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Electronic Health Record Adoption, Interoperability, and Consumer Access

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Abstract

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Dissertation Submitted in Partial Fulfillment

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Abstract

Electronic health record (EHR) adoption is necessary across many healthcare settings. The problem identified in the current study is that EHR systems and consumer access to their health records tend to be inconsistently applied across various health care settings which could have adverse effects on health outcomes in the policies, and procedure of healthcare delivery. EHR systems can improve the perceptions of patients on healthcare systems and the operation of health care facilities. More specifically, interoperability in the context of EHR system implementation was reviewed in the current project. The purpose of this study was to understand the lived experiences of health care professionals and consumers regarding benefits, barriers, conditions, agreements, and standards as perceived in regards to EHR interoperability, adoption, and consumer access. Through an application of the theory of planned behavior, an exploration of the rational decision-making processes required in health care operations processes, including the implementation of EHR systems and structures, was conducted. A qualitative phenomenological design was chosen for the current study, including semi-structured interviews from 10 nursing healthcare professionals currently working and 10 healthcare consumers who received health care services within the previous 365 days to establish detailed accounts of the lived experiences. Thematic data analysis was used after the collation of the responses to identify and interpret the patterns. The results revealed many benefits of implementing EHR systems, the issues involved, and the risks. Understanding the lived experiences could offer insights into strategies for overcoming barriers, improving health outcomes, policy, and procedures, and empowering consumers to take greater control of their health access to and management of personal EHR.

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Dedication

May all glory and honor go to God, who sustained me throughout this experiential journey. I lost my father at the age of 11, and my late mother, Akonanwan Archibong `Udofia, automatically became my best friend. She was a woman who turbocharged me to always strive for competence and to never settle for mediocrity and inferiority. Mother challenged me to surround myself with people who would believe in me, "empower me, uplift me, motivate me, and appreciate me," but that is who she was in my life. There were times the mother would say, "Son, if you want to dream, dream big, and have a passionate dedication to your pursuits." The wisdom from my mother gave me the impulse and insatiable appetite to pursue my doctoral program. I knew I could do it because if I worked hard, stayed focused, and completed my PhD program, history would always point to my late mother as the precursor and bridge builder of my life. At the start of the day, every morning, I tell myself that I have to work hard to make my mother proud. I thank God that my mother nurtured me and showed me the way to follow. So, I dedicate this dissertation firstly to my late mother.

After I lost my mother, God gave me my wife Alice, who came in to pick up where my mother left off; she became my best friend, a confidant, a partner who cares to the max. This motivator has an extraordinary talent to push me up, empower me to stay focused on my education, and provide all the cushions to make sure I remain balanced and focused. To our five children, Iniobong, Idaraobong, Kufreobong, Mfonobong, and Otobong, you have given me hope to work harder, live an exemplary life, and allow me to convince you all that "tough times don't last but tough people last." Thank you for giving me space to breathe when l needed it, and thank you for understanding that Daddy

wanted to complete his PhD program desperately. Many times, when Mom explained to you about what l was doing, the radiance in each of you ignited me and rejuvenated my primordial sentiments. You all have contributed to this success, and may God bless all of you. I love you all so very much with every fiber of my being. If I had to mention five people who added so much value to my life today, I would say the name of my wife four times.

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I want to thank Dr. Sheryl Richard, the chair my dissertation committee, for her inspiration; she always reminded me that “perfectionism will not allow me to have joy until l do everything the right way.” Dr. Richard, who was also my content expert, encouraged me all the time to do my work right, and she never believed in window dressing. In the process of trying to do my work right, she always complimented me by telling me how proud she was with my efforts. Dr. Richard went extra mile in directing me to academic tools that were available for me to use to do better in my dissertation project. Dr. Richard is extraordinary, and through her guidance, I have made incremental improvements in my writing and a significant level of discipline in the weekly planning of the work towards my dissertation. I give her my unalloyed gratitude and appreciation. I also want to thank Dr. Nicole Dhanraj, who is my methodologist. Dr. Dhanraj was meticulous, making sure I followed all technicalities required of the methodology. He took the time to read my work. I thank him for working collaboratively with other members of the committee and giving me feedback to help me improve in my dissertation. My gratitude also goes to Dr. Frederick Schulze for all his suggestions towards the improvement of my project. Every member of my committee has been a part of this great journey, and I appreciate them all.

Table of Contents

Chapter 1: Introduction to the Study

In the current section, I explored the relevant background information on electronic health records (EHR) and its functions. A major purpose of this section is the establishment of a basis on which to develop the purpose and significance of this paper. Through an exploration of the information on EHR systems, I establish and support the developed problem statement and research questions.

Background

EHR are digital forms of record keeping. In the health care industry, EHR systems cover a broad array of types of information and information exchange systems. For example, EHR in health care covers patient records, charts, reports, and virtually any information that had traditionally been kept in paper form. The implementation of EHR systems, however, should not be viewed simply as the transformation of print forms of records to digital forms. The EHR system implementation often increases the functionality and capabilities of such systems. Thus, EHR systems not only streamline data keeping and information exchange but also increase the functions of such systems. For example, EHR systems allow for greater data analytic capabilities. In addition, such systems increase the amount of patient data and information that can be stored (Dicenso, Guyatt, & Ciliska, 2014). Of course, the rate of data transfer between systems also tends to increase with the implementation of EHR systems. Delivering information electronically between healthcare systems, even with increased security protocols and protections, is much quicker and easier to sort than physical information systems (Abdelhak, Grostick, & Hanken, 2014).

A clear benefit of EHR systems is that patient data can be tracked across health care providers over a long period. In contrast, physical information systems such as paper systems tend to result in patient data being constrained to specific organizations and systems as well as such information being archived after a specific period because of retention policies. In contrast, EHR systems with contemporary digital and physical technologies allow for all patient and historical data to be housed in compact servers (Abdelhak et al., 2014; Naidoo & Wills, 2016; Hill &Topol, 2012). This major advantage of EHR systems, then, provides a strong justification for the implementation of EHR systems in health care organizations.

Another of the useful functions of EHR systems is that they allow health care staff to immediately identify and confirm when patients are due for procedures planned well ahead of time, preventative checkups, routine screenings, and the monitoring of a patient's medical history (DiCenso et al., 2014). Physical systems cannot keep up with the capabilities of EHR systems. Another important function of EHR systems is that they allow health care workers for the real-time monitoring of patient conditions and readings, which, coupled with the patient's medical history and allergies, can lead to major improvements to patient outcomes and ensuring that the proper treatments are administered.

A major distinction between EHR systems and physical record systems is that the records of the former are universal (Abdelhak et al., 2014; Naidoo & Wills, 2016; Topol & Hill, 2012). In other words, EHR systems coordinate patient data between organizations, allowing such information to be standardized and easily readable between

EHR systems. Such flexibility and adaptability in the ability of EHR systems to exchange information between organizations provide a discernible advantage for this type of system over physical systems.

EHR systems also provide opportunities to standardize information, including patient information (Abdelhak et al., 2014; Hatef et al., 2019). The standardization of health care data does not require the standardization of all EHR systems. Instead, it requires that the information fits a set of objective criteria, allowing such information to be discernible within and between health organizations. Likewise, such standardization helps ensure that all medical records kept by EHR systems are reliable and dependable as well as secure (Immergluck et al., 2009; Topol & Hill, 2012). Such standardization tends to occur through EHR systems but is facilitated through electronic medical record systems (Howe et al., 2019; Naidoo & Wills, 2016; Topol & Hill, 2012;).

Operational efficiency contributing to financial gains is a leading factor for the implementation of EHR systems. There are two primary ways that EHR system implementation can contribute to operational efficiency and improve the financial outlook. The first is that EHR systems often allow for significant decreases in appointment waiting times schedule for both staff and patients. This directly contributes to an increase in revenue for organizations implementing such systems. The second source of potential financial gains with the implementation of EHR systems is a decrease in operating expenses. Physical information and records systems tend to be more costly to operate than EHR systems. While the implementation of EHR systems can be quite costly in the short-term, the long-term efficiencies gained from such an implementation can

substantially decrease operating costs. The net increase from these two sources of operational efficiencies that contribute to financial gains can be quite large in the long term.

There is some evidence that EHR can improve the quality of patient care and increase patient safety (Cea Soriano et al., 2019; Naidoo & Wills, 2016; Summers et al., 2019). For instance, EHR systems tend to promote greater levels of understanding between organizations. EHR systems allow for greater levels of interorganizational coordination and information sharing. One benefit of EHR systems is the reduction of overprescribing (Vos, Boonstra, Kooistra, Seelen, & van Offenbeek, 2020). Digital record-keeping allows patients with multiple physicians to be more closely monitored to ensure that such patients are not being prescribed the same medication multiple times in a single period. It also helps prevent deleterious or risky drug combinations. Similarly, allergy information can be shared over EHR systems and information systems connected to such EHR systems.

One of the clear potential benefits of EHR systems is that they streamline the health care process (Immergluck et al., 2009; Topol & Hill, 2012). The health care process begins with information collection and analysis. EHR systems streamline this process by providing health care providers with more immediate, detailed, and targeted information on patients. Compared to physical record systems, electronic systems provide a clear advantage of eliminating much of the waste that goes along with health care operations and patient treatment (Kocher, 2021).

Patient education and awareness are increasingly popular goals for health care organizations, precisely because they promote prescription adherence and self-regulation, both of which in turn contribute to positive patient outcomes (Topol & Hill, 2012). EHR systems now play integral roles in promoting patient education and awareness because they provide additional opportunities to provide patients with summaries, reports, and other information regarding treatments and possible drug interactions. Moreover, EHR systems promote interactions between patients and health care providers (Misto, Padula, Dame, Molloy, & Nimmagadda, 2020). Such interactions tend to promote patient outcomes and improve the understanding that patients have of their conditions and treatment plans.

The impacts of EHR system implementation on preventative care are quite strong. In particular, EHR systems allow for the recognition of cases in which patients should be seeking additional treatment if a review of the system shows worsening health conditions (Brom et al., 2020). Preventative care is very important for reducing medical costs and promoting patient outcomes, especially from a community-wide or population-wide perspective. EHR also may decrease billing errors (Atasoy, Greenwood, & McCullough, 2019). After all, EHR systems allow for a level and number of data and compatibility checks that are generally not available to physical information systems. Such thorough checking can prevent billing errors and are used to identify billing errors much earlier on.

EHR systems also help coordinate the actions of staff. Such EHR systems promote interactions between staff members and help prevent overlapping duties, responsibilities, and assignments (Abdelhak et al., 2014; Naidoo & Wills, 2016; Topol &

Hill, 2012). Such functions provide significant efficiencies for operations and may decrease stress, anxiety, and too heavy workloads for staff members (Sieck, Pearl, Bright, &Yen, 2020). Given the important functions of EHR systems to health care systems across the country, it is clear that there are good reasons for health care organizations to adopt such systems. However, despite substantial research on EHR systems, there is insufficient information on the implementation of EHR systems. Thus, the identified research gap is at the nexus of EHR and practical implementation. The need for the current study stemmed from the strong support for the clear benefits of EHR systems (see Abdelhak et al., 2014; Naidoo & Wills, 2016; Topol & Hill, 2012) and the lack of information on their actual implementation in practice, which may carry certain benefits and risks that are unaccounted for in the initial research on EHR systems. In this section, I have provided a concise overview of EHR systems, their functions, their benefits, and the connections between EHR systems and other systems within a health care organization. Research on EHR systems will be covered in more detail in the literature review. For this project, EHR refers to electronic medical records and health records.

Problem Statement

Researchers have explored a variety of benefits and issues with EHR systems (see Mikk et al., 2017; Tofannello et al., 2017). Benefits include expedited information transfer and better data analytics. However, the identified problem addressed in the current study involved the inconsistency revealed in consumer access to their medical records. Specifically, while EHR implementations have been effective and have provided a number of benefits, consumers have had varying levels of access to their records

(Hemsley et al., 2018; Mikk et al., 2017; Tofannello et al., 2017). Consumers in the context of the current research were patients receiving and seeking healthcare services. The variance in the levels of access that patients have to medical records and pertinent information suggests some variance in the specific configurations of EHR systems. Regulations and laws, then, must be sufficiently flexible and tolerant to different levels of information sharing via EHR systems. Researchers have suggested that increasing patient access may lead to improvements in health outcomes by empowering patients and promoting greater self-care (Hemsler et al., 2018; Mikk et al., 2017; Toffaenello et al., 2017). Thus, there is a need to identify causes and trends related to health care organizations not providing sufficient access to patient outcomes.

Though evidence documenting the effectiveness and utility of EHR has expanded, there remains debate about the level of access stakeholders should have to patient information stored in protected electronic databases (Hemsley et al., 2018; Mikk et al., 2017; Toffanello et al., 2017). Stakeholders include patients, physicians, employers of healthcare, insurance companies, pharmaceutical firms, and government. Though research remains limited, there is some evidence to suggest that EHR can lead to improved service quality and patient care by increasing patient access (Plantier et al., 2017a).

Some researchers have indicated that unlimited access of all stakeholders to EHR data warehouses should be provided (Greer, 2015; Jacob, 2015). Others have questioned the ethics and security risks associated with this level of access (Pell et al., 2015; Plantier et al., 2017b). However, contemporary practitioners have asserted that enhanced

interoperability is needed regarding EHR access, and a shift is needed in the current information sharing paradigm to promote more access on the part of patients and the management of health data (Essen et al., 2018; Finset, 2018). All current health care patients, practitioners, and related stakeholders are affected by this problem as there remains limited knowledge as to how to ethically and feasibly increase consumer access to health records due to the possibility that increasing access will improve self-care and allow patients to more fully manage their wellbeing. By helping to fill the identified literature gap, a better understanding of the connection between electronic access to health records and patient outcomes could be achieved.

The results of this research may help address the identified literature gap by providing qualitative evidence of the factors that contribute to the implementation of EHR systems based on inquiry with healthcare professionals in the field who have experience with the adoption and implementation of electronic health records. The theory of planned behavior (TPB) holds that this problem of varying patient access and a lack of understanding of interoperability issues related to a lack of readiness for change while the technology acceptance model suggests that it is the lack of acceptance for contemporary technology in health care (Stanczyk et al., 2017; Yu & Qian, 2018). In this study, the TPB was used as the theoretical framework.

Researchers have not yet fully explored the implications involved in the provision of greater access to health records, and the impact interoperability might have for all stakeholders as patients take a more active role in managing their data (Essen et al., 2018; Finset, 2018; Greer, 2015; Hemsley et al., 2018; Jacob, 2015; Mikk et al., 2017; Plantier

et al., 2017a; Plantier et al., 2017b; Toffanello et al., 2017). Existing research has provided evidence that further investigation is needed to understand the factors involved in the adoption, interoperability, and access to EHR. This lack of research is a shortfall that requires further investigation to better inform practice in regards to EHR, interoperability, adoption, and consumer access.

Purpose of the Study

The primary purpose of this qualitative phenomenological study was to identify and describe the lived experiences of health care professionals and consumers regarding benefits, barriers, conditions, agreements, and standards, such as regulations, as perceived by health care providers and consumers in regards to EHR interoperability, adoption, and consumer access. At this stage in the research, EHR was defined as medical and health records, laboratory data, radiology reports, past medical history, vital signs, and all key administrative medical data, including post patient information that is collected and stored electronically.

The theory that guided this study was the TPB (see Stanczyk et al., 2017; Yu & Qian, 2018). The phenomena of interest in this study included aspects of EHR and perceptions by stakeholders and consumers regarding its adoption, interoperability, and consumer access. The specific population of the study was health care professionals and consumers in the United States with experience using EHR. Through a phenomenological qualitative approach, the current study contributed to filling the gap in the literature regarding the provision of greater patient access to EHR. This research could support the professional practice by informing health care professionals as to the most appropriate

approach to take in regards to providing patients access to, and control of, pertinent health data and records. This claim aligned with the problem statement to reflect the potential relevance of this study to society by leading to positive social change in regards to ethical and feasible patient data accessibility.

Research Question

What are health care professionals' lived experiences regarding electronic medical records and health records?

What are health care consumers' lived experiences regarding electronic medical records and health records?

Theoretical Foundation

Covered in this section are the seminal studies that formed the research foundation for the current study. Jacob (2015) and Jung et al. (2014) provided research that interoperability has incorporated the developmental phenomena of procuring, processing, and exchanging data through systems and devices and making the information accessible and simple to understand at the receiving end. Greer (2016) found that there should be a secured electronic medical record data warehouse where all the stakeholders, patients, physicians, vendors, payors, and initiative representatives have access to the information they desire anytime. Pell et al. (2015) and Mikk et al. (2017) proposed that interoperability will lead to active patient engagement and health system improvement. Researchers have generally agreed that the EHR should be customized to provide information from any location to any individual who needs access to health

information for use in solving healthcare problems (Essen et al., 2018). Pare et al. (2017) and Whitacare (2017) provided preliminary evidence of the preconditions, agreements, and standards that should be established between the participants and health care providers and representatives, including the patients who will receive, handle, or exchange the interoperative health information. However, a gap remains regarding the lived experiences of health care professionals concerning EHR adoption, interoperability, and consumer access.

The conceptual framework suitable for the current research was the TPB. The TPB is a framework for evaluating change and posits that the implementation of a new intervention or technology in health care only occurs in a stage-like manner based on individual and/or organizational readiness and beliefs about any particular behavior that people can exert self-control over at a specific time and place (Stancyzk et al., 2017). In particular, the TPB holds that a change of technology in practice and its successful adoption is determined by behaviors, subjective norms, and the perception of one's control over the behavior (Bosnjak et al., 2020). These factors combine to determine one's intention to adopt the change and implement it in practice. This theory served as an expansion on the theory of reasoned action and also asserted that self-efficacy plays an essential role in the determination of whether or not a new change would be adopted in practice. This theory helped frame the topic of interest and research questions because of the existing evidence base supporting its efficacy in health care practice and its specific implications for the role of user efficacy (e.g., health literacy) in adopting technology like EHR. The ability to determine the user's perceived usefulness and perceived ease of use

could be substantiated from the critical variables of TPB, including normative beliefs, control beliefs, perceived behavioral control, and behavioral intention. The theory could help predict how new technology will be accepted based on the process of changed behavior (Stancyzk et al., 2017).

Nature of the Study

In the current qualitative phenomenological study, I intended to explore the lived experiences of healthcare professionals and healthcare consumers concerning their interactions with EHR systems. In particular, the interviews featured in the current study were used to generate information on the experiences of these two populations with EHR systems. Information on both favorable and unfavorable experiences with such systems were pursued. The lived experiences of the chosen samples were determined by an analysis of their recorded experiences, attitudes, and observations. The rationale behind the design choice is that the chosen study design was the best fit for an attempt to determine the lived experiences of two distinct populations.

Definitions

Electronic medical records: Collections or sets of data about or related to medical and personal information on specific patients. In this study, electronic health records and electronic medical and health records were used with electronic medical records interchangeably.

Healthcare professionals: Certified or licensed professionals in the healthcare industry, including registered nurses and nurse practitioners, physician assistants, physical therapists, and clinical social workers.

Point-of-care data: Data that are collected as care is being given to patients or immediately after care has been given to patients.

Assumptions

I assumed that the interviewees would give honest and transparent information. I also assumed that the information provided by the interviewees could contribute to the formation of an understanding of the lived experiences of each population that was interviewed in the current study. These assumptions allowed for the lived experiences of the sample to be determined.

Scope and Delimitations

The scope of the current study was focused on determining the lived experience of two populations, healthcare professionals and healthcare consumers. Such a focus allowed for the development of a better understanding of the practical implementation and operation of EHR systems and the potential benefits and risks of such systems, which were not determined by previous research. Both populations were interviewed about their experiences with EHR systems. While the questions asked participants in the study were concentrated on EHR systems, there were opportunities for follow-up questions to turn to other aspects that were indirectly related to EHR systems. Thus, the significant delimitations of the current study were two targeted populations and a concentrated focus on the encounters that healthcare professionals and consumers have had with EHR systems in healthcare.

Limitations

The researcher's direct role in both data collection and analysis may generate expectancy effects or confirmation bias, such as the construction of themes that match the researcher's *a priori* belief about EHR interoperability, adoption, and consumer access. I encouraged honest and authentic responses to prevent bias, and thematic analysis was performed according to a structured and systematic process to reduce the likelihood of expectancy effects. There was little risk of psychological or physical harm to participants based on participation in this study. A final limitation in this study was having limited samples of participants from both groups.

Significance

The current study was intended to help fill the gap in understanding access, interoperability, and adoption of EHR by offering an original contribution to understanding the lived experiences of health care professionals and consumers in regard to EHR, interoperability, adoption, and consumer access. This research could support professional practice by offering insight into perceptions of EHR and issues affecting interoperability, adoption, and consumer access. This research could allow practical applications by helping to inform health care professionals of potential strategies for overcoming barriers to the successful implementation of EHR through empowering consumers and providing greater access. The research aligned with the problem statement to facilitate positive social change by empowering consumers to take greater control of their health through increasing access to, and management of, personal EHR. This study could address a gap, and thus a problem regarding the understanding of the lived

experiences of health care professionals and consumers regarding EHR access, adoption, and interoperability (see Essen et al., 2018; Finset, 2018; Greer, 2015).

Summary

The current chapter provided an introduction to the use of EHR systems and issues surrounding such use for both healthcare professionals and healthcare consumers. A background exploration of this topic revealed that EHR systems are highly crucial for the proper implementation of the latest healthcare information requirements. However, there are also significant limitations to the use of EHR systems and potential risks with implementing systems that feature greater consumer access to medical information. The current qualitative phenomenological study was intended to develop an understanding of the lived experiences of both healthcare professionals and healthcare consumers concerning EHR systems.

Chapter 2: Literature Review

Introduction

The problem addressed in the current research is that while EHR have been effective, consumers have varying levels of access to these records, which has led to inconsistency in current health care policies and operations (Hemsley et al., 2018; Mikk et al., 2017; Tofannello et al., 2017). Consumers in this context are patients and those seeking healthcare services. Increasing patient access may lead to improvements in health outcomes by empowering patients and promoting more excellent self-care (Hemsler et al., 2018; Mikk et al., 2017; Toffaenello et al., 2017). Though evidence documenting the effectiveness and utility of electronic medical and health records has expanded, there remains a debate about the level of access stakeholders should have to patient information stored in secure electronic databases (Hemsley et al., 2018; Mikk et al., 2017; Toffanello et al., 2017). Though research remains limited, there is some evidence to suggest that EHR can lead to improved service quality and patient care by increasing patient access (Plantier et al., 2017a). Some researchers have suggested that unlimited access of all stakeholders to electronic medical and health data warehouses should be provided (Greer, 2016; Jacob, 2015). Stakeholders include patients, physicians, employers of healthcare, insurance companies, pharmaceutical firms, and government. Others have questioned the ethics and security risks associated with this level of access (Pell et al., 2015; Plantier et al., 2017b). However, contemporary practitioners have asserted that enhanced interoperability is needed regarding electronic medical and health records access, and a shift is needed in the current information-sharing paradigm to

promote more access on the part of patients and the management of health data (Essen et al., 2018; Finset, 2018).

All current health care patients, practitioners, and related stakeholders are affected by the problem of inconsistency in healthcare policies and operations, as there remains limited knowledge as to how to ethically and feasibly increase consumer access to health records. This is partially due to the possibility that increasing access will improve self-care and allow patients to more fully manage their well-being. Increasing access to healthcare information may, then, significantly improve the conditions and well-being of patients. Similarly, improved health information systems can improve the efficiency of the operations of healthcare organizations. The identified literature gap, here, concerns the relative lack of information on how healthcare organizations can improve information processes to improve consumer access to medical information. The results of the current study may help to address this gap by providing qualitative evidence of these factors based on inquiry with healthcare professionals in the field who have experience with the adoption and implementation of electronic medical and health records. The current chapter begins with an explanation of the literature search strategy. Next, the chapter features an explanation of the conceptual framework used for the current project. Finally, I present recent literature on a host of topics related to healthcare information systems.

Literature Search Strategy

To explore current issues bordering on EHR adoption, interoperability, and consumer access, I examined scholarly peer-reviewed journals, reports from reputable research institutions such as Healthcare Information and Management Systems Society,

reports from governmental agencies of current developments in EHR adoption, best practices and standards, regulations, and symposium proceedings. I searched for information from EBSCOhost, ProQuest, Google Scholar, American Doctoral Dissertations, and Walden University Doctoral Dissertations. I examined the information from articles published within the last 5 years. The keywords I used in my search included, among others, *technology and healthcare utilization, technology and healthcare, healthcare issues from technology, consumer and technology in healthcare, interoperability in healthcare, framework of interoperability in healthcare with consumers in mind, healthcare and consumer's electronic record, interoperability and consumer health records, policies in healthcare interoperability,* and *policies in consumer electronic health record*. The TPB was chosen as the theoretical framework.

Conceptual Framework

The TPB served as the conceptual framework for this project. The TPB is a framework for evaluating change and posits that the implementation of a new intervention or technology in health care only occurs in a stage-like manner based on individual or organizational readiness and beliefs about a particular behavior (Stancyzk et al., 2017). The TPB has several constructs, with six, perceived behavioral control being particularly relevant to the current project. In particular, the TPB proposes that a new change or technology in practice and its successful adoption is determined by behaviors, subjective norms, and the perception of one's control over the behavior (Stancyzk et al., 2017). These factors combine to determine one's intention to adopt the change and implement it in practice. This theory serves as an expansion on the theory of reasoned

action and also asserts that self-efficacy plays an important role in the determination of whether or not a new change will be adopted in practice. This theory helped frame the topic of interest and research questions, both because of the existing evidence base supporting its efficacy in health care practice and its specific implications for the role of user efficacy (e.g., health literacy) in adopting technology like EHR.

Electronic Health Record Systems and Benefits

While EHR systems, by definition, are digital forms of information recording and exchange, there are varieties within EHR systems (Naidoo & Wills, 2016; Weaver et al., 2016). Many of the varieties are best explained by scale, with larger and more robust systems being required for large health care organizations. In the health care industry, EHR includes several distinct types of information systems and information exchange systems. EHR systems in health care tend to span across a wide array of types of information and include, but are not limited to, metadata, cross-sectional data, data patterns, patient records, charts, graphics, financial records, payment information, data reports, and any information that can be kept in physical information systems (Naidoo & Wills, 2016; Weaver et al., 2016). The variety in the types of data and data analytical capabilities depends on the specific EHR system implemented in a health care organization or information exchange systems established between organizations (Naidoo & Wills, 2016; Weaver et al., 2016).

EHR systems, despite requiring transitions from existing physical systems and the transference of data from such systems, include a unique set of capabilities that physical systems cannot handle (Naidoo & Wills, 2016; Weaver et al., 2016). The implementation

of EHR systems, then, should not be viewed only as the transformation of print forms of records to digital forms. Instead, data transference is the first step in EHR implementation, a process that often also includes the installation of a variety of other monitoring, scheduling, and analytic data systems, depending on the needs of the individual organization. EHR system implementation massively increases functionality and the capabilities of information systems within health care organizations, while providing opportunities for further integration into other systems (Naidoo & Wills, 2016; Weaver et al., 2016;). As mentioned earlier, data trends from outside sources (e.g., Centers for Disease Control and Prevention [CDC]) can be integrated into EHR systems via information inflow systems, even for organizations not explicitly enrolled in information exchange programs (Hatef et al., 2019). EHR systems not only streamline the often complex data keeping and information exchange process of even the largest health organizations in the country but also serve a role in increasing the functions of such organizations and the integration between systems within organizations. EHR systems, in particular, allow for greater data analytic capabilities, such that patient monitoring systems become feasible and scheduling systems become completely refashioned. The integration of EHR systems with a variety of other systems within a health care setting may also increase the amount of data and the types of information that can be stored, analyzed, and ultimately implemented into practice in such settings. The specific rate of data exchange within organizations and between organizations also tends to increase with the implementation of EHR systems (Sieck, Pearl, Bright, &Yen, 2019). The efficacy of such systems and the ability of such systems to deliver these advantages over physical

systems depends on the strategies implemented by the health care organization and the number of organizational systems that are integrated into EHR systems. The delivery of information electronically requires increased security protocols and protections as well, as identified by several federal and state acts regarding the storing and exchange of personal and health-related information for patients (Shi et al., 2020). Nonetheless, it is quite clear that EHR systems are much faster and easier to install than physical information systems with similar functions.

While data security and information exchange functions are among the most critical functions of EHR systems, especially when compared to physical information systems, patient tracking has emerged as an important function of EHR systems (Naidoo & Wills, 2016; Weaver et al., 2016). Thus, one of the primary benefits of EHR systems and their integration into existing health care organizations is patient data tracking. Such tracking plays an important function within health care organizations, but also plays a role in tracking patient information across health care providers, often over a long period (Naidoo & Wills, 2016; Weaver et al., 2016). Interorganizational tracking of patient information expedites and improves information exchanges. This demonstrates a clear advantage of EHR systems over physical, informational systems. After all, physical information systems limit data exchanges for a variety of reasons, including security and practical reasons (Naidoo & Wills, 2016; Weaver et al., 2016). Thus, physical information systems tend to restrict data exchange to specific organizations and systems, minimizing the ability of organizations to exchange information on patients.

Similarly, physical information systems tend to decrease the capability of information storage, requiring patient files to be archived after some time. EHR systems allow for quick information exchanges between organizations (Naidoo & Wills, 2016; Weaver et al., 2016). EHR technologies have expanded the digital information storage and exchange capabilities, increasing the ability of all patient and historical information to be stored on servers. This advantage of EHR systems over physical information systems is one of the greatest, given the historical limitations on physical information systems. In this way, EHR systems provide an undeniable advantage over physical systems (Naidoo & Wills, 2016; Weaver et al., 2016).

Another major competitive advantage of EHR systems over traditional physical information systems is immediacy (Li et al., 2020). Instead of the healthcare professional digging through files to locate specific information about a patient, EHR systems provide the opportunities to locate immediately and extract information about a patient (Li et al., 2020). . Similarly, whenever a patient receives treatment, or an allergy is revealed, the patient's record is immediately updated and can be shared with other departments and even other organizations instantly (Li et al., 2020). Thus, one of the clear advantages of EHR systems over physical systems is that the former allows the health care organization to very quickly identify and confirm when patients are due for treatments, checkups, routine screenings, and the monitoring of a patient's medical history (Li et al., 2020). Such an advantage suggests that EHR systems could expedite several internal processes of a health care organization, even leading to the more timely treatment of patients with fewer worries of interactions or potential problems (Li et al., 2020).

Real-time monitoring of patients has been cited as a benefit of the implementation of EHR systems (Naidoo & Wills, 2016). An essential function of EHR systems is the healthcare professionals real-time monitoring of patient conditions and assessment readings. There is a discernible need for health care workers to monitor patients, following up after care and reminding them of appointments, and virtually all do so to some degree. But EHR systems allow health care organizations to incorporate additional sources of data into patient monitoring (Naidoo & Wills, 2016). For example, when the hospital admits a patient with flu-like symptoms, real-time data on potential pandemics would be useful in determining whether the patient has the flu and, if so, which strain (Naidoo & Wills, 2016). Such real-time monitoring also provides the benefit of disseminating information between organizations, allowing for improved real-time monitoring of other patients and general medical trends. Being able to immediately view not only the patient's medical history and allergies, but also those of the patient's family members in certain cases, generate major improvements in patient outcomes and help ensure that the health professionals administer proper treatments. The net effect of these increased capabilities of EHR systems is improved patient outcomes (Naidoo & Wills, 2016).

Many of the differences between EHR systems and physical record systems have been reviewed thus far ((Li et al., 2020). The major differences between the two types of systems demonstrate clear advantages of EHR systems over physical systems ((Li et al., 2020). An additional distinction that quickly becomes evident when comparing EHR systems and physical record systems is that electronic records are universal, readable

across various electronic record systems (Li et al., 2020). Such universality of EHR System data allows for the coordination of patient data between disparate organizations. This promotes the information to be standardized under a single set of criteria, making it easily readable between various EHR systems (Li et al., 2020). This major advantage of electronic records likely improves entire health care systems, even at a global level (Li et al., 2020).

Electronic systems also have the advantage of providing sufficient grounds for regulation (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). In other words, electronic systems provide additional opportunities to establish regulations. The EHR systems establish data that allow for standardized information processing and coding. The standardization of health care data could have a major impact on the regulation of health care information storage, accessibility, and exchange in the context of a trend towards greater regulatory requirements for health care data. The standardization of data ensures that all medical records kept under EHR systems are highly secure, reliable, and dependable. The standardization of EHR systems provides yet another reason for health care organizations to adopt such electronic record systems.

Solving Specific Healthcare-Related Problems

One of the major problems facing patients in health care systems involves prescription medications (Naidoo & Wills, 2016). The current opioid crisis and several other cases of prescription problems stem, at least in part, from physicians overprescribing drugs. Fortunately, one of the indirect benefits of EHR systems is the reduction of overprescribing. The process of such a reduction stems from the increased data analytical

capabilities and improved real-time data management and viewing, allowing multiple physicians to check patient records to locate prior prescriptions. In particular, EHR systems promote patient prescription monitoring, which helps ensure that such patients are not being prescribed the same drug on multiple occasions at the same time. Such record systems also help prevent drug combinations that have been proven to be risky. A related problem involves allergies. At times, patients will forget that they have allergies. Information on allergies can be shared over EHR systems and information systems connected to such systems. Electronic Medical Record and Health Record Systems also provide opportunities to unify the communication and data-processing systems (Wencheng et al., 2018).

. Another clear problem within the realm of health care is communication about patients between health care organizations (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). Thus, a potential benefit of Electronic Medical Record and Health Record Systems is the convergence of information into a single standardized file or set of files, sharable across multiple platforms and organizations. Of course, such a centralized solution to this problem would include very specific information and likely would not include much of the more personal information about patients. Only such information that would be pertinent to the health and well-being of patients would likely be included. The health care process starts with information that is collected and then analyzed. If more information, including centralized information, is included at this step, physicians and other medical professionals will be in better positions to make well-informed

decisions about patient outcomes. By clearing up and integrating communication and informational exchange channels between health care models, EHR systems may massively improve the capabilities of health care organizations. EHR systems restructure this process by the provision of health care providers with more clear and immediate information on patients. Such convergence without major communication barriers would be a major benefit for health care organizations and is only really achievable through EHR systems (Weaver et al., 2016).

Another identified problem in health care is patient education and awareness. Education and awareness are major goals in many contemporary health initiatives. EHR systems may provide the frameworks for solutions to the need to increase patient education and awareness. The primary issue currently is that patient education and awareness need to be aimed at the promotion of prescription adherence, compliance, and self-regulation. All of these goals are intended to contribute to positive patient outcomes. EHR systems are becoming crucial for promoting patient education and awareness because they provide additional opportunities to provide patients with a plethora of information regarding treatments and possible drug interactions. Such EHR systems also promote interactions between patients and health care providers, helping to ensure positive outcomes with issues such as prescription schedule adherence and self-regulation. These interactions improve patient outcomes by increasing the capabilities of patients to manage their treatments. EHR systems, then, may be viewed as a framework that generates some capabilities that may be aimed at alleviating these issues. On the other hand, such electronic records also directly promote patient education and awareness

by providing medical professionals with the requisite information to properly treat such patients and provide them with sufficient resources (Kuo et al., 2018).

Preventative care is another major issue facing health care organizations (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). Specifically, by increasing preventative care, it is anticipated to improve patient health outcomes significantly. EHR systems can play an important role in bolstering preventative care initiatives. First, EHR systems will provide more information for medical personnel in establishing preventative health care initiatives. For example, additional information about community trends in preventative care can be used to construct initiatives that are tightly aimed at accomplishing community-specific needs in preventative care. The implementation of EHR systems can also improve preventative care by improving the ability of health care organizations to contact patients, especially those in need of preventative care measures. EHR allows for the development of awareness, often at the community level, of those cases in which patients need a specific preventative care measure, based on the available community data. As part of a broader health care strategy, preventative care is considered extremely important for reducing medical costs of patients and the health care system as a whole and in the promotion of patient outcomes, especially in those communities that are vulnerable for certain disease outbreaks.

Another significant problem identified in the health care industry as a whole is billing error (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). Such error incurs major penalties and can make it difficult for patients, especially those who receive the

wrong medical bills or charges. Legal fees for handling such cases add to the expenses. EHR can decrease billing errors by maximizing accountability and the open flow of information to and from the proper health care organizations. EHR also allows for additional data checks and compatibility checks, demonstrating a major advantage of EHR systems over physical information systems. These checking can prevent billing errors and may be used to identify billing errors. The net result for health care organizations implementing EHR, then, should include decreased legal fees and fewer billing errors in the long-term (Weaver, Ball, Kim, & Kiel, 2016).

The final problem identified is that EHR systems can help solve workplace stress. Health care organizations tend to be quite demanding and stressful work environments for staff at all levels (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). The implementation of EHR may help to alleviate stress and anxiety in several ways indirectly. First, EHR improves the coordination of the actions of staff members, requiring that staff members perform fewer tasks in the same period. This benefit was mentioned in the section on operational efficiency, but special considerations for the health of team members are the focus here. EHR also promotes positive and effective interactions between staff members, which prevents overlapping assignments and responsibilities. The effect of this is that staff members may have more time to develop professionally and to take breaks.

Moreover, EHR systems provide significant efficiencies for scheduling operations, decreasing the need for staff members to intervene in the creation of schedules. The net result of EHR on stress and anxiety in the workplace, then, is

negative. Such systems, at least after they have been successfully implemented, tend to reduce stress and anxiety.

Operational and Financial Benefits

EHR systems offer several operational and financial benefits (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). Many of the benefits mentioned earlier of such systems contribute to financial and operational advantages. Yet, there are several specific purposes for such systems in improving operational efficiency, minimizing costs, and maximizing revenue generation. Operational efficiency refers to the maximization of productivity and minimization of waste. Increasing operational efficiency often takes the form of streamlining operations by cutting waste and installing processes that require less work for more productivity. The installation of EHR transforms the processes of health care organizations, while also cutting waste, such as written records. The installation of such processes contributes to the financial gains of health care organizations by streamlining data collection, storage, and recall processes. Reducing the waste of physical information systems in health care organizations decreases costs. Even though the initial implementation of EHR in health care organizations requires substantial investments, long-term financial benefits are clear.

EHR systems improve the quality of patient care and increase patient safety specifically through the operational efficiency gains and reductions in error (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). The EHR also tends to promote stronger institutions and cooperation between organizations. EHR systems promote increased inter-organizational coordination and information sharing. The net result for

individual organizations is an increase in operational efficiency, but there may be an even greater gain in operational efficiency across the entire health care industry. Thus, the implementation of other EHR directly and positively impacts those health care organizations that have already established such systems. In this way, these electronic systems are highly interdependent on one another, effectively feeding off of each other. This synergistic relationship suggests that EHR systems become more popular because organizations can benefit from implementing such systems.

Manca (2015) investigated whether electronic medical record-keeping improved the quality of care provided to patients across a wide spectrum of health care operations. The results of the investigation revealed that such record-keeping did improve the quality of care provided to such patients across various health care domains. Such evidence strongly supports the implementation of such systems in health care organizations across various medical environments.

Electronic Records, Patient Access to Records, and Interoperability

An important concept to emerge in health care data fields is interoperability, referring to the information and data interconnectivity between levels of operations and organizations without any effort from consumers. Without interoperability, there are major disconnections between the information available to different operating levels of an organization and longer delays for information transmission. Jacob (2015) explores the complex issues related to interoperability in health care. The researcher recognizes that delays within and between health care organizations can lead to diminished patient outcomes and operational inefficiencies. Many organizations and agencies have aimed at

standardizing and coordinating information technologies and initiatives in the industry. Nonetheless, interoperability remains lacking in many health care organizations. Increasing interoperability and interconnectivity in information systems within health care organizations remain major priorities.

A primary focus regarding interoperability and interconnectivity in health care information systems is the implementation of adequately secure informational channels. Adequate security in information and data exchange systems in the health care industry is very high, putting additional pressures on health care organizations to ensure that their information systems are secure. Interorganizational and interdepartmental information exchanges appear particularly vulnerable and, as such, are among the most problematic, leading to fewer of such exchanges and substantial delays in these exchanges. Such delays can lead to major operational efficiencies and slower treatment times for patients, potentially compromising patient outcomes and experiences.

Pell et al. (2015) explored the issue of patient access to electronic health records while they are hospitalized. In particular, the researchers were interested in discovering to what degree patients had access to such records and what were the factors for such access. The researchers found the following:

> The suspected risks of giving inpatients direct access to their EHR did not bear out, with no increase in workload reported by the nurses or the clinicians and no increase in confusion or worry reported by the patients. Consistent with outpatient studies, patients answered more positively to empowerment questions after being given EHR access. Despite supporting patient empowerment, the promise of

> patients finding errors in their medications or knowing when they were being discharged never materialized. (Pell et al., 2015, p. 857)

These findings are important for understanding the rationale behind patients being granted or denied access to their medical records. Nonetheless, the findings ultimately revealed that reasons for restricting such access were without support or merit.

Pell et al. (2015) also considered the widespread impacts and factors associated with patient information access. The researchers found,

> Federal programs recommend that patients be able to access results from their hospitalization within 36 hours of discharge. Based on our results, we believe that this requirement still misses an opportunity for patient engagement through better transparency, and future policies should consider real-time EHR access for inpatients. (Pell et al., 2015, p. 857)

Such evidence weighs heavily in favor of the promotion of patient access to their medical records. The evidence in favor of such a proposition in most cases far outweighs the evidence against it.

Mikk, Sleeper, and Topol (2017) explored the relationship between digital health data and improved health outcomes for patients. One of the central focuses of the researchers was the integration of emerging technologies with patient data. For example, the researchers find strong purposes behind the implementation of EHR systems and the connectivity of various smartphone apps and wearable sensors. The connections between these multifarious systems and hardware may promote the well-being of patients, and patient health outcomes are improving patient monitoring and health tracking. If a patient

has a history of heart disease or stroke, medical professionals may want to monitor the heart rate of the patient, allowing for more details and personalized treatment recommendations. The researchers, however, also recognize several problems related to the proliferation of patient data and the interconnectivity of personal health data and private companies, especially those that are not directly in the health care industry. Sorting out these issues may be an important step in developing the types of interconnected applications and monitoring that would further advance patient monitoring and more personalized health care.

Essén et al. (2018) also explored the access that patients have to their electronic records. In this study, the researchers compared such access and factors for access across ten countries, allowing the researchers to make determinations about the impacts of such access cross-culturally. The researchers found that

> A mix of hard and soft regulations and a diverse set of approaches to specific issues prevail in all countries, which have simultaneously enabled and restricted a consistent and meaningful development of systems towards increased patient access to their medical data. Importantly, the multiple different patterns reveal great variability regarding how to access in three (security, user rights, data sets displayed) different areas is operationalized within and across countries." (Essén et al., 2018: p. 54)

Such a finding suggests that the accessibility in many of these systems is deeply fragmented and not distributed within states or between states with much equality. The resulting inequities likely contribute negatively to patient empowerment and decrease any

equity in patient outcomes across national and demographic factors. The researchers "conclude that policy development and cross-country learning is particularly needed in the following areas: extended efforts to improve international interoperability at a legal level, as well as joint efforts to handle adolescent dilemmas and variability in data sets displayed" (Essén et al., 2018: p. 54). They go on, "In order to facilitate evidence-based policy development, more research is warranted about how actors have succeeded or failed in solving these issues" (Essén et al., 2018: p. 54). Collectively, such findings reveal that there are specific factors for patient access to their medical information that spans across countries. For example, age is a major factor for such access across the countries under investigation. Similarly, medical professionals appeared to weigh the value of allowing patients to view such information against the security risks of revealing such information or at least for having such information accessible to patients.

Turning to specific intranational factors for EHR adoption and patient access to medical records, Whitacre (2017) investigated the impact of rurality on health care organizations adopting EHR systems. The researcher found the following:

> This study finds that, in general, rates of EHR adoption among physician offices tend to increase with the degree of rurality. The results of the logistic regressions and marginal effect analysis indicate that at the aggregate level, the impact of moving from the most urban classification of the county to a nonmetropolitan one is around a 6–7 percentage point increase in the likelihood of EHR adoption, and the effect does not vary much across nonmetropolitan designations. However, the "rural influence" on EHR adoption rates does vary substantially by specialty, with

> some types of practice displaying no significant marginal impacts, while others demonstrated impacts that jumped from 10 to 20 percentage points across RUC codes. (Whitacre, 2017: p. 631)

Such evidence suggests that there is a significant rural influence on whether organizations will choose to adopt such technologies.

There is quite strong evidence that EHR systems have a discernible positive effect on patient care outcomes, the subjective well-being of patients, and the work lives of physicians across several health care domains, from family care physicians to emergency room physicians. The past several decades have led to major technological advancements in information technologies and promoted the development of medical knowledge across health care systems. As a result of such advances, there are now many more investigative and treatment options available to both health care organizations and patients. Nevertheless, increased treatment and assessment processes also lead to an increase in the number of patients who are not also living longer. Treatment for chronic conditions has also improved drastically in the past few decades, which increases the life expectancy of patients with such conditions. These factors increase the demand for health care, despite providing clear benefits and being benefits in themselves. The increased demand for health care that technological and medical advancements generate must be met by operational efficiency increases and continued efforts to improve health care systems.

Physicians in virtually every health care domain are not in a position of omnipotence when it comes to patient information (Nelson & Staggers, 2016; Collen, & Ball, 2015). In other words, physicians and health care organizations more broadly

cannot quickly generate detailed patient histories using physical methods. Therefore, coordination between health care organizations is essential in generating adequate and acceptable patient data. To adequately address the complex and often difficult to discern needs of patients, especially when considering cultural complexities, health care organizations require reliable and standardized sources of information and the development of strong relationships between health care organizations at the local, state, national, and now global levels. Such relationships should bolster access to multidisciplinary teams of health care professionals and specialists in a variety of other fields, from neuroscience and sleep science to sociology and social work. Health care organizations require tools aimed at improving general access to pertinent information and the relationships that connect patients with health care.

Health care organizations have had to transform health care practices and record-keeping and sharing practices based on established industry standards and regulations (Collier, 2015). EHR systems have emerged to play a central role in health care organizations, conforming to regulations, and industry standards. The clear associations between information technology advancements and the emergence of EHR systems have facilitated this transformation, including the advancement of standards and regulations about patient information record keeping and data sharing. The technological advancements in digital record-keeping, in other words, have dictated the need to increase industry standards and regulation. No longer are the early adopters or the industry innovators the only groups to implement EHR systems, often as competitive advantages. The aim of many government agencies and health care organizations is to

standardize the recordkeeping practice in health care by the installation of standard requirements for EHR systems that enable for inter-organizational data sharing in a highly secure way. It is estimated that around 75% of physicians who responded to the most recent National Physician Survey relied on data from EHR systems (Collier, 2015). Moreover, an estimated 65% of the physicians who responded indicated that patient health care outcomes were being improved by the implementation of EHR systems, while fewer than 5% of respondents could note the negative effects of EHR System implementation on the quality of health care provided to patients (Collier, 2015).

Nonetheless, skeptics of EHR remain (Collier, 2015). Dissidents argue that EHR implementation is a disruptive force, one that holds the potential for abuse. Hacking and unauthorized access to medical records remain significant concerns for some health care professionals who resist EHR technologies. Similarly, many have raised the issue of large-scale error resulting from dysfunction in EHR systems (Collier, 2015).

Current EHR technologies provide health care providers substantial amounts of information in a variety of formats unavailable to physical systems, such as those that rely on paper reports and charts. Health care providers with today's technologies provide the capabilities to provide a variety of statistical analytical capabilities and digital graphics that can be printed for consumers. Factors such as weight, body mass index (BMI), cholesterol levels, height, and blood pressure are observable under EHR systems, allowing for changes to be tracked and analyzed over time. Such EHR systems, then, significantly improve chronic disease management and prevention. Even for non-chronic diseases, such management protocols can be extremely fruitful in efforts and initiatives

for patient outcome improvement. The screening, data monitoring, and data analysis provided by EHR systems have demonstrated clear improvements in health care quality measures. After all, EHR systems strongly increase capabilities for identifying trends in the data. The increasing amount of data analytic capabilities provides the opportunity for measures to be developed based on the identified trends (Li et al., 2020).

EHR systems not only improve data analytics and the identification of measures for improving patient outcomes, but can also lead to the development of new and data-driven treatment goals (Li et al., 2020). Similarly, the identification of treatment goals by medical professionals that are conducive to positive patient outcomes can be enhanced greatly by EHR System and integration with other health care systems. The alerts also provided by EHR systems help remind providers of processes involving prevention and screening, especially regarding when due dates are coming up, minimizing mistakes and errors by health organizations (Li et al., 2020). EHR systems also provide wide access to the sort of information and quality resources that aim health care providers at seeking and understanding the ideal approaches to the plethora of conditions that such providers may encounter in practice.

Researchers often use data from EHR systems to determine widespread population-based health care trends and treatment efficiency (Li et al., 2020). EHR systems also provide increased access to research and laboratory data from within organizations and outside of such organizations. This had led to a significant reduction in much of the waste involved with patient records, minimizing duplications, and the costs of such duplications. Based on the recent research on EHR systems, there is substantial

evidence that disease outcomes may be improved by such systems. In a randomized clinical trial with a twenty-one-health organization, the implementation of EHR systems led directly to significant reductions in the levels of blood pressure in patients who had been previously diagnosed with hypertension (Weaver, Ball, Kim, & Kiel, 2016; Naidoo & Wills, 2016). The EHR interventions in this study were in the form of targeted screening and consultation efforts to explain the major risks associated with alcohol abuse and other factors for high blood pressure. The results provide strong evidence that specific health outcomes can be targeted by information and capabilities provided by EHR systems. As part of larger health initiatives, EHR interventions can be highly targeted to solve problem areas within organizations or a target population.

Depending on how the EHR systems are structured within larger organizational health information structures, EHR systems can serve as potential access points of information retrieval from major health organizations, such as the CDC (Li et al., 2020). Without many of the health care organizations within a country implementing EHR systems, the CDC and other public health organizations may have inadequate information about the identification of disease patterns and effective treatments. Such data and relationships can also be applied to inform health care practice and conducting research on improving patient outcomes, approaches to care, and treatment plans. The standardization and consistent application of data entry into specified fields also serve as a major advance of EHR systems over traditional physical data management systems. EHR data provides health care providers with highly valuable and practical data on the activities and identified trends of organizations such as the CDC. Such information may

be and is used for pragmatic health care interventions, including the identification of patients who may not be receiving the appropriate screenings or tests based on the patient profiles, symptoms presenting, and prior test results. Such information also provides detailed feedback to primary care physicians from specialist practices and major health organizations — the convergence of data directly towards those practitioners treating patients, maximizing the data that can be used to make informed decisions about the patient. While there are worries about information overload leading to decreased operational efficiency, the implementation of EHR systems also tends to include major data analytical capabilities, allowing information to be parsed and analyzed, maximizing instead of minimizing operational efficiency.

Point-of-care data (proper documentation at the point of care), then, has been a significant focus of EHR System implementation and researchers assessing the impact of EHR on health care organizations. EHR data care is being used to investigate primary care problems. For example, EHR data on the medications and treatments applied in primary care settings can be used for the identification of drug repurposing. After all, only through EHR systems can sufficient information be gathered to make determinations about drug repurposing and the potential negative side effects of drug use. Many patients take multiple medications. Complex interactions between medications may be revealed through data patterns revealed through EHR systems.

Similarly, it may be the case that certain drug interactions may positively contribute to the treatment of specific conditions or symptoms. Moreover, researchers who intend to explore experimental treatments for conditions may benefit from exploring

previous trends discovered in the previous use of potential treatments in target populations. In this way, EHR data bolsters on-going research efforts and provides additional leads for the researcher to pursue.

EHR information can also improve communication and relationships within organizations, effectively streamlining such communication. However, EHR information can also bolster communication between physicians and their team members, as well as between such team members, patients, and patient families. The provision of supplemental information to staff, including charts, summaries, notes, and consultations, may increase the clarity and structure of information and information channels within health care organizations. There are also pharmaceutical benefits to be drawn from EHR System implementation. For example, prescriptions can be granted in clear and structured formats, allowing them to be easily readable and minimizing the instance of an error occurring in writing and filling prescriptions. EHR systems also facilitate assignments and responsibilities to team members, increasing operational efficiency, and possibly improving employee satisfaction. The schedule generation is also facilitated by EHR systems. After all, physical systems are highly susceptible to error. Even if scheduling systems remain at least partially physical, the implementation of EHR systems to measure patient demand can drastically improve scheduling. EHR systems allow schedules to be easily observable by both team members and clinicians. Patients are also allowed to book appointments remotely using EHR systems, increasing the accessibility of health care to patients, and minimizing delays. EHR systems also tend to improve communication between specific staff members and patients. Patient portals are often

used in EHR systems to allow for more focused and personalized experiences. Personal health records can also be made accessible using EHR systems, increasing engagement with patients, even improving their abilities to self-manage.

EHR systems not only have indirect and direct effects on patient outcomes but also have effects on the workflow of a health care organization. The specific impacts of EHR systems involve how team members within such organizations manage their work lives. In general, EHR System implementation provides benefits directly to nursing staff and physicians, thus at least partially explaining the favorable perceptions of such physicians on EHR implementation. While the implementation of EHR systems may improve the subjective feelings of physicians by decreasing the requirements of work time by physicians, research indicates that EHR implementation may not directly result in major decreases in the access that patients have to physicians or nurses. Moreover, EHR tends to allow more patients to be assessed in a single organizational environment. Notifications delivered with the help of EHR systems to patients decrease the rate of patients missing appointments, which may further increase patient demand for medical care, but also helps to manage the patient flow. Patient histories and other information retrieved from EHR systems are also used to increase the efficiency of health care organizations further. EHR systems also appear to have hit a critical mass. That is, there are sufficient EHR systems to increase the positive effects of such systems. As mentioned earlier, there needs to be a sufficient number of such systems within a particular area, country, or even globally for the full benefits of EHR systems to manifest. With the number of such systems continuing to increase, additional benefits should become

apparent, as more information sharing and data analysis spur the advancement of information technology capabilities in health care (Sharma, & Balamurugan, 2020).

Methodology Used in Prior Research

Essén et al. (2018) explored the access that patients have to their electronic medical records. The researchers assessed the PAEHR policy in various countries across the world, including in the U.S. Then, the researchers assessed the required system documentation procedures of the various health systems. By conducting policy analysis, the researchers were able to determine the level of access that consumers had to their medical records. Note that the researchers did not poll or survey patients to determine whether they had access to their medical records. Rather, the researchers analyzed the policies to determine the levels of access that patients had to their medical data.

Pell et al. (2015) examined the issue of patient access to electronic health records during hospital stays. The researchers investigated the degree to which patients had access to their medical records and the significant factors behind such access. The researchers conducted a hospital-level study to determine the experiences of the various stakeholders of the policy involving the use of patient electronic medical information. The researchers conducted a survey targeted at patients, clinicians, and nurses. All stakeholders were administered a pre-intervention survey. The intervention in this study involved the implementation of a digital medical information structure that increased the access that the stakeholders had to patient information. Patients were given greater access to their medical information as well as the practitioner and nurses' access to such

information. The survey was used to determine how each group of stakeholders perceived the interview and its impacts. By implementing a survey method, the researchers were able to draw conclusions about the implementation of the new system as well as determine how the stakeholders perceived the implemented changes. This provides a foundation on which a study on EMR systems can be conducted.

Justification of Selected Variables

The primary independent variables chosen for the study involve the implementation of electronic medical record systems. The second independent variable chosen for the study is the interoperability of such systems. The dependent variables include the attitudes that various stakeholders have about the systems and their impacts on health care and health care outcomes. The literature that was reviewed in this chapter provides strong evidence that the implementation of electronic medical record systems promotes higher levels of satisfaction among stakeholders, including patients, nurses, and administrators. However, there has been insufficient research on the impact of interoperability. Therefore, it is worth exploring the potential impacts the implementation of electronic medical record systems and interoperability have on stakeholder attitudes and perceptions.

Summary

The problem addressed in the current study involves EHR systems being inconsistently applied and accessed across various health care settings. While such systems have been found to be highly effective at improving the perceptions of patients and the operations of health care facilities, without consistent applications of EHR

systems, there are major problems concerning health care information systems. The current literature review has featured an in-depth exploration of the research on the topic. In particular, the issue of interoperability in the context of EHR system implementation was reviewed. The theoretical framework chosen for the project was the theory of planned behavior, which serves to help explain the rationale decision-making processes that go into health care operations processes, including the implementation of EHR systems and structures.

Chapter 3: Research Method

Introduction

The purpose of this qualitative study was to identify the lived experiences of health care professionals and consumers concerning EHR benefits, barriers, conditions, agreements, and standards. This was a qualitative phenomenological study based on 20 interviews. Ten of the interviewees were professionals in the health care industry, and 10 were consumers of health care. This was a qualitative phenomenological study with qualitative data collection and analysis. Specifically, a phenomenological design was adopted to explore lived experiences of areas of interoperability and EHR access, with a particular focus on benefits, barriers, conditions, agreements, and standards as perceived by health care providers and consumers. The details regarding the methodology follow this section.

Research Design and Rationale

The research design of the current project was qualitative phenomenological with interviews. This research design was chosen because of the need to determine the lived experiences of each group of participants (see Creswell & Creswell, 2017). Phenomenological studies collate the stated experiences of particular groups of individuals to determine the shared experiences and perspectives of individuals in each group. Interviews allow for a more detailed extraction of information from contribution. Also, a phenomenological study design elicits not the direct experiences of participants, but the perceived experiences of participants (Creswell & Creswell, 2017). The following

research question was constructed for the current study: What are health care professionals' lived experiences regarding electronic medical record and health records? What are health care consumers' lived experiences regarding electronic medical record and health records?

Role of the Researcher

The role of the researcher in the current study was to conduct and code the interviews. Next, I analyze the results and contextualize them based on the established literature.

Methodology

Participant Selection Logic

The study featured two different participant groups. The first included healthcare consumers who received healthcare from local hospitals in Nashville, Tennessee. The second included active nurses from the same hospital settings. An adequate number of participants was chosen because 10 responses each was considered sufficient for determining the lived experience of each group of participants (see Creswell & Poth, 2017). Once the answers to the semi structured questions reached saturation where recurring information from the participants no longer provided new information, I commence the coding of the results. Participants were selected based on individuals meeting the inclusion criteria, which were as follows:

- Participants were at least 18 years of age.

- Participants in the healthcare consumer group had received assessment or treatment from a medical professional in the previous 365 days.
- Participants in the healthcare professional group had been working as healthcare professionals.
- There was a total of 20 participants.

Instrumentation

Semi structured interviews were used for the data collection. Semi structured interviews allow researchers to elicit a wide variety of information on specific topics and subjects (Creswell & Creswell, 2017). I developed a survey including sets of questions that were used to conduct the interviews. The questions were broken up into two types. The first type included those questions directed at healthcare consumers, and the second type included those questions directed at healthcare professionals, specifically nurses. The questions were intended to prompt the participants to describe their lived experiences, allowing me to develop an understanding of the experiences, attitudes, and observations of the participants about EHR system implementation and operation.

Procedures for Recruitment, Participation, and Data Collection

Participants for the healthcare professional group were recruited through local hospitals in Nashville, Tennessee area. Participants at the local hospital were contacted via email, advertisements on hospital poster boards, and the internet to request participation from healthcare professionals in their networks. Participants for the consumer group were recruited through the internet, via email and through participating

healthcare professionals, who handed out brief recruitment announcements. Once a sufficient number of participants agreed to participate, all recruitment processes ceased.

Data were collected via semi structured interviews. The interviews were conducted in-person, and I took notes during the interviews. I read from a set of questions and gave participants the opportunity to ask follow-up questions for any of the original questions asked. The focus of the questions were open-ended, as such questions provided the most opportunities for participants to describe their own lived experiences (see Creswell & Creswell, 2017). A recording device was used during the interviews.

Data Analysis Plan

The data analysis process included the application of the TPB to construct themes based on the semi structured interview results. Data collection consisted of semi structured interviews with the 20 participants to identify the lived experiences of the benefits, barriers, conditions, agreements, and standards involving interoperability, adoption, and consumer access to EHR. The combination of semi structured interviews and thematic analysis allowed me to determine the commonalities between the lived experiences of the participants (see Creswell & Creswell, 2017). A thematic analysis was applied to identify themes and subthemes that best characterized these data. The TPB was used to conceptualize this evidence and to connect the findings. A qualitative phenomenological methodology was selected to provide a comprehensive depiction of the perceptions of health care professionals and consumers in regard to EHR adoption, interoperability, and consumer access. Inductive analysis was used, adhering to a thematical analysis protocol. Specifically, I used Moustakas's (1994) protocol for

analyzing and organizing data, creating individual textural descriptions of each participant experience, and performing a reflective structural analysis to capture the essence of these experiences and induce themes.

Issues of Trustworthiness

Ethical Procedures

Establishing trustworthiness is essential not only for ethical purposes but also for promoting honest and transparent responses from the interviewees (Creswell & Creswell, 2017). Ethical procedures include maintaining anonymity for all participants, maintaining personal information on a secure server, and deleting such personal information after the study is completed. Such ethical procedures are intended to preserve the security of personal information of all participants, thus fulfilling the guarantee made to them under the informed consent form. The use of an informed consent form also helped ensure that participants were fully informed of their rights and protections and that they had provided full consent to participate in the study. Additional ethical procedures were employed during the interviews. In particular, the notes I took during the interviews did not include personal information. Instead, I used coded names.

The internal validity of the results was established through reflexivity journaling. The confirmability was ensured through an audit trail strategy. Under such a strategy, the processes of data collection, analysis, and interpretation were detailed and updated in order to maintain a clear record of the reasoning behind such processes. All coding decisions included strong details.

The transferability and generalizability of the results were bolstered by the sampling method. In particular, the requirement for the participants in the healthcare consumer group to have received assessment or treatment from any medical professional in the previous 365 days helped establish transferable and generalizable results. Sufficient variation in the samples was also ensured by drawing from a broad pool of prospective participants. A reflexivity strategy was employed to keep track of all potential sources of researcher bias and influence on the research. A reflexive journal was kept to track idea progression and external influences on topic, data collection, and so on.

Summary

In this chapter, I explained the chosen methodology of the study. The qualitative phenomenological design with the use of interviews was chosen to provide the most detailed accounts of the lived experiences of the populations of healthcare professionals and healthcare consumers. The phenomenological design was the most appropriate, given that a major goal of the current research was to construct narratives of the lived experiences of both populations. Ethical procedures were constructed and were conducted to ensure that all ethical obligations were fulfilled. Reflexivity journaling, sufficient variation in participant selection, and audit trail strategies were used to ensure adequate validity.

Chapter 4: Results

Introduction

In this study, I used a phenomenological study design intended to identify the lived experiences of both health care professionals and consumers, especially concerning EHR benefits, barriers, conditions, privacy concerns, agreements, and standards of care. The results of the survey were based on the responses to the qualitative phenomenological survey that featured 20 interviews, 10 professionals in the health care industry and 10 consumers of healthcare. The phenomenological study featured qualitative data collection and analysis. The research design of the current project features targeted semi structured interviews that allowed respondents to answer specific sets of questions with the opportunity for follow-up questions. In practice, follow-up questions were relatively limited. The results presented here are collated in order to determine the stated experiences of the two groups of individuals to determine the shared experiences and perspectives of individuals in each group. The interviews allowed for a more detailed extraction of information from contribution.

Setting

The setting of the semi structured interviews was in Nashville, Tennessee. The study included two different participant groups in Nashville. The first sample comprised healthcare consumers who received healthcare from local hospitals in Nashville, Tennessee, while the second included active nurses from the same hospital setting.

Results

Theme 1: EHR Systems Free Up Time

The first theme concerning healthcare team members implementing and using EHR systems in their healthcare settings is EHR systems reducing the time required for information collection, transfer, and analysis. In general, healthcare team members recognized that EHR systems free up time for the performance of other important tasks and reduce workload burdens. EHR systems are perceived to increase the efficiency of data processing, which appears to increase the efficiency of entire healthcare organizations. The following quotes demonstrate this idea.

Participant 1 stated:

> They decrease the time it takes to look up information. This makes us more available to patients… in some ways, they may increase interactions. The net may be fewer interactions with individual patients because we don't have to gather information multiple times or recheck information. But this isn't a negative.

Participant 2 shared, "They improve the workflow a lot. This is what I meant earlier. Information is more accessible and easier to store. It really makes a big difference." Participant 4 agreed, "Absolutely. I can get a call about a patient and immediately check the patient's schedule and medical records seamlessly. This saves so much time over non-electronic systems and systems that are not integrated well."

When asked about workflow concerns that have been identified as a potential problem for the implementation of EHR systems,

Participant 4 responded:

Really? I had never thought of that. EHR systems solve workflow problems. I used to have to check around for various sources of information. I would get behind on my duties. But electronic records help put all information in one accessible place. Workflow is so much better now. We actually cut some of the staff when we updated our systems. It's been several years now, but I remember that we simply didn't need as much staff.

When asked the question if they believed that EHR decreased interactions between health care professionals and patients, Participant 4 responded, "No, I don't think so," and then added, "Free time. (laughs) No, but seriously, it gives us more time and makes our jobs less stressful."

Participant 5 shared:

The benefits far outweigh the costs. It's important for our health care system. Medical records are pretty much standardized now. I can quickly obtain medical records on a patient with few issues. It's great and secure as far as I can tell… The benefits are clear. That's pretty much the nature of digital apps now, to integrate seamlessly and securely… I think by freeing up time to interact with patients more.

Participant 6 claimed:

> Patients can fill out a lot of information electronically now. It is less interaction.
>
> Maybe that's a bad thing, but I think it also makes care quicker, which is great…
>
> Maybe the staff can interact with patients as they fill out forms. I'm not sure.

In response to the question about experiences with EHR systems, and if they decrease interactions between health care professionals and patients,

Participant 7 stated, “I’m not sure. I could see it, I guess. Patients were filling out information not directly, but we really don’t do that much here.”

Participant seven further indicated that additional training would improve patient interactions with staff with EHR systems implemented:

> I suppose more training. I honestly am not sure I could use some of our electronic systems. Maybe that speaks more about my company than anything else… I’m not sure about directly, but for my own organization, I would like training or some kind of educational program about how to use these systems, especially with other systems, even though I will likely never use these systems directly. I would at least have an understanding of what others in my department do and how I could help them when they are using these systems.

Participant 8 stated:

> Not a chance. they give me more opportunities to interact… Nothing directly to do with EHR. Some sort of system for taking records and pulling very specific information would be great for me. Maybe give me even more time with patients.

Conversely, Participant 10 stated, “Yes, I can see that. I think it could be distracting or could take away from direct interactions.”

Theme 2: Transition/Adjustment Period

The second theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings pertains to the burden of transitioning to EHR systems and the increased workloads of the adjustment to such systems. There is no universal agreement among the healthcare professionals on how heavy the burdens

are. Some participants reflected major burdens, and others indicate relatively minor burdens, indicating that EHR system implementations and the adjustments required for such implementations may differ between organizations. Moreover, many healthcare professionals may adjust to such systems better than others. Nevertheless, there is strong agreement that the burdens are easily worth the benefits yielded by such systems.

Participant 1 remarked:

> I remember the change of information being available much more quickly. Instead of a file that needs to be pulled, all relevant patient information could quickly be pulled up on-screen or printed. I remember this being a pretty big change, one for the better certainly, but I also remember some issues with implementing the new system, nothing major though.

Participant 2 stated, “Our systems are pretty new. Maybe less of a learning curve. That would be nice.”

Participant 4 remarked, “I think our hardware could be updated, maybe. I’m not sure that’s what you meant by directly. Maybe the software would be easier to use. That’s all I can really think of.”

In responding to the question, based on your experience as a health care professional, have you had any serious problems implementing EHR systems or integrating them into existing health care systems,

Participant 4 stated:

> No, integration was pretty easy from what I remember. It’s been a while, but I know that we took several weeks preparing for the change and then learning the

> new system, so maybe learning time or education could have been a problem. Not a serious one, though.

Participant 5 responded:

> I can see it both ways. The initial implementation does disrupt workflow. I have experienced that. There is a learning curve, and the system does not always go as planned. But I also know that disruptions tend to be temporary. Now that our EHR systems are in place, the workflow is much better. Our secretaries can work so much quicker. It's really amazing the difference. So yes, I can see workflow issues at the beginning, especially but not in the long-run… Yeah, we did. It didn't quite work right at the beginning, and it was confusing. But we figured it out… proper planning must occur, or the system will fail. That's just the reality of it. We almost had it happen to us. That's a major worry.

Asked based on your experience as a health care professional, have you had any serious problems implementing EHR systems or integrating them into existing health care systems,

Participant 7 stated:

> Not me personally, no, but I don't work as much with these systems as others. I seem to recall some of my coworkers having a problem interpreting certain commands from these systems. But really, my major problems with medical records concerns how other organizations keep their records. They just don't match up to ours as they should. Maybe more regulations would promote their usage or standardization, as you said.

Participant 8 responded, “Our tech is good. Others aren’t I’ve heard. So, making sure all are up to our standards at least should be a focus.”

Theme 3: Speed

The third theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings is pertinent to the speed of using EHR systems. The speed of such systems is considerably higher for EHR systems than traditional physical systems. Such speed yields more benefits than mere convenience. The increased speed of such systems allows for improved functioning and performance, as well as information and data accuracy. Respondents generally recognized that EHR systems improved their jobs and directly led to improved care of patients.

Participant 1 responded:

> EHR systems improve health care. For example, we can quite easily obtain information about the previous care received by patients. I say easily, which makes it seem insecure, but it is. We go through all of the necessary procedures to ensure patient personal information is secure and confidential. But back to the question, yes, I believe our EMR systems improve patient care…Our EHR system integrates well with our other systems. In fact, I don’t even really think about it. That’s definitely been one of the major benefits of electronic records.

Participant 2 remarked:

> Electronic is so much easier now. There’s no going back, and really there is no reason everyone shouldn’t be up to date at this point…electronic records are much easier to relay. It’s just so much better than paper systems. I say that, but we do

> still rely some on paper, but just for temporary information keeping… Electronic records definitely improve functioning. In the ER, time is crucial, so electronic records have drastically changed how quickly we can address patient issues, checking for medications. I think electronic records have transformed our decision-making processes.

Participant 2 said, "I much prefer them to the paper systems and think they make my job easier and better."

Participant 3 argued:

> Sure. EHR systems are great. I really don't know what it was like before them and I can't imagine not having them. So, yes, I understand the mandates completely… Yeah, as I was saying earlier, EHR is very beneficial for the health care system as a whole… I really don't know what it was like without these systems, so I'm not familiar with these systems being installed. But still, I am not sure where workflow issues would arise. I would think they would improve workflow.

Participant 4 said:

> Everything in one place. That's the key. I know nurses from other organizations who do not have integrated systems, as least not like ours. It's much worse for them. I don't think they are properly utilizing EHR systems… some of them have to go to different areas to retrieve different sources of patient information. That's ridiculous. Talk about workflow issues. So, yes, I guess I could see how EHR systems, if not properly integrated, would be potentially problematic.

Participant 5 stated, “I think electronic records are probably more accurate and less prone to error. That’s a big one.”

In reacting to the question of whether EHR is good or bad for workflow, Participant 6 responded, “Good, I think. Why wouldn’t it be? I mean, it’s digital and easy to use. That has to be better than the systems before… Electronic is good. It’s easier to check for errors. That’s important.”

Participant 7 responded:

> They are quick. I’ve never really considered integration between systems since I don’t use them as much as others, but yeah, I could see it… All positive. I can’t really think of any negative experiences. The electronic systems seem to promote good workflow, I guess.

Participant 8 stated, “It’s faster and efficient. Probably more accurate too… Ours runs smoothly as far as I can tell. I’ve heard no complaints about it, and I just wish everyone had our technology.”

Participant 10 remarked, “All of the changes to your medical records and information systems have been intuitive. So, all positive.”

Theme 4: Need for Flexibility in Healthcare Systems and Structures

The fourth theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings is the major requirement for healthcare systems and structures to be highly flexible. Such flexibility is highly desired among healthcare team members, as demonstrated in the results by team members discussing the wide variety in their job duties and daily functions. Information and records systems are

just one part of the broader healthcare structures, but they play an important role in the flexibility of such structures.

Participant 1 stated:

> When I work during the day, I consult with the night team about issues faced by patients that I need to know about and review any planned procedures or major events for the day. Then I make the rounds with another nurse checking on the patients and administering medication. I then usually assist in physical therapy sessions in the afternoon, but really, I just do what is needed. At different times, we have different patients with distinct needs, so my typical days can vary quite drastically.

Participant 2 responded:

> I work in an ER, so we tend to rotate duties. I'll receive patients at one point, and later I may take the patient's information. I may respond to patient needs on the floor. It just depends. I don't know if there is really a typical day.

Participant 3 remarked:

> I take patient information, vitals, all the typical stuff. Earlier today, I cleaned out an ear, treated and dressed a wound, nothing out of the ordinary, really… Yes, medical records should be standardized across platforms. This will make it easier for us to share information with others and them to share with us. That's part of a successful health care system.

Participant 4 stated:

> I administer medications, check BP, talk with patients about their symptoms, participate in exercises with patients, that sort of thing. I also help patients get to bed. More recently, we have been making an effort to improve the sleep of patients by providing more restful conditions. We ensure noise is minimal or ambient noise is available. Temperatures are appropriate. Lights are off, and so on.

Participant 6 stated, "I really don't have a typical day. I fill in where I'm needed. I commonly take patient vitals, but I do a lot of other stuff as well."

Participant 7 remarked: "I assist in procedures, meet with patients and their families. I do a lot of explaining and assistance; it just depends on what we have going on that day."

Theme 5: Government Oversight

The fifth theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings is the role of government oversight in the EHR processes. Traditional paper systems are much less susceptible to government oversight. Even if government oversight is not guaranteed under EHR systems, such systems make it much easier for government oversight on the information healthcare systems. The respondents reflected that government oversight can be intrusive, but can also provide clear benefits and help prevent certain major systematic issues.

Participant 1 stated:

> I'm actually unsure about this one. I understand the importance of government oversight, but I don't know about how much oversight would really benefit

> patient care. We do a really good job of following all regulations and rules, so we feel quite strongly that our systems are secure.

Participant 2 remarked:

> Governments ensuring patient information is properly stored is important. Electronic records may make it easier for them to check for trends as well. I have actually used electronic records for research purposes, so I can certainly see the benefits there.

Participant 3 declared, “It’s got to be quicker for governments to review, so that makes it easier for everyone involved. I don’t see why anyone would have a problem with that.” In answering the question, do you believe that the mandates for health care organizations to transition to EHR systems are reasonable, participant four responded in the affirmative. Participant 4 affirmed, “I don’t think that’s a great reason for them, but I understand it. Maybe that’s a reason for governments to increase regulations and mandates, but it really doesn’t mean that much to me.”

Participant 5 stated, “I could see it helping government oversight, especially because there are now standards for EHR. Governments know what to look for and where to look now.”

Participant 6 remarked:

> I haven’t worked much with non-electronic medical records, so I can’t really speak to why electronics are better. Well, maybe, I can. I mean, it makes sense for digital records to be more efficient. Yeah, I think the mandates make sense. I have no problem with them. I think everyone should have transitioned to electronic

> record-keeping by now anyway… this is what I was thinking earlier. Everyone can better use the information if it is standardized… I've had nothing but success with them. I don't have much to compare them to, but they work great for me. I don't ever think about them. That's probably a positive.

Participant 7 responded:

> Yes, I'm a big fan of EHR systems. I think they are essential. I even think the mandates should be expanded. I've seen facilities that do not properly implement medical record systems, and we have even received medical records that are difficult to follow. I would love to see stronger laws here… I think governments should play a major role in promoting good or positive health care outcomes. I'd like to see more activity from them.

Participant 8 acknowledged, "Exactly, yes, they should be standardized. It would be ideal if all medical record-keeping were uniform. Maybe I'm asking for too much, but I'm talking about exactly what should be included… Yes, I agree. Government oversight is necessary."

Participant 9 asserted:

> Electronic records have certainly improved information sharing. Maybe not so much for us, except in special cases, but for the rest of health care, absolutely. Think about major hospitals and clinics, how hard it would be otherwise. I agree with that too. [Oversight is] an important government function… I can easily see how these systems could help integrate with other systems.

In response to the question, do you believe that the mandates for health care organizations to transition to EHR systems are reasonable,

Participant 10 stated, “That’s close, but yes. In general, I would say it would be better to have them than not have them… I think we need our information to be normalized like that. It’s good.”

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 10 stated, “I’m not sure. It seems like an overreach, but maybe not. I guess it depends on where you stand on government involvement. If I have to pick a side, I’ll go ahead and say it’s a good thing.”

Theme 6: Necessity of EHR Systems

The sixth theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings is the government required to implement EHR systems across all healthcare organizations. The participants recognized this necessity. The respondents indicated that EHR systems are both reasonable and necessary.

Participant 1 insisted, “It is more than reasonable; it is necessary. I can’t imagine being dependent on the old information keeping systems.”

Participant 2 said, “Accuracy. I think they are much more accurate than paper systems.”

Participant 4 said, “Yes, they help information sharing. I think they are a necessity today.”

Participant 7 said, “I mean, we have massively improved how we operate in large part because of technological advances like these. Keep them coming.”

Theme 7: Specialization

The seventh theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings is specialization, which refers to EHR systems allowing for more specialized functions for health records systems. The specializing allowed by EHR systems strongly promotes increased healthcare capacities. The responses of the participants reflect some recognition of the increased opportunities for specialization offered by EHR systems. Nevertheless, this theme is the weakest among all themes for the healthcare team members, given that only a few of the respondents recognized it. Even so, such recognition reflects the importance of identifying the many different functions, benefits, and risks of EHR systems.

Participant 1 said:

> For larger health care organizations, I think specialization is good. We are not that big, so we don’t get to specialize as much as larger operations. I mean people dedicated to information retrieval, presentation, that sort of thing. Our staff does a little bit of everything. I think if we could find a way that focuses EHR functions on particular staff members, this would also us to be even better at organizing our information and retrieving it when we need it. We are probably too small for that, but it’s a thought.

Theme 8: Security/Privacy Issues

The eighth theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings involves security and privacy issues. Many of the issues identified in implementing EHR systems involve privacy and information security. EHR systems may provide opportunities for hacking and digital intrusions. While traditional physical information systems feature their own issues, electronic systems introduce additional risks that are recognized by the participants. Participant 2 remarked:

> I guess hacking. I have heard stories of potential threats to patient information from hacking groups. That worries me, but that's not really my responsibility as long as I treat patient information appropriately. IT and administration can worry about hackers.

Participant 3 said:

> Keeping patients informed about test results would be an improvement. They are just keeping contact with patients while they wait. A lot of patients complain about being neglected, so I try to engage with them more. I think we could use EHR to improve engagement with patients while they wait… Maybe through a more interactive system, one that I could access more easily and be updated about patients. In the clinic, this may not be as useful as in other health care settings, but I think I could still find a use for it, and patients would benefit from it.

Participant 7 argued:

> Electronic records are more secure. Fewer privacy concerns, I think… I've heard stories of possible hacking, but I'm not sure how big of a deal this is. That's my

> biggest worry, at least… They are only as good as technology lets them be. In other words, as long as the technology behind these systems holds up and is unhackable and keeps information private and secure, I think they'll be great. Much better than the alternative.

Theme 9: Ease of Use

The ninth theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings involves its ease of use. In this context, ease of use is much more than efficiency and freeing up time for healthcare team members to focus on completing other tasks. Ease of use also involves relieving the burdens on nurses. The participants in the current study reflect a clear preference for EHR systems in part because of the ease of use of such systems compared to traditional physical health records systems.

Participant 1 claimed:

> EHR systems improve health care. For example, we can quite easily obtain information about the previous care received by patients. I say easily, which makes it seem insecure, but it is. We go through all of the necessary procedures to ensure patient personal information is secure and confidential. But back to the question, yes, I believe our EMR systems improve patient care…Our EHR system integrates well with our other systems. In fact, I don't even really think about it. That's definitely been one of the major benefits of electronic records.

Participant 2 said:

> Electronic is so much easier now. There's no going back, and really there is no reason everyone shouldn't be up to date at this point…electronic records are much easier to relay. It's just so much better than paper systems. I say that, but we do still rely some on paper, but just for temporary information keeping… Electronic records definitely improve functioning. In the ER, time is crucial, so electronic records have drastically changed how quickly we can address patient issues, checking for medications. I think electronic records have transformed our decision-making processes.

Participant 2 said, "I much prefer them to the paper systems and think they make my job easier and better."

Participant 3 affirmed:

> Sure. EHR systems are great. I really don't know what it was like before them and I can't imagine not having them. So, yes, I understand the mandates completely… Yeah, as I was saying earlier, EHR is very beneficial for the health care system as a whole… I really don't know what it was like without these systems, so I'm not familiar with these systems being installed. But still, I am not sure where workflow issues would arise. I would think they would improve workflow.

Participant 4 remarked:

> Everything in one place. That's the key. I know nurses from other organizations who do not have integrated systems, as least not like ours. It's much worse for them. I don't think they are properly utilizing EHR systems… some of them have to go to different areas to retrieve different sources of patient information. That's

> ridiculous. Talk about workflow issues. So, yes, I guess I could see how EHR systems, if not properly integrated, would be potentially problematic.

Participant 5 said, "I think electronic records are probably more accurate and less prone to error. That's a big one."

In responding to the question of whether EHR is good or bad for workflow, Participant 6 responded, "Good, I think. Why wouldn't it be? I mean, it's digital and easy to use. That has to be better than the systems before… Electronic is good. It's easier to check for errors. That's important."

Participant 7 argued:

> They are quick. I've never really considered integration between systems since I don't use them as much as others, but yeah, I could see it… All positive. I can't really think of any negative experiences. The electronic systems seem to promote good workflow, I guess.

Participant 8 said, "It's faster and efficient. Probably more accurate too… Ours runs smoothly as far as I can tell. I've heard no complaints about it, I just wish everyone had our technology."

Participant 10 remarked, "All of the changes to your medical records and information systems have been intuitive. So, all."

Theme 10: Standardization of Information/Data

The tenth theme concerning healthcare team members implementing and utilizing EHR systems in their healthcare settings is the standardization of data. Traditional physical health records systems make such standardization difficult. Government

regulations associated with EHR have helped to standardize medical record-keeping. Such standardization helps promote inter-organizational information and data sharing, which improving auditing and similar processes. The participants recognized how the standardization of data could be improved through EHR systems.

Participant 1 responded:

> I'm actually unsure about this one. I understand the importance of government oversight, but I don't know about how much oversight would really benefit patient care. We do a really good job of following all regulations and rules, so we feel quite strongly that our systems are secure.

Participant 2 said:

> Governments ensuring patient information is properly stored is important. Electronic records may make it easier for them to check for trends as well. I have actually used electronic records for research purposes, so I can certainly see the benefits there.

Participant 3 argued, "It's got to be quicker for governments to review, so that makes it easier for everyone involved. I don't see why anyone would have a problem with that." In answering the question, do you believe that the mandates for health care organizations to transition to EHR systems are reasonable, participant four responded in the affirmative. Participant 4 remarked, "I don't think that's a great reason for them, but I understand it. Maybe that's a reason for governments to increase regulations and mandates, but it really doesn't mean that much to me."

Participant 5 responded, “I could see it helping government oversight, especially because there are now standards for EHR. Governments know what to look for and where to look now.”

Participant 6 said:

> I haven’t worked much with non-electronic medical records, so I can’t really speak to why electronics are better. Well, maybe, I can. I mean, it makes sense for digital records to be more efficient. Yeah, I think the mandates make sense. I have no problem with them. I think everyone should have transitioned to electronic record-keeping by now anyway… this is what I was thinking earlier. Everyone can better use the information if it is standardized… I’ve had nothing but success with them. I don’t have much to compare them to, but they work great for me. I don’t ever think about them. That’s probably a positive.

Participant 7 remarked:

> Yes, I’m a big fan of EHR systems. I think they are essential. I even think the mandates should be expanded. I’ve seen facilities that do not properly implement medical record systems, and we have even received medical records that are difficult to follow. I would love to see stronger laws here… I think governments should play a major role in promoting good or positive health care outcomes. I’d like to see more activity from them.

Participant 8 added, “Exactly, yes, they should be standardized. It would be ideal if all medical record-keeping were uniform. Maybe I’m asking for too much, but I’m talking

about exactly what should be included… Yes, I agree. Government oversight is necessary."

Participant 9 said:

> Electronic records have certainly improved information sharing. Maybe not so much for us, except in special cases, but for the rest of health care, absolutely. Think about major hospitals and clinics, how hard it would be otherwise. I agree with that too. [Oversight is] an important government function… I can easily see how these systems could help integrate with other systems.

In response to the question, do you believe that the mandates for health care organizations to transition to EHR systems are reasonable,

Participant 10 stated, "That's close, but yes. In general, I would say it would be better to have them than not have them… I think we need our information to be normalized like that. It's good."

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 10 stated, "I'm not sure. It seems like an overreach, but maybe not. I guess it depends on where you stand on government involvement. If I have to pick a side, I'll go ahead and say it's a good thing."

Theme 1: Improved Expected Health Outcomes

The first theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend is expectations in the

improved health outcomes. In general, patients seem to recognize that EHR systems can promote improved health outcomes and, thus, prefer such systems.

In response to the question, many argue that EHR system implementation will improve health care by improving the sharing of information between organizations. Do you agree with this and why or why not?

Participant 1 stated, “Yes, that seems efficient. It should improve health care too. I have no issue with it.”

Participant Two remarked, “I agree. It sounds good for health care. Electronic records can probably do a lot more than, what, physical records… It seems fine. As I said, I assumed all of those records were electronic already.”

In response to the question, many argue that this will improve health care by improving the sharing of information between organizations. Do you agree with this and why or why not?

Participant 3 stated, “Yes, I agree. It seems like a really good thing.”

In response to the question, many argue that this will improve health care by improving the sharing of information between organizations. Do you agree with this, and why or why not?

Participant 4 responded, “Of course, why would anyone not want that. Doctors need to be able to communicate patient information. I’m sure electronic records are a lot easier to do that with… The integration will probably be good.”

Participant 5 remarked, “I can certainly see how it would improve information sharing.”

In response to the question, many argue that this will improve health care by improving the sharing of information between organizations. Do you agree with this and why or why not?

Participant 8 stated, “Yes, I think I agree. It seems like a good thing.”

In response to the question, do you like the idea of medical records becoming electronic?

Participant 9 stated:

> Yes, it’s a great thing. I would think they would all be electronic by now… Electronic records would certainly improve functions and virtually everything I would think. Think about the waste of all the files in filing cabinets. Good for sustainability too.

Participant 10 stated:

> I haven’t noticed a difference. It seems like they may be taking longer. I don’t know if that’s because they have moved to electronic records or not. Might be. Might be something else though, like less staff or more patients.

Theme 2: Government Oversight

The second theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend is a government oversight. As the healthcare professionals, patients recognize the role of government oversight in ensuring well-functioning healthcare systems. Nevertheless, there is some skepticism involving government oversight, even among healthcare consumers.

Participant 1 remarked, “Yes, government oversight will help ensure that health care organizations protect the personal information of patients.”

Participant 2 stated, “ I agree. Even though I am not big on government intervention, I think it should be looking over health care.”

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 3 stated, “Yes, I agree. These electronic records can help the government protect patients.”

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 4 stated, “I don’t agree. I think the government should stay out of healthcare for the most part.”

In response to the same question,

Participant 5 remarked, “I agree. I think the oversight will be good.”

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 6 responded, “I’m not sure whether that is the best purpose for medical records, but I guess it will be okay.”

Participant 7 responded to this question in the following way, “I agree. Totally. It’s great to make sure these hospitals aren’t maybe overcharging us, or I don’t know using our information inappropriately.”

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 8 stated, “ That’s a tough one. I’m skeptical. I’ll go with that.”

Participant 9 is in favor of strong government oversight, stating, “Yes, I agree. It keeps them accountable… Yes, I get that. It would seem to improve everything from the sound of it.”

Participant 10 responded, “ I prefer government out of healthcare in general, but for this reason, I guess it’s okay.”

In response to the question based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this and why or why not?

Participant 10 responded, “No, not for auditing. What would they audit? Finances yea, but not patient records.”

Theme 3: Increased Regulations

The third theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend is increased regulations. Such regulations are intended to shape healthcare systems and structures in

ways that promote better health outcomes. Such regulations are recognized by patients as important and less intrusive than direct government oversight.

In response to the question, while this may not have been a reason for the increasing regulations on health care organizations concerning EHR implementation, but it may be a good reason for health care organizations to implement EHR systems or expand such systems. Do you agree with this and why or why not?

Participant 1 stated, “Certainly. This is a no-brainer.”

In response to the same question,

Participant 5 stated, “Yeah, I guess I can agree with that one. It makes sense.”

In response to the question, while this may not have been a reason for the increasing regulations on health care organizations concerning EHR implementation, but it may be a good reason for health care organizations to implement EHR systems or expand such systems. Do you agree with this and why or why not?

Participant 6 stated, “ Yes, I agree. Those sound-like major benefits for doctors and hospitals.”

Participant 7 responded, “Yeah, I think it’s good. I like the idea of cross-checking information. It seems necessary in the healthcare industry, for sure.”

Participant 9 is also in favor of regulations, stating, “Yes, I agree. It keeps them accountable.”

Participant 10 remarked, “It is fine with increased regulations.”

Theme 4: Perceived Healthcare Staff Workflow Improvements

The fourth theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend is perceived healthcare staff workflow improvements. When asked, patients seemed to recognize some of the improvements in staff workflow because of EHR systems. Of course, patients are not in a position to understand staff workflow as well as staff members, but they do provide a third-person and objective perspective on such a workflow.

Participant 2 responded, “I guess the workflow in medical settings is good. Waiting times are often long, but I don’t think that can be avoided.”

In response to the question as a health care consumer, how would you describe your experiences with EHR systems with specific regard to how they impact the perceived workflow of staff.

Participant 3 stated, “My experiences have been great. The workflow of staff seemed fine; I mean, I didn’t know if there were problems. I don’t remember interacting with electronic records directly.”

Participant 4 responded, “I’m sure the electric systems are good and help with workflow. I don’t recall any problems.”

Participant 7 remarked, “I’m sure it helps the staff a lot. They can pull info quicker. Don’t have to wait as long. Works for me.”

Participant 8 stated, “It has to be good for workflow. Everything is on computers now. That’s helped my job a lot, and I’m sure it’s the same for doctors and nurses and the like.”

In response to the question as a health care consumer, how would you describe your experiences with EHR systems with specific regard to how they impact the perceived workflow of staff,

Participant 9 responded, “I don’t know. I suspect so, but I really am not sure. I could see it either way… I don’t worry about that. I’m sure it’s fine.”

Concerning interactions with healthcare professionals,

Participant 9 stated:

> It’s good. I think it’s fine. Maybe less time would be bad, but as long as the information is conveyed clearly and quickly, it should be okay. I’m not worried about it. I think that was the original question.

Theme 5: Patients Cannot Tell a Difference

The fifth theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend is patients not being able to recognize major differences in EHR systems and traditional physical systems. The responses of the patients indicate that some cannot tell any differences in such systems, reflecting the fact that EHR systems do not disrupt typical patient processes. It may also reflect the fact that EHR systems do not impact the interactions between patients and staff members.

In response to a question regarding the perceived healthcare staff workflow, Participant 1 responded:

> I still fill out forms on written paper. I guess they become digitized after. The workflow of hospitals and clinics seems very good right now. That probably has

> some to do with electronic records, but I am not sure the exact relationship between the records and workflow.

In response to the question as a health care consumer, how would you describe your experiences with EHR systems with specific regard to how they impact the perceived workflow of staff,

Participant 5 stated, “My experiences with EHR systems? I have no idea. I have noticed that clinics are getting faster. Waiting times are down, I think. I fill out my forms and then get seen quickly.”

Participant 6 responded, “No clue, honestly. I’m not even sure I know when I am interacting with EHR systems.”

Theme 6: Fewer or More Interactions with Healthcare Staff

The sixth theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend involves the interactions between healthcare staff and patients. In some cases, patients recognized fewer interactions with staff members. In other cases, patients recognized more interactions due to the increased availability of staff members because of EHR systems.

In response to the question, do you worry that EHR systems will decrease interactions between health care professionals and patients?

Participant 1 stated:

> I hadn’t considered that, but yeah, I guess it would…. I think the time spend with my doctor is really good. How else would the doctor know if I was sick? More

time means more attention from my perspective. My current interactions are fine, though.

Participant 2 responded**:**

No, I don't think electronic records would decrease interactions with patients. I don't even remember using electronic records or filling anything out on a tablet or other digital device. A nurse asked me questions… I find it comforting when the staff talks to me. I don't know if it is all that important, but it makes me feel better. I would prefer more interactions or at least shorter waiting times.

In response to the question, do you worry that EHR systems will decrease interactions between health care professionals and patients,

Participant 3 stated:

No, I don't think it would. I don't know, though. My last trip to the doctor was highly interactive with the staff. It seemed fine. I do not see the connection between less time spent with the staff… Yes, the doctor and staff talk with me plenty. It's nice, but not necessary.

When asked about potentially fewer interactions with healthcare professionals, Participant 4 remarked:

I don't worry about it. I don't care about interactions, and I just want to get better when I'm sick or injured. If I don't have to talk with many people, that's okay… If anything, I think there is too much interaction. I don't think spending less time talking to staff would hurt my care. That's kind of silly (laughs). I just want the doctor and nurses to do their jobs.

Participant 5 responded:

> I think electronics are decreasing human interactions in general. But this isn't a good enough reason to abandon ERM, or what is it? EHR.

In response to the question, do you worry that EHR systems will decrease interactions between health care professionals and patients?

Participant 6 indicated, "I don't know. Maybe they do. I think the nurses and doctors talk plenty with me… Less interaction wouldn't hurt health care, no."

Participant 7 responded, "I've never, I mean, I don't think so. I always get interviewed, like at the dentists. They asked me for the details of my condition, pain, that sort of stuff."

In response to the question, what about your current interactions with health care professionals? Do you believe that decreasing the time that you spend with medical professionals would improve or hurt your overall care received?

Participant 7 stated, "I think it would hurt it. I think that's an important time. They can get the details of the issue."

In response to the question, there is a worry that the implementation of EMR systems will severely reduce the interactions between health care professionals and patients. Do you worry that EHR systems will decrease interactions between health care professionals and patients?

Participant 8 said, "Yes, that's a major worry. If everything goes digital, we won't get to interact much with our providers. That's a major problem… I think it's a problem. I want my doctors to have enough interaction with me to diagnose me right."

When asked do you worry that EHR systems will decrease interactions between health care professionals and patients?

Participant 10 stated, “Yes, that would be a major problem…Less interaction would be bad. Health care shouldn’t be like a factory. That’s how my chiropractor is already.”

Theme 7: Information Security

The seventh theme concerning the implementation and utilization of EHR systems in the healthcare settings of the consumer involves information security. In particular, the information security concerns of the patients were noted. For many of the patients, information security involves the possibility that private information is revealed to parties it was unintended for.

In response to the question are there any other worries about EHR that we have not discussed in this interview?

Participant 1 stated, “My private information is protected. I don’t know if electronic records will make information less private or safe, but it would seem like it would.”

Participant 2 indicated, “I’m not sure how much they should be sharing my information. Maybe if they have a good reason for it, but I’m skeptical still.”

Participant 3 responded, “What about privacy? I think that’s always a major worry. I don’t want everyone to know my private information.”

Participant 4 remarked:

> I worry about people selling my information. I’ve already had it happened to me, so I hesitate to trust organizations. I don’t know how electronic records would

affect this, though… I hope they are safe. That's my main concern. But other than that, I hope they help the staff.

In response to the question are there any other worries about EHR that we have not discussed in this interview?

Participant 5 stated, "Privacy. I want my information kept private. I hope electronic records can ensure this."

When asked about other issues,

Participant 8 stated, "Not that I can think of. Oh, maybe crashes. I've lost everything on a crash. That would have to be terrible for hospitals. They probably have backups though."

In response to the question are there any other worries about EHR that we have not discussed in this interview?

Participant 10 responded:

Privacy. I think it would help it, but I don't know. Might hurt it… I think it's necessary, but worrisome nonetheless. I think government control is the biggest worry. Privacy too. But it's got to happen—the move to electronic records.

Theme 8: General Impressions of EHR Systems

The eighth theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend involves the general impressions of EHR systems. The participants had a generally favorable view of EHR systems. Such impressions reflect the recognized benefits of EHR systems.

Participant 1 remarked, “I think it is a good thing overall, but I also don’t think it’s a big deal for me. Maybe it improves how staff operates, but it probably won’t impact me directly.”

Participant 2 *stated, “Sure.* I don’t see anything wrong with it, but I don’t know what the worries you are referring to are.”

In response to the question, do you like the idea of medical records becoming electronic?

Participant 3 remarked:

> I actually just assumed they already were, so yes… They seem good. I mean, electronic records sound like they would improve the operations of hospitals and clinics.

In response to the same question,

Participant 4 said, “Yes, that’s good.”

In response to the question, do you like the idea of medical records becoming electronic?

Participant 6 stated, “Yeah, I think that’s a good thing… I think they will be great for health care. The benefits are greater than the costs.”

In response to the question, many argue that this will improve health care by improving the sharing of information between organizations. Do you agree with this and why or why not?

Participant 7 responded, “Yes, sounds good to me… Very good. I wouldn’t want to go to a doctor’s office that didn’t have electronic records.”

Participant 8 stated, “I think they are necessary but still worrisome. They should encourage interaction, not discourage it.”

In response to the question Do you like the idea of medical records becoming electronic?

Participant 10 remarked, “Yes. Yes, I do.”

Theme 9: Patient Privacy

The ninth theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend involves patient privacy. Some of the patients expressed direct concerns over their privacy because of electronic and digital systems. As the healthcare team members, there were concerns about hacking and private information being used inappropriately.

In response to the question, are there any other worries about EHR that we have not discussed in this interview,

Participant 1 stated:

> My private information is protected. I don’t know if electronic records will make information less private or safe, but it would seem like it would.

Participant 2 responded, “I’m not sure how much they should be sharing my information. Maybe if they have a good reason for it, but I’m skeptical still.”

Participant 3 responded, “What about privacy? I think that’s always a major worry. I don’t want everyone to know my private information.”

Participant 4 said:

> I worry about people selling my information. I've already had it happened to me, so I hesitate to trust organizations. I don't know how electronic records would affect this, though… I hope they are safe. That's my main concern. But other than that, I hope they help the staff.

In response to the question are there any other worries about EHR that we have not discussed in this interview?

Participant 5 stated, "Privacy. I want my information kept private. I hope electronic records can ensure this."

When asked about other issues,

Participant 8 responded, "Not that I can think of. Oh, maybe crashes. I've lost everything on a crash. That would have to be terrible for hospitals. They probably have backups though."

In response to the question are there any other worries about EHR that we have not discussed in this interview?

Participant 10 stated:

> Privacy. I think it would help it, but I don't know. Might hurt it… I think it's necessary, but worrisome nonetheless. I think government control is the biggest worry. Privacy too. But it's got to happen—the move to electronic records.

Theme 10: Recent Healthcare Visit Experiences

The tenth theme concerning healthcare consumers concerning the implementation and utilization of EHR systems in the healthcare settings they attend is the nature of the recent healthcare visits of the patient respondents. The nature of the visits should reflect

the typical visit of patients. If too many patients had unique experiences, the results would not be generalizable. The responses of the patients appear standard with no clear trends emerging that would reflect abnormal visits.

Participant 1answered “I had an eye appointment a few weeks ago. It was a standard exam to get my glasses. It went like it always does.”

Participant 2 responded, “I went to a clinic for a cold a few months ago. My throat hurt when I swallowed. I tested positive for strep throat and was given antibiotics. It was pretty quick.”

Participant 3 stated:

> I had burning leg pain for several weeks, so I went to my primary care physician. I had an X-ray, but it didn’t show anything. I was not really diagnosed with anything, but I was told that I might have a bad strain or even a stress fracture. I received steroids.

Participant 4 remarked, “It’s been a long time now. I think I had a cold or something. I got antibiotics if I remember correctly.”

Participant 5 responded:

> I had a checkup a few weeks ago. It was a standard checkup; they didn’t find anything… From my last experience, the staff seemed friendly. They talked with me a lot and really didn’t leave me waiting long.

Participant 6 stated:

> I pulled a muscle in my back a few months ago. The accident occurred during work, so my manager drove me to the hospital. It wasn't as bad as I thought, but I still received pain medicine and had to take it easy for four weeks.

Participant 7 remarked, "I had a few cavities filled, I think four weeks ago or so." Participant 8 responded, "I can't remember actually. Maybe I went to the doctor for a cold or the flu or something. Yeah, that's probably the last time like a year ago." Participant 9 responded, "Rehabilitation for a torn ACL. Aquatic exercises and stretching exercises."

Participant 10 stated, "Broke my toe at work. Smashed it with hardy backer."

Summary

The current chapter featured the results of the interviews. Several themes emerged in the responses of the healthcare professionals to the sub-questions. The first theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is electronic health records systems reducing the time required for information collection, transfer, and analysis. In general, healthcare team members recognize that electronic health records systems free up time for the performance of other important tasks and reduce workload burdens. Electronic health records systems are perceived to increase the efficiency of data processing, which appears to increase the efficiency of entire healthcare organizations. The second theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is the burden of transitioning to electronic health records systems and the increased workloads of the adjustment to such systems.

There is no universal agreement among the healthcare professionals on how heavy the burdens are. Some participants reflected major burdens, and others indicate relatively minor burdens, indicating that electronic health records system implementations and the adjustments required for such implementations may differ between organizations. Moreover, many healthcare professionals may adjust to such systems better than others. Nevertheless, there is strong agreement that the burdens are easily worth the benefits yielded by such systems. The third theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is the speed of electronic health records systems. The speed of such systems is considerably higher for electronic health records systems than traditional physical systems; such speed yields more benefits than mere convenience. The increased speed of such systems allows for improved functioning and performance, as well as information and data accuracy. Respondents generally recognized that electronic health records systems improved their jobs and directly led to improved care of patients.

The fourth theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is the major requirement for healthcare systems and structures to be highly flexible. Such flexibility is highly desired among healthcare team members, as demonstrated in the results by team members discussing the wide variety in their job duties and daily functions. Information and records systems are just one part of the broader healthcare structures, but they play an important role in the flexibility of such structures. The fifth theme concerning healthcare team members implementing and utilizing electronic health records systems in their

healthcare settings is the role of government oversight in the electronic health records processes. Traditional paper systems are much less susceptible to government oversight. Even if government oversight is not guaranteed under electronic health records systems, such systems make it much easier for government oversight on the information healthcare systems. The respondents reflected that government oversight can be intrusive, but can also provide clear benefits and help prevent certain major systematic issues. The sixth theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is the government required to implement electronic health records systems across all healthcare organizations. The participants recognized this necessity. The respondents indicated that electronic health records systems are both reasonable and necessary.

The seventh theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is specialization, which refers to electronic health records systems allowing for more specialized functions for health records systems. The specializing allowed by electronic health records systems strongly promote increased healthcare capacities. The responses of the participants reflects some recognition of the increased opportunities for specialization offered by electronic health records systems. The eighth theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings involves security and privacy issues. Many of the issues identified in implementing electronic health records systems involve privacy and information security. Electronic health records systems may provide opportunities for hacking and digital intrusions.

While traditional physical information systems feature their own issues, electronic systems introduce additional risks that are recognized by the participants. The ninth theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings involves its ease of use. In this context, ease of use is much more than efficiency and freeing up time for healthcare team members to focus on completing other tasks. Ease of use also involves relieving the burdens on nurses. The participants in the current study reflect a clear preference for electronic health records systems in part because of the ease of use of such systems compared to traditional physical health records systems. The tenth theme concerning healthcare team members implementing and utilizing electronic health records systems in their healthcare settings is the standardization of data. Traditional physical health records systems make such standardization difficult. Government regulations associated with electronic health records have helped to standardize medical record-keeping. Such standardization helps promote inter-organizational information and data sharing, which improving auditing and similar processes. The participants recognized how the standardization of data could be improved through electronic health records systems.

The first theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend is expectations in the improved health outcomes. In general, patients seem to recognize that electronic health records systems can promote improved health outcomes and, thus, prefer such systems. The second theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare

settings they attend is a government oversight. As healthcare professionals, patients recognize the role of government oversight in ensuring well-functioning healthcare systems. Nevertheless, there is some skepticism involving government oversight, even among healthcare consumers. The third theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend is increased regulations. Such regulations are intended to shape healthcare systems and structures in ways that promote better health outcomes. Such regulations are recognized by patients as important and less intrusive than direct government oversight. The fourth theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend is perceived healthcare staff workflow improvements. When asked, patients seemed to recognize some of the improvements in staff workflow because of electronic health records systems.

The fifth theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend is patients not being able to recognize major differences in electronic health records systems and traditional physical systems. The responses of the patients indicate that some cannot tell any differences in such systems, reflecting the fact that electronic health records systems do not disrupt typical patient processes. It may also reflect the fact that electronic health records systems do not impact the interactions between patients and staff members. The sixth theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare

settings they attend involves the interactions between healthcare staff and patients. In some cases, patients recognized fewer interactions with staff members. In other cases, patients recognized more interactions due to the increased availability of staff members because of electronic health records systems. The seventh theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend involves information security. In particular, the information security concerns of the patients were noted.

The eighth theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend involves the general impressions of electronic health records systems. The participants had a generally favorable view of electronic health records systems. Such impressions reflect the recognized benefits of electronic health records systems. The ninth theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend involves patient privacy. Some of the patients expressed direct concerns over their privacy because of electronic and digital systems. As the healthcare team members, there were concerns about hacking and private information being used inappropriately. The tenth theme concerning healthcare consumers concerning the implementation and utilization of electronic health records systems in the healthcare settings they attend is the nature of the recent healthcare visits of the patient respondents. The nature of the visits should reflect the typical visit of patients. Based on the responses, the experiences of the patients appear normal.

Reflexivity journaling was utilized to ensure trustworthiness. The reflexivity journal informed the interpretation of the results, helping to reduce the impacts of any researcher biases and otherwise unaccounted for influences on results interpretation. The journaling revealed that the questions were created in such a way that minimized the influences on the responses of the participants. The implementation of a reflexivity strategy helped keep track of all potential sources of researcher bias and influence on the research. All potential sources were corrected in the interpretation of the results. The confirmability was ensured through an audit trail strategy which featured a record of the processes of data collection, analysis, and interpretation. The rationale behind the processes were updated to maintain a detailed record of the reasoning behind such processes. This strategy ensured that the results of the current work are replicable and that other researchers can code the data for themselves to confirm the conclusions of the current work. While the sampling method targeted two specific groups, sufficient variation in the samples was ensured by drawing from a broad pool of participants in each group.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

In this research, I conducted semi structured interviews to determine the lived experiences of healthcare professionals and patients with regard to the implementation and use of EHR systems. Prior researchers have shown many benefits and potential issues with the implementation and use of EHR systems (Hemsley et al., 2018; Mikk et al., 2017; Tofannello et al., 2017). Such benefits include improved information transfer, efficiency, and better data analytics. The identified problem addressed here has involved the inconsistency revealed in consumer access to their medical records, and the inconsistency revealed in EHR implementations by healthcare professionals. EHR implementations have been effective and provide a number of benefits, but consumers have varying levels of access to their records, which could impact the lived experiences of such consumers. Prior researchers have also suggested that increasing patient access may lead to improvements in health outcomes through patient empowerment and the promotion of greater self-care (Hemsler et al., 2018; Mikk et al., 2017; Toffaenello et al., 2017). However, it is necessary to identify causes and trends related to health care organizations not providing sufficient access to patient outcomes. In the current research, I revealed that the lived experiences of both healthcare professionals and patients reflect largely positive experiences with a few reservations and recognized risks.

Interpretation of the Findings

The results of the current work suggest that the lived experiences of both healthcare professionals and patients reflect positive experiences with EHR systems. The

major concerns associated with the implementation of such systems involved privacy and security concerns. While there were a few issues involving the transition to EHR systems, these tended to be mild and were quickly overcome. The healthcare professional experiences reflected the clear benefits of EHR systems, especially in terms of efficiency, speed, and ease of use. Some of the experiences of the patients also reflected such benefits, although the patients were generally not in a position to recognize all of the impacts of EHR systems. The major benefits recognized by the patients reflected more interactions with healthcare professionals, though some patients indicated that there might be a risk for decreased interactions because of EHR systems. Government oversight and regulations were not major concerns for most participants. In general, there was high perceived interoperability of EHR systems based on the lived experiences of both groups.

Limitations of the Study

The major limitations of the study involved the nature of interviews. The beliefs about EHR interoperability and EHR adoption may have been reflected in the interviews, though efforts were made to minimize my impact on the responses. Another limitation to the study was the limited samples of participants from both groups. While 10 participants is sufficient for each group in a phenomenological study, additional participants could promote the development of a stronger understanding of the typical lived experiences of members of each group.

Implications

The major implications of the current study include the recognition of the clear benefits of EHR systems, the relative lack of security, privacy, and patient interaction concerns, and strong interoperability. Future research may be aimed at developing an improved understanding of the opportunities to increase the functioning and efficiency of EHR systems based on the experiences of both healthcare professionals and patients.

Recommendations for Practice

The first recommendation for practice is for healthcare organizations to plan effectively for any major changes to health records systems, including any transition to EHR systems. While the transitions to such systems noted by most participants were smooth, there were a few disruptions noted. The second recommendation for practice is healthcare organizations ensuring that EHR systems do not disrupt interactions between healthcare professionals and patients, as patients recognized this is a potential issue with the implementation of EHR systems. Finally, it is recommended that future research should be focused on determining the best means for minimizing the potential disruptions to EHR implementation in healthcare settings.

Conclusion

The adoption of EHR is necessary across most contemporary healthcare settings. The advantages of EHR are clear and include the standardization of information and data, increased efficiency, and greater opportunities for government oversight over record-keeping and data analytics. The problem identified in the current study involved EHR systems tending to be inconsistently applied across various healthcare settings. EHR systems can improve the perceptions of patients on healthcare systems and the operations

of health care facilities through improvements to healthcare structures and processes. The issue of interoperability in the context of EHR system implementation involves how healthcare systems and structures interact and whether EHR system interactions improve or harm the experiences of healthcare professionals and patients. I used the TPB to explain how the lived experiences of healthcare professionals and patients may be impacted. The qualitative phenomenological design was chosen for the current study. The use of semi structured interviews allowed for detailed accounts of the lived experiences of healthcare professionals and healthcare consumers to be taken. The results revealed several benefits of implementing EHR systems as well as several issues and risks.

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Appendix A: Questionnaire Questions

The following questions were developed for healthcare professionals:

Can you please describe your title and job description?

Can you describe, in detail, your typical day?

EHR refers to record-keeping systems that record and store data digitally. The past decade has included major changes to the regulatory requirements of medical care operations, which now have certain obligations to adopt EHR systems. These regulations are based on the many benefits provided by EHR systems. However, there are also associated worries with the implementation of EHR systems. Do you believe that the mandates for health care organizations to transition to EHR systems are reasonable, why or why not?

EHR system implementation provides additional opportunities to standardize record-keeping, making it easier for health care organizations to share and process information with increased regularity. Many argue that this will improve health care by improving the sharing of information between organizations. Do you agree with this, and why or why not?

EHR systems are also intended to make it easier for government agencies and oversight departments to audit the information of health care organizations. After all, digital information and data are easier to review and analyze than physical information. Based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this, and why or why not?

EHR systems are designed to integrate with various other systems in health care organizations, enabling increased functionality and more cross-departmental checks. While this may not have been a reason for the increasing regulations on health care organizations concerning EHR implementation, it may be a good reason for health care organizations to implement EHR systems or expand such systems. Do you agree with this, and why or why not?

Workflow concerns have been identified as a potential problem for the implementation of EHR systems. In particular, there are worries that implementing EHR systems will add complexities in obtaining and verifying the information. On the other hand, EHR systems are designed to increase efficiency, perhaps even decreasing workflow issues. Can you describe any of your experiences, either positive or negative, with the implementation of EHR systems?

A major issue identified in EHR systems is that they may reduce the interactions between patients and health care professionals. There is a worry that the implementation of EHR systems will severely reduce the interactions between health care professionals and patients. Based on your experiences with EHR systems, do you believe that they decrease interactions between health care professionals and patients? Based on your experiences, how could health care professionals implement EHR systems in such a way that would maintain or even improve interactions between health care professionals and patients? Similarly, how could EHR systems be improved directly in order to facilitate interactions between medical professionals and patients?

Based on your experience as a health care professional, have you had any serious problems positive or negative with implementing EHR systems or integrating them into existing health care systems?

Based on your experience as a health care professional, are there any other potential benefits to EMR that have not been covered in this interview? If so, can you describe those benefits and any experiences that have had related to those benefits? Based on your experience as a health care professional, are there any other worries that you have about the implementation of EHR systems?

Based on your experience as a health care professional, how would you summarize your experiences with EHR systems?

The following questions were developed for consumers:

Can you describe in detail your last encounter with health care professionals?

EHR refers to record-keeping systems that record and store data digitally. The past decade has included major changes to the regulatory requirements of medical care operations, which now have certain obligations to adopt EHR systems. These regulations are based on the many benefits provided by EHR systems. However, there are also associated worries with the implementation of EHR systems.

EHR system implementation provides additional opportunities to standardize record-keeping, making it easier for health care organizations to share and process information with increased regularity. Many argue that this will improve health care by improving the sharing of information between organizations. Do you agree with this, and why or why not?

EHR systems are also intended to make it easier for government agencies and oversight departments to audit the information of health care organizations. After all, digital information and data are easier to review and analyze than physical information. Based on the improved ability of governments to oversee information kept by health care organizations, many are arguing in favor of EHR systems. Do you agree with this, and why or why not?

EHR systems are designed to integrate with various other systems in health care organizations, enabling increased functionality and more cross-departmental checks. While this may not have been a reason for the increasing regulations on health care organizations concerning EHR implementation, but it may be a good reason for health care organizations to implement EHR systems or expand such systems. Do you agree with this, and why or why not?

Workflow concerns have been identified as a potential problem for the implementation of EHR systems. In particular, there are worries that implementing EHR systems will add complexities in obtaining and verifying the information. On the other hand, EHR systems are designed to increase efficiency, perhaps even decreasing workflow issues. As a health care consumer, how would you describe your experiences with EHR systems with specific regard to how they impact the perceived workflow of staff?

A major issue identified in EHR systems is that they may reduce the interactions between patients and health care professionals. There is a worry that the implementation of EHR systems will severely reduce the interactions between health care professionals and

patients. Do you worry that EHR systems will decrease interactions between health care professionals and patients?

What about your current interactions with health care professionals? Do you believe that decreasing the time that you spend with medical professionals would improve or hurt your overall care received?

Are there any other worries about EHR that we have not discussed in this interview?

Based on our interview today, what are your general impressions about EHR systems in health care?