



Midocean University

College of Management -PMP

Title:

The Impact of Using Artificial Intelligent on Improving Patient Satisfaction
in Saudi Arabia Medical Appointment & Referral System

Prepared by: Hanadi Alhejari

Ahad Alharbi

Supervised by:

Year:2024

Contents

1.	Introduction	1
1.1	Significance of the study.....	2
1.2	Aim of the study:	3
■	Literature Review	3
■	Methodology:	6
3.1	Research design	6
3.2	Study setting:	7
3.3	Population and Sample	7
3.4	Instruments.....	7
3.5	Data collection procedure	7
3.6	Ethical considerations:	7
■	Data Analysis (Statistical analysis):	7
■	Discussion:	7
■	Conclusion and recommendations:	7
■	References:	7

1. Introduction

In digitized organizations, information and communication technology plays a crucial role in improving operational efficiency and gaining a competitive edge (Lee & Lee, 2020). Contemporary digital technologies and devices are extensively utilized in various industries to foster innovation and generate value (Lee & Lim, 2018). This is also true for the healthcare industry. In developed economies, hospitals and care providers worldwide are actively implementing digital technologies, including artificial intelligence (AI), machine learning, smart sensors, robots, and big data analytics, with the aim of enhancing the quality of care and operational efficiency (Lee, 2019).

Technological utilization is anticipated to continue expanding. According to Stewart's (2023) forecast, the A.I. market in medicine will increase from \$11 billion in 2021 to \$188 billion in 2030. In recent times, there has been a notable proliferation of AI-supported technologies within healthcare institutions, aiming to enhance the quality-of-care services and optimize the utilization of medical resources (Yoon & Lee, 2019).

In order to maintain a competitive advantage, healthcare organizations should actively adopt and leverage the emerging trend of integrating artificial intelligence and related technologies. The healthcare industry is very receptive to the innovative potential of artificial intelligence (AI) due to its transformative nature. The utilization of artificial intelligence is revolutionizing the healthcare industry by revolutionizing diagnostic and treatment protocols as well as influencing individuals' lifestyles. This is due to the recognition that optimal health requires engagement in a comprehensive array of routine activities. According to Shaheen (2021) and AI (2018),

AI applications in healthcare present a multitude of prospects, such as enhanced illness therapies, more patient involvement, and improved reduction of medical errors and service quality. According to Drysdale et al. (2019),

Artificial intelligence (AI) refers to the emulation of human intelligence in machines, such as computers or robots, that have been designed to mimic cognitive activities, such as learning and problem-solving, that humans associate with other human brains.

Artificial intelligence (AI) offers a wide range of advantages in the medical field. One such advantage is its ability to streamline repetitive operations, allowing healthcare personnel to shift their attention towards more intricate patient difficulties. This, in turn, leads to enhanced patient outcomes. Additionally, the use of artificial intelligence (AI) allows healthcare professionals to acquire prompt and relevant information, thereby facilitating prompt actions for the management of health issues.

The A.I. has the capability to customize treatments for individual patients, resulting in enhanced patient outcomes (Kapa, 2023; Shaheen, 2021). ..

There are a number of disadvantages to the aforementioned benefits, such as social biases that raise concerns about patient care. Additionally, the proper functioning of these systems necessitates human effort, limiting their complete reliability in delivering patient care. A.I. has been observed to raise apprehensions over data privacy because of its potential to facilitate unauthorized access to sensitive information, hence compromising data privacy and security.

Conversely, the adoption of A.I. results in significant job losses as technology supplants humans in some tasks. Mitigating and re-skilling or up-skilling are necessary measures to prevent any potential job losses. (Kapa, 2023; Drysdale et al., 2019) Achieving AI integration in the healthcare sector. . Moreover, the extensive implementation of AI and digital devices presents several significant obstacles, such as privacy concerns, cybersecurity, data integrity concerns, data ownership, the issue of data-sharing among different organizational silos, medical ethics concerns, accountability for medical errors, and the potential for system failures (Yoon & Lee, 2018).

1.1 Significance of the study

Artificial intelligence (AI) serves to streamline routine and laborious tasks within the medical domain. The tasks may encompass insurance evaluations, care recommendations, appointment scheduling, and the interpretation of clinical information. Optimising these processes reduces time and resources, allowing medical staff to allocate their focus towards other crucial matters, such as enhancing a patient's experience.

In Saudi Arabia, the effects of utilising intelligent systems on patient satisfaction with the referral and Appointment systems are still unknown due to the dearth of prior research.

Hence, it is imperative to examine the current state of AI-based technologies and their applications in order to comprehend the future trajectory of their utilisation in diagnostics, comprehensive care services, and operational strategies. This study also investigates the application of artificial intelligence (AI) in the context of acceptance and referral systems. It provides valuable insights into the potential of artificial intelligence (AI) in improving the patient experience within the Saudi Arabian Ministry of Health, with the aim of successfully implementing this approach in other healthcare organisations.

Moreover, the significance of this study lies in its contribution of novel perspectives on the development of technology-driven service operations management. It is anticipated that the findings of our research will offer significant novel insights to hospital administrators, medical personnel, education and training managers, and medical ethics specialists.

1.2 Aim of the study:

The goal of this study is to examine the influence of artificial intelligence (AI) on patient satisfaction, with a specific focus on the appointment and referral system within the Ministry of Health in Saudi Arabia.

Chapter Two

Literature Review

In a recent study conducted by Lee and Yoon (2021), the objective was to investigate the present condition of artificial intelligence (AI) technology applications and their influence on the healthcare sector. The findings of the study indicated that the utilisation of AI in diagnostics and administrative workflow support underscores the broadening range of AI's applications within different domains of the healthcare system. In order to enhance the calibre of AI-supported systems, it is imperative for the market to create specialised solutions tailored to each specific domain, incorporating machine learning algorithms. Medical AI systems have both positive and negative implications. The growing utilisation of patient data for analytics might heighten cybersecurity vulnerabilities, amplify the responsibility for medical blunders, and result in job displacement.

A randomised clinical trial was conducted by Jayakumaret et al. (2021) at a single academic orthopedic center in the United States. The study covered a sample of 129 patients, with the objective of the researchers conducted a trial to evaluate the impact of an AI-enabled patient decision aid, which includes personalised outcome estimations, on decision quality and patient experience among individuals with advanced knee osteoarthritis considering total knee replacement (TKR). Compared to education alone, the AI-enabled decision aid significantly improved decision quality without significantly affecting consultation times, TKR rates, or treatment concordance in patients with knee osteoarthritis considering TKR. Utilising personalised, data-driven decision aids can improve the management of knee osteoarthritis.

Artificial Intelligence has transformed the healthcare system. Similarly, Alexandra Harry's (2023) research demonstrates the significant impact of artificial intelligence in healthcare settings. The research emphasised the significant impact of artificial intelligence on patient care, including advanced disease detection, personalised treatment practices, and early intervention strategies, those finding are coincided with the finding by Secinaro et al. (2021) which examined the role of A. I. in healthcare and stated that A. I. offer clinicians support through diagnostics, predicting, and coming up with treatment plans.

The researchers found that artificial intelligence is used to analyse large volumes of data, which enables positive patient outcomes. Additionally, they found that AI could be used to support clinical decision making, which helps in forming proper conclusions about patient care. This was found in the article that was developed by Dave and Patel (2023), which aimed to provide an analysis of the impact that artificial intelligence has had in the medical industry, with a focus on the advantages and disadvantages of the innovation in the sector. A.I. was determined to be essential in the field of

healthcare as a result of their discovery that the accuracy of diagnoses increased with the assistance of machine learning.

According to the findings of a study conducted by Thomas and Kidziński (2022), the researchers came to the conclusion that artificial intelligence is already being utilised to improve the user experience in customer-facing applications used in a variety of businesses. In clinical trials, the implementation of this strategy has the potential to enable a greater number of patients to participate in studies, to successfully complete those trials without experiencing an excessive amount of burden, and to provide high-fidelity assessments of their health throughout the duration of their involvement.

Mathur et al. (2021) conducted a study in which they analysed the experiences of 15,453 patients who had consented to remain anonymous. The conclusion is that artificial intelligence can be of assistance in the interpretation of patient experience surveys in a near-real-time manner. Open-source algorithms that are widely used have the potential to be utilised in the healthcare industry for the purpose of quality improvement, hence eliminating the requirement for considerable development resources and providing the chance to generalise.

Additionally, a study by Jiang et al. (2017) highlighted the fact that applications of artificial intelligence include patient data and diagnostics. Using AI approaches, medical researchers can better manage the massive amounts of data that patients provide (also known as "big data" in the medical field). In clinical settings, such as screening, diagnosis, and treatment assignment, artificial intelligence systems are able to manage the data that is created. In this manner, medical workers are able to acquire knowledge about related topics and the correlations that exist between the characteristics of the subject and the outcomes of interest. Additionally, technologies are able to analyse raw data and provide valuable insights that can be utilised in the treatment of patients. These devices can be of assistance to medical professionals during the diagnostic process. For instance, in order to carry out a high-speed body scan, it will be easier to get an overall image of the patient's condition. A three-dimensional mapping solution of a patient's body can be recreated with the use of artificial intelligence technologies.

A study that was carried out by Sadasivan and colleagues (2023) came to the conclusion that artificial intelligence has the potential to result in improved patient outcomes, personalised care, and enhanced patient experiences. By way of illustration, artificial intelligence has the capability to automate communication that is both detailed and personalised, optimise follow-up scheduling based on diagnosis, age, and personal preferences, and free up staff members to concentrate on patient care.

Additionally, artificial intelligence technology such as chatbots and virtual health assistants improves patient involvement by giving help around the clock, answering questions, and effectively organizing appointments.

Chapter Three : Methodology

The methodology employed by this research included a

3.1 Research design

The study's design is a **quantitative descriptive** study.

3.2 Study setting:

This study will be conducted at

3.3 Population and Sample

Simple random sample will be deployed for this study , a sample size of

3.4 Instruments

3.5 Data collection procedure

3.6 Ethical considerations:

The principle of voluntary participation regarding research ethics requires that people not be forced into participating in research, as participants have the right to withdraw from the study at any time. In addition, Anonymity and confidentiality will be maintained.

■Data Analysis (Statistical analysis):

Collected data will be entered and analyzed by SPSS®. Only completed questionnaires will be entered and the incomplete questionnaires will be counted as drop-rate. Descriptive statistical will be performed on the demographic data to obtain the means and standard deviations for the Continuous variables whilst frequencies and percentages will be used to describe the categorical variables

■Discussion:

■Conclusion and recommendations:

■References:

- AI, W. I. (2018). Artificial intelligence (AI) in healthcare and research. *Nuffield Council on Bioethics*, 1-8. 530-533. <https://journal.mediapublikasi.id/index.php/bullet/article/view/2760>
- Alexandra Harry. (2023) Transforming Patient Care: The Role of Artificial Intelligence in Healthcare; A mini Review. *Journal Multidiscipline Limmu*, 2,

Dave, M. and Patel, N. (2023) Artificial Intelligence in Healthcare and Education. S. Kapa DOI: 10.4236/jcc.2023.1111001 15 Journal of Computer and Communications British Dental Journal, 234, 761-764. <https://doi.org/10.1038/s41415-023-5845-2>

Drysdale, E., Dolatabadi, E., Chivers, C., Liu, V., Saria, S., Sendak, M., ... & Mazwi, M. (2019, October). Implementing AI in healthcare. In *Vector-SickKids Health AI Deployment Symposium. Toronto*. <https://www.statista.com/statistics/1334826/ai-in-healthcare-market-size-worldwide>

Jayakumar, P., Moore, M. G., Furlough, K. A., Uhler, L. M., Andrawis, J. P., Koenig, K. M., ... & Bozic, K. J. (2021). Comparison of an artificial intelligence-enabled patient decision aid vs educational material on decision quality, shared decision-making, patient experience, and functional outcomes in adults with knee osteoarthritis: a randomized clinical trial. *JAMA network open*, 4(2), e2037107-e2037107.

Jiang, F., Jiang, Y., Zhi, H., Dong, Y., Li, H., Ma, S., ... & Wang, Y. (2017). Artificial intelligence in healthcare: past, present and future. *Stroke and vascular neurology*, 2(4).

Kapa, S. (2023). The Role of Artificial Intelligence in the Medical Field. *Journal of Computer and Communications*, 11(11), 1-16.

Lee, D. (2019). Effects of key value co-creation elements in the healthcare system: focusing on technology applications. *Service Business*, 13(2), 389-417.

Lee, D., & Yoon, S. N. (2021). Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. *International Journal of Environmental Research and Public Health*, 18(1), 271.

Lee, S. M., & Lee, D. (2020). Healthcare wearable devices: an analysis of key factors for continuous use intention. *Service Business*, 14(4), 503-531.

Lee, S. M., & Lim, S. (2018). *Living innovation: from value creation to the greater good*. Emerald Publishing Limited.

Mathur, P., Cywinski, J. B., Maheshwari, K., Niezgoda, J., Mathew, J., do Nascimento, C. C., ... & Papay, F. A. (2021). Automated analysis of ambulatory surgery patient experience comments using artificial intelligence for quality improvement: A patient centered approach. *Intelligence-Based Medicine*, 5, 100043.

Sadasivan, C., Cruz, C., Dolgoy, N., Hyde, A., Campbell, S., McNeely, M., ... & Tandon, P. (2023). Examining Patient Engagement in Chatbot Development Approaches for Healthy Lifestyle and Mental Wellness Interventions: Scoping Review. *Journal of Participatory Medicine*, 15, e45772

Secinaro, S., Calandra, D., Secinaro, A., Muthurangu, V. and Biancone, P. (2021) The Role of Artificial Intelligence in Healthcare: A Structured Literature Review. BMC Medical Informatics and Decision Making, 21, Article No. 125.

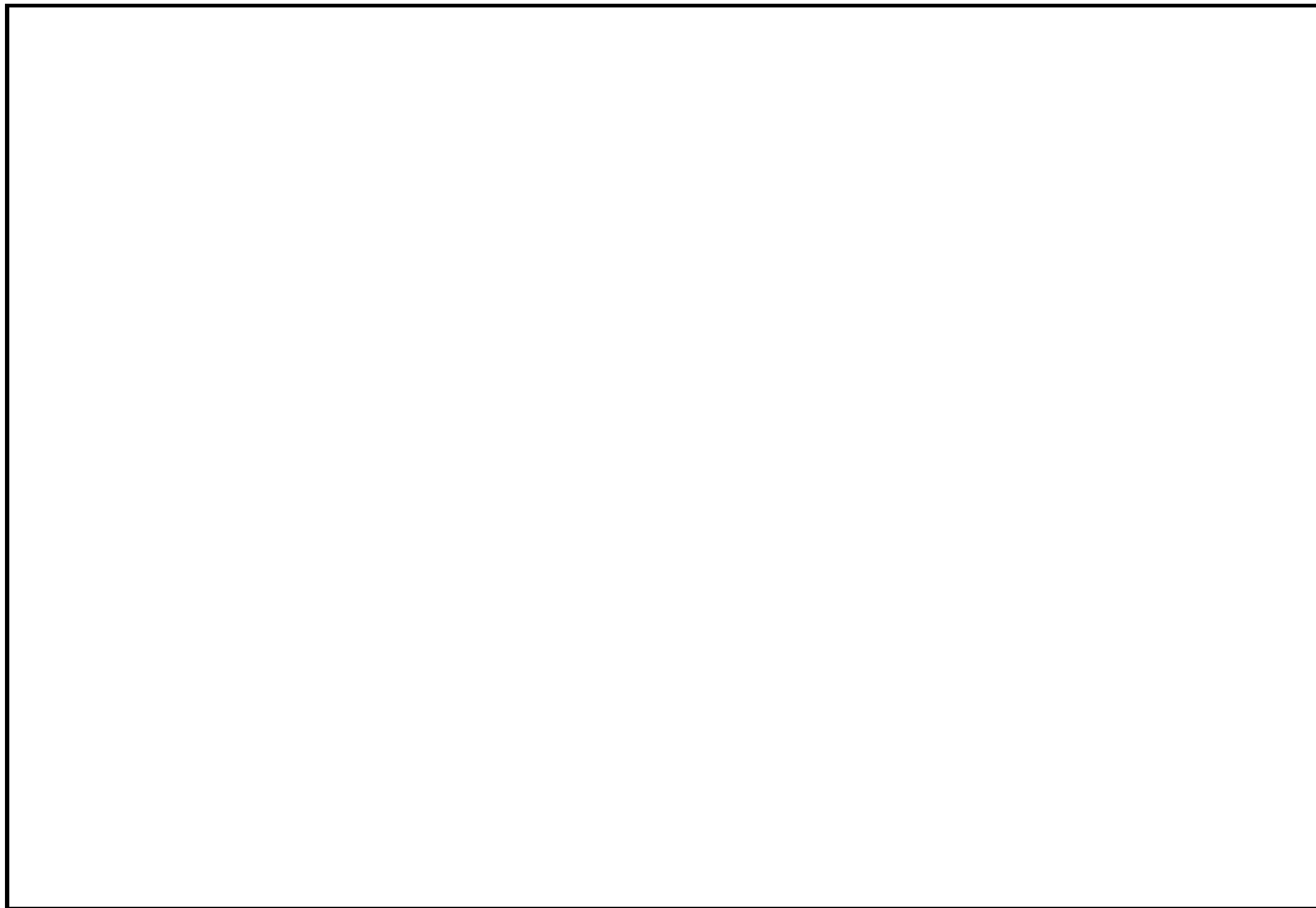
Seong No Yoon & DonHee Lee (2019) Artificial intelligence and robots in healthcare: What are the success factors for technology-based service encounters?, International Journal of Healthcare Management, 12:3, 218-225, DOI: [10.1080/20479700.2018.1498220](https://doi.org/10.1080/20479700.2018.1498220)

Shaheen, M. Y. (2021). Applications of Artificial Intelligence (AI) in healthcare: A review. *ScienceOpen Preprints*.

Stewart, C. (2023) Artificial intelligence (AI) in Healthcare Market Size Worldwide 2021-2030. Statista.

Thomas, K. A., & Kidziński, Ł. (2022). Artificial intelligence can improve patients' experience in decentralized clinical trials. *Nature Medicine*, 28(12), 2462-2463.

Yoon, S. N., & Lee, D. (2018). Artificial intelligence and robots in healthcare: What are the success factors for technology-based service encounters?. International Journal of Healthcare Management.



Summary الملخص:

التوصيات: