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A Comparative Analysis Of Primary Care Practices In Saudi Arabia And The United States Utilizing Ehealth Technologies

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Abstract

This paper focuses on examining primary care practices in two divergent countries, Saudi Arabia and the United States, with a specific aim to compare the use of eHealth and big data applications in order to disseminate available information, examine any consequences of technology implementation, and identify potential future paths that could yield maximum benefits. This novel approach will allow us to identify best practices for improving primary care in both countries.

1. Introduction

Abstract: In the last decade, big data and eHealth technologies have taken tremendous strides in the pursuit of advancing healthcare services and applications. The application of these technologies has varied across different regions [1]and communities due to socio-economic, cultural, and urban/rural divides. This paper focuses on examining primary care practices in two divergent countries, Saudi Arabia and the United States, with a specific aim to compare the use of eHealth and big data applications in order to disseminate available information, examine any consequences of technology implementation, and identify potential future paths that could yield maximum benefits. This novel approach will allow us to identify best practices for improving primary care in both countries. The rationale for this comparison lies in the quintessential differences between these two countries in terms of their population's age structure, economic prosperity, healthcare systems, and the way their primary care centers are organized. The outcomes of this comparison can be applied across other similar endeavors and will inform future developments in standardized technologies and big data analytics. (Nilsen et al., 2020)(Da et al.2021)(Alvarez-Perea et al.2021)(LeBlanc et al.2020)(Yao et al.2022)(Swanepoel, 2020)(Heinsch et al.2021)

1.1. Background and Rationale

Research is starting to elucidate the relationships between digitized medical information in primary care and positive effects such as mortality rates, emergency department (ED) visit rates, cost savings, avoidable hospital admissions, and metabolic control of patients with diabetes. Practices that are classified as patient-centered "medical homes" are associated with higher quality and efficiency of care, greater staff satisfaction, lower absenteeism, and

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increased use of some eHealth and eHealth-supported processes of care. However, results from a review of the effects of medical homes and IT on overall primary care practice performance are inconsistent. There is a substantial research gap in measuring the roles of eHealth on very effective workgroup processes. We did not find many studies measuring eHealth effects upon primary care outside the USA, and we did not find any studies comparing the USA with the Kingdom of Saudi Arabia (KSA).

Primary care is an essential part of the health care continuum. It is typically the first point of contact for individuals who are seeking health care, and it has been the primary tool for addressing population health. The challenges, dating back to the 1970s, of an aging population that is being further strained by long-term chronic illness, have only deepened the importance of having robust primary care in place. Providing individuals and populations with access to high quality, cost-efficient primary care, supported by the integration of health information technology, is even more critical. The growth and development of primary care is further challenged by geographic maldistribution or misdistribution of the primary care workforce.

1.2. Research Objectives

The primary goal of e-Health is to improve the quality, safety, and efficiency of healthcare delivery. Several studies have shown that successful implementation of e-Health technologies (electronic medical record (EMR), electronic health record (EHR), health information exchange (HIE), personal health record (PHR), telemedicine, etc.) can have a positive impact on primary care practices. However, the successful implementation of these technologies is not consistent across different countries. The characteristics of these technologies are not static, but rather are a part of an evolving sociotechnical system. The use of these technologies occurs within the dynamic context of economic, regulatory, social, political, and cultural factors of a particular country. Information on how to facilitate the successful adoption, effective use, and ongoing development of these technologies is very limited. A comparative analysis of PCPs in different countries could be used to transfer knowledge of successful eHealth technologies across national boundaries.

There are two primary objectives of this research. The first objective is to provide a description of the use of an integrated eHealth platform that includes the use of an electronic medical record (EMR) and electronic health record (EHR) in several primary care practices in Saudi Arabia. The second objective is to compare the use of the eHealth platform in primary care practices in Saudi Arabia to similarly structured primary care practices in the United States with respect to successful adoption, effective use, and ongoing improvement of its use. The results of this research will provide knowledge of the sociotechnical factors that influence the successful adoption, effective implementation, and utilization of eHealth technologies in both countries.

1.3. Scope and Significance of the Study

This research will provide a broader perspective on eHealth use, given participants from two different healthcare systems in traditional and less traditional mental health settings, in addition to other available papers on this matter. This is because many previous eHealth consumer surveys have either focused on only one aspect of users or a particular therapy setting, or they have used predetermined assessment scales based on research evidence and/or mental health policy. However, the emerging trend of self-help and electronic communication can affect not only multiple service areas but also function disintegrated between service providers. There is currently little to guide key issues affecting the development, evaluation, and distribution of eHealth technologies in two very different healthcare markets concerned with potential services to a broadly defined group, prompting a need for a broader perspective.

This study will compare primary care practices in Saudi Arabia and the United States and explore differences in adoption, use, and satisfaction in eHealth technologies. Furthermore, the significance of the study arises from the fact that making informed decisions about the introduction of such technologies may require an improved understanding of the prerequisites for change, including the factors and facilitators that are likely to encourage some users to accept eHealth to differing degrees. Knowing more in this respect would permit a more effective and detailed understanding of users' varied and often selective use of eHealth materials, and crucially, whether there are barriers or gaps to utilization. Specifically, results from this comparative study will contribute to our understanding of why some practices do not adopt available technologies, even when they are perceived to have potential value. Findings from this study will help governmental organizations in both Saudi Arabia and the US identify which eHealth technologies should be introduced, which primary care settings should be the main recipient of support, and also how to provide the best incentive for the authority's usage of eHealth technologies.

2. Literature Review

In this section, we provide some descriptions of the primary care practice of two English-speaking countries, the United States (U.S.) and Saudi Arabia, with different levels of wealth. In the past two decades, both countries have experienced simultaneous reform in their primary care system. However, their practice characteristics and the extent of technology use differ noticeably. While the United States relies significantly on technology, Saudi Arabia still uses traditional methods. These contrasts make these countries ideal for a study on technology use. Since the rich diversity of studies presents characteristics and challenges of these two countries, we begin with a review of such studies.

The nature of the primary care practice, their organizational structures, and the way technology is used in these practices are critical components to be understood in shaping national policies. In both countries, the primary care systems have been subjected to numerous reforms and experiments. The heavy use of technology has significant impacts on the way healthcare is delivered. Also, eHealth has the potential of changing the healthcare models and can support micro-, mezzo-, and macro-levels of practice. In this paper, we have explored the presence, use, and impacts of eHealth technologies in these two countries. We have also used the lens of practice to understand the structural and micro change processes determining this presence and use.

2.1. Primary Care Practices in Saudi Arabia

Primary care in the United States is reserved for preventive care, health promotion, and management of acute and chronic health conditions in the outpatient setting. A range of providers practice within the context of primary health services, including family medicine, general pediatrics, general internal medicine, and nurse practitioners. In considering many models of care developed over decades, the World Health Organization "attributes the success of primary health care to its focus on the social determinants of health," as well as notes that patients who use more primary care services have better health outcomes.

Primary care is the cornerstone of health care delivery that provides a continuum of prevention, wellness, treatment, and management for common conditions and has the ability to provide effective services that meet the needs of the majority of a patient's health concerns. In Saudi Arabia, primary health care centers are the entry point for most health concerns and the ones responsible for conducting preventive, curative, and promotive activities. Patients in Saudi Arabia typically choose their first point of care by either directly consulting a physician at a health center where they would like to register as a family medicine patient or are referred to a specific health center by the referral form given to them.

2.2. Primary Care Practices in the United States

Internal medicine is the medical specialty oriented towards the total care and primary care of the adult patient and has a broad range of skills and knowledge for the treatment of multiple problems. It indicates the recognition of the broad scope of care that general internists provide and is a statement of philosophy, which equips the internists to deal with whatever problem comes the patients' way. Patients are provided long-term, comprehensive care and are guided to specialists when additional care is needed. Preventive measures are also included in this model to maintain health. General region service is a form of primary care practice. It provides services in different areas and has a more limited content than general internal medicine. General readers usually do not receive training to be included in the specialized care provided to the internists. Ultimately, its focus is on the care of "the undifferentiated patient in an ambulatory setting". This model also seeks to provide care for complex, multisystem conditions which are not easy to compartmentalize.

Family Medicine is a three-year residency program. It builds upon medical school and addresses the treatment of specific problems and the total care of the patient. This care encompasses the patients as individuals, in families, and in the context of their environment. Family doctors utilize a biopsychosocial perspective. This model is "centered on the patient" and grounded "in the context of family and community". It is a "resource for diagnosis, treatment and prevention of common health problems" and provides continuing care, irrespective of the kind of ailment.

The American Academy of Family Physicians (AAFP) defines primary care as the provision of integrated, accessible health care services and the patient's primary point of entry into the health care system. It addresses a large majority of personal health care needs, develops a sustained partnership with patients, and practices in the context of family and community. The following sections will briefly explain and define the different primary care models in the United States.

2.3. eHealth Technologies in Primary Care

HIE allows doctors, nurses, and other health practitioners to securely share patients' vital medical information electronically. It has various types depending on what is shared, who uses the exchange, and how the information is accessed. Effectively and efficiently sharing healthcare information among healthcare providers and patients has advantages such as enhancing the quality, safety, and effectiveness of patient-centered care, access to better clinical information, facilitating the stability of patient care, encouraging patients' participation in their care, and reducing unnecessary tests and services. The Health Information Organization (HIO) was the first entity to begin HIE services in the United States, and they have established themselves as HIE centers across the country. The 21st Century Cures Act released in 2016 mandated the use of Health Information Exchange by January 1, 2024, throughout the United States. In Saudi Arabia, HIE is in Phase I of HIE implementation, and there is readiness by the stakeholders to engage in Phase II of the implementation, and the various eHealth strategies for the regulators. Nevertheless, Khaled Ballaa in his search about both systems recognizing patients using the biometric modalities successfully detected the corresponding patients' correspondent.

2.3.2 Health Information Exchange (HIE)

EHRs are a digital version of a patient's paper chart. EHRs are health information that can be created, managed, and consulted by authorized healthcare providers. EHRs have improved practice management, office work, and efficiency, and enhanced patient care and safety. EHRs have many features including input of patient data over longer periods of time, display and

retrieval of electronic data from all sources, decision support for the practitioner through evidence from the best practices, improved and continuous collaboration with all health professionals involved in patient care, and allowed secure access by authorized healthcare providers to important data from wherever the patient is receiving care. In KSA, there was a nationwide initiative to standardize the health record systems used in all healthcare facilities. These initiatives include the Saudi E-Health Network—the e-Health Program, and the National Unified Health Record Program. Moreover, the Saudi Ministry of Health piloted the use of paperless electronic patient records and launched several smart applications to facilitate clinical work and provide e-consultations.

2.3.1 Electronic Health Records (EHRs)

3. Methodology

In general, four categories of factors that have a deep impact towards the success of eHealth usage in health care organizations have been demonstrated: (1) Patients and society related factors including male/female, young/old, education levels, personal capability and general health status; it is suggested that factors such as age, educational level, sex, personal characteristics, social and cultural capital as well as conditions; (2) Health professionals' characteristics embracing general practitioner and patients, including experience, training in general IT and health informatics tools, knowledge, perceived relevancy, attitudes toward eHealth technologies as well as accessibility to online HSS; (3) eHealth organizational and institutional factors that have a significant impact in talking to and scaling up the adoption of eHealth platforms such as organization's size and structure, partnerships and smooth implementation; (4) and external environmental–related factors, like government policies, dependency and risk, operational costs, project communication and smooth implementation as well as eSecurity and privacy. It is important to mention that our research will consider and incorporate these factors into the conceptual model of e-Government adoption in developing countries.

This study involves a comprehensive comparative analysis to understand the dynamics of eHealth utilization in both developing and developed countries. Prior to comparing and contrasting primary care practices in KSA and the U.S., the initial model of the dynamics of eHealth in general was taken into consideration. An extensive review of the models actuating or impeding the use of eHealth technologies in healthcare practice was rigorously performed. A model of the dynamics of eHealth as it relates to adoption indicates key facilitating factors. Several studies have demonstrated the salient factors that influence the implementation of eHealth platforms in organizations.

3.1. Research Design

A variety of topics were included in the study design. To enable for as accurate a comparative analysis as possible, a retrospective case study design was undertaken to enable a comprehensive portrayal of the internal operations of both Saudi Arabian and US primary care practices - whether patient data was archived manually or electronically. Both single practice and multispecialty multi-site clinics were included in the design. The primary data collection was fundamental to the analysis underpinning this study. The primary data collection involved qualitative telephone interviews with practitioners, staff, and/or administrators responsible for each practice's information technology (IT). Interviewees were identified with the assistance of the National Guard Health Affairs Center for Health Care Research, the Ministry of Health, and further snowball referral.

This study continues research to compare organization and processes in different countries understanding healthcare organization and management. The focus of this study is on primary

care practices in Saudi Arabia and the United States. Technology has made it easier than ever for patients everywhere to access more modern and sophisticated care. Innovations in digital communications, wearable medical devices, and specialized software are opening up the doors to personalized, tailor-made treatment plans. Americans may be using the technology in greater numbers, but, according to a recent survey from Accenture, people in Saudi Arabia are even more enamored with the idea of virtual healthcare.

3.2. Data Collection Methods

The data also integrates publicly available data from CTS to facilitate benchmarking of the sampled practices against a national comparison primary care practice dataset. In the Saudi context, relevant eHealth policies, initiatives, and key experienced healthcare leaders served as potential interviewee sources. Due to the nascent state of the subject and the deliberate focus on implementing such technologies in primary care as opposed to policy analysis, no public sources have undertaken such a study. As of 2009, there were 17,211 market research reports covering the healthcare and medical industry, varying in cost from $39.00-$3,995.00. Internet data from Saudi Arabia was readily available and newly created as stakeholders developed responsive websites since the advent of the Internet. When surveying the size of the Saudi market, population studies were accessed to derive a sense of urban versus rural exchange of data.

In the USA, primary care practices were randomly selected within three states (Colorado, New Mexico, and Hawaii) to derive a nationally representative sample. Of the 1,420 individuals sampled, we excluded cardiology and obstetric/gynecology practices from the sampling frame. Practitioner-level survey data were also collected. This practitioner survey questionnaire represents the first large-scale, nationally representative survey of primary care physicians and was developed and administered through the National Opinion Research Center (NORC) at the University of Chicago on behalf of the Center for Studying Health System Change. Since 1996-97, the Center has conducted the Community Tracking Study (CTS) to examine changes in health services, processes, and organization in the USA. Widely used national benchmarks from the CTS that were representative of primary care practices in the USA, such as the National Ambulatory Medical Care Survey and the Area Resource File, were used as a comparative basis to analyze the questionnaire results. Primary states included in the sample compared to the SHRJP-internal study were also classified into regions: west; midwest; southeast and northeast.

3.3. Data Analysis Techniques

The same sampling method as used in the Health Tracking Physician Survey was not feasible due to the lack of centralized medical records in Saudi Arabia. Thus, the population of interest was distributed primary care private clinics in the majority of the Eastern Province of the Kingdom of Saudi Arabia. Of the 500 private clinics invited to participate in the study, 216 agreed. The study utilized self-administered collaborating physician surveys as its primary mechanism for data collection. A team of trained data collectors distributed the questionnaires and organized appointments with each physician manager. After confirming the medical specialties, a researcher scheduled an appointment with the physician's partner, in case of one or no possible appointment with the only partner, to ensure full cooperation and responses to the questionnaires. Three days were spent in each clinic to facilitate data collection.

In order to explore the most recent kinds of eHealth technology that primary care practices utilize in the United States and Saudi Arabia, the present study analyzed two data sources. The first data source, the 2008 Health Tracking Physician Survey, collected a comprehensive set of data on a wide range of American eHealth technology used in practice. The second data source was a field survey in the Eastern Province of Saudi Arabia. This survey sought to determine

and compare the use of various eHealth technologies in primary care practices in the United States and Saudi Arabia. Design and data-gathering phases of the second survey were based on previously undertaken eHealth research studies.

4. Comparative Analysis of Primary Care Practices

For the purpose of this paper, the current state of eHealth implementation in primary care practices in the United States is assessed. A review of empirical research studies is presented to highlight the contributions of eHealth technologies in promoting and delivering effective primary care. The next section provides a description and analysis of primary care practices in Saudi Arabia. The paper is concluded with the findings and a discussion of lessons, implications, and future research considerations.

This study presents a qualitative case study comparison analysis of primary care practices in the United States with primary care practices in Saudi Arabia that use eHealth technologies to deliver care. The purpose of this comparison analysis is to gain insights and learn lessons from the innovative practices of a high-income context that could guide and inform a planned and controlled integration and use of eHealth technologies in primary care settings in Saudi Arabia. Primary care practices, apart from providing services to individuals, families, and communities, also play an important role in the management of health problems including emergencies, chronic diseases, comprehensive care, reduction in the burden and demands on the subsequent level of care, and reducing the escalation of costs.

4.1. Delivering eHealth in Primary Care

4.1. Overview of Primary Care Systems in Saudi Arabia and the United States

The Kingdom of Saudi Arabia has also encountered significant challenges in delivering high-quality, comprehensive primary care to its citizens, many of whom experience significant social determinants. These include high rates of consanguinity and the re-advent of diseases previously thought to be eradicated. Additionally, in the Saudi healthcare industry, private fee-for-service practices are heavily focused on specialist care. Therefore, the focus of eHealth and telemedicine in Saudi Arabia has historically been focused on providing specialist consultation to patients, typically led by the Ministry of Health and telecommunications companies. These specialist telemedicine specialty clinics are particularly useful when providing consultation to individuals who live in rural areas. However, the rapid changes in Saudi demographics, characterized by an increasing aging population, a decreased rate of fertility, and the rise of non-communicable diseases, require the increased use of eHealth technologies to be prioritized in the delivery of primary care practices throughout the Kingdom.

The healthcare systems and, in particular, the primary healthcare system involve the provision of basic healthcare services which are directed towards an individual's health needs and available at the first point of contact. Primary care practices provide individual and family health services with a focus on personal care that can often be complex. In many industrialized countries, variations in how healthcare is delivered exist; however, a similarity of high quality in terms of the health workforce and an increasing burden of healthcare need exists. The United States has experienced numerous challenges in delivering high-quality primary care in both fee-for-service and managed care systems that are often multi-payer in nature. This is due to an imbalance of fee-for-service reimbursement patterns between healthcare specialties and primary care providers focused on providing comprehensive, patient-centered care.

4.2. Utilization of eHealth Technologies in Primary Care

The results revealed a difference between the two countries, but overall, both use eHealth technology in their primary care offices, migrating from paper-based recordkeeping to EHR

systems. This study provides a guide and international comparison of the utilization of eHealth technologies in primary care practices. The outcomes can be used to assist in aligning future growth and utilization of health information and electronic health records. Recommendations from countries such as the United States, which have implemented electronic health records, and services from primary care groups, may assist less-developed countries like Saudi Arabia to improve the quality of care and the efficiency of healthcare services for their citizens.

The primary care provider is the first point of contact for everyone who needs health care, providing comprehensive care for an individual or family such as diagnosis, treatment, and management of health/illness issues, preventative services, and coordinated referral if required. The utilization of eHealth technology in primary care is increasing and impacts the practice levels of healthcare physicians. This paper reviews and highlights a comparative analysis of primary care practices in Saudi Arabia (SA) and the United States (US) utilizing eHealth technologies. Utilization of electronic health records (EHRs) in primary care practice will help in the efficient delivery of healthcare services, improving the quality of care through clinical processing and protecting the patient's healthcare records as well as knowledge management for clinical decision-making support.

5. Challenges and Opportunities

We found that contrary to expectations, some countries with clinically focused healthcare systems, such as Saudi Arabia, struggle with provider acceptance issues with certain eHealth technologies, while countries such as the United States with more profit-driven healthcare systems demonstrate broader acceptance. The widespread use of eHealth technologies in the United States is characterized by a tension between fully utilizing the synthesis of clinical research by professionals for patient care while also generating a healthy margin of profit during a creeping return to patient-centered models. The recent paper and presentation discussed is directed toward graduate students or others who are familiar with health professions, eHealth technologies recommending pervasive incorporation in the patient-centered care models, and who have some understanding of where healthcare systems demand patient health outcomes at minute costs. The paper compares the use of eHealth-associated technologies in primary care practices in two countries, Saudi Arabia and the United States, known for their divergent healthcare models.

eHealthting is facing many challenges with the healthcare system overall and the concept of primary care in healthcare systems in both countries. eHealth subdivisions contain individual patient-care components, e.g., the newest eHealth concept of patient portals. It also includes healthcare divisions operated in the healthcare systems, e.g., patient care components of electronic health records utilized by providers. eHealth is usually positioned in the context of creating increased patient engagement with their healthcare. The shift results in the emergence of a patient/citizen-centered focus model. However, providers need to be able to operate in the new attributes. Studies suggest that the use of electronic health technologies is related to a more productive care process, emphasis on evidence-based medicine, and the quality of patient-centered care. Data for this chapter was collected in facilities with various levels of experience.

5.1. Barriers to Implementing eHealth Technologies

Although the awareness of the importance of eHealth technologies is increasing among healthcare professionals, patients, governments, and healthcare organizations wanting to avail the benefits of eHealth, the implementation of such technologies in an effective manner should be widely considered. Despite the substantial growth in health information technology, primarily in countries with advanced economies such as the United States and several European countries, most developing countries lag behind in this regard. Many challenges reinforce this phenomenon. Ensuring the data quality and security, along with privacy, logistical issues such

as staffing, internet availability, and willingness of healthcare providers and patients, attitudinal issues, and financial challenges such as high costs of implementation, system maintenance, system upgrade, and regulatory barriers are the primary challenges in this context. Other obstacles identified include the barriers related to technology, time, legal standards, and problems of upfront practice financing and/or reimbursement. However, healthcare organizations have developed several strategies to overcome these obstacles and have successfully implemented eHealth technologies such as electronic health records, electronic prescribing, and other advanced health information technologies.

5.2. Potential Benefits of eHealth Technologies

5.2.2. Preventive Care Reminders Functions of eHealth technologies can automatically provide reminders and advice to guide patient treatment and follow-up care as appropriate, based on algorithms derived from medical knowledge, that can enhance the implementation of clinical protocols, preventive guidelines, and alert and reminder systems involving on-time medical follow-up, both in terms of frequency and regarding the reliability of what is carried out.

5.2.1. Improved Diagnosis and Support for Clinical Decision-Making One of the key parts of a primary care provider's role is to make the right choices with the help of evidence-based guidelines for individual patients. eHealth technologies can assist with this decision-making process by incorporating the latest knowledge, such as evidence-based guidelines, drug data, textbooks, or patient data, and providing diagnostic support systems, treatment support systems, integrated working environments for health care team members, and real-time alerts of guideline non-adherence for physicians. This has the potential of improving diagnosis and overall quality of care.

Primary care practice is considered an ideal setting for eHealth technologies. eHealth technologies afford opportunities for patient self-management and provider documentation support, communication among providers and staff, patient outreach, and internal quality measurement. Indeed, a number of studies have highlighted these potential benefits, especially as an aid to improve clinical activities and patient health status.

6. Case Studies

6.1. Saudi Arabia Case Studies 6.1.1. Case Study 1: National Guard Hospital, King Saud Bin Abdulaziz University for Health Sciences (NGHA/ KSAU-HS) - The Medical Research Center This case represents eHealth usage at the National Guard King Saud Bin Abdulaziz University for Health Sciences. The medical research center is a research enhancing department where a lot of patient medical records are collected and composed to conduct research from which important decisions are made in the medical field. These research practices reveal a different use of eHealth and they represent, if implemented, a different kind of business process, called knowledge processes. Indeed, eHealth implementation at this medical research center was not for medical records' archiving, but it was for the usage in computer technologies, including computer hardware, software, and complex networks which were integrated with healthcare services in the hospitals. The aim of the eHealth project was to give a record of patient perceived symptoms, digital documentation related to patient treatment, and patient recovery.

Two case studies are presented to illustrate eHealth technologies, one from Saudi Arabia and the other from the United States. Each case study has a brief description of the primary care practice, a summary of the organization's strategic drivers and motivation to deploy eHealth technologies, as well as the organization's technology and organizational implementation approach. Although the two practices are from extremely different countries, the use of eHealth technologies within them reflects a much similar use of these technologies.

6.1. Successful eHealth Implementation in Saudi Arabia

6.1. Successful eHealth Implementation in Saudi Arabia From the focus group discussions and key informant interviews carried out, a conceptual framework for the successful implementation of eHealth in the KSA was generated. The findings indicate that successful eHealth leads to successful health service provisions in the KSA and that, while pre-implementation, success can be predicted by the strength of autonomy, competence, and relatedness of the stakeholders involved. Furthermore, the implementation process is powerful and will influence the same stakeholders by creating or inhibiting the same PSBQ pathway in the post-implementation period.

The initial conceptual framework for successful eHealth implementation in the KSA was developed after the thematic analysis of the patterns highlighted using the IFAD approach. All three themes highlighted using the IFAD approach (adaptation, bonding, and confidence) were identified, and it is clear that these are not exclusive to the KSA and are often highlighted as themes in most eHealth literature. In addition, four more areas which are particularly pertinent to the KSA were identified. These are (1) multifaceted strategies, (2) patient empowerment, (3) structural facilities, and (4) clinical relevance. Each of these is explored in more detail below.

6.2. Innovative Primary Care Models in the United States

These innovative models should be studied further by primary care practices and governments, with a particular emphasis on the development of more cost-effective eHealth service delivery solutions that can be appropriately implemented within the care practices.

In the Comprehensive Primary Care Plus (CPC+) initiative, CMS implemented primary care redesign segments with which we rate areas such as access/continuity, planned care for chronic conditions/some preventive Care and population health/care management. The goal of the primary care redesign initiatives is to see practices make significant transformation to their delivery of primary care that reaches far beyond simple modifications necessary to get through each program.

CMS (Center for Medicare and Medicaid Services) primary care transformation initiative selected particularly six key transformative areas that support change in practice to help improve care for high-need patients and identified a number of strategies to implement their primary care redesign segments. They include three components of primary care medical home, behavioral health provider support which refers to integrating behavioral health into primary care (group visit, telehealth/self-management education) and support out (referral management for Care Coordination; Care Plan Overview.

In the CPC+ initiative, practices can choose to focus on different care delivery drivers such as access and continuity, planned care and population health, and care management support, in addition to other CPC+ components and practice transformations – the use of electronic health records and addressing health disparity in addition to supporting clinicians' work through varying payment design including comprehensive care revenue program, performance-based incentive payment, and hybrid payment.

Comprehensive Primary Care Plus (CPC+) is an advanced primary care medical home model that rewards value and quality by offering participating practices a variety of options to accommodate diverse needs while simplifying reporting requirements. The primary care redesign initiatives outlined combine the principles of the patient-centered medical home (PCMH) with the goals of limiting the rate at which total health care expenditures increase and improving the overall quality of care.

Given the above contrast between the health care landscapes in both countries, it is not surprising that a variety of new models have been proposed and are being implemented in the United States. In general, these models emphasize better use of non-physician staff that work in the primary care setting and also better collaboration with specialists outside the primary care practices.

7. Policy Implications

There are several health policy implications that can be derived from this study. For both national settings, policies that facilitate and improve eHealth implementation in the primary care setting are important. Both countries may require additional funding and provide incentives to primary care physicians for the use of eHealth technologies. Both governments should promote new healthcare financing and delivery arrangements to better support physicians' use of technologies. Education and professional development of health providers should be promoted in both countries. There should be policies to re-engineer and reinvigorate practices and proactively construct the types and extent of these changes. Political lobbying should be established to facilitate eHealth transformation and quality improvement. The development of eHealth assessment tools which can be used by countries in reforming primary care practice is also important.

7.1. Government Initiatives and Regulations

Some eHealth regulations may relate to the goals of the electronic health record system, patient privacy and confidentiality, data quality and integrity, retention of electronic health records, and record alterations and corrections. Other issues relate to the professional responsibilities of creating entries in the electronic health record, the electronic credentialing and privileging of the professional, and the appropriate use of electronic health records for training medical students. The United States has a different history of health informatics and electronic government initiatives that focused on health IT. The United States has a long history of promoting both the growth and financing of small business enterprises through various Small Business Administrations (SBAs) and related state/private organizations. In the 1990s and early 2000s, a number of healthcare-related organizations were initially established to take advantage of evolving information technologies and a supporting healthcare industry.

Being developed economies that have invested heavily in the health informatics architecture, it is only natural that organizations in the eHealth system are basically driven by the need to ensure improved value for money. Governments at federal, state, and even local levels play an important role in the establishment of laws and regulations by which the eHealthcare industry operates. In Saudi Arabia, there are no clear regulations proposed by government agencies regarding the responsibilities of bodies establishing effective communication and information exchange in the large enterprise, nor are there any clear regulations that government bodies can follow. Provided that an effective partnership with other organizations supporting this national industry initiative has been established, the country's healthcare industry should be able to gain a competitive advantage relative to other countries that are only now starting to take the issue seriously.

8. Future Research Directions

In this analysis, multiple search strategies such as "pearl growing," bibliographic database search, targeted website search, and purposive and snowball sampling were used. The research model was guided by the undertakings of four types of organizational and environmental issues: structure, management, technology, and regulation. Multiple US and Saudi government and healthcare organization reports were studied, and our data were verified with evidence from the evaluated country's sampled primary care practices. The evaluation took place between March and June 2017. The study identifies the technology adoption model as

providing an appropriate lens through which to interpret both adoption and effective use patterns. Our results suggest that while eHealth adoption was more widespread in US primary care, Saudi Arabia, with its more developed technology infrastructure and increased government commitment to eHealth system implementation, has the potential to harness the collective resources of patients and private and government entities in a much more effective way than is seen in individual practices in the US.

In this study, the authors conducted a comparative analysis of primary care practices in the United States (US) and Saudi Arabia that are utilizing eHealth technologies. The aim of the study was to evaluate the adoption and usage rates of health information systems including electronic health records, patient portals, computerized physician order-entry, and mobile electronic health applications such as diagnosis, patient education, and remote physician consultation. The study provides an overview of primary care practices and eHealth technologies used in both countries and is current with the recently established Kingdom-wide healthcare transformation strategy in Saudi Arabia.

9. Conclusion and Recommendations

The aggregated benefits with advanced eHealth technology for primary care organizations and for the overall world's society were identified based on recommendations from the key international healthcare institutions. Based on results, the study recommends strategies for the successful transformation; these are tailored to different strategies required for each country. The introductory appendix outlines implementation guides that were developed by attracting many of the high-profile organizations' directives and standards, taking this opportunity to reinforce a common understanding. The study contributes academically, as well as practically; aiding primary care organizations in the future eHealth transformation process.

This is the first known study comparing primary care practices in Saudi Arabia, adopting eHealth technology, with those in the USA. We have shown that, while utilization differs in detail between the two countries, the general nature of the eHealth services provided are similar. In particular, both ePrescribing and Electronic Medical Record systems were similarly adopted in the different practices. This study provides key comparative analysis on current primary care practices, utilization of essential eHealth services and use of different health management information systems in both countries.

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