

**“The Impact of Information Technologies on patient confidentiality rights, measuring the perception of health care professionals in Eastern Saudi Arabia”**

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## Abstract:

### Information Technology in healthcare

Information technology advancements have contributed various impacts on patient experience in health care. The growing need for cost-efficacy, time management, and protective healthcare is driving the changes in present healthcare systems, demanding modern technology capabilities to deliver care. Its applicability in healthcare has had many benefits, for instance, facilitating health communication between patients and care providers.

### Patient confidentiality in Saudi Arabia

Countries in the Middle East, including Saudi Arabia, have increased investment in health information technologies to enhance the efficacy and provision of healthcare in care centers. However, health information technology (HIT) has faced challenges primarily associated with patient information confidentiality. The idea of confidentiality in healthcare is vital as it builds the basis of care for both the patient and the care providers. Patients need to be confident to disclose important information on their health and trust that the healthcare professionals will appropriately use it to administer diagnosis and treatment.

### Perception of healthcare professionals towards IT

Health professionals have their own opinions regarding the implementation and use of Information Technology in their daily duties. These perspectives are based on their experiences and knowledge regarding the application of IT systems. **Chapter One**

## Introduction and Objectives

### Introduction:

According to Christodoulakis et al., (2017) the challenge with introducing information technology in healthcare is associated with understanding how to effectively use the technologies. Therefore, it is the responsibility of care providers to protect patient information in confidence to uphold confidentiality. It is unlawful for healthcare professionals to reveal patient information without consent from any person.

The perception of healthcare professionals plays an essential role in adopting and using the Electronic Health Records system in healthcare (Alanazi et al., 2020). The use and ethical understanding of electronic health record systems are vital in improving the healthcare system, and it is the moral responsibility of care providers to protect the patient's interests and information.

### Background

Recently, technological advances have been rapidly evolving advances in Information Technology (IT) in healthcare systems. The idea of patient confidentiality has also progressed over the years according to the changes in the healthcare systems and jurisdictions. Patient confidentiality is mostly considered a human right, an ethical obligation, and a legal obligation to ensure patient data integrity (Elgujja & Arimoro, 2019). The Saudi laws are based on Sharia law, the region's historical culture, and international human rights laws (IHRLs). These are the basics that frame the perspective on patient confidentiality in Saudi Arabia. Confidentiality laws have been established under various legislations to serve the general purpose of protecting patient confidentiality. Recently, the Ministry of Health in Saudi Arabia formulated an e-Health strategy consisting of the application of telemedicine as a way of improving the availability and quality of healthcare to patients and healthcare providers in the Kingdom of Saudi Arabia (Albarrak et al., 2021).

Health information systems store data, which can at times attract cyber attackers, aiming to have an access to confidential patient data and information. Unauthorized access threatens the quality of care and wrongful use of health information which can result in consequences in terms of patient care and data integrity. A report from the Cybersecurity Quarterly Bulletin of the 2020 fourth quarter, published under the Saudi National Cybersecurity Authority, shows that the healthcare industry came third globally in terms of sectors that are mostly attacked by cyber attackers and information is leaked, by 14% (Almaghrabi

& Bugis, 2022). The Kingdom of Saudi Arabia ranks fourth in terms of attacks and leakage of information. Therefore, the availability of patient health data in information technology systems risks patient privacy and confidentiality.

The World Health Organization (WHO) describes e-health as the application of Information and Communication Technology (ICT) in supporting healthcare services, health education, surveillance, and research (Albarrak et al., 2021). However, the use of information technology systems in healthcare settings remains to be associated with various challenges in terms of adoption and use, especially with how different physicians and other health professionals vary in perception regarding the use of the systems. The successful implementation and use of IT in a healthcare setting rely on factors such as health professionals' knowledge, attitudes, and work conditions within the institution (Albarrak et al., 2021). As a result, ensuring that the professionals understand and positively perceive the effectiveness of the system enhances the use in providing healthcare services as well as their attitude.

### Problem Statement

Health is an essential human right. According to the constitution of the World Health Organization (WHO), all people are entitled to healthcare. As required, ministries of health (MOHs) around the world have established laws, which include patients' bills of rights (PBRs), in ensuring the preservation of patient and professional rights. The Ministry of National Guard Health Affairs (MNGHA) of Saudi Arabia established a PBR in 1989, titled Rights and Responsibilities of Patients and their Families (Al-Rebdi et al., 2021). The Ministry of Health described the rights of patients as the policies and rules which are to be adhered to protect patient's rights and their families in a healthcare setting.

As much as health institutions around the world have established PBRs, research conducted in the Middle East shows that there is little recognition of patients' rights as well as displeasure with the application of PBRs amongst healthcare givers (Al-Rebdi et al., 2021). Additionally, the advances in technology and the use of Information Technology in healthcare have come with many challenges, including cyber threats. Among the rights being breached is patient confidentiality rights. Therefore, the research involves measuring how healthcare providers perceive the use of information technology and the impact on patient confidentiality rights in the Eastern Saudi Arabia setting.

### Aim

The perception of healthcare professionals on the impact of information technology on patient confidentiality is relevant in demonstrating the empirical extent of the issue in the Eastern Saudi Arabia healthcare system.

### Objectives

1. The perceptions of the healthcare professionals regarding the impact of IT on patient confidentiality rights.
2. The major concerns that the healthcare professionals perceived regarding the application of Information Technology in healthcare.
3. Information Technology systems impact patient confidentiality.
4. Dimension that the healthcare professionals perceived that it needs to be improved the most.
5. The overall opinion of healthcare professionals regarding Information Technology on patient confidentiality

### Chapter Two

#### Literature Review

#### Literature Review

Patient's rights are fundamental human rights. In the Kingdom of Saudi Arabia, the Ministry of National Guard Health Affairs (MNGHA) developed a Patients' Bill of Rights (PBR) around 30 years ago (Al-Rebdi et al., 2021). One of the fundamental rights is patient confidentiality. Privacy and confidentiality rights are important in ensuring efficiency in the use of health information systems. According to Almutairi (2022), this involves the use of patient information, access to the

information, and disclosure of patient health data. In some cases records in a health information system can have challenges in terms of confidentiality; hence users such as physicians and other healthcare providers can be associated with ethical problems in managing patient information important for patient care.

Protecting patients' health information is a vital subject in the healthcare setting, which includes the provision of care through Information Technology systems, patients' data storage, and research. Disclosing or accessing patient data without proper authorization is a breach of patient confidentiality rights and can have negative consequences on the care of the patients and life in general because of exposure such as personal information (Elgujja & Arimoro, 2019). To have a balance between authorizing access to information and ensuring patients' confidentiality, technological tools should be utilized properly in establishing care and protecting patients' data. The technological advances have created challenges in preserving the obligation to confidentiality because the information has become predisposed to unauthorized disclosure to third parties.

According to Elgujja (2020), health information technology (IT) can be helpful in improving the health of people as well as the performance of healthcare providers, providing better quality services of care, saving costs, and improving engagement between providers and patients. However, technological advances and their use in the healthcare sector have evoked many issues regarding the privacy and confidentiality of health information (Almaghrabi & Bugis, 2022). Health institutions in Saudi Arabia have been facing major security breaches due to technological challenges and inadequacy of security in the use of information technology systems.

Almaghrabi & Bugis (2022) discussed that the application of legislation regarding data protection in Saudi Arabia is the Personal Data Protection Law. The legislation was instituted in September 2021, requesting institutions to apply various changes in their day-to-day performances in order to comply with the implemented legislation. The legislation was fully enforced in March 2023, which compels registering of data controller particulars, keeping records of processing, improved governance of patient personal information, and enforcement of data rights (Almaghrabi & Bugis, 2022). This legislation has also limited data transfers and enforced the need for consent for sharing and handling private. As a result, it encourages improved impact evaluations, private communications, and the implementation of breach report protocol, will the aim of protecting patient privacy and confidentiality.

Ethical practices and the ability to acknowledge the necessity of ethical values in a healthcare setting are important and need to be recognized by healthcare professionals, especially in the use of health information technologies (Almutairi, 2022). Therefore, the use and ethical understanding of electronic health record systems are vital in improving the healthcare system, and it is the moral responsibility of care providers to protect the patient's interests and information. Currently, there are policies associated with the use of health information systems in the Kingdom of Saudi Arabia. For instance, ISO 7498-2 of the Saudi Health Information Exchange Policies puts emphasis on confidentiality by stating that health information is not supposed to be disclosed or made accessible to unauthorized parties (Ministry of Health Saudi Arabia). Additionally, the ethical understanding of EHR adoption aligns with patient experience during the processes of care because it is associated with important aspects of treatment such as privacy, confidentiality, communication, and cost. Research that involved 45 countries from various healthcare settings indicates that 67% of respondents perceived that the negative perception and low acceptance of using EHR are due to poor usability, inadequate training to users, and limited functionality (Alanazi et al., 2020).

A number of theories and models can be used to predict technology acceptance in healthcare. An example is the Technology Acceptance Model, which hypothesizes the significance of users' attitudes toward accepting and using innovative technologies. However, there is limited data on healthcare professionals' perceptions of the influence of information technologies on patient confidentiality rights in the Gulf context despite the growing adoption and use of health information systems (HIS) in the region and the world. For example, the Saudi Arabian government dedicated \$1.1 billion between 2008 and 2011 intending to develop an E-health program and implement several health information tools, including EHRs, to advance the delivery of healthcare services in alignment with the E-health strategy of Saudi Vision 2030 (Alanazi et al., 2020). However, the adoption of information technology in health has been accompanied by challenges such as privacy and confidentiality concerns. The challenges can be noticed in Saudi Arabia's healthcare settings because of under-developed infrastructure and management.

In healthcare, the terms "privacy" and "confidentiality" are mostly interchangeably used to describe situations associated with information. However, the terms can sometimes be differentiated on the grounds that privacy entails the physical aspects, while confidentiality entails the informational elements. Therefore, privacy is associated with the limitation ascribed to the right to access other people's information or physical space. Equally, the limitation regarding access to information is

in the realm of confidentiality, as it protects the patient's health information from being disclosed to third parties (Elgujja, 2020).

Almaghrabi & Bugis (2022) describe that confidential information is safeguarded by patient confidentiality rights. These rights limit access to patient information with the aim of ensuring safety and security of that personal data. Access of information is limited only to authorized personnel to avoid data loss and breach of personal health information. Health data stored and applied in healthcare should observe to legal and ethical obligations set (Hameed et al., 2021). For instance, the United States has the Health Insurance Portability and Accountability Act (HIPAA) to protect patient confidentiality rights. The purpose of such systems is to ensure the safety and privacy of confidential patient information from unauthorized access, as well as to protect healthcare institutions and its several services information (Masud et al., 2021).

To understand the successful implementation of information technology in health systems, it should require understanding the impacts of its challenges. Considering that the healthcare system consists of complex aspects that result in difficult feedback loops, it is difficult to describe it by using limited boundaries (Christodoulakis et al., 2017). This is because the healthcare systems are fundamental to the functions of the society; hence they are associated to the pillars of government and other major elements of the society. As a result, some concerns related to health outcomes can be overlooked in the process of trying to find solutions to better the outcomes. Such cases include the misuse of information in the available and unauthorized system interaction.

There is an increase in demand for fundamental services in Saudi Arabia, which include healthcare services, because of the rapid population growth. According to a 2018 Ministry of Health report, the Saudi population is having a population growth of 2.54% per annum (Alsahafi et al., 2020). At present, the Ministry of Health (MOH) is working towards implementing infrastructures to ensure the safety of the health system depending on the quality patient care and e-health strategies. The aim is to create a national technological system named “unified EHRs” by developing standardized medical language and electronic communication networks (Alsahafi et al., 2020). The NEHR system is also supposed to support data mining, manage knowledge, and conduct research.

There has been growth in the implementation of e-health systems in primary care in Kingdom of Saudi Arabia. Budget for advances in of information technology has been allocated to the Ministry of Health and other health institutions such as the Armed Forces Services and University Hospitals. An example of the implemented EHR system is the Electronic System for Integrated Health Information (e-SiHi) at the King Saud University Medical City (KSUMC) (Alshahrani et al., 2021). The E-SiHi system is an operating paperless electronic system that maintains patient health information. This transformation from the traditional paper-based system to computer systems is associated with concerns regarding data security, patient privacy and unethical practices. However, there are limited concerns on EHRs privacy from the perspectives of family physicians (Alshahrani et al., 2021).

The use of social media has been improved, and it has proved to be a useful tool in supporting better healthcare outcomes when used appropriately by healthcare professional (Alshakhs & Alanzi, 2018). Results from a study that was carried out in Riyadh indicated that 70.6% of healthcare professionals used social media for professional development, sharing information, and networking activities. Social media has the capacity to improve patients' care and health education (de Martineo et al., 2017; Hao & Gao, 2017). However, there concerns associated with patient privacy and quality of information, in using social media in healthcare. According to related studies, social networks can promote the improvement of the quality of care, but can also have risks like privacy and lack of accuracy of health information.

## Chapter Three

### Materials and Methods

#### Study Design:

The methodology of this research was based on a systematic literature review (SLR). It involved a web-based search through the use of various electronic search engines, which include Google Scholar, Pubmed, and Saudi Digital Library (SDL), to find published articles and gather facts and data on the perception of health providers on the impact of information technology to patient confidentiality rights. Google Scholar was the primary database used in collecting data from published sources. Pubmed and the Saudi Digital Library (SDL) were also used as databases.

A cross-sectional study on the perception of healthcare providers towards the impact of IT on patient confidentiality would also be appropriate in the related setting. This kind of research would involve measuring the impacts of IT on healthcare and the exposure of healthcare professionals to IT in terms of patient confidentiality rights. The participants of the study would be selected according to the inclusion and exclusion criteria of the research before conducting the study to assess the variables at the same time. The healthcare professionals as the participants would be selected based on the primary and secondary healthcare centers in the region with available IT systems.

The search was first conducted on patient confidentiality in eastern Saudi Arabia on Google Scholar where keywords like “Confidentiality,” “patients” rights,” “legal safeguards,” “Electronic Health Records,” “HIAPP,” and “Saudi Arabia” were noticed and considered in assessing the literature on the topic at hand. The search on the Google scholar engine had a custom range from 2017 to 2022. The search generated about 17,500 results. The Boolean operator that was used in the search was “and” and “or.” This was to connect pieces of information and focus the search on the main aspects of the research. The search conducted using the Pubmed engine with the same custom range generated 16 results.

**Table 1: Inclusion and Exclusion criteria**

Criteria	Decision
Papers published between 2017 and 2022	Inclusion
Paper addresses the keywords and research topic. These keywords include “patient,” “confidentiality,” “Saudi Arabia,” “healthcare professionals,” “patient confidentiality rights,” “perception,” and “information technology.”	Inclusion
Paper published in English	Inclusion
paper published in a scientific peer-reviewed journal	Inclusion
Paper presents outcomes of interest according to the research topic.	Inclusion
Health professionals experience on the use of IT systems in the healthcare setting	Inclusion
Perception and knowledge of health professionals concerning IT in terms of patient confidentiality	Inclusion
Paper published before 2017	Exclusion
Papers not published in English	Exclusion
Not a systematic study or literature review	Exclusion
Paper not educational according to research question	Exclusion
Insufficient full text publication and papers that cannot be accessed	Exclusion

**Table 2: Table for databases of the reviewed articles**

Healthcare Professionals + Perception + Patient Confidentiality + Technology + Saudi Arabia ( and – or – privacy – HIAPP – Information - Experience - Rights)	
Database name	Number of Articles
Google Scholar	8
Saudi Digital Library (SDL)	1
Pubmed	3



**Table 3: Timeline for analysis of literature**

Reference	Aim	Study Design	Time period
Elgujja & Arimoro (2019)	To evaluate the law for the patient privilege in terms of consent and disclosure of information under Saudi Arabian.	Systematic review. In-depth review of the relevant Saudi laws in accordance to the International Humana Rights Laws.	2 days
Almaghrabi & Bugis (2022)	To generate a picture of the role of EHRs in the healthcare structure of Saudi Arabia regarding patient confidentiality.	Systematic review. A web-based search review through various electronic search engines such as Google Scholar, Saudi Digital Library (SDL), and PubMed, to find published articles on the topic.	1 day
Albarrak et al. (2021)	To evaluate the knowledge and perception of e-health and its uses among physicians.	Cross-sectional study. Self-administered questionnaire were distributed to individual participants to collect data for the study.	1 day
Al-Rebdi et al. (2021)	To assess levels of knowledge of Patients' Bill of Rights (PBR) and to find data sources from visitors of primary healthcare centers.	Cross-sectional study. A study conducted using self-administered questionnaire through convenience sampling.	1 day
Almutairi (2022)	To assess ethical issues in applying the electronic health record by the healthcare professionals of King Khalid General Hospital, Hafar Al-Batin.	Quantitative-cross sectional design. A simple random sampling technique was used by the researchers to identify the number of participants.	1 day

**Table 4: Results of literature analysis**

Number	Article	Findings
1	Elgujja & Arimoro (2019)	There are concerns regarding the lack of quality inclusive data protection laws to determine clarity and foresee the functions of current laws. There is also limited access of the courts regarding patient confidentiality rights. Also, the system lacks law reporting and structure for discretion in terms of interpreting the laws.
2	Almaghrabi & Bugis (2022)	The healthcare structure in Saudi Arabia is flawed and is exposed to many risks regarding integrity of patient data. The healthcare system is being faced by challenges such as cybercrimes confidential patient information can be accessed by hackers. The internal factors contributing to such incidences include

		inexperienced medical personnel who use EHRs in Saudi Arabia. The lack the appropriate skills and knowledge to handle EHRs can result to breaches of patient data, thus compromising patients' health and safety.
3	Albarrak et al. (2021)	Generally, 70% of physicians reported patient privacy, costly equipment, insufficient training, and lack of programs between information technology specialist and clinicians to improve skills, as the major challenges in adopting telemedicine.
4	Al-Rebdi et al. (2021)	About 72.2% of the participants were fairly aware of their rights, but 65.3% of them were not aware of the existence of the Patients' Bill of Rights (PBR). Healthcare providers were the key source of information for patients' rights. However, participants with the most awareness scores knew about the patient rights through social media. The level of awareness was related to education, revenue, and hospital follow-ups.
5	Almutairi (2022)	The healthcare professionals in King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia, have a positive perception as regards the ethical subjects on electronic health records. Therefore, it may be applied in improving care practices as well as in protecting patient health and information records.

**Table 5: List of included articles for review**

Authors, references	Title	Journal	Study population	Data collection method	Objectives
Al Otaybi et al. (2022)	Performance, barriers, and satisfaction of healthcare workers toward electronic medical records in Saudi Arabia: a national multicenter study.	Health	Healthcare providers in Al-Ahsa, Dammam, Medina, and Riyadh in Saudi Arabia.	Designed questionnaire	To assess the perceptions and activities of healthcare professionals toward applying EMR systems.
Albarrak et al. (2021)	Assessment of physician's knowledge, perception and willingness of telemedicine in Riyadh region, Saudi Arabia	Infection and Public health	Physicians in hospitals in Saudi Arabia	Designed questionnaire	To evaluate the physician's knowledge and perception of telemedicine and its use.
Almaghrabi, & Bugis (2022)	Patient Confidentiality of Electronic Health Records.	Dr. Sulaiman Al Habib Medical Journal volume	Saudi Arabian population and healthcare providers	Literature review	To assess the role of EHRs in the Saudi healthcare system concerning patient confidentiality.
Almulhem (2021)	Medical students' experience with accessing medical	BMC Medical Education	Medical interns	Self-developed survey	To assess the perceptions of medical students on access to paper medical records and electronic



	records in Saudi Arabia				health records (EHRs) in Saudi Arabia and comparing their experiences with the systems.
Almutairi (2022)	Ethical Issues on Electronic Health Records: Perception from the Medical Record Staff at King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia.	Saudi Journal of Pathology and Microbiology	Medical record staff	Self-administered questionnaire	To assess the perception about the ethical issues in the use of electronic health record among the healthcare staff of King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia.
Alsahafi et al.	The acceptance of national electronic health records in Saudi Arabia	Australasian Conference on Information Systems 2020, Wellington	Healthcare consumers	Comprehensive survey	To assess factors influencing healthcare consumers' adoption of National Electronic Health Records (NEHRs) in Saudi Arabia.
Alshahrani et al. (2021)	How private are the electronic health records? Family physicians' perspectives towards electronic health records privacy.	Journal of Health Informatics in Developing Countries	Family physicians	Developed questionnaire	To assess the perception of family physicians regarding the privacy of electronic health records (EHR) and determine the contributing factors.
Alshakhs & Alanzi (2018)	The evolving role of social media in health-care delivery: measuring the perception of health-care professionals in Eastern Saudi Arabia	Journal of Multidisciplinary Healthcare	Healthcare professionals	Online-based questionnaire	To assess healthcare professionals' perceptions in Saudi Arabia toward using social media in healthcare.
Althumairi et al. (2022)	Healthcare Providers' Satisfaction with Implementation of Telemedicine in Ambulatory Care during COVID-19.	Health Information Management and Technology	Healthcare providers	Comprehensive survey	To assess healthcare providers' satisfaction in using telemedicine and the factors contributing to the satisfaction.
Chikhaoui et al. (2017)	Privacy and Security Issues in the Use of Clouds in e-Health in the Kingdom of Saudi Arabia.	Communications of the IBIMA	Healthcare providers	Comprehensive survey	To assess the application of cloud computing in healthcare and present legislations to deal with privacy issues in the Kingdom of Saudi Arabia.

#### Ethical consideration

The research involved searching and using relevant literature. The influence of possible publication biases and search biases was considered in formulating the appropriate sampling and search strategy. The articles were obtained from a common search engine. Google Scholar was the primary data used in obtaining the articles' collected data.

The search was based on relevant epistemological orientation. It was purposefully aligned with the objective of the review and critical interpretation of data. This was aimed to reduce threats to the internal and external validity of the studies, as well

as reliability. The key constructs were well-defined and a sampling strategy and statistical analysis were employed to establish a conceptual review.

Evaluation and interpretation of data were logically conducted according to the reflection of the authors' contextual position. The assumptions and conclusions made were based on the authors' quality of evidence and findings.

## PRISMA

After the first abstracts and titles screening, 80 papers were identified (n=80). The articles that were used in review articles were 10 and the other articles that did not qualify the inclusion criteria were excluded. Of remaining articles, 20 were duplicated while another 20 were invalid, because they were not relevant to the topic. The remaining 10 articles were excluded because they did not meet the eligibility criteria after the full text assessment.

## Quality appraisal

All the reviewed materials were assessed by the use of a quality appraisal tool for qualitative and quantitative studies. The JBI critical appraisal checklist was used in determining the degree to which a study addresses the probability of bias in its evidence, bearing and analysis. The articles that passed the quality appraisal were included in the review while those that did not pass were excluded. The papers that were not included were excluded because of lack of relevance to a low quality appraisal score. The articles were reviewed independently and a comparison was conducted to determine the established scores. A compromise was reached for those articles that had some inconsistencies in the score. The review was established to determine various relevant technological, social, ethical and legal subjects related to information technology in healthcare.

## Chapter Four

### Results

### Results

The review included 10 research articles, which fitted the inclusion criteria as mentioned in the methodology. The analysis of the studies relied on the main research subject: the impact of technologies on patient confidentiality rights, measuring the perception of health care professionals in Eastern Saudi Arabia Information. However, related subjects to the focus of the review were considered and analyzed according to the research topic. The objective of this study was to establish the role of information technology in the healthcare system of Eastern Saudi Arabia concerning patient confidentiality through the perspectives of healthcare professionals. The issues regarding the impact of information technology on patient confidentiality are associated with the benefits and challenges that come with IT systems.

All the articles were published between 2017 and 2022. The articles show concern about the confidentiality of patient data, which is related to the adoption and use of information technology systems in healthcare. According to the results from most of the articles, the confidentiality rights of patients should be safeguarded. This is due to the healthcare system in Saudi Arabia facing various security challenges that could risk the integrity of patient data. The associated factors to the risks include lack of experience in use of IT systems and cybercrimes by hackers who breach confidential data. The results of this study were gathered from all the 10 research articles and are categorized into the following impacts:

### Completeness of patient data documentation and communication

In a descriptive study, Almulhem (2021) assessed the authorization of medical interns from several Saudi Arabian medical institutions in accessing electronic health record systems. The study comprised open-ended questions that assessed the benefits of EHRs in the following categories:

- Legibility and clarity
- Accessibility and availability
- Data entry and organization
- Safety and privacy
- Other uses of EHR data

About 62.8% of the participants accessed health records, 66.1% accessed the electronic health records systems, and 83.27% were allowed read-only access. From the research, most of the participants agreed that the electronic health records systems improved patient safety and privacy, hence improving confidentiality. About 51.9% of the participants perceived that using EHRs was satisfactory in doctor–patient communication, which is relevant in safeguarding patient confidentiality rights. Also, most of the participants, about 87.2%, perceive that EHRs are ensuring completeness of documentation, which safeguards patient data safety and privacy.

### Security of information technology

Chikhaoui et al. (2017) assess privacy and security concerns regarding the use of cloud computing e-health through a survey and discusses the potential that can be used to address the security and privacy challenges in Saudi Arabia. The authors' results relied on content analysis and information from specialists to assess the perceptions of the adoption of cloud computing. This included understanding its benefits, drawbacks, challenges, and issues related to confidentiality, privacy, security, and present legislation.

According to the findings, 50% of the respondents perceive that there is no safety for patient health data in cloud computing in a healthcare setting. About 40 % of the participants perceive that patient health data is safe in cloud computing while the rest 10% had no answer on the issue. However, most of the participants related the hospital data to bank data, concluding that data in cloud computing in healthcare can be secure as that of bank accounts.

The findings from the survey in terms of sharing and privacy show that 85% of the participants perceive that sharing patient information from one hospital to another through the cloud poses a risk to patients' privacy. About 5% of the respondents did not think information transfer through the cloud poses a threat to patient confidentiality while the rest 10% did not have an answer. Based on the findings of Chikhaoui et al. (2017), more than half of the participants perceive that there is a vulnerability of patient health records in cloud computing. Several participants showed concern about the security of hospital data in terms of storage and sharing through cloud computing, which reflects patient confidentiality concerns.

In a cross-sectional study, Alshakhs & Alanzi (2018) assessed the perception of healthcare professionals in Saudi Arabia concerning the applications of social media in healthcare functions. The sample size of the study was 120 respondents, and 80% of them perceived the usefulness of using social networks in providing healthcare services. They perceived that using IT in the provision of healthcare services benefits their professional knowledge and can be an appropriate tool in establishing tool patient health education as well as health awareness. On the other hand, 20% of the participants perceived that the application of social media in healthcare is associated with several risks which limit patient confidentiality and privacy. Such risks include ethical practices and legal challenges.

### Trust factors regarding the use of IT systems

In a study, Alsaifi et al. (2020) integrated associated security issues and trust aspects into the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The aim of this was to determine the strength of those factors in impacting the adoption of the National Electronic Health Records (NEHR) system in Saudi Arabia with regard to patient confidentiality. The survey consisted of a size volume of 794 responses. The respondents in the research perceived that the NEHR system is associated with security concerns and has a negative influence on adoption.

Alsaifi et al. (2020) found that trust is linked to the useful impact on Saudi healthcare users' behavior toward the use of the NEHR system ( $\beta = 0.22$ ;  $P = 0.001$ ). The results showed that the behavior regarding the use of the NEHR system is impacted by the users' trust in government e-health uses in terms of security standards and patient data confidentiality. Also, trust significantly influenced the perceived challenges associated with security issues ( $\beta = -0.39$ ;  $P = 0.001$ ). The findings indicated that the users of the NEHR system perceived they can trust the administration and can adopt the use of the system because of the fewer privacy and security issues.

### Issues associated with the adoption of information technology

In a cross-sectional study, Albarrak et al. (2021) assessed physicians' knowledge and perception regarding the application of telemedicine in healthcare. A size volume of 391 physicians participated in the research, of which 301 (77.0%) were male and 90 (23.0%) were female. In the study, 90% of the participants perceived that the use of telemedicine can be a useful

method in delivering healthcare services. By considering factors influencing the adoption of telemedicine, 90% of the respondents were concerned with issues such as:

- Patient confidentiality
- Costly equipment
- Lack of appropriate training
- Shortage of consultation among information technology specialists and healthcare professionals

#### **Ethical issues related to the use of information technology**

In a quantitative-cross-sectional study, Almutairi (2022) analyzed the perception of the medical staff concerning the ethical issues associated with the use of electronic health record systems in a healthcare facility in Saudi Arabia. The size volume of participants in the study was 43 medical staff. According to the findings of the survey, most of the staff had a positive perception (3.68) about EHRs with respect to ethical practices. From their responses, there is a strong perception regarding the issue of the possibility of the occurrences of privacy breaches, which is associated with issues of confidentiality, with a frequency of 3.98. Various respondents, with a frequency of 4.30, perceive that data can be lost in EHRs, which can cause problems.

#### **Capacity of IT systems to maintain privacy of patient information**

In Alshahrani et al. (2021) study, of a size sample of 110 family physicians, results from the responses from 92 physicians was analyzed. Among the themes in the study, privacy was on them and it was focused on the capacity of information technology systems in keeping patient health data private. Majority of the respondents (52/89; 58.4%) perceived that they were satisfied with the ability of computers in maintaining privacy of patient health data, safely than the paper-based system. On the contrary, 41.6% (37/89) of the physicians disagreed on the capacity of computers to keep health records private. Additionally, 38.2% (34/89) of them disagreed on the grounds that data can be leaked through the internet.

From the study, the majority of the respondents perceived that EHR maintains the privacy of patient information more than paper-based systems while some disagreed on the grounds of associated data leakage. According to the study, the senior physicians ( $p=0.05$ ), non-Saudis ( $p=0.029$ ), and consultants ( $p=0.004$ ) had a stronger perception regarding the privacy of computerized patient data. The majority of the physicians were in agreement to share health information with the Ministry of Health (53/89; 59.6%) and hospital-related study centers (49/89; 55%). However, they did not agree on sharing data with insurance and pharmaceutical.

#### **Perceived benefits and challenges of electronic medical records (EMR)**

In a cross-sectional study, Al Otaybi et al. (2022) assessed the perceptions and activities of the medical staff regarding the implementation of EMR systems. With respect to the observed benefits of EMRs, the majority of the respondents perceived that EMR systems have a positive impact on the provision of quality care to patients, which is followed by the perception that it improves productivity. Regarding the challenges of the use of EMR systems, many of the participants perceived that temporary loss of access to patient records in case the system crashes or power failure is a barrier, and is followed by privacy and security issues.

#### **Satisfaction with respect to patient confidentiality**

In a descriptive and quantitative cross-sectional study, Althumairi et al. (2022) conducted a survey among physicians in a hospital-based ambulatory care facility in Eastern Saudi Arabia. The aim of the survey was to assess the physicians' satisfaction with using telemedicine through different variables. The variables used are tangibility, reliability, responsiveness, empathy, and assurance. These variables can be linked to patient confidentiality rights. Althumairi et al. (2022) found that Saudi physicians are averagely more satisfied with the use of telemedicine than non-Saudi physicians ( $t = 1231.5$ ,  $p = 0.05$ ). There is a statistically major relationship between the level of satisfaction and the frequency of the use of telemedicine/televisits with  $p$ -value.

## Chapter Five

### Discussion

#### Discussion

The purpose of this study is to determine the perceived impact of information technology on patient confidentiality rights. Patient confidentiality and security are crucial factors in patient satisfaction, which has led to major developments in the confidentiality rules and policies for information technology systems in eastern Saudi Arabia. There are not many clinical EHRs apply advanced and adequate e-security features and policies used in the protection of patient confidentiality. Because of rising hacker threats targeting patient data in Saudi hospitals, improved data security rules have become essential to avoid potential threats that may break patient confidentiality (Almaghrabi & Bugis, 2022). As a result, there is a need to improve e-security measures and develop data security rules to reduce the challenge of risking patient data integrity and safety.

#### Completeness of patient data documentation and communication

In Saudi Arabia, medical students are required to have the knowledge and skills to use health informatics and information technology documentation in their course of study. However, there is a limited number of studies that have reviewed the perspectives of the students regarding their experiences with the use of information technology systems such as electronic health records (EHRs). Almulhem (2021) assessed the perspective of medical interns with respect to the accessibility of medical records and EHRs in Saudi Arabia. The study examined the accessibility of information systems in the healthcare setting in comparison to their experiences. In a similar study, Welcher et al. (2018) found that most medical interns accessed medical records and that about 96% of medical institutions allowed students accessibility to medical records. The study found that most medical students in Saudi Arabia access EHRs, as discussed by other studies (Wallach et al. 2019). This indicates that Saudi Arabia's hospitals minimally use paper medical records.

Almulhem (2021) found that hospital policies can limit medical students from accessing medical records, which is similar to the findings of Wittels et al. (2017). These policies can restrict access to medical records because of the need to control liability and patient data integrity. Wittels et al. (2017) emphasize that the issue of liability could be considered a barrier to documentation in EHRs. The solution to this challenge would be to give feedback to the medical interns after documentation to improve documentation skills. Similar results from Bani Issa et al. (2020) suggest that the major concerns regarding patient safety include poor management of health information and challenges with documentation. These factors contribute to inconsistencies in patient data integrity.

#### Security of information technology

The healthcare system is a crucial sector that requires that data integrity and patient confidentiality be maintained by certain regulations. Due to technological advances in the healthcare setting, cloud computing is one of the known information technologies being adapted and used in the sector (Chikhaoui et al., 2017). However, the adoption is associated with regulatory challenges and issues linked to the security and confidentiality of patients' data. The concern associated with the use of cloud computing is that personal health information in the remote data center can be accessed by unauthorized third parties thus breaching patient confidentiality rights. In such systems, it is likely that data could be lost or misused thus negatively impacting patient confidentiality.

Chikhaoui et al. (2017) findings show that the increase in the use of e-Health services needs the support of a legal framework and ethical practices to ensure data privacy, integrity, and confidentiality. This is because sharing health data should consider and respect human rights and privacy, at a personal health level as well as the health institution. Chikhaoui et al. (2017) discuss that it is the responsibility of a healthcare institution to maintain health data security, especially in cases such as outsourcing cloud computing services to ensure the security of information. However, according to the results, there is no existence of particular structure for managing security in cloud computing. To ensure the protection and integrity of patient data, it is important to understand the effective measures that can be used to enforce security and confidentiality in cloud computing. However, the attempts to improve potential security and confidentiality are not satisfying and patient confidentiality remains a challenge under cloud computing in the Saudi healthcare system.

Alshakhs & Alanzi (2018) found that the majority of the participants were uncertain about the risks associated with the use of social media in healthcare. Most of the respondents perceived that "sometimes" using social media could present a risk



for healthcare providers (54.2 %). Also, 52.5% of them perceived that it presents a risk to patient health status, 30% believed it could damage the professional image, and 53.3% of them perceived a risk to patient privacy. Additionally, >15% of the respondents firmly perceived that social media presents a risk for healthcare providers, while 17.5% of them are for patient integrity.

Based on Alshakhs & Alanzi's (2018) results, it is evident that the use of social media in healthcare is related to issues, such as unauthorized accessibility of patient online information regarding treatment and other private information. As a result, this can cause legal bias against healthcare professionals. To add on, inappropriately using social media can cause a breach of patient privacy. In such a case, healthcare professionals would face severe lawsuits against them, which can negatively impact their professional careers. Therefore, the issue of privacy is one of the major barriers to using social media by healthcare professionals.

### **Trust factors regarding the use of IT systems**

In Alsahafi et al. (2020) study, the healthcare professionals perceived that security issues significantly influenced participants' behavioral aspects of using the NEHR system in eastern Saudi Arabia in a negative way ( $\beta = -0.22, p < 0.001$ ). This shows that the issues surrounding the use NEHR system are related to patient health information in terms of access and protection. These results are similar to the findings of Abd-Alrazaq et al. (2019). In their study, they found that trust is a major factor in the use and acceptance of the NEHR system ( $\beta = 0.22, p < 0.001$ ).

According to the results, trusting the government's e-health applications to provide security and confidentiality to patient data handling significantly influences the behavior of Saudi healthcare consumers toward using the NEHR system. Hoque et al. (2017) also found consistent results regarding the adoption of e-health systems in developed nations. The findings reveal that trust significantly contributes to the believed security issues of e-health systems ( $\beta = -0.39, p < 0.001$ ). Therefore, Saudi healthcare consumers would likely adopt and accept the use of the NEHR system if they perceive that the systems in place to manage and use them can be trusted in terms of confidentiality and security.

### **Issues associated with the adoption of information technology**

In their study, Albarrak et al., (2021) found that 47.3% of the respondents have several smart technological devices and use them for professional purposes. Health professionals use those gadgets in delivering care services for better health outcomes as well as developing patient-centered networks. The information technologies, help improve awareness of health procedures and research, enabling better health outcomes for the public. However, the use of social media and other information technologies to establish patient-doctor is associated with ethical and medical issues. The results of the study show that the concerns are linked to legal concerns in instances such as using online platforms to interact with patients as a mode of communication. As a result, the adoption of information technology in healthcare relies on the knowledge and integrity of healthcare professionals.

Albarrak et al., (2021) study also reveals that the four major issues in the adoption of telemedicine by healthcare professionals are patient privacy, the cost of equipment, the knowledge of the professions regarding the use of the systems, and consultation between information technology specialists and the medical staff. These factors have greatly determined the implementation of telemedicine because they are related to patient safety and the protection of patient data. Therefore, it is a recommendation that policymakers should put into consideration the need to reexamine the given factors. This is to develop effective mechanisms for ensuring the sustainability of telemedicine with respect to patient confidentiality rights.

### **Ethical issues related to the use of information technology**

The results of Almutairi's (2022) this study indicate that the respondents are aware of the requirement to maintain the protection of patient confidentiality and data integrity in the electronic health records systems. From that perspective, it is an assumption that the respondents have prior knowledge of the ethical issues related to the use of EHRs with respect to patient confidentiality rights. Therefore, identifying and resolving technical and nontechnical issues in EHRs is a way to strengthen the security of patient information. However, the lack of national guidelines regarding the exchange of information over information technology systems has security and ethical concerns, including confidentiality of patient health data. These findings can help policymakers and health institutions to understand that to address security and confidentiality concerns in the use of EHRs, ethical practices should be established. Having ethical grounds would help keep information private and maintain data integrity.



### Capacity of IT systems to maintain privacy of patient information

Data privacy is a major issue in many healthcare systems around the world, which include the healthcare system in the Kingdom of Saudi Arabia. Alshahrani et al. (2021) found that the use of EHR in the provision of healthcare services is beneficial. Many of the respondents agreed that computers have more capability to protect health data as compared to traditional paper-based records. The majority of the respondents disagreed that it is challenging to store confidential information in such systems and that it risks data breaches, and few agreed on the concerns. Also, health professionals who are of older than 45 years, and those of non-Saudi nationality, highly perceived that EHR systems can safeguard privacy. The results show a mixed perception and attitude toward the adoption of information technology in healthcare settings because of confidentiality and privacy concerns.

Western nations like the United States have policies and systems in place to protect health data and patient confidentiality and penalize data breaches. Such systems include the Health Insurance Portability and Accountability Act (HIPAA). On the other hand, there are no specific legislations to protect patient health information in the Kingdom of Saudi Arabia (KSA). However, there are available bodies such as the KSA Anti-cybercrime law and KSA Healthcare Practice Code which penalizes breaches of confidentiality (Alshahrani et al., 2021). Nevertheless, there is a need for measures to ensure data protection in computer systems to limit the incidences of data leakage and threats of hacking by unauthorized users. Other studies have also agreed on the ability of computer systems to protect data privacy and confidentiality more than paper-based records.

Alzobaidi et al. (2016) assessed the attitudes of Saudi physicians toward EHR and the findings were that 57% of the respondents strongly agreed that electronic health records are more secure than the traditional paper record. The study also stressed the complexity of the issue of privacy according to the user's experience and knowledge. However, the users of EHRs showed satisfaction with the potential of the systems to protect patient confidentiality and e-health information. To ensure confidentiality and privacy, features such as access control, encryption, and identification are usually applied to reduce the risks of data breaches and enhance the security of EHRs (Alshahrani et al., 2021).

### Perceived benefits and challenges of electronic medical records (EMR)

There has been growth in the implementation of health information systems (HIS) in eastern Saudi Arabia over the past three decades. Al Otaybi et al. (2020) discuss that there are several health institutions and facilities that have implemented information technology, such as the healthcare system used in their study. The purpose of implementing EMR systems in the Saudi healthcare system is to improve health outcomes and the quality of healthcare services in the provision to meet the evolving demands in the health sector. According to Hasanain et al. (2015), the Saudi ministry of health aimed to achieve improvements in the healthcare system by using EMRs. The improvements include the reduction of patient waiting times, improving the flow of patient information, and reducing errors in the documentation of health records. Improving the flow of patient data improves security and safeguards patient confidentiality rights.

Al Otaybi et al. (2020) found that the barriers associated with the use of computer systems in healthcare include temporary accessibility challenges to patient records in case of a system failure as well as privacy and confidentiality issues. Similar findings were found by Al Otaybi et al. (2020) in another study they conducted in Jeddah, Saudi Arabia. Keshta & Odeh (2021) also reported similar results where electronic records are associated with temporary loss of private information and security breaches in health data from within the health institution and outside threats from hackers. Contrarily, Alzobaidi, et al. (2017) conducted in Taif, Saudi Arabia, and found that most of the physicians perceived that electronic medical record systems (EMRs) can protect patient confidentiality and security.

### Satisfaction with respect to patient confidentiality

In their study, Althumairi et al. (2022) assessed the satisfaction of physicians regarding the use of telemedicine in ambulatory care during the period of the COVID-19 crisis in Saudi Arabia. To obtain the findings, they used the SERVQUAL model as the main determinant of the research. The assessment of the physicians' satisfaction with using telemedicine was based on various dimensions. These dimensions are the tangibility of the system, reliability of the system, the responsiveness of patients and physicians towards the system, empathy, and assurance in the use of the system.

Althumairi et al. (2022) found that 44.4% of the physicians were in agreement with the impact of the frequency to use televisits aligns with their satisfaction. As of the COVID-19 outbreak, healthcare professionals in eastern Saudi Arabia have been using electronic health records (EHRs) systems in the provision of healthcare services. The study indicates an insight regarding the relationship between the frequency of using televisits and the physician's satisfaction. Therefore, this shows that the physicians using televisits in their care services benefit from the system in terms of practical assistance and safeguarding data integrity. Satisfaction from the named dimensions means that healthcare professionals can access and rely on the systems in their performances. The level of satisfaction in using telemedicine was established to be connected to the quality of the system in use and its acceptance. The quality of the system is related to the needs of the patients, which include rights to confidentiality and privacy.

## Conclusion

This study aimed to systematically review related literature to assess the perceptions of healthcare professionals on the influence of information technology on patient confidentiality rights. The conclusions of the study were successfully developed by reviewing the findings of the related literature. The major issues found in the study include ethical concerns about using information systems, perceived benefits, and limitations of using IT systems, protection of privacy and confidentiality, technical issues, and trust. Also, the results indicate that privacy and confidentiality are the basis of a reliable information technology system. The factors perceived to influence the confidentiality of patient data explored include work relationships amongst healthcare professionals, the security of the system, and social factors related to the healthcare of the users. As part of ensuring patient confidentiality, the KSA healthcare system should adopt and implement strategies that align with the safety of care and data integrity.

In most instances of the review, the healthcare professionals positively perceived information technology by showing a higher level of satisfaction. Most of the healthcare professionals showed satisfaction in terms of preference and utilization of computer systems. They mostly agreed that computer systems such as EHRs and EMRs maintain safety and privacy more than traditional paper-based record systems. They perceived that the application of information technology in a healthcare setting has a positive impact in terms of improving the quality of care as well as productivity. However, in matters of accessibility, many healthcare professionals showed concern about the temporary loss of access to patient records in case of a system failure. Also, concerns such as privacy and security were the most perceived as some of the major barriers to the use and adoption of IT.

The results of this research show that most healthcare professionals are aware of information systems such as social media, and agree on the usefulness of such systems in the delivery of healthcare services. Therefore, systems like social media can be used by health professionals as an important tool in providing services to patients as well as disseminating health information. Nevertheless, there are threats associated with using social networks to communicate with patients, which can lead to legal consequences for the patients and also healthcare professionals. This indicates that measures should be put in place to protect patient confidentiality and data leakages, among other concerns, which can lead to legal action. Such actions can result in damage to the health professionals' image and career.

According to the findings from the research, most of the articles show that the majority of healthcare professionals were satisfied with data protection and security in computer systems, hence reducing ethical concerns. Technological advances have modernized and impacted many aspects of the current life, including the healthcare system. As a result, ethical and privacy issues have been associated with data leakages, breaches of patient confidentiality, and access to electronic health records. In eastern Saudi Arabia, data protection and patient confidentiality are the major issues in the adoption and use of information technology according to the perceptions of healthcare professionals.

This systematic review assessed perceptions regarding privacy, confidentiality, and safety of patient information in IT in eastern Saudi Arabia. The technological factors associated with the systems were found to be the main causes of concern. The concerns voiced were correlated to data integrity, particularly unauthorized access to health information and inappropriate use of the IT systems. The legal and ethical aspects of keeping patient data on computer systems are linked to professional knowledge and security. As a result, the lack of knowledge in health informatics risks data integrity, which threatens patient confidentiality rights.

## Recommendations

The eastern Saudi Arabia healthcare system should revolutionize its IT infrastructure to improve the provision of safer and more efficient care services. This is because the present IT infrastructure is related to several concerns such as breaches of patient confidentiality. However, the implementation of information technology inventions requires massive capital expenditure in terms of operation and maintenance. Therefore, healthcare institutions in eastern Saudi Arabia should consider investing in IT infrastructure that saves cost and protect health data. Cloud computing can be considered one of the systems that save costs and improve data integrity. Various information technology developers offer cloud-based solutions to provide a better approach to improving healthcare service outcomes as well as reducing costs. On the other hand, there are currently concerns regarding the viability of cloud-based solutions in providing patient privacy and protection of personal data.

To maintain patient confidentiality rights, the healthcare system should establish legal frameworks to ensure privacy and security are enforced in the use of information technology in healthcare. As much as there are many benefits associated with using information technology systems, patient confidentiality rights and the security of information can be breached because of the development of new ways of bypassing security measures. Therefore, the increasing use of information technology in healthcare requires legal and ethical policies to ensure data privacy, safety, and confidentiality. Also, the exchange and sharing of health information via e-health services should show regard to human rights, especially considering the security of health data is an important factor.

According to the perspectives of healthcare professionals, there should be training programs and consultations between the medical staff and information technology specialists to reduce temporary system failures and data loss. Having regular training programs will ensure the reinforcement of confidentiality requirements and give the staff an improved perspective on how to apply IT systems to provide healthcare services. Improving their knowledge of the systems can also improve their experience.

To encourage the adoption of ethical practices in the use of information technology, healthcare institutions, and providers should integrate policies and compliance that respect patient confidentiality rights. Through sufficient programs and training in policy requirements, it would set the standards for using IT as well as provide an approach to dealing with challenges related to data integrity. Increasing awareness of ethical conduct can contribute to accountability in the healthcare setting. The lack of appropriate knowledge among healthcare providers can limit processes of policy-making that involve protecting patient confidentiality rights and data integrity.

## References

- Abd-Alrazaq, A., Bewick, B. M., Farragher, T., & Gardner, P. (2019). Factors affecting patients' use of electronic personal health records in England: Cross-sectional study. *Journal of medical Internet research*, 21(7), e12373.
- Al Otaybi, H. F., Al-Raddadi, R. M., & Bakhamees, F. H. (2022). Performance, barriers, and satisfaction of healthcare workers toward electronic medical records in Saudi Arabia: a national multicenter study. *Cureus*, 14(2).
- Alanazi, B., Butler-Henderson, K., & Alanazi, M. (2020). Perceptions of healthcare professionals about the adoption and use of EHR in Gulf Cooperation Council countries: a systematic review. *BMJ health & care informatics*, 27(1).
- Albarrak, A. I., Mohammed, R., Almarshoud, N., Almujaalli, L., Aljaeed, R., Altuwaijiri, S., & Albohairy, T. (2021). Assessment of physician's knowledge, perception and willingness of telemedicine in Riyadh region, Saudi Arabia. *Journal of infection and public health*, 14(1), 97-102.
- Alharbi, A. S., Halikias, G., Rajarajan, M., & Yamin, M. (2021). A review of effectiveness of Saudi E-government data security management. *International Journal of Information Technology*, 13, 573-579.
- Almaghrabi, N. S., & Bugis, B. A. (2022). Patient Confidentiality of Electronic Health Records: A Recent Review of the Saudi Literature. *Dr. Sulaiman Al Habib Medical Journal*, 1-10.
- Almulhem, J. A. (2021). Medical students' experience with accessing medical records in Saudi Arabia: a descriptive study. *BMC Medical Education*, 21(1), 272.

- Almutairi, H. T. (2022). Ethical Issues on Electronic Health Records: Perception from the Medical Record Staff at King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia. *Saudi J Pathol Microbiol*, 7(7), 280-288.
- Al-Rebdi, M., Rabbani, U., & Alqahtani, S. M. (2021). Are Patients Aware of Their Rights? A Cross-Sectional Study of Visitors to Three Primary Healthcare Centers in Riyadh, Saudi Arabia. *Cureus*, 13(11).
- Alsahafi, Y. A., Gay, V., & Khwaji, A. A. (2020). The acceptance of national electronic health records in Saudi Arabia: healthcare consumers' perspectives.
- Alshahrani, A., Jamal, A., & Tharkar, S. (2021). How private are the electronic health records? Family physicians' perspectives towards electronic health records privacy. *Journal of Health Informatics in Developing Countries*, 15(1).
- Alshakhs, F., & Alanzi, T. (2018). The evolving role of social media in health-care delivery: measuring the perception of health-care professionals in Eastern Saudi Arabia. *Journal of Multidisciplinary Healthcare*, 473-479.
- Alshakhs, F., & Alanzi, T. (2018). The evolving role of social media in health-care delivery: measuring the perception of health-care professionals in Eastern Saudi Arabia. *Journal of Multidisciplinary Healthcare*, 473-479.
- Althumairi, A., AlHabib, A. F., Alumran, A., & Alakrawi, Z. (2022). Healthcare Providers' Satisfaction with Implementation of Telemedicine in Ambulatory Care during COVID-19. *Healthcare* 2022, 10, 1169.
- Alzobaidi, H., Zolaly, E., Sadeq, B., Alghamdi, A., & Ahmed, E. (2016). Attitudes toward implementing electronic medical record among Saudi physicians. *Int J Med Sci Public Health*, 5(6), 1244.
- Alzobaidi, H., Zolaly, E., Sadeq, B., Alghamdi, A., & Ahmed, E. (2016). Attitudes toward implementing electronic medical record among Saudi physicians. *Int J Med Sci Public Health*, 5(6), 1244.
- Bani Issa, W., Al Akour, I., Ibrahim, A., Almarzouqi, A., Abbas, S., Hisham, F., & Griffiths, J. (2020). Privacy, confidentiality, security and patient safety concerns about electronic health records. *International nursing review*, 67(2), 218-230.
- Chikhaoui, E., Sarabdeen, J., & Parveen, R. (2017). Privacy and Security Issues in the Use of Clouds in e-Health in the Kingdom of Saudi Arabia. *Communications of the IBIMA*, 18.
- Christodoulakis, C., Asgarian, A., & Easterbrook, S. (2017, November). Barriers to adoption of information technology in healthcare. In *Proceedings of the 27th Annual International Conference on Computer Science and Software Engineering* (pp. 66-75).
- de Martino D, D'Apolito R, McLawhorn AS, et al. Social media for patients: benefits and drawbacks. *Curr Rev Musculoskelet Med*. 2017;10(1):141–145.
- Elgujja, A. A. (2020). Impact of information technology on patient confidentiality rights: a perspective. In *Impacts of Information Technology on Patient Care and Empowerment* (pp. 365-387). IGI Global.
- Elgujja, A., & Arimoro, A. (2019). A review of the patients' right of confidentiality under the Saudi Arabian laws.
- Hao J, & Gao B. Advantages and disadvantages for nurses of using social media. *J Prim Health Care Gen Pract*. 2017;1(1):1–3.
- Hasanain, R., Vallmuur, K., & Clark, M. (2015). Implementation of Electronic Medical Records in Saudi Arabia: A Systematic Review.
- Hoque, M. R., Bao, Y., & Sorwar, G. (2017). Investigating factors influencing the adoption of e-Health in developing countries: A patient's perspective. *Informatics for Health and Social Care*, 42(1), 1-17.
- Keshta, I., & Odeh, A. (2021). Security and privacy of electronic health records: Concerns and challenges. *Egyptian Informatics Journal*, 22(2), 177-183.

Ministry of Health Saudi Arabia. Ministry of health Saudi Arabia. <https://www.moh.gov.sa/en/Ministry/eParticipation/Policies/Pages/Policy.aspx?PID=1>

Wallach, P. M., Foster, L. M., Cuddy, M. M., Hammoud, M. M., Holtzman, K. Z., & Swanson, D. B. (2019). Electronic health record use in internal medicine clerkships and sub-internships for medical students graduating from 2012 to 2016. *Journal of General Internal Medicine*, 34, 705-711

Welcher, C. M., Hersh, W., Takesue, B., Stagg Elliott, V., & Hawkins, R. E. (2018). Barriers to medical students' electronic health record access can impede their preparedness for practice. *Academic Medicine*, 93(1), 48-53.

Wittels, K., Wallenstein, J., Patwari, R., & Patel, S. (2017). Medical student documentation in the electronic medical record: patterns of use and barriers. *Western Journal of Emergency Medicine*, 18(1), 133..