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A Sociological Analysis of The Impact of Artificial Intelligence on Healthcare Delivery: A Systematic Review of Allied Hospital Faisalabad

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Abstract
Incorporating Artificial Intelligence into the system of healthcare has revolutionized many fields like medical services, improvement in diagnostic accuracy, patient outcomes and working efficiency. The present study depicts systematic review of impact of Artificial Intelligence on Healthcare Delivery at Allied Hospital Faisalabad, Punjab which is one of the largest teaching hospitals in Pakistan. The paper analyzes various AI applications such as diagnostic techniques and tools, clinical decision support systems, the monitoring technologies and the automation of administrative jobs. Depicting a comprehensive review of existing material and literature, case studies and hospital reports, the article assesses both the benefits and challenges related with the AI adoption in Pakistani Healthcare context. The findings present that AI has improved treatment methods, reduced errors and improved various departments of patient management such as radiology and surgery. The article also points out various problems and challenges such as shortage of trained staff, absence of modern and updated infrastructure and monetary restrictions.
Moreover, the paper also presents useful and valuable suggestions such as need of training programs, availability of modern digital infrastructure and the role of Government Policies for the improvement and implementation of Artificial Intelligence in the health sector of Pakistani Society. The study is also handful for the policy makers, administrators related to healthcare sector and the researchers who are seeking the role of AI in the betterment of healthcare sector especially in underdeveloped countries like Pakistan.

Key Words: Artificial Intelligence, Allied Hospital, Healthcare Delivery.

Introduction
The role of Artificial Intelligence in delivering services in Healthcare sector is getting integration rapidly day by day worldwide. Artificial Intelligence technology like machine learning and predictive analysis, processing natural language get important potential for the improvement of diagnostic accuracy, enhancing planning for treatment & streamline the operations of the hospital (Topol, 2019) and have ability to tackle various challenges in healthcare systems like medical errors, diagnostic delaying and resource restrictions which make them valuable in developing countries like Pakistan because in Pakistan the healthcare systems face many challenges of accessibility, quality & efficiency (Khan et al., 2021). The healthcare facilities in Pakistan are overloaded such as the limited access to modern medical technologies & specialized care especially in the public hospitals. The Allied Hospital Faisalabad is the major teaching hospital in Punjab which serves an ideal center in providing health related services yearly to countless people across Punjab. In spite of all this, the Allied Hospital Faisalabad faces various problems and challenges such as the shortage of resources, high volumes of patients and absence of modern and

advanced technological tools for diagnosing and treating like many other public health institutions in Pakistan. Introducing AI in healthcare sector has alleviated these challenges by increasing the capacity of healthcare professionals and improvement in patients' outcomes by automation of diagnostic processes, the optimization of hospital management and predictive analytics (Srinivasan & Malek, 2023). The use of Artificial Intelligence in Health sector is like a double-edged sword. It assurances extensive betterment in quality & efficiency of the delivery of healthcare. It also allows for early detection of disease, personalized plans of treatment & for the best management of the resources of the hospital (Gupta et al., 2022). It also raises important concerns about data privacy, equity in healthcare access and potential displacement of human healthcare workers. The understanding of both opportunities & challenges of integrating Artificial Intelligence into the healthcare delivery system is important for ensuring the successful implementation in Allied Hospital Faisalabad as the AI adoption is still in its emerging stages. The main objective of this article is to conduct a review on the Role of Artificial Intelligence in delivering services especially in Allied Hospital Faisalabad while keeping in mind both the challenges and advantages of AI integration through scrutinizing the existing literature, the reports of the hospital and the case studies. This study provides valuable insights about how Artificial Intelligence can positively and effectively be used in the healthcare sector of Pakistan in order to improve the care of patients, optimizing hospital operations & addressing the barriers to AI adoption as the findings will contribute to the emergent body of knowledge on the Artificial Intelligence in the healthcare sector and will recommend useful suggestions for policymakers, the administrators of health and the medical professionals who are interested in integrating AI into the practice.

Review of Literature

The use of AI in the field of healthcare has increased in recent decades as machine learning (ML), (NLP) & deep learning (DL) are being used in healthcare delivery and served as a transformative tool in medical diagnosis, healthcare operations and predictive analytics. As mentioned by Topol (2019) AI has revolutionize the healthcare sector in many ways like IBM Watson, Google's Deep Mind & AI-powered diagnostic systems demonstrated results in radiology, oncology & cardiology (Jiang et al., 2017). The applications of AI can reduce the time of diagnosis, improving accuracy of medical decisions and reduced the human error (Esteva et al., 2019). It assists in disease detection in radiology and pathology and have shown more accurate data (Zhou et al., 2020). AI helps in patient treatment plans and the factors like genetics, lifestyle & medical history (Reddy et al., 2021). Its adoption is not common in developing countries like Pakistan as hospitals often face problems and challenges like limited resources, inadequate healthcare infrastructure & absence of skilled professionals by making integration of modern technologies of AI more complex.

The several studies have also pointed out growing interest in Artificial Intelligence to bridge healthcare gaps in these areas such as a study was conducted by Patel et al. (2021) found that AI could importantly increase diagnostic capabilities and minimize the load on healthcare professionals. The AI-powered telemedicine platforms can improve the access of patients to the specialized healthcare services in remote and underserved areas of under developing countries like Pakistan (Srinivasan & Malek, 2023). It can reduce the burden in the hospitals where healthcare workers are overburdened with high number of patient's volumes and administrative works (Miller & Walker, 2020). AI technologies such as decision support systems & predictive analytics are being explored to improve the efficiency & quality of care in the context of Pakistani Society as the healthcare infrastructure is already stretched thin (Khan & Yousaf, 2021) for example the AI-based tools could help alleviate the operational inefficiencies faced by Allied Hospital Faisalabad. AI could benefit hospital in managing patient flow, optimizing the allocation of resources & improving patient management (Khan et al., 2021). It improves the diagnostic accuracy, operational efficiency and treatment efficacy. The tools like electronic health records (EHRs), predictive analytics & automated diagnostics are vital in increasing the quality of patient care and

the AI algorithms analyze medical images with greater accuracy as compared to human doctors in some cases (Esteva et al., 2019) such as the AI in radiology detects abnormalities in medical images like tumors that can be overlooked by human eyes. It is valuable in detecting cancer, cardiovascular diseases & neurological disorders (Jiang et al., 2017). AI can improve the speed and accuracy of diagnoses in public hospitals as there is a shortage of specialized diagnostic tools. The scheduling, patient triage & resource allocation can also be improved by using AI technologies in the hospital and can predict patient volumes, optimize bed management & reduce wait times (Miller & Walker, 2020). AI tools can play a significant role in improving the efficiency of hospital operations, better patient management and resource utilization in Allied Hospital Faisalabad where patient volumes are high and resources are limited. Various challenges and problems hinder in the adoption of AI in health sector in Pakistan in the form of the key challenge like data quality and availability as AI systems rely on large datasets to function properly and in Allied Hospital Faisalabad, the absence of standardized electronic health records and data-sharing may limit the hospital's ability to implement AI tools effectively (Khan et al., 2021).

There are certain challenges which can be faced while integrating AI into health sector such as data privacy, patient consent and the accountability of AI decisions as in Pakistan the regulatory frameworks for AI in healthcare are still under development. So there is a need for policies and guidelines to govern the ethical use of AI in medical practice (Srinivasan & Malek, 2023). The resistance from healthcare workers is also an important barrier who view AI as a threat to their professional autonomy and job security. So it is essential to promote cooperation between AI systems and healthcare professionals (Esteva et al., 2019). No doubt, Allied Hospital Faisalabad is considered as one of the best and a leading public sector healthcare institution in Pakistan. It is in a position to discover the prospective applications of AI in health sector and AI tools can be used in various areas like clinical decision support, patient management & resource optimization. The hospital can better its diagnostic capabilities, manage patient flow & streamline administrative processes through implementing AI-driven systems.

Methodology

This section will discuss the materials and methods used in the present study.

Research Design:

The present study will use systematic review methods to analyze the impact of Artificial Intelligence on the Healthcare delivery especially at Allied Hospital Faisalabad Punjab Pakistan. The systematic review was used because it facilitates a comprehensive, impartial synthesis of prevailing literature on AI applications in the Healthcare settings in Pakistani hospitals. The main objectives of the article were to identify, evaluate, and summarize the findings of relevant studies on implementation, benefits, challenges and outcomes of AI in Healthcare delivery.

Research Objectives:

- To examine the important Artificial Intelligence technologies presently used in the Healthcare in Allied Hospital Faisalabad.
- To explore the effects of AI on care, diagnostic accuracy, operational efficiency and Healthcare systems in Pakistani hospitals.
- To dig out the problems, challenges and barriers to the successful integration of AI in healthcare, especially in developing country contexts.

Data Collection Strategy:

A systematic process of data collection was conducted for comprehensive coverage of existing material and literature on AI in healthcare.

- **Inclusion Measures**: The review included the studies focusing on AI applications in healthcare delivery in hospitals settings. These studies must be published in peer-reviewed journals or reputable conference records from last 10 years (2013-2023).

- **Exclusion Measures**: excludes the studies that are irrelevant to healthcare, studies outside the specified time frame or those that are not available in English will be excluded.
- **Data Sources**: The primary data sources included well-known academic databases such as:
    - *PubMed (for health-related studies)*
    - *Google Scholar*
    - *IEEE Xplore*
    - *Scopus*
    - *Science Direct*

These databases were chosen due to their extensive collection of peer-reviewed literature in medical, healthcare, and technological fields.

Study Selection Process:
The titles & abstracts of articles were screened to identify studies that meet the inclusion criteria after data base search. Then Full-Text Review was done. Quality of selected studies was judged by using a standardized quality assessment tool called Critical Appraisal Skills Programme (CASP) checklist which evaluates the validity, reliability and relevance of the studies, ensuring that only high-quality, evidence-based research is included in the review.

Data Analysis:
- A thematic analysis was conducted to identify recurring themes and patterns in the literature regarding the impact of AI on healthcare delivery including identifying the types of AI technologies used in healthcare, their benefits, and the challenges reported in the implementation process. The key themes were grouped into categories, such as "AI in Diagnostics," "AI in Operational Efficiency," "AI in Patient Care," and "Barriers to AI Adoption."
- A narrative synthesis was used to summarize the findings of the review which explored the specific challenges and opportunities of AI adoption at Allied Hospital Faisalabad.

Limitations:
- There was a tendency for studies with positive results to be published more frequently than those with negative findings and can distress the complete outcomes of the review.
- As there are quite limited studies have been conducted on AI in Allied Hospital Faisalabad, the use of AI in healthcare system is quiet emerging in various parts of world.
- The studies in English-language will be included. The studies in other languages may be excluded leading to incomplete depiction of the universal background of AI in healthcare sector.

Expected Outcomes:
The Artificial Intelligence has positive effects on the overall system of healthcare in Allied Hospital Faisalabad according to the study. It has revolutionized the diagnostic accuracy, patient care & operational efficiency and the study also points out the major hurdles and challenges facing in the adoption of Artificial Intelligence such resistance from healthcare professionals, concerns regarding data privacy and limitation of resources.

Results and Discussion
According to this review, the AI technologies have played an outstanding role in the betterment of healthcare system in Allied Hospital Faisalabad and machine learning (ML), (NLP) and (DL) are quite helpful in following ways:
- AI has revolutionized the diagnostic accuracy in medical images like X-rays, CT scans & MRIs and it can help in accurate and timely diagnoses, reducing diagnostic late and errors in Allied Hospital as well.

- AI has improved patient management in identifying at-risk patients and can analyze the data of the patient to predict disease progression, results and complications (Reddy et al., 2021) and can be useful in managing chronic diseases like diabetes, hypertension & cardiovascular at Allied Hospital Faisalabad.
- AI helps in personalized treatment plans through patient-specific data (e.g., genetics, medical history, and lifestyle) and Allied Hospital Faisalabad can power AI for more individualized care and the satisfaction of patient.
- The tools of Artificial Intelligence have been used in many hospitals across the globe for hospital operations like managing the bed capacity, the scheduling, the flow & staffing and it can streamline administrative tasks. (Miller & Walker, 2020). The AI can also increase resource management, reducing waiting times & the improvement of overall patient experience.
- The reviewed literature showed that AI can analyze large volumes of medical data quickly and accurately contributes to enhanced diagnostic precision (Jiang et al., 2017).
- The Allied Hospital Faisalabad face lack of finance and Artificial Intelligence can optimize the use of resource which can lead to more cost-effective care such as AI diagnostic tools can minimize the need for expensive and time-consuming manual testing.
- The geography and the socio-economic reasons often limit the access to healthcare services in Pakistan. This gap can be bridged by providing access to expert professionals and health monitoring with the help of AI-powered telemedicine solutions (Patel et al., 2021). The Allied Hospital Faisalabad can integrate Artificial Intelligence into telemedicine platforms for underserved populations.
- One of the most significant challenges identified in the literature is The absence of modern, standardized and comprehensive electronic health records (EHRs) is a major challenge identified through literature that is an integral part for AI systems to function effectively (Khan et al., 2021). The Allied Hospital Faisalabad has absence of strong data infrastructure such as incomplete and the inconsistent patient records which hinders the complete use of AI technologies because Artificial Intelligence systems need high-quality and standardized data to provide correct results.
- The AI technology requires professionals to be trained in both AI systems & ethical implications of using technology and the lack of training programs in Artificial Intelligence remains a hindrance in many developing countries (Khan & Yousaf, 2021). The medical staff may require extensive training in this regard at Allied Hospital Faisalabad.
- The absence of clear ethical guidelines and lack of regulatory frameworks is also an important challenge for using AI in health sector in Pakistan (Srinivasan & Malek, 2023) and there are no regulations regarding the ethical use of AI in healthcare. The Artificial Intelligence has reduced long-term costs but financial investment needed for its operations (Miller & Walker, 2020).

Recommendation

Following recommendations are suggested for the successful use of Artificial Intelligence at Allied Hospital Faisalabad. It should establish a comprehensive standardized electronic health record (EHR) system so that all patient data may be digitized and stored as it would lay a strong foundation for implementing AI technologies in the hospital. The continuous training programs should be organized to upskill medical professionals &administrators for using AI tools. A collaboration is need with AI technology developers and research institutions to adapt AI solutions for specific needs of the hospital which would be helpful in taking into consideration its patient demographics, operational challenges & resource limitations. There is need of clear regulations regarding the use of AI in healthcare related to data privacy, patient consent & the accountability of AI systems in clinical decision-making.

Conclusion

This review highlights the impact of Artificial Intelligence (AI) on the healthcare delivery at Allied Hospital Faisalabad Punjab Pakistan. The findings of the article explore that Artificial Intelligence technologies have great impact in improving many aspects of healthcare delivery such as enhancing diagnostic accuracy, predictive analytics and personalized treatment at Allied Hospital Faisalabad. Its ability to manage patient data and optimize hospital operations can improve the challenges faced by healthcare sector institutions in developing countries like Pakistan in many ways like limited resources, long waiting times and the overloaded hospital settings but in spite of all these benefits, various challenges are present in adopting AI in healthcare settings in Allied Hospital Faisalabad such as inadequate healthcare infrastructure, data privacy concerns, absence of skilled professionals & monetary constraints. These challenges can be tackled through digital infrastructure, training programs and clear regulatory frameworks to settle moral and ethical challenges surrounding AI integration.

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