



The impact of AI system in Healthcare Management



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Abstract

Artificial Intelligence (AI) systems are increasingly being integrated into healthcare management, these suggest changing the way patients are cared for, how efficient operations can be and what decisions should be made. A literature review is presented in this article that considers all the literature available on AI systems used within healthcare management. To complete this review, articles from 2014 through 2024 were synthesized with findings from peer-reviewed sources, as well as studies conducted before then and industry reports.

The research explores different areas where artificial intelligence is applied in managing health care such as automation of administrative processes; clinical decision support systems; predictive analytics for patient outcomes and resource allocation; diagnosis driven by AI among others like personalized medicine. Also, it seeks to find out merits reported vis-à-vis challenges met during implementation stage while testing them against efficiency in service delivery plus patient wellbeing besides looking at ethical, legal social implications associated with adoption of these technologies within medical facilities.

Methodology consists mainly of doing searches through selected publications in major databases like PubMed, Scopus, IEEE Xplore, Web of Science followed by a thorough screening exercise which involves data extraction and quality appraisal among other things.

The study establishes that there are many benefits which could accrue from using artificial intelligence in healthcare management including streamlining operations thereby improving efficiency levels achieved so far while enhancing clinical decision making process towards achieving better outcomes for patients but also recognizes difficulties faced during execution such as lack of awareness or knowledge about it among staff members alongside resistance shown by some employees due concerns over data security thus insisting on need strong moral codes around its usage within health settings.

Chapter 1 (Introduction):

The integration of healthcare management and artificial intelligence (AI) has been a game-changer for the medical field. This has created new promise for patient care, decision making and operational efficiency among others (Racine et al., 2019). Organizations in health care are under pressure to improve results while containing costs; AI can help meet these needs by addressing long-standing problems with new ideas. As AI continues advancing, it is important that we comprehend how this affects healthcare management and thus should be taken seriously by policy makers as well as those working in the medical field (Dixit et al., 2021).

This study will discuss about possible benefits which can accrue from using AI systems in hospitals or any other healthcare settings; challenges faced during implementation process and also ethical considerations surrounding such adoption within various organizations. Moreover, we shall point out areas where more research needs to be done because there exists limited information concerning some issues related with current studies done under rapidly changing environment like health sector where everything revolves around life itself. In addition, we hope that this overview contributes towards increasing knowledge base regarding application areas of AI technologies within health care services and suggest future directions for further investigations as well.

The aim throughout this study is to go through different literatures available about uses of Artificial Intelligence in Health Care Management until now. The author is going to look at many things through these reviews such as possible advantages ,disadvantages ,ethical concerns among others when implementing them into healthcare facilities .Also we need find gaps left behind by previous researchers who conducted their studies on this topic then recommend what should be done next following rapid changes witnessed currently within our hospitals plus clinics etcetera which deals with saving lives every day.

Background:

The integration of Artificial Intelligence (AI) in healthcare management roots in advances in technology within medicine and increasing digitalization of healthcare information. This understanding is necessary to fully comprehend the current position

and potentiality of artificial intelligence (AI) in health care management (Musbahi et al., 2021).

According to (Formosa et al., 2024), the idea of using AI systems for healthcare was first introduced between the 1960s and 1970s when expert systems like MYCIN were developed for diagnosing infectious diseases. However, at that time computing power was insufficient, and the data required was not available, hence limiting their use. Over the last twenty years or so there has been an unprecedented growth in AI capabilities.

Many things have contributed towards this; among them being rising costs which have made it necessary for organizations to find ways through which they can operate more efficiently, increase productivity levels while lowering expenses incurred during service provision processes such as hospitals (Kim & Kim, 2024). Another factor is aging populations coupled with increased chronic disease burden this has put pressure on healthcare systems worldwide leading to shortages of medical professionals especially doctors but also other staff categories such as nurses etcetera who are needed most where these conditions prevail over long periods without adequate attention given towards addressing them adequately because there may not be enough people available with appropriate qualifications required by such positions.

Different groups have shown interest in developing and utilizing artificial intelligence (AI) within health care management systems (Stagi et al., 2021). These parties include providers/organizations involved directly with patient care delivery; patients themselves plus their representatives from advocacy groups; developers/tech firms specializing exclusively or largely around creating algorithms applicable across various sectors; regulators/policy makers charged primarily or partly overseeing safety standards implementation including those related directly or indirectly impacting upon AI adoption within specific domains such as medicine/pharmacy etcetera; insurance companies/payors interested mainly but not limited solely towards insurance products designed specifically aimed at covering costs associated directly/indirectly arising from use artificial intelligence (AI) within health care systems; researchers/academics involved primarily but not exclusively conducting studies aimed at generating new knowledge on different aspects related directly or indirectly to the application of AI in health care management among others.

AI systems in healthcare management can be broadly categorized into:

- **Machine Learning (ML):** which are Algorithms that enhance through experience and used for predictive analytics.
- **Natural Language Processing (NLP):** which makes it possible for computers to understand and interpret human language, a necessary condition for dealing with medical records and literature.
- **Robotics Process Automation (RPA):** which carries out routine administrative jobs in order to increase efficiency.
- **Computer Vision:** which tests medical images to diagnose and monitor patients (Cock et al., 2022).

For this reason, we will evaluate the different ways in which AI systems have affected healthcare management, basing our analysis on what we have come to learn about it. These impacts will be discussed later in this paper.

Problem statement:

Despite the many advantages of AI system use within health care organizations there still exist certain areas where it has not been properly implemented or where its effects are not yet clear. The problem faced by many healthcare providers is how best they can integrate these technologies into their current operational structures to achieve maximum benefit from them while at the same time ensuring that privacy rights are protected, and data accuracy maintained. It is also necessary for ethics committees within such organizations adopt policies which guide staff members on when they should report certain findings made using artificial intelligence tools especially those related directly towards patient care since failure do so may lead severe consequences including legal implications. Another challenge lies in trying to understand what exactly happens when different types of AI impact various settings or specialties because currently there only limited knowledge available concerning this matter thus making difficult design appropriate interventions based on needs identified through study findings alone without considering wider context of application across other areas too. Finally, there are few studies that have provided comprehensive information regarding real world outcomes associated with implementation these systems more especially against quantifiable measures like mortality rates among others therefore

making impossible determine actual benefits derived from them at present moment in time.

Research objective:

1. Identify and categorize the main applications of AI in healthcare management.
2. Review the advantages and disadvantages that come with introducing AI to health care facilities.
3. Examine the impact of AI systems on operational efficiency, cost-effectiveness, and treatment for patients.

Research scope:

This literature review will focus on peer-reviewed articles, previous studies, published in the last ten years (2014-2024) to ensure relevance to current AI technologies and healthcare practices.

The scope of the review includes:

- AI applications in healthcare management.
- Studies conducted in various healthcare settings, including hospitals, clinics, and long-term care facilities.
- Research from different geographical regions to capture a global perspective on AI adoption in healthcare management.

Chapter 2 (Literature review):

Research undertaken by (Secinaro et al., 2021) intends to evaluate the function of artificial intelligence in healthcare using a systematic literature review. The organized literature review, with its consistent and reproducible research process, enabled the researchers to get 288 peer-reviewed publications from Scopus. The authors analyzed authors, publications, keywords, and researcher cooperation networks using both qualitative and quantitative characteristics. In addition, the work benefitted from the Bibliometrix R software package. The analysis revealed that literature in this topic is developing. It specializes in health services administration, predictive medicine, patient

records and diagnostics, and clinical decision-making. The US, China, and the United Kingdom supplied the most studies. Keyword analysis demonstrated that AI may help clinicians make diagnoses, anticipate disease progress, and tailor treatment plans. The literature suggests various AI applications for health care, as well as an underexplored area of study. For example, AI initiatives need skills and data quality awareness for data-intensive analytics and knowledge-based management. Insights may assist academics and health professionals to better understand and handle future AI research in healthcare.

(Alanazi, 2021) conducted a systematic evaluation of 75 peer-reviewed academic journal publications to investigate the implications of technologies such as IoT and AI in healthcare. The study finds an exponential increase in the number of articles published in the previous decade, a diverse range of publishing sources, many authors, and several conceptual and design science studies, all suggesting a burgeoning subject with high publication potential in the next years. The data also demonstrates that these technologies' applications are being explored all over the globe, not only in the United States, but also in numerous European and Asian nations. The paper additionally emphasizes key insights for the top use categories, which include wearables and connectivity, disease surveillance and treatment, patient care, and sensor networks, as well as identifying gaps and future research directions in technology design and acceptance, data security and privacy regulations, and system efficacy and safety.

According to (Mohamad et al., 2020), the Internet of Things (IoT) has transformed how we use technology over the last decade. The fast rise of the Internet of Things has an impact on a variety of industries, including healthcare. As a consequence, the notion of smart healthcare (or e-healthcare) has evolved. Smart healthcare promises to improve people's life and well-being by monitoring them, providing efficient connections, boosting mobility, collecting medical data, and lowering hospital and patient expenses. IoT in healthcare is one of the most popular and trending subjects that need more exploration. There has been no recent review to highlight the scope of research in the subject, the characteristics of published articles, the motivations and problems in enabling IoT in healthcare systems. This report provides a detailed systematic assessment of the selected publications published between 2015 and 2022 on enabling IoT in healthcare services and applications. A total of 106 publications met the final inclusion criteria and were assessed by a systematic literature review (SLR). There were

two techniques used to evaluate the final articles: First, publications are evaluated in terms of research designs, publishing journals, and study topics/objectives. In the second approach, motivations, obstacles, and suggestions for enabling IoT in healthcare systems are investigated. This article highlights previously published research on IoT in healthcare systems and its use in smart healthcare service delivery. Based on the evaluated studies, suggestions for future study are made to allow the successful use of IoT in healthcare and service delivery.

According to (Esmailzadeh, 2020), patients may be among the most significant benefactors and consumers of AI-based apps, and their perspectives may influence the broad adoption of AI-based technologies. Patients should be assured that AI-based gadgets will not hurt them, and that adopting AI technology for healthcare will help them. Although AI may improve healthcare results, any problems and hazards should be addressed before it is integrated into ordinary clinical treatment. Because of the unique nature of the healthcare industry, the research creates a model based mostly on value judgments. This research will look at how consumers perceive the advantages and hazards of AI medical devices with clinical decision support (CDS) characteristics. The research employs an online poll to gather information from 307 people in the United States. The suggested approach detects the sources of patient incentive and pressure during the development of AI-based products. The findings indicate that technical, ethical (trust considerations), and regulatory concerns all contribute considerably to the perceived dangers of deploying AI technologies in healthcare. Of the three categories, technology concerns (i.e., performance and communication features) were revealed to be the most important predictors of risk perceptions.

A research by (Contreras and Vehi, 2018) attempts to analyze current initiatives to apply artificial intelligence approaches to help with diabetes care, as well as the issues that come with them. A review of the literature was carried out using PubMed and other bibliographic databases. From 2010 to 2018, we analyzed the literature and identified 1849 relevant publications, of which we chose 141 for a full evaluation. The research offered a functional taxonomy for diabetes care with artificial intelligence. In addition, a comprehensive analysis of each topic area was carried out utilizing relevant key outcomes. This technique demonstrated that the tests and research examined produced promising outcomes. The study found signs of increased research effort focused at producing artificial intelligence-powered solutions for predicting and preventing

diabetic complications. Our findings suggest that artificial intelligence technologies are gradually gaining acceptance as acceptable for use in clinical daily practice and diabetic self-management. As a result, these treatments provide effective tools for increasing patients' quality of life.

A study by (Ahmad et al., 2023) clarified firstly the new generation of technology and AI nowadays and gained increasing attention. They extracted a 288 peer-reviewed papers from Scopus. It revealed that AI can support physicians in making a diagnosis, predicting the spread of diseases, and customizing treatment path by algorithms to assist healthcare providers and AI powered applications can positively effect on the diagnosis and management processes .in addition, algorithms also can enhance and accelerate the drugs development. As well as reduce the workload on healthcare partitioners and cost saving (economically). In other hand, IOT and AI in healthcare: a systematic literature review, which aimed to discover the impacts of two technologies - IoT and AI – on healthcare through a systematic review of the literature and to provide a comprehensive understanding of the applications, benefits, and challenges associated with this integration. A systematic literature search process, including queries in multiple databases (e.g., Scopus, IEEE Xplore, PubMed) was followed. The study includes patient monitoring, early disease detection and Operational efficiency and resource optimization in healthcare facilities. It reveals many benefits of utilizing the new generation of technology to enhance the quality of care given, refine disease detection and control and management.

In other hand, (Yang et al., 2022) clarifies that Artificial Intelligence for Diabetes Management and Decision Support, study paper described the diabetes condition and how it impact the patient's life and the routes of observation and managements. Then it showed how AI systems can enhance the patient's life by continuous monitoring, reading recorded, and the action should be done to manage the events. a detailed analysis of each subject category such as Glucose Prediction and Forecasting, Glucose Prediction and Forecasting, Continuous Glucose Monitoring (CGM) Data Analysis and Personalized Lifestyle Recommendations were performed using related key outcomes. This approach revealed encouraging results Improved glycemic control and reduced risk of complications and Personalized and adaptive care tailored individually demands.

A Study on Heart Disease Dataset by (Wu and Trigo, 2020) designed to focus on different explainable AI techniques in the healthcare sector especially on heart disease cases from the UCI Machine Learning Repository. The process generated by SHAP and LIME helped to understand the complex relationships between the input features and the heart disease outcome. The limitation of the study that need exploration on other majors than heart disease to check out the impact of the process of working and benefits. Lastly, the outcome revealed XAI techniques usage can enhance the transparency and interpretability of AI-based decision support systems, promote trust, and enable more informed medical decision-making.

In the study by (Ocak et al., 2017) which Use of AI-based tools for healthcare purposes: a survey study from consumers' perspectives, investigates consumer perceptions and attitudes towards the use of AI-based tools in healthcare applications which showed promising future in utilizing the AI in healthcare, as well as Organizational, professional, and patient characteristics associated with artificial intelligence adoption in healthcare: A systematic review encourage the outcome of the study awareness wise and familiarity and the users were aware of using AI system and there benefits but the specific application was limited. The process faced a barrier related to security and data privacy but in general, most of the users were well to learn and utilize the system by time.

According to (Formosa et al., 2024), a collaborative approach that balances the benefits of AI with consumer preferences and ethical considerations is crucial for the successful integration of these technologies in the healthcare sector. Most of the previous studies show that more investigations need to be done, ethical application should be considered to overcome the challenges and the limitations, expand the geographical regions to cover up more cases and datasets to observe the real impact of AI system usage. Lastly, all the previous studies encourage and support the use of AI in healthcare, it supports the detection, evaluation, and treatments of medical issues better and easier for the health provider and patient.

Chapter 3 (Research methodology):

Research methodology:

This study will employ a literature review methodology to ensure a comprehensive and unbiased analysis of the available research.

The process will follow these steps:

1. Database Selection:

To find related works, PubMed, Scopus, IEEE Xplore and Web of Science will be employed.

2. Search Strategy:

“Artificial Intelligence,” “Machine Learning,” “Healthcare Management,” “Hospital Administration,” “Clinical Decision Support” and “Predictive Analytics” are the keywords that are used during the search.

3. Inclusion Criteria:

- Peer-reviewed articles published between 2014-2024.
- English language publications.
- Studies focusing on AI applications in healthcare management.

4. Exclusion Criteria:

- Non-peer-reviewed articles, opinion pieces, and editorials.
- Studies solely focused on AI algorithm development without healthcare management applications.

5. Data Extraction:

A standardized form will be used to extract pertinent information which includes study design, AI application type, outcomes measured and key findings.

6. Data Synthesis:

A narrative synthesis approach will be used to summarize and interpret the findings.

Expected outcomes:

1. A full review of existing healthcare management AI applications.
2. Recognition of the main advantages and disadvantages of introducing AI systems into medical environments.
3. Evaluation of how much operational efficiency, cost-effectiveness and patient outcomes have been influenced by AI.
4. Examination of ethical, legal, and social considerations associated with adopting artificial intelligence in managing health care.
5. Recognition of areas where research has not been done enough and recommendations for possible future studies.
6. Advice to healthcare administrators and policy makers regarding successful integration of AI.

Gantt chart:

Task	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Literature search						
Screening & selection						
Data extraction						
Data synthesis						
Draft writing						
Review & revisions						
Final paper preparation						
Submission & formatting						

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