial Intelligence in Healthcare**,** Mobile Health Applications**,** Cybersecurity in Healthcare**,** Digital Literacy in Healthcare**,** Healthcare Innovation

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Chapter 1 Introduction
1.1 Introduction background and rationale
Every healthcare system has the primary objective to improve the quality of the clinical care services and to promote the improvement of the patient outcome. The burden of chronic health issues is increasing among the adult population for which a more effective caregiving system is needed.

Additionally, the management of aspects like patient empowerment, effective storage, and retrieval of clinical data have also got integrated with the healthcare system in the current times. All these mentioned issues can be addressed with Digital Transformation (DT) of the healthcare setup. Najran Area of Saudi Arabia has a low number of hospitals as compared to the other parts of the country.

Figure 1.1: Distribution of hospitals in Saudi Arabia
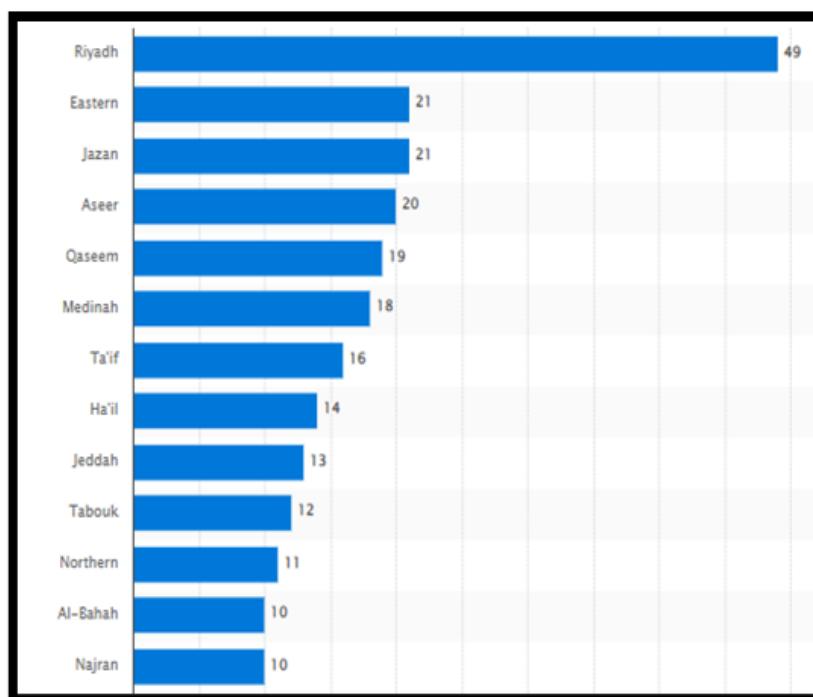
(Source: Statista, 2022)

Only 10 hospitals are providing healthcare support to the entire Najran region. This is the main reason for which development of efficiency and capability of the hospitals of Najran is highly needed.

1.2 Aims
The aim of the paper is to identify the requirements and challenges for DT (digital transformation) in the healthcare system of Najran's hospitals.

1.3 Objectives
● To discuss the concept and outcome of DT for the healthcare system
● To identify the requirements and challenges for DT for the healthcare system of Najran area
● To find out the impact of DT of the hospitals on the entire healthcare system of Najran
● To suggest effective recommendations for DT of the Najran's hospitals

1.4 Research questions Primary question

What are the requirements and challenges associated with DT of the hospitals in Najran region?

Secondary questions
What is the concept and outcome of DT in the healthcare system? What will be the impact of DT on the healthcare system of Najran?
What can be recommended for the successful DT of Najran's hospitals?

Chapter 2: Literature Review
2.1 Impact of digital transformation on the healthcare system
The development of effectiveness of the healthcare service is the primary outcome of DT in the healthcare system. Gopal et al. (2019) suggested that seamless communication and coordination between the patient and the healthcare provider can be developed with the help of digital transformation. On the other hand, Panch et al. (2018) stated that data security can effectively be maintained with the help of digital transformation

in the healthcare system. Errorless documentation of the patient's information and easy retrieval can be done with the help of DT (Ebert & Duarte, 2018). Electronic Medical Recordkeeping (EMR) can be done with the digitized infrastructure of the hospital and this is one of the best outcomes of digitalization in the healthcare system.

2.2 Challenges associated with healthcare system for digital transformation

Resource availability is one of the primary issues that hinder the digital transformation of the hospitals. According to Vaagan et al. (2021), fund crisis or a lack of economic resources hinder the digitalization of hospitals. Additionally, the healthcare staff and professionals are not skilled to handle the digital technology (Brown et al., 2020). This factor deteriorates the productivity of the healthcare professionals in the digital setup.

The lack of initiative or awareness often acts as a major hindrance to the digitalization of the healthcare system. Dijmarescu (2021) commented that weak infrastructure is the primary issue that hinders the hospitals to initiate digitalization. Additionally, Raji et al. (2022) commented that the failure of the Artificial Intelligence or AI or the IT system creates a hindrance in the maintenance of digitized healthcare systems. Hence, from this point, it can be noticed that the lack of initiative regarding the development of the IT maintenance team create major issues in the effective digitalization of the healthcare systems.

2.3 Theories and models
Theory of disruptive innovation

Innovation is essentially needed for the upgradation of the quality of clinical care service for a healthcare organization. Moro Visconti & Morea (2020) opined that the digitized healthcare service is one of the most recent examples that has improved the quality of offered clinical service. In this context, the theory of disruptive innovation can be discussed. Hopp et al. (2018) commented that disruptive innovation is the introduction of innovation to an established industry that can perform better at a lower cost. This type of introduction of innovation often brings disruption to the traditional process as it invokes changes in the traditional method of management and in the context of healthcare systems, digitalization has invoked disruption by introducing the trends like telemedicine, EMR and more.

Alignment theory

It is the objective of all hospitals to initiate streamlined management of healthcare services along with organizational activities. In this context

Alignment Theory can be discusssed. According to Landers et al. (2020), Alignment theory suggests the process of optimization by combining four primary logics, such as administration, production, integration, and development. In the case of the healthcare system, the factor production should be replaced with service. Hence, alignment of all the activities of a hospital can only be done through digital transformation.

2.1 Literature gap

Wide research has been done regarding DT of the healthcare system. However, there is a literature gap or research gap regarding the crisis of digitalization in the Najran healthcare system. Moreover, a little research has been done regarding the challenges associated with the healthcare system of Najran. This factor has promoted to do primary research on digitization of the healthcare system of Najran.

Chapter 3: Methodology
3.1 Philosophy, Approach, and Design

This research has been done with the positivism philosophy. Alharahsheh & Pius (2020) stated that positivism philosophy is adopted for the studies which are focused on the practical issue of the present time. The lack of digital efficiency in the hospitals of Najran is a practical issue of the current time. Casula et al. (2021) commented that the research associated with quantitative data can be effectively done with deductive reasoning. Hence, deductive reasoning has been taken along with descriptive design.

3.2 Method for data collection

This research has been done by taking data from the primary resources. A survey strategy is used for amassing information from the primary sources. Hence, to know about the practical challenges faced by Najran's hospital in implementing DT, a survey among the healthcare administrators has been done. According to Shekelyan et al. (2022), sampling type is one of the most essential factors that determine the survey outcome. In this case, a simple random sampling has been done among the healthcare administrators in the ten hospitals of Najran to collect information. According to Shekelyan et al. (2022), a simple random sampling includes minimum bias in the outcome of the survey. This is the reason for selection of this sampling strategy. The sample size of the survey has been selected as 50 and 10 closed-ended questions have been included in the survey questionnaire regarding the challenges and requirements associated with DT implementation in Najran's healthcare system.

3.1 Data analysis

In this paper, the analysis of numerical data has been done which was collected from the primary source by means of survey. According to Semyonov-Tal & Lewin-Epstein (2021), closed-ended questions on surveys help in the degeneration of quantitative or numerical data. On the other hand, statistical analysis of the quantitative data is mostly done by using SPSS (Statistical Package for Social Science) software. However, in order to reduce complexity, a graphical analysis has been done. Additionally, the graphical analysis has been identified suitable for the paper since the survey has been done with a comparatively lesser sample size, i.e., only 50.

3.2 Ethical consideration

All the ethics regarding the survey have been maintained and no personal information and identity of the survey participants have been disclosed. No confidential information about the hospitals of Najran area has been disclosed. All the participants have been provided with the option to leave at any stage of the survey. No such question has been included that can invoke mental or psychological stress in the participants. A declaration form has been signed by all the participants before initiating the survey.

Chapter 4: Findings, Results, and Discussion

Data has been gathered by doing surveys among the healthcare administrators from the ten hospitals of Najran. Names of the hospitals have been kept confidential to maintain the ethics of this primary research. 50 healthcare administrators have provided their opinion regarding the acceptance of DT in the hospitals. In addition, 100% response has been obtained and a graphical analysis of each question has been done in this section of the paper.

Figure 4.1: Gender
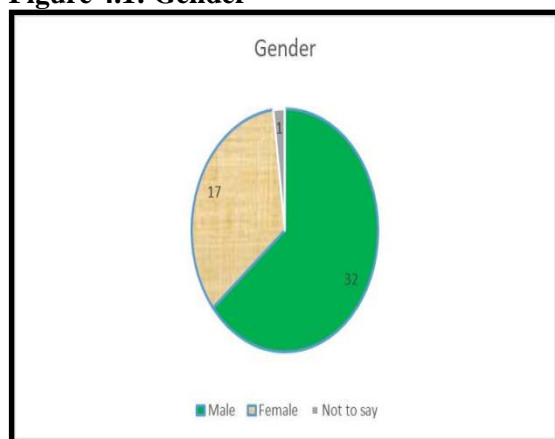
(Source: MS Excel)

The first question of the survey has been done by focusing on the demographic aspect of the research paper. Age, gender, income, education, and other factors are considered as the demographic factors.

In this case, the majority, i.e. 64% of the respondents are male which indicates the male supremacy in the profession of healthcare administration in the Najran region of Saudi Arabia.

Figure 4.2: Experience level
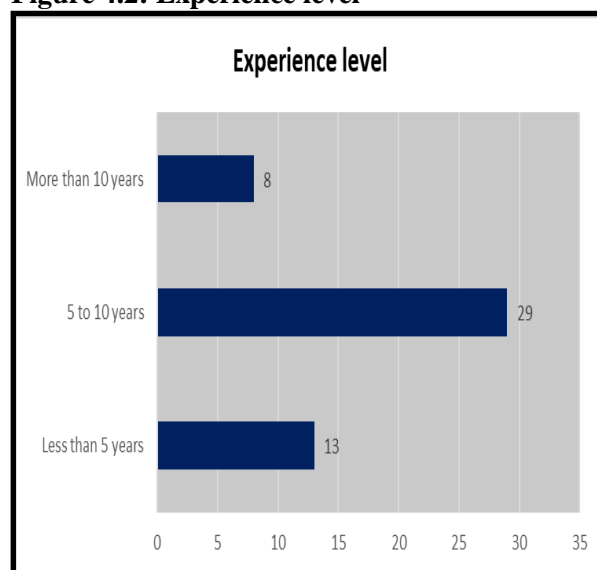
(Source: MS Excel)

Professional experience in the field of healthcare administration needs to be assessed initially. This helps to evaluate the quality of the sample selected for this survey. 58% of the survey population are associated with the job role of healthcare administrator from 5 to 10 years. Additionally, 26% of the population are serving the post of healthcare administrators for more than 10 years.

This factor indicates that the majority of the respondents have an idea about the challenges and opportunities associated with the healthcare system of the Najran region. Hence, they should be able to provide wise opinions regarding the crisis or challenges associated with digital transformation of the hospitals in Najran.

**Figure 4.3: Use of digital health equipment**
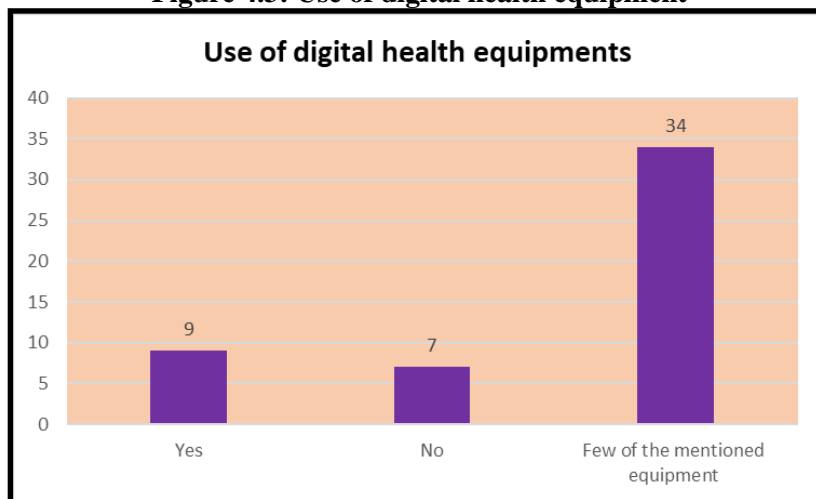
(Source: MS Excel)

The process of diagnosis is one of the main aspects associated with the healthcare service. It is the role of the healthcare administration to support the upgradation of diagnosis techniques in the healthcare setups. This is the reason for which the question has been asked regarding the use of digital equipment. Better imaging is provided by digital X-rays in which tiny irregularities and fractures can be identified. On the other hand, the digital USG helps in a better management of patient safety and visualizes soft tissue muscles in a better way. 68% of healthcare administrators have mentioned that a few of the digital equipment is currently used in their hospitals. Hence, this survey has identified that there is a gap in the acceptance of digital equipment in the hospitals of Najran.

Figure 4.4: Digitalization and its impact on diagnosis quality
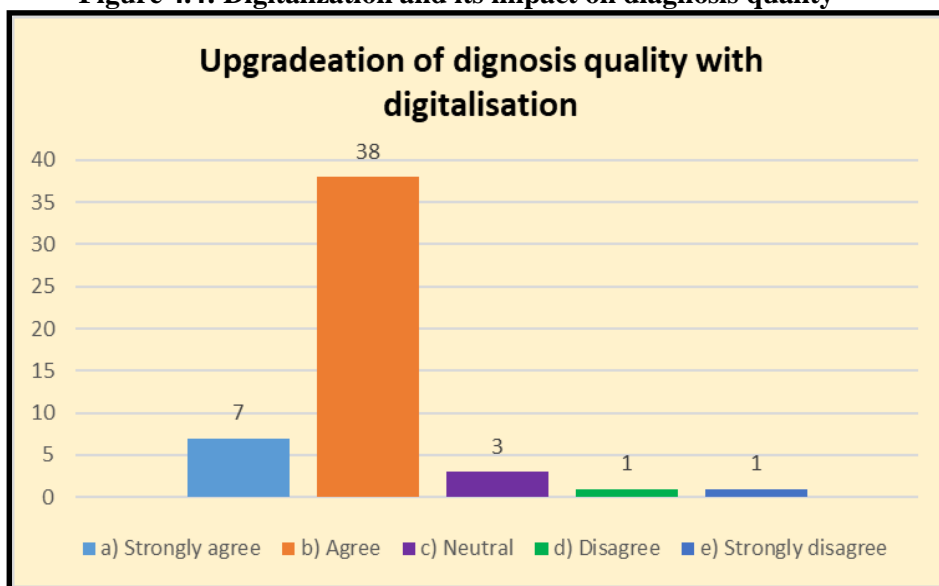
(Source: MS Excel)

The majority of the respondents have opined that the acceptance of digital technology till now in the hospitals of Najran has directly helped to upgrade the health services. Kwon et al. (2018) suggested that the digitalization of medical transcripts and documents can be done which help in easy access to the medical data. Additionally, errors in the delivery of clinical care can also be minimized with the support of digital systems. Hence, it can be analyzed that the same factor has been supported by the healthcare administrators of Najran. Additionally, the healthcare administrators of Najran have ideas about the advantages of the digitized healthcare system. Therefore, a positive impact has been created by the digitalization of the healthcare system in Najran.

Figure 4.5: Telemedicine in Najran hospitals
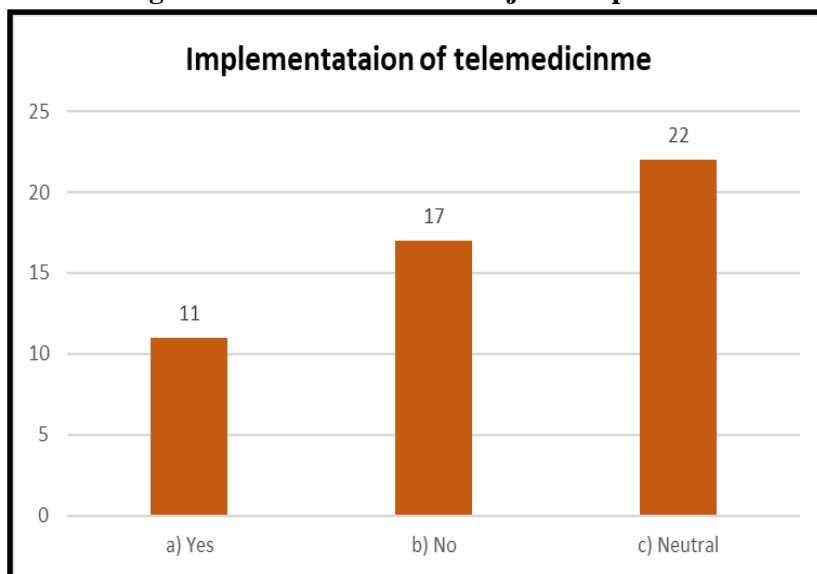
(Source: MS Excel)

From the opinion of the healthcare administrators, it has been revealed that telemedicine has not been implemented widely in the healthcare system of Najran which includes the hospitals as well. Wosik et al. (2020) commented that during the post-pandemic period, telemedicine is one of the major tools to deliver healthcare support and clinical consultations safely. Telemedicine has a high demand on a global level. However, only 22% of Najran's care administrators have taken an initiative to implement telemedicine. Hence, there is a gap in the healthcare system of Najran which creates challenges to the effective implementation of DT.

Figure 4.6: Readiness of the patents to cooperate with digitized healthcare
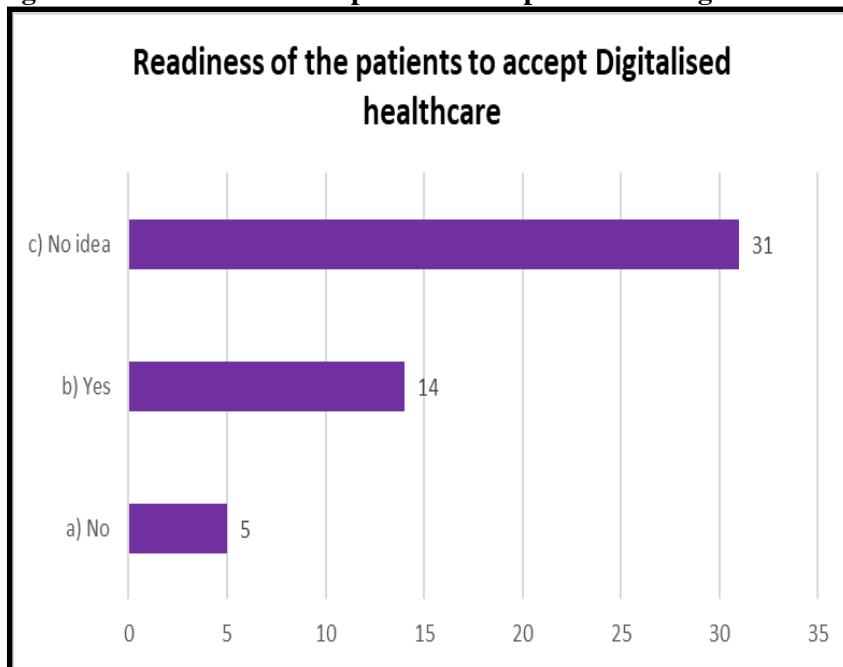
(Source: MS Excel)

It has been pointed out that the patients have poor ideas about digital technology in the healthcare system. More than 60% of healthcare administrators have no idea whether they will get support from the patients regarding digital transformation of their hospitals. Hence, the healthcare administrators of Najran have a poor perception regarding the patients and the operating market. This is a primary challenge or barrier to effective DT in the Najran's healthcare system.

Figure 4.7: Availability of the resources
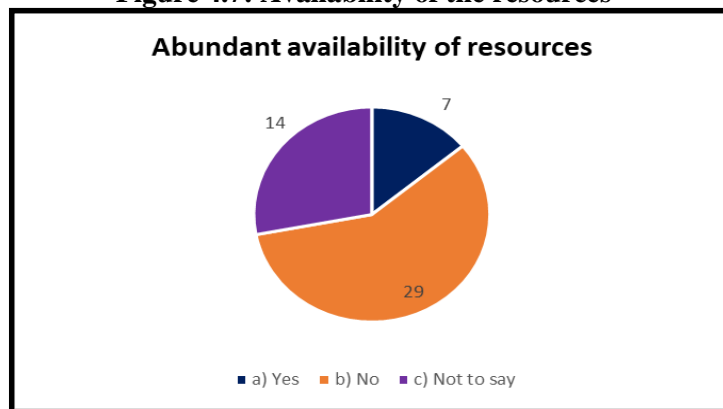
(Source: MS Excel)

Only 14% of the population have opined that there is no issue regarding the availability of resources for the digital transformation of the entire hospital. On the other hand, more than 55% are not ready to answer this question which signifies that there might be an issue in the availability of resources to implement digital transformation in the healthcare setup. This is a challenge to promote DT in Najran's healthcare system.

Figure 4.8: Training for the nurses to develop their efficiency in digital technology handling
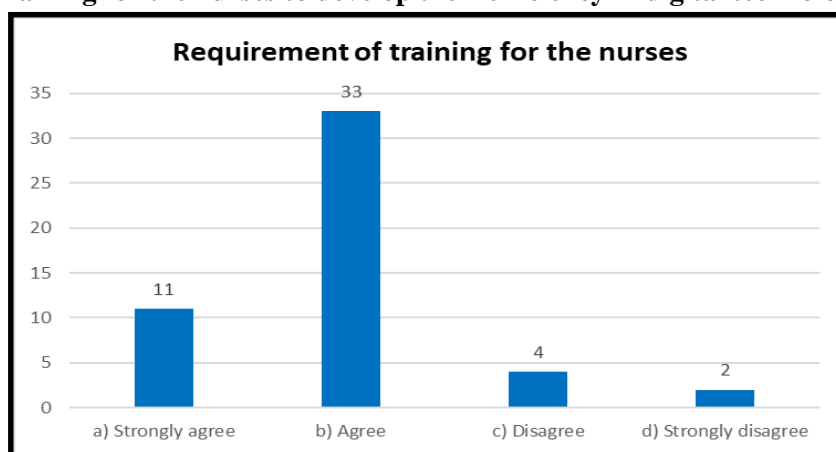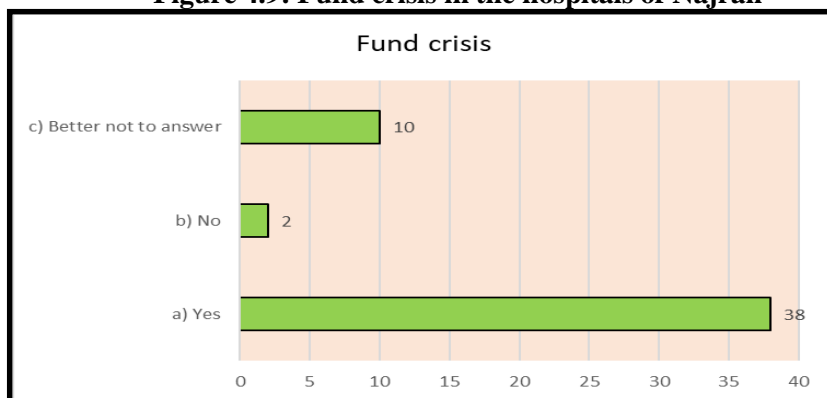

(Source: MS Excel)

The efficiency of the healthcare professional needs to be developed for DT of the healthcare system. As opined by Brown et al. (2020), nurses often face challenges due to poor digital skill. This factor has been admitted by the healthcare administrators and more than 65% of respondents have stated that special training is needed for the nurse. This is one of the requirements for successful digital transformation of Najran's healthcare system.

**Figure 4.9: Fund crisis in the hospitals of Najran**

(Source: MS Excel)

Nataliia et al. (2021) commented that availability of funds or financial resources is essentially needed for digital transformation. However, the healthcare system of Najran is suffering from a fund crisis as more than 75% respondents have approved the same. Hence, there is a high requirement of economic resources to imply DT.

Figure 4.10: Preference to imply DT in the entire healthcare system
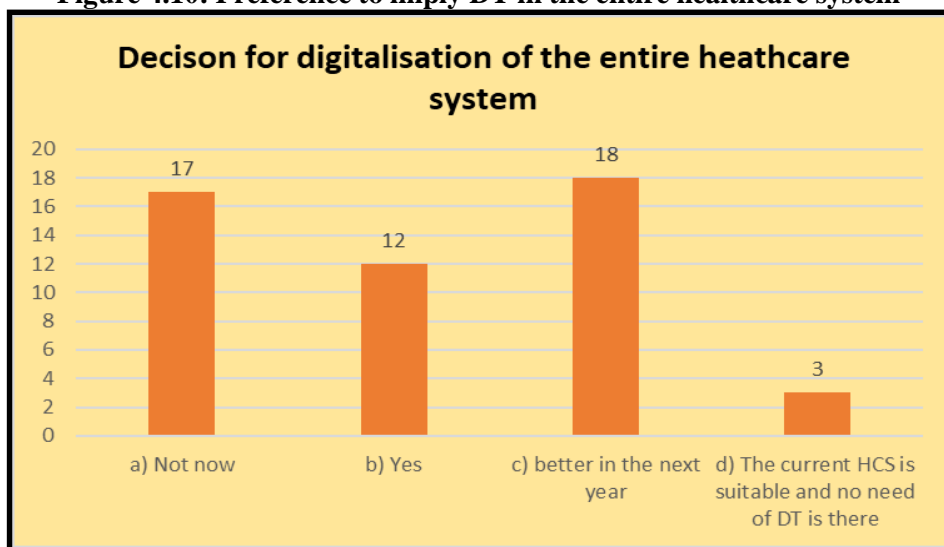
(Source: MS Excel)

The survey has proved that only 24% of the healthcare administrators of Najran are ready to initiate DT to their hospitals. By analyzing this fact, it can be evaluated that more than 70% of Najran hospitals are not ready currently to initiate DT. Hence, poor infrastructure is the main hindrance for the initiation of DT in the hospitals.

Chapter 5: Conclusion and Recommendations
5.1 Conclusion
In the end of the paper, it can be concluded that the healthcare administrators of Najran have ideas about the beneficial outcomes of the digitized healthcare system. However, the lack of infrastructure is creating a main challenge for the healthcare administrators to introduce DT in the hospitals of Najran region. The lack of digital skill of the nurses and other caregiving staff is a main issue associated with the digital transformation. Appropriate digital training to the nurses needs to be provided. Additionally, the crisis of financial resources is one of the major factors which is also creating challenges for the hospitals of Najran to initiate DT. However, the development of accuracy in diagnosis and other healthcare services has taken place with the implementation of digitized medical equipment.

5.2 Recommendations
From the findings of the entire paper, it can be recommended that Saudi Arabian government should take initiative for the DT of the hospitals of Najran area. Financial crisis is the major drawback which hinders the progress of the task of DT for the hospitals. Hence, the government should arrange special grants to accelerate the process of digital transformation in the entire healthcare system of Najran.

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