ORIGINAL RESEARCH

Digital Disruption and Big Data in Healthcare - Opportunities and Challenges

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Background: As the amount of medical data in the electronic medical records system (EMR) is increasing tremendously, the required time to read it by health providers is growing by the exact proportionality. This means that physicians must increase the time spared for each patient again by the precise proportionality. This may lead to exposing the accuracy and quality of the course of action to be taken for the patients. Increasing the physician's required time for one patient means that the physician can see fewer patients. This will create an issue with the medical management authority as more physicians are needed, and higher expenses will be required.

Purpose: The two questions that arise here are 1. Identify the potential opportunities and challenges for extensive data analysis in the healthcare sector. 2. Evaluate different ways in which big medical data can be analyzed?

Methods: The authors identified the four concerned parties representing the four potential solutions dimensions to answer these two questions. These parties are 1. physicians, 2. health information systems management (HISM) departments, mainly the EMR system, and 3. Health management departments 4. Relevant Health Information Systems (HIS) parties. A literature review and 25 interviews were conducted. The interviews covered 1: Two global organizations: John Hopkins and Joint Commission International (JCI), 2: Three United Arab Emirates-based health organizations: Department of health in Abu Dhabi, SEHA in Abu Dhabi, Dubai health Authority (DHA) in Dubai, 3: 10 Physicians from different specialties, 4: Five EMR managers and 5: Five IT (Information Technology) professionals representing the HIS parties. Qualitative analysis is used as the approach for data analysis.

Results: Identifying the managerial and the technical recommendations to be utilized mainly based on digital disruption technologies, tools, and processes.

Conclusion: Healthcare has been slow in embracing digital disruption and transformation. In most areas, it is still in the initial stages. Recommendations are based on the UAE cases, highlighting the specific technologies and their features.

Keywords: digital disruption, healthcare, big data, electronic medical records, EMR, health information systems, HIS

Introduction

Recent research from the McKinsey Global Institute (MGI) published at agnitio.com in 2022 shows that the healthcare sector is well behind other industries when it comes to using digital technology. The research concludes that if the healthcare sector can close the technological gap with other industries, the upside could be substantial in innovation, productivity, and profit.

Commenting on MGI's findings, Lars Diemer, Agnitio CEO, says: "Clearly, McKinsey's report highlights the need for the industry to act faster in adopting digital technologies.

Digital disruption technologies as identified by the simple learn digital transformation program in 2022 are: Platforms, Big Data, Artificial intelligence (AI), Blockchain, Internet of Things (IoT), Robotics, Cloud computing, Drones, Edge computing, Virtual reality/Extended reality (VR/XR).

Healthcare has undergone several changes in recent years. This can be attributed to the large-scale research and development that has taken place along with the rapid evolution of technology. A significant part of providing quality healthcare is analyzing large volumes of medical data quickly and correctly.[1] However, as practices become more

technical and evolve, it is necessary for healthcare providers, including physicians and healthcare facilities, to be aware of them and know how to implement them correctly.

Information Technology, represented by its latest wave – digital disruption and digital transformation - is an essential tool increasingly used to improve quality for various industries, including health care. Information technology can improve safety and quality in healthcare by implementing evidence-based health care.[2] The most controversial information-tion technology tool used in health care is the electronic medical records (EMR), and it is also considered the application with tremendous potential for quality improvement. The EMR is a digital form that records and stores patient data.[3] There are multiple benefits to the use of the EMR, and one of them is that it can be viewed and updated by various specialties, which often comprise the healthcare team.[4] In addition to this, the EMR also has the potential to improve communication and, thus, the collaboration between physicians and specialists.

The EMR helps in identifying allergies and drug interactions along with the ability to generate appointment reminders. Moreover, using the EMR also reduces errors associated with prescriptions and erroneous medications being given. On the other hand, implementing EMRs was never easy or cost-effective.[5] For instance, the EMR involves a learning curve, which increases the time needed for implementation due to the user's learning curve. Aside from this, the EMR also imposes an additional workload on staff members, not to mention that, as an IT system, it can also crash, lag, or break down.[6]

The EMR should be inclusive, accurate and should serve its purpose of relaying the necessary information to other healthcare professionals.[7] EMR should contain the details of the previous visit and the results of diagnostic and treatment interventions.[8] During the daily clinical practice, despite the complexity of the EMR, the physicians do not have enough time between patients' visits to allow for proper revision of the incoming patient's record.[9] The lack of time affects the accuracy and reliability of the patient's records, directly impacting the quality and safety of patient care.[10]

Therefore, providing adequate healthcare involves quick and correct analysis of large volumes of medical data in a shorter time[11] and.[12] This has become possible with advanced technologies.[13] The evaluation of the article highlights that the historical data about the patients help the healthcare providers know about the patient's issue and disease. Therefore, they would be able to provide proper medication.[14]

In the last few years, the healthcare sector has developed rapidly, and new technologies have helped them solve the challenges of analysing large amounts of data.[15] The analysis of the article also highlights that the gap between the outcome of the healthcare sector and cost has been increasing.[16] Healthcare providers have taken several steps to overcome this challenge and fill the gap. However, while maintaining the data through intelligent devices, the healthcare provider must take care of privacy measures; therefore, it is the healthcare provider's responsibility to ensure that the patients' sensitive data remain confidential and safe.[17]

One study was conducted to measure the physicians' satisfaction with the EMR system involving physicians of Primary Health Care in Abu Dhabi emirate. The study showed that physicians were satisfied, but their opinions about its utility for patients were mixed. The primary function of the EMR that was most satisfying to clinicians was viewing, as it enabled them to enhance the physician-patient relationship and improve the records' accuracy and reliability.[18] The patient-physician relationship is affected negatively as the waiting time increases. Aside from this, eye contact was lost at the initial time of implementation. However, according to the study, some physicians used the screen to gain their patients' trust by showing images and explaining issues of concern to them.[19]

Hu et al[20] opine that utilizing the control theory that can guide healthcare professionals in a significant manner to correctly read and analyze large volumes of medical data in a concise amount of time. They state that this could help healthcare professionals quickly analyze medical data. In recent years, with an exponential surge in people who must avail the of healthcare services, such a necessity will keep rising.[20] Luo et al[21] state that a double-reading or entry system can significantly help healthcare professionals extract and thereby analyze large volumes of structured and unstructured medical data in a concise amount of time. They believe this will rapidly change the face of the healthcare field.[21]

Research Question

The main question this report aims to answer through research is to understand "How huge volumes of medical data can be read in short amounts of time?"

Research Hypothesis

H1: It is assumed that a significant amount of time is spent analyzing medical data by healthcare facilities in the UAE.

H2: It has been assumed that disruption technologies enabled tools can help significantly reduce the time taken to analyze such large volumes of medical data.

H3: It has been assumed that the tools used in advanced countries can also be implemented in the UAE.

Research Objectives

- Analysis of the current circumstances of the healthcare facilities in the United Arab Emirates.
- Get a clearer perspective of how various concerned stakeholders interact.
- Emphasizing the significance is necessary for early, correct, and quick analysis of large volumes of medical data.
- Determine the gaps in the present scenario of medical data analysis prevalent in the healthcare facilities in the UAE and how they can be bridged.
- To provide suggestions to augment solutions to the problem of EMR integration.

Statement of Need

The present study needs to know the different opportunities and challenges the clinical physicians face while conducting or preparing any medical report. With the help of this study, the problem with digital disruption in analyzing big data in the healthcare sector is evaluated. This study is of primary importance because the healthcare sector is vital. After all, it deals with taking care of the health of individuals. Digital disruption is a prevalent factor in the present times now with the innovation of new technology and advancement. The research will thus bring into light the opinions of different authors, and IT professionals regarding how analyzing big data can disrupt the infrastructure of healthcare facilities operating in the UAE.

Digital Disruption Tools and Use Cases

Below are listed a handful of digital disruption-enabled tools that can easily be integrated into the current infrastructure of the healthcare facilities in the UAE. It can help save valuable time, which can be utilized in saving lives and providing better facilities for the patients receiving treatment.

Artificial Intelligence

Some of the AI-enabled tools that can significantly help healthcare facilities as well as healthcare professionals to analyze large volumes of medical data in very short amounts of time, especially in the case of the UAE, are listed as follows:

- AI-enabled analytics tools. The AI-enabled analytics tools such as descriptive, predictive, and prescriptive analytics can help healthcare facilities to analyze present situations, compare them with records and provide data regarding how they can better prepare themselves for any oncoming medical emergencies.[22]
- Neural Networks. Neural Networks can be an effective tool in the arsenal of healthcare facilities. It can help these facilities provide better treatment and help them avoid any medical crises.[23] If put to use correctly, they can go a long way in helping the physicians as well as the HIM department in better handling of records, finding obscure connections between past and present cases, and even determining if there is any relation between cases that must be examined.
- Double Reading/Entry System. This system can make the work of the professionals working in the HIM departments of the healthcare facilities. This sort of entry system will not only ensure that the data entered is consistent but also make it possible for them to store the data in a manner that can be easily accessed and analyzed as and when required within a concise amount of time. It can go a long way in helping the effective management of patient records stored by the healthcare facilities' HIM department.[24]

- Hivemind – Halemind is the AI-enabled hospital management solution that helps medical institutions streamline patient registration, electronic health records, and appointment scheduling procedures. Administrations can achieve insights into revenue, statistics, trends, average appointment time, and others. These AI tools help interpret massive volumes of medical data effectively.[25]
- AI is being used for data mining to find patterns and carry out a diagnosis of medical conditions.

For example, IBM Watson (an AI tool) helps in the selection of a treatment procedure

- A platform called "Artificial Intelligence for Drug Discovery "(AIDD), built by biopharma company NuMedii leverages AI and big data to detect the connection between drugs and diseases and prescribe the right medicines.

Blockchain
- Patients' medical history can be recorded and easily accessed by doctors through Blockchain. Counterfeit medicines can be identified by checking the source from where the drugs were procured on the Blockchain network.

IOT
- IoT helps in remote monitoring of a patient's health.
- Patients can record their heart rates at home, record the data in a central software for real-time analysis, and get results on the same day with a doctor's advice.

Remote Patient Care
- Philips allows doctors to use sensors and remote devices to support patients with medications and even measure their biometrics.

Patient Wait Time Prediction
- It's an IoT-driven software that monitors availability to reduce delays for patients requiring urgent care efficiently.

Chronic Disease Remediation
- Wearable technology, next-gen computing, and mobile access are combined to improve clinical care and reduce healthcare bills for chronic illnesses.

Smart Pharmacy and Logistics
- The pharmacy ecosystem ensures greater operational efficiency, error-free pharmaceutical distribution, protection, and improved overall quality of care.

Robotics and Automation
- RPA (Robotic Process Automation) tools are used in hospital process management to provide faster service to patients by automating the entry of patient information using chatbots and optical character recognition tools. Below are some use cases.

Virtual Assistance
- Is using a combination of AI and RPA to help customers and deliver medication.
- Alerts, educational materials, and more.

Fraud Detection
- GE uses RPA and machine learning algorithms to help prevent fraudulent claims and send alerts to the concerned people as soon as they detect one.

Data-Driven Decision Making

- GE is helping document and offers more insights about a patient's status to help doctors make better data-driven decisions.

Smart Hospital Administration

- RPA can handle administrative tasks like patient registration, patient data entry, and doctor scheduling for appointment requests.

Drones

Drones are also currently used for critical deliveries of health supplies in healthcare.

Edge Computing

Rural healthcare has been challenging because of connectivity issues; therefore, IoT-powered healthcare solutions coupled with an edge can decrease dependency and provide needed support for rural locations.

Use Case

Healthcare requires real-time data and continuity

- Real-time health monitoring is complex for hospitals because data is unstructured and requires a lot of focus.
- IoT medical equipment can find any anomalies in the data and send alerts, allowing hospitals to respond in real-time, potentially saving lives.
- Using IoT equipment will allow the consumer to check the data on their health.
- Location-based movement in hospitals, specifically to services like a guest room, cafeteria, and administrative office, are critical edge computing solutions that can improve patient experience and transform the healthcare industry.

XR/VR

Karuna is building an XR app to support many therapies, including physical therapy, mental well-being, hormonal changes, cognitive therapy, cardiovascular rehabilitation, and pain relief.

Medical Imaging

Karuna uses VR to create ultra-precise 3D medical images. The imaging tools help surgeons see through obstructions and collaborate with colleagues on surgery plans.

How the Gaps Can Be Filled

Tseng[26] believes that Load Balancing Multipath Routing is a method using which healthcare professionals can significantly reduce the time that they require to quickly and correctly read and then analyze large volumes of medical data and make it possible for them to do so in a brief period.[26] Yong[27] suggests that in the case of big medical data, a load balancing strategy can not only help reduce the stress on the cloud but can also significantly help the professionals working in the healthcare sector to sort the medical data based on what is necessary to their diagnosis and what is not. This can go a long way in significantly reducing the time being taken to correctly read and analyze large volumes of medical data.[27] Table 1 below summarizes the relevant literature.

Research Methodology

With the emergence of healthcare, big data analytics have opened the newest ventures for improving healthcare insurers. Various research has discussed frameworks about the methods of handling large volumes of big data from different sources. The approach used is qualitative. Reviewing the literature and analysis based on interviews with all

Table 1 Literature Review Summary

Author	Title	Source	Findings
12.Oussous, A., Benjelloun, F. Z., Lahcen, A. A., and Belfkih, S. (2018)	Big Data technologies: A survey	Journal of King Saud University-Computer and Information Sciences	Effective healthcare comes with quick analysis of data
15. Cheng, B., Zhang, J., Hancke, G. P., Karnouskos, S., and Colombo, A. W. (2018)	Industrial cyberphysical systems: Realizing cloud-based big data infrastructures	IEEE Industrial Electronics Magazine	The latest technology clears large data analysis obstacle
16. Perwej Y, Haq K, Parwej F, Mumdouh M, Hassan M, (2019)	The internet of things (IoT) and its application domains	International Journal of Computer Applications	Highlights the gaps healthcare sector
19. Al Alawi, S; Al Dhaheri, A; Al Baloushi, D; Al Dhaheri, M; Prinsloo, EA (2014)	Physician user satisfaction with an electronic medical recs system in primary healthcare centers in Al Ain: a qualitative study	BMJ Open	Patient-physician relationship is affected negatively from increased waiting time
20.Hu, Zijing, Hongyan Li, Baojun Qiu, Lv-an Tang, Yu Fan, Haibin Liu, Jianlong Gao, and Xinbiao Zhou (2005)	Using control theory to guide load shedding in medical data stream management system	Annual Asian Computing Science Conference	Control guide theory significance in healthcare
21. Luo, L., Li, L., Hu, J., Wang, X., Hou, B., Zhang, T. and Zhao, L.P (2016)	A hybrid solution for extracting structured medical information from unstructured data in medical records via a double-reading/entry system	BMC medical informatics and decision making	The demand of data analysis of big data in the future
22.Prat, N. (2019)	Augmented analytics	Business & Information Systems Engineering	Analytical tools by AI in processing data
23.Albawi, S., Mohammed, T. A., and Al-Zawi, S. (2017)	Social Touch Gesture Recognition Using Convolutional Neural Network	International Conference on Engineering and Technology (ICET) (pp. 1–6). Ieee	Neural Network a capable tool for HIM in data management
24.Butte, 2021	DOUBLE-ENTRY READING JOURNALS	Butte College	Double reading and entry system utilization
25.Softwareadvice, 2021	About Halemind	https://www.softwareadvice.com/	Example of AI in hospital management solution
26.Tseng, C. H. (2016)	BMR: Load-balanced multipath routing for wireless data-intensive transmission in real-time medical monitoring	International journal of environmental research and public health	Time reduction in data processing through Load Balancing Multipath
27.Yong, H. (2020)	Load balancing strategy for medical big data based on low delay cloud network	The Journal of Engineering, 2020(9), 799–804	Supporting and ensuring the necessity of Load Balancing
28. Palanisamy, V. and Thirunavukarasu, R, (2019)	Implications of big data analytics in developing healthcare frameworks –A review	Journal of King Saud University – Computer and Information Sciences	Introduction of big data analytics and witnessed result of the transformation

concerned parties is made. The outcome from the article "Implications of big data analytics in developing healthcare frameworks –A review" by Palanisamy and Thirunavukarasu[28] is about how with the introduction of big data technology, the healthcare sector has witnessed has brought forward transformation. The diversified sector of big

data sources enables in meeting the needs of some prominent stakeholders upon attaining several healthcare solutions.[28]

Study Design

Various data works have been reviewed to derive the application of the multiple factors that help improve big data analytics in the healthcare sector. The study design adopted in this research is the qualitative research design where interviews have been collected from two global organizations. This is a qualitative research design because primary and secondary data have been gathered.

Data Collection Method

Primary Data Collection

Qualitative analysis is used as the approach for data analysis. Twenty-five interviews were conducted, including two global organizations: John Hopkins and Joint Commission International (JCI), and the three most prominent UAE-based health organizations: the Department of health, SEHA in Abu Dhabi, and the Dubai health Authority (DHA) in Dubai. Additional interviews were conducted with 10 Physicians, 5 EMR managers, and 5 HIS professionals.

The ten physicians interviewed were from four different specialties to gain better insights physicians are the interface between the EMR and the patients. Proper channels were followed while getting in touch with all interviewees.

Secondary Data Collection

The secondary data that have been utilized for this research consists mainly of existing literature and research that has been conducted on this topic.

Details of the literature review

Sampling Methods

The sampling method used in this research is purposeful because the interviewees voluntarily participated in the interview methods. On the other hand, for the secondary data, many journals and websites were searched that hold accurate data about the challenges and opportunities that extensive data analysis might bring to the healthcare sector.

Analysis

The Physicians

- It has been noticed that quick analysis of large volumes of medical data can go a long way in saving patients' lives.
- Medical data is stored on digital databases, but most of it is analyzed manually.
- In critical cases, where split-second decisions matter, they must often go through several pages of medical jargon and data to conclude.
- They should investigate introducing complete automation in their processes for storing and analyzing medical data.
- More time dedicated to patients and more informed data-driven decisions is needed.
- Digitized data help physicians find underlying connections between cases and treat patients accordingly.
- Some gaps are present in the current infrastructure of healthcare facilities in the UAE.

Regarding the EMR

- The data were analyzed in two parts. The first part is the analysis of the demographic data collected, and the second part is the analysis of the responses to open questions.
  - o The physicians were asked to estimate the percentage of their total working hours that they see their patients in the office (clinic) as outpatients to evaluate their experience and requirements of the changes in the EMR settings for outpatient encounters.

○ This increases the complexity of the EMR and contributes to the confusion of physicians. In addition, the notes from other healthcare providers, such as radiologists and nurses, cluttered the EMR interface. It increases the time required to get the necessary information before the patient enters the physician's office.

○ Our study showed that the time given to physicians to review the patient's EMR before the encounter is five minutes or less, according to the majority (87.5%).

- A consensus was reached, and all the physicians preferred a more user-friendly interface in the system to help them search through the patient record.

- According to the interview results, the minimum required information for any patient's visit includes the past medical history (chronic diseases including surgeries), the physician's note of the last stop, investigation results (including laboratory tests, radiological tests, and biopsy results), and current medication list.

The HIS Department

The HIS and management department is integral to the healthcare facility. They are responsible for handling the medical records. Therefore, they are responsible for analyzing the relevant data very carefully.

- They also believe that their jobs will become easier if they can analyze such vast volumes of medical data in short periods.
- They believe that the quality of services they provide will improve by leaps and bounds if this happens.
- Digital disruption is the need of the hour.
- Compared to advanced countries, the system in the UAE has a lot to catch up on.
- It is also their opinion that this will significantly help spot patterns that might help them in the early detection of diseases such as the Covid-19 pandemic in the future.
- Data digitalization even allows them to observe patterns in the symptoms of patients being treated, including early detection, and help curb the spread of diseases.

Regarding the EMR

- Adding an overview page to replace the summary page could solve the problem of time needed to review the patient's EMR to avoid replication.

The Healthcare Management Department

- They agree that the need for tools to analyze large volumes of medical data correctly and quickly will make their work easier and significantly better.
- The management system at the healthcare facilities in the UAE can also benefit significantly from the integration and automation into their systems.
- Allow the decision-makers and policymakers to have a better overview of all the operations in the healthcare system.
- Facilitate better decisions and policies. It can also help them in.
- Organizing their plan and inventory based on trends and symptoms of patients visiting them daily.

The IT Dimension of the Problem

Consultation with experts in the HIS field led to the conclusion that:

- Digital disruption-enabled tools have helped healthcare professionals analyze large volumes of medical Big Data.
- They have helped physicians to arrive at better split-second decisions which have been elemental in saving the lives of the patients being examined.
- Find trends and patterns for early detection of an epidemic/pandemic and help them better equip themselves for it.
- With the proper platforms, infrastructure, and training and guidance, the employees working in the healthcare industry can reap great benefits.

- The actual beneficiaries of this would always be the patients receiving better quality treatment.
- Artificial Intelligence, big data, and other disruptive technology tools can significantly help healthcare facilities in the United Arab Emirates overcome the gaps in their current infrastructure.

Regarding the EMR

- Improvements to the EMR system are needed to make the system more usable to physicians and managers.
- A different interface needs to be devised that would make the EMR easier.
- "One patient – one record" for each seeking medical care.[29]
- The indicator for performance, the number of patient visits, has made the metric even harder to understand and use.[30]

The suggested solution by the authors of this paper is to make the EMR easier to read. The complete customization of the EMR interface to a more user-friendly one is not within the scope of this article.

Discussion

EMR will allow it to be more easily handled by physicians to reduce the time required to gain the necessary information about each patient. Therefore, this will reduce the patient encounter time by allowing the EMR to be more user-friendly. The Healthcare Management Department is essential to ensure the smooth operation and functioning of the healthcare facilities. Thus, using new digital data services and storing and analyzing data in intelligent devices have made it possible for the healthcare sectors to reduce costs and improve their overall organizational performance. The healthcare sector operating in the UAE must ensure the quality of services provided is top-notch. This includes top-class infrastructure and correct and timely access to the necessary medical data as and when required. It must also be ensured that this data can be analyzed correctly and as quickly as possible. As the number of medical cases being attended to surges, it is high time medical facilities start implementing systems that ease the medical analysis.

Recommendations

Johns Hopkins Medical International, Joint Commission for International Accreditation (JCIA), Department of Health, SEHA, and Dubai Health Authority Officials Interviewed Agree on Common Aspects as Technical and Managerial

Technical

- Digital transformation is medical data is to be done in a manner that is both sustainable and profitable.
- All HIS data must be stored on the cloud through proper Dig data. This Big data can be accessed by the authorized personnel as and when required.
- Digital disruption-enabled tools can significantly help healthcare facilities and professionals, as highlighted in the literature review.
- The AI-enabled tools can also lead to going through the file of the patients in a proper way that will ensure better reading. This enables customized treatment for the patients as per their needs.
- Data management tools like the Load Balancing Multipath Routing system can be implemented for time slicing the process into batches.
- In some cases, an integration or combination of tools like AI, Big Data, and IoT is required.
- The Healthcare industry, in general, is lagging in embracing digital disruption.

Managerial

- While the doctors faced no significant trouble during an analysis of medical data, the process implemented by them can be improved significantly.
- The medical report is characterized as concise but not incomprehensible at the same time. This will make it easier to analyze.

- Specific Suggestions shall also be gathered from the healthcare professionals and enable better medical data analysis.
- Specific secondary data can also be gathered in terms of setting up the right tools that will help the organization assess the treatment need of the patients.
- Giving enough time to read medical documents is necessary for better treatment facilities.
- Full collaboration between health professional bodies and HIS providers better identifies the areas of strengths and weaknesses.
- Making sure that the quality of services being provided to the companies are appropriate.

Conclusion

To conclude this research report, it can be said that:

The healthcare facilities in the United Arab Emirates are world-class in some areas and predominantly manual in other regions, like the patient files reading system.

The healthcare facility employees interviewed were all the opinions that reading large volumes of medical data correctly and quickly in a concise amount of time can bring a revolutionary and significant change to the healthcare facilities.

The situation here is not a strategic problem. It is an operational gap that can be worked on and resolved. The healthcare sector is competent in implementing infrastructure, processes, and tool changes. Organizations must investigate implementing digital disruption technologies and tools to speed up this process. Digital disruption technologies and tools are highly recommended to be embraced in healthcare transformation in UAE. What has been assessed from the findings is that with the ongoing healthcare transformations, the operational problem has emerged to be the primary reason for issues related to big data analytics. EMR is faced with technical problems, such as the long learning curve needed in its implementation and initial use. It is also faced with complexities regarding the clutter on the record, which may prevent clinicians from seeing the vital information needed for each patient encounter. Physicians have limited time to extract data from the patients' records (EMR) before meeting them. Providing physicians with improved technology systems is the best way to ensure better quality patient services. What has been assessed from the findings is that with the ongoing healthcare transformations, the operational problem has emerged to be the primary reason for the occurrence of issues related to big data analytics.

Suggestions for Future Research

Some suggestions that can be made for future research is to make the study both qualitative and quantitative, where surveys can be conducted among several researchers or prominent data analysts so that they can discuss the problems that they have faced while analyzing big data.

Data Sharing Statement

The datasets used or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Approval

Ethical approval was obtained from the Research Committee, Hamdan Bin Mohamed Smart University.

Consent to Participate

Informed consent was obtained from the study participants.

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Disclosure

The authors have no competing interests to declare relevant to this article's content.

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