

2000319

by Huan Geng

Submission date: 04-Jun-2024 12:17AM (UTC+0100)

Submission ID: 235689146

File name: 25610_Huan_Geng_2000319_417322_432678743.docx (2.64M)

Word count: 13244

Character count: 81713

Unit name: Converting Research into Practice

Module code: LCDB7010

**A pilot study examining the Influence of AI-Driven Operations
Management Solutions on Healthcare Facilities in Heilongjiang
Province, China.**



Prepared for: Caroline Jawad

Written by: HUAN GENG

Student ID: 2000319

Date submitted: 4 June 2024



Section one: Journal Selection and Publication Details

This pilot study examines the influence of AI-driven operations management solutions on healthcare facilities in Heilongjiang Province, China. The Journal of Medical Internet Research (JMIR) was selected as the target journal for potential publication due to its focus on digital health, AI applications in healthcare, and its broad readership that includes researchers, healthcare professionals, and policymakers. JMIR's open-access model and high impact factor guarantee extensive dissemination and easy accessibility of the research findings. The journal encourages interdisciplinary research, making it an ideal platform for a study that intersects healthcare management and AI technology. Details about the aims and scope, author guidelines, submission requirements, peer-review process, and publication timeline were thoroughly reviewed to ensure compliance and suitability.

Section two: A Pilot Study

This study aims to explore the extent of AI implementation and its impact on healthcare operations in Heilongjiang Province. The research addresses four main objectives: understanding AI implementation and healthcare professionals' experiences, exploring the perceived impact on operational efficiency and patient care quality, identifying specific outcomes and challenges associated with AI integration, and assessing the long-term impact and future developments of AI in healthcare.

The methodology adopted a qualitative approach, employing semi-structured interviews with healthcare professionals from various facilities in the region.

41
Thematic analysis was conducted to identify key themes related to AI adoption, operational efficiency, patient outcomes, workforce adaptation, and ethical considerations.

Key findings indicate that AI technologies have significantly improved operational efficiency, enhanced diagnostic accuracy, and optimized resource allocation.

Healthcare professionals reported positive impacts on job performance and patient care quality, although initial skepticism and resistance were noted. Ethical and privacy concerns, particularly regarding data security and the balance between AI recommendations and human judgment, emerged as critical issues. The study emphasizes the need for robust training programs, ethical frameworks, and tailored regulatory policies to support the sustainable 58 integration of AI in healthcare.

The results underscore the transformative potential of AI-driven operations management systems in improving healthcare delivery in Heilongjiang Province.

However, addressing ethical, privacy, and workforce adaptation challenges is essential to fully realize these benefits. Future research should focus on longitudinal studies and culturally sensitive AI solutions to ensure equitable access and effectiveness across diverse healthcare settings.

 3 study offers crucial insights for healthcare administrators, policymakers, and researchers, enriching the ongoing discussion on AI integration in healthcare.  61 It

underscores the significance of adopting a balanced approach that harnesses AI's potential while preserving the essential human aspects of healthcare.

 4

Table of Contents

Abstract	2
Section 1: Journal Selection and Publication Details.....	8
Journal of Medical Internet Research (JMIR)	8
Justification:.....	8
Publication Information(See Appendix 1-4).....	8
Section 2: Pilot Study Article.....	10
INTRODUCTION	10
1.1 AI in Healthcare: A Paradigm Shift in the 21st Century	10
1.2 Research Problem Statement	11
1.3 Significance of the Research	13
LITERATURE REVIEW	14
2.1 AI Adoption in Global Healthcare.....	14
2.2 Contextual Factors in AI Adoption.....	15
2.2.1 Regional Variations and Challenges in Heilongjiang Province.....	16
2.2.2 Regulatory and Policy Considerations	18
2.3 Experiences of Healthcare Administrators and Personnel	20
2.3.1 Exploring the Technology Acceptance Model (TAM).....	20
2.3.2 The Impact on Operational Efficiency	21
2.4 The Influence of AI Adoption on the Quality of Patient Care.....	23
2.4.1 Enhanced Clinical Decision-Making and Patient Outcomes.....	23
2.4.2 Streamlined Workflows and Resource Optimization.....	24

2.4.3 Patient-Centric Approaches and Improved Communication	25
2.5 Barriers, Concerns, and Opportunities in AI Adoption in Healthcare	
Operations.....	26
2.5.1 Challenges Hindering the Acceptance of AI	26
2.5.2 Focus on AI Implementation	27
⁴⁶ METHODS.....	28
3.1 Study Design.....	28
3.2 Sampling	30
3.3 Approval of Ethical Standards and Consent for Participation.....	31
3.4 Interviews.....	31
3.5 Analysis.....	33
RESULTS	33
Theme 1: Presence and Impact of AI Technologies.....	34
Theme 2: Integration of AI in Operational Management.....	35
Theme 3: Specific AI-Driven Management Systems.....	36
Theme 4: Frequency of Interaction with AI Systems.....	37
Theme 5: Impact on Job Performance and Workflow.....	38
Theme 6: Ethical and Privacy Concerns.....	39
DISCUSSION-PILOT STUDY RESULTS.....	40
5.1 Enhancements in Operational Efficiency	40
5.2 Impact on Patient Care and Outcomes.....	41
5.3 Integration Challenges and Workforce Adaptation	42

5.4 Practical Implication	43
5.5 Ethical and Privacy Concerns.....	44
5.6 Future Research Suggestions	46
5.7 Applicability of the Findings	47
STUDY LIMITATIONS.....	48
6.1 Size of the Sample and Inclusiveness	48
6.2 Hospital Size and Setting.....	49
6.3 Cultural Aspects.....	49
6.4 Generalizability.....	50
CONCLUSION.....	50
REFERENCES.....	52
APPENDIX.....	58
Appendix 1: Journal of Medical Internet Research	58
Appendix 2: Focus and group	58
Appendix 3: Editorial Board	59
Appendix 4: Publisher	59
Appendix 5: Raw transcript-participant 5.....	59
Appendix 6: Interview questions.....	63
Appendix 7: Final Codes and Themes	65

Section 1: Journal Selection and Publication Details

48

Journal of Medical Internet Research (JMIR)

Justification:

The Journal of Medical Internet Research (JMIR) is an ideal choice for the pilot study examining the influence of AI-driven operations management solutions on healthcare facilities in Heilongjiang Province, China.

Relevance: JMIR specializes in digital health, internet-based interventions, and the application of AI in healthcare. This focus aligns perfectly with the pilot study's subject, which explores the implementation and effects of AI-driven operations management solutions in healthcare settings.

Audience: The journal's readership includes a diverse group of researchers, healthcare professionals, and policymakers who are deeply interested in cutting-edge advancements in healthcare technology. Publishing in JMIR ensures that the study reaches a highly relevant and influential audience.

Impact Factor: JMIR boasts a high impact factor, signifying its strong influence and high citation rates within the field of medical research. This indicates that articles published in JMIR are widely recognized and respected, enhancing the visibility and credibility of the pilot study.

Accessibility: As an open-access journal, JMIR ensures that the study will be freely accessible to a global audience. This is particularly important for maximizing the dissemination and impact of the research findings among healthcare administrators, operations managers, and other stakeholders who can benefit from the insights provided by the study.

Interdisciplinary Approach: JMIR encourages interdisciplinary research, which is particularly beneficial for this study that intersects healthcare management and AI technology. The journal's openness to diverse methodologies and perspectives supports the comprehensive analysis required to understand the impact of AI on healthcare operations.

Publication Information(See Appendix 1-4)

Aims and Scope: JMIR publishes original research, reviews, and viewpoints on digital health, eHealth, and the implementation of AI and other advanced technologies in healthcare settings.

Author Guidelines: Manuscripts should follow JMIR's formatting guidelines, typically ranging from 3,000 to 7,000 words. The structure should include sections such as Introduction, Methods, Results, Discussion, and Conclusion.

Submission Requirements: Submissions must include a cover letter, abstract, main manuscript, references, and any supplementary materials. Manuscripts are submitted online through the JMIR submission portal.

Peer-Review Process: JMIR employs a rigorous double-blind peer-review process, ensuring high-quality and unbiased evaluations. Initial decisions are typically made

within 4-6 weeks.

Publication Timeline: *Accepted articles are published rapidly, often within 2-3 months from the acceptance date, facilitating timely dissemination of research findings.*

Article processing fee: *JMIR charges an article processing fee, with waivers available for authors from low-income countries or those facing financial hardship.*

Section 2: Pilot Study Article

¹INTRODUCTION



1.1 AI in Healthcare: A Paradigm Shift in the 21st Century

The healthcare sector has undergone a significant transformation in the 21st century, mainly due to the incorporation of Artificial Intelligence (AI) technologies (Naveed, 2023). This paradigm shift represents a significant turning point in the evolution of healthcare systems, with the potential to redefine patient care delivery, enhance operational efficiency, and reshape the overall structure of healthcare services (Casey *et al.*, 2021). It will be practical to examine the impact of this transformative change in the medical field on healthcare practices in Heilongjiang Province, China.

AI offers transformative solutions through automation technologies like machine learning and deep learning, providing effective insights by integrating big data. Currently, AI applications in the medical field are primarily seen in diagnostic algorithms, surgical assistance robots, and patient data management (Naveed, 2023). Nations worldwide are progressively introducing AI into the healthcare sector (Sun⁷⁷ and Medaglia, 2019). The implementation of AI tackles the rising demand for medical services and the difficulties associated with an aging population. It also improves the quality of care and manages costs (Kalra and Seitzinger, 2023). Consequently, AI-driven operational management is increasingly vital for enhancing healthcare accessibility and quality, especially in areas with scarce resources and a lack of skilled

medical professionals.

The impact of AI on healthcare operations is anticipated to be profound, with forward-looking studies predicting transformative changes in organizational structures, processes, and healthcare roles (Ghaleb, Dominic and SARLAN, 2020). However, integrating AI into healthcare encounters considerable obstacles. Given the complexity and multifaceted nature of the healthcare sector, practitioners exhibit varying levels of acceptance and implementation of AI technologies. Factors influencing this variability include perceived ease of use, effectiveness, and compatibility with current workflows (He *et al.*, 2019). Furthermore, the interaction between healthcare professionals and AI systems plays a critical role in the effectiveness of these technologies in real-world settings, affecting not only technology usability but also diagnostic accuracy, treatment effectiveness, and patient satisfaction (Knop *et al.*, 2022).

1.2 Research Problem Statement

The introduction of AI technologies into the healthcare industry is an inevitable future trend (Davenport and Kalakota, 2019). The study by Kamruzzaman, Alrashdi, and Alqazzaz (2022) provides a global perspective but overlooks specific regional challenges and complexities. Heilongjiang Province's unique socioeconomic and cultural context may result in different outcomes and responses to AI integration compared to other regions. This gap in localized understanding hinders the

development of smart strategies tailored to the region's specific needs and challenges.

25
Despite the growing body of research on AI in healthcare, most studies frequently overlook qualitative dimensions (Scott, Carter and Coiera, 2021). Qualitative research is crucial for capturing stakeholder perceptions of AI technology and its impact on practice management. By delving into the experiences of relevant stakeholders, researchers can develop a systematic understanding of the interaction between AI and humans (Cheng, Li and Xu, 2022). Additionally, exploring the qualitative impact of AI on patient care quality is essential for a comprehensive evaluation of its effects. (Liu *et al.*, 2022). It is important to recognize that a thorough qualitative analysis of the impact of AI-driven operations management systems on stakeholders can reveal the primary challenges and concerns associated with the current integration of AI into the healthcare system, which have not yet been adequately addressed by existing policies (Jeyaraman *et al.*, 2023).

To thoroughly address these gaps, the study attempts to find out the frequency of use of human-computer interaction and its experience, and to find out the impact of AI operational management on workflow and operational efficiency. And examine how the quality of patient care is affected from the perspective of stakeholders, and the main concerns and challenges faced by AI healthcare.

1.3 Significance of the Research

The findings from this pilot study can practically influence the approach to AI implementation in healthcare facilities in Heilongjiang Province and comparable regions. Each region has its own set of challenges and opportunities that must be taken into account when formulating strategies(Wolff *et al.*, 2021). Healthcare professionals play a crucial role in delivering quality care to patients. Their opinions on AI adoption are essential for successful implementation. This study explores their views, concerns, and expectations regarding AI technology. The study explores how these professionals view AI's capacity to improve diagnostic accuracy, simplify administrative tasks, enhance treatment planning, and optimize the allocation of resources.

The practical significance of this study is particularly relevant to policy making. Empirical data play a crucial role in informing policy decisions regarding the management of AI in medical practice(Greenhalgh *et al.*, 2017). In addition to addressing technical skill gaps among medical staff, policymakers can use the insights gained from this pilot study to allocate resources effectively. By understanding how AI impacts different aspects of healthcare delivery such as patient outcomes and cost-effectiveness, policymakers can make informed decisions on where to invest resources for maximum benefit. This could involve funding research and development efforts focused on improving AI algorithms or providing financial support for hospitals and clinics looking to adopt AI technologies.

This pilot study can serve as a model for future research in different regions or countries, promoting a more thorough comprehension of AI's effects on healthcare. By replicating similar studies across different contexts, researchers can identify common trends and patterns that may emerge when implementing AI solutions in diverse healthcare systems. This knowledge sharing will contribute to a global body of evidence that informs best practices for integrating AI effectively into healthcare(Jiang *et al.*, 2017).



LITERATURE REVIEW

2.1 AI Adoption in Global Healthcare



Healthcare organizations are increasingly leveraging AI-driven solutions to enhance processes and improve patient outcome(Mehta, 2023). AI applications encompass a broad range of functions, from assisting in diagnosing diseases and providing personalized treatment recommendations to streamlining administrative tasks and optimizing resource allocation(Yin, Ngiam and Teo, 2021).

Delvallee et al. (2020) have identified key challenges and established principles for AI adoption in the public sector, focusing on AI's role in healthcare prevention and human resource management in addressing global risks. Research underscores AI's vast potential to transform healthcare through machine learning, data analytics, and predictive modeling. In modern healthcare, AI algorithms have demonstrated exceptional accuracy in interpreting medical images, which helps clinicians detect

diseases early and with precision(Aleid *et al.*, 2023). As AI technology advances, healthcare managers are becoming more cognizant of its potential to enhance operational efficiency(Lee and Yoon, 2021).

AI-powered decision support systems have proven effective in enhancing personalized medicine by developing tailored treatment strategies based on individual patients' medical conditions and genetic profiles(Simon ⁶³ *et al.*, 2019). A significant use of AI in personalized medicine is its application to embryo assessments in assisted reproductive technologies (ART). Through the combination of AI-driven analysis and patient-specific data, clinicians and embryologists are able to derive personalized estimates of clinical pregnancy success rates for individuals undergoing ART procedures. This synergy functions as an essential decision support tool, offering valuable insights that aid medical professionals and patients in making informed decisions regarding fertility treatments(Seidman *et al.*, 2023). This example illustrates AI's capability to achieve precision medicine by offering personalized success rates for medical procedures based on unique patient attributes.

2.2 Contextual Factors in AI Adoption

AI technology extends its benefits beyond clinical applications by enhancing healthcare management through efficient resource utilization and improved care quality. Despite the widespread enthusiasm for AI in healthcare, its adoption varies significantly across different regions. As Lee and Yoon (2021) highlight, regional

characteristics heavily influence AI adoption, resulting in varied implementation levels and approaches. These regional differences are shaped by distinct social, cultural, regulatory, and infrastructural factors, as noted by Davis et al. (2021).

Although many areas have successfully integrated AI to optimize healthcare operations, Heilongjiang Province in northeastern China faces unique challenges that require in-depth investigation.

¹ 2.2.1 Regional Variations and Challenges in Heilongjiang Province

The province, located in northeastern China, is known for its vast geographical area and diverse population. These factors contribute to the complexity of integrating AI technologies into the local healthcare infrastructure. One of the key challenges lies in adapting AI technologies to fit the existing healthcare infrastructure within Heilongjiang Province. This involves ensuring that the hardware and software requirements are met, as well as addressing any compatibility issues with existing systems. Additionally, considering the availability of resources such as high-speed internet connectivity and data storage facilities is crucial for successful implementation.

Another important aspect is aligning AI systems with the regulatory framework governing healthcare practices in Heilongjiang Province. Compliance with regulations related to patient privacy, data security, and ethical considerations becomes paramount when implementing AI-driven Clinical Decision Support Systems (AI+CDSS).

Adhering ⁶⁶ to these regulations not only ensures patient safety but also fosters trust among healthcare professionals and patients alike.

To gain insights into how hospitals across China have adopted AI+CDSS technology, Mengting et al. (2021) conducted a comprehensive study involving ¹ 160 tertiary medical centers in six provinces and provincial-level cities including Heilongjiang. Their research employed various methodologies such as descriptive analysis and statistical tests like Fisher's exact test and Mann-Whitney U test. The study also revealed that hospitals with integrated AI+CDSS had more streamlined organizational structures, allowing for efficient decision-making processes and improved coordination among different departments. These hospitals were able to effectively manage their operational scales by leveraging ⁹ AI technologies to automate routine tasks, optimize resource allocation, and enhance overall efficiency.

Furthermore, the integration of AI+CDSS in these hospitals enabled them to better handle patient workload management. The use of AI algorithms and predictive analytics helped healthcare professionals prioritize patients based on severity levels, allocate appropriate resources accordingly, and ensure timely interventions. This not only improved patient outcomes but also reduced waiting times and enhanced the overall quality of care provided.

However, it is important to note that the absence of integrated AI+CDSS in some

hospitals highlights the diverse levels of preparedness and capability within the healthcare industry when it comes to adopting advanced technologies. This disparity can be attributed to various factors such as limited availability of financial resources for technology investments, lack of staff training on AI implementation and utilization, as well as compatibility issues with existing systems.

Addressing these challenges requires a comprehensive approach involving investment in technological infrastructure upgrades, providing adequate training programs for healthcare professionals on AI integration into clinical workflows, and fostering collaborations between hospitals and technology providers to ensure system compatibility. By addressing these barriers head-on, healthcare organizations can bridge the gap in readiness for adopting AI technologies across all sectors within the industry.

2.2.2 Regulatory and Policy Considerations

Regulatory frameworks play a vital role in the effective AI within the healthcare sector. China's strategy for technological innovation, especially its "military-civil fusion" approach, introduces distinctive policy challenges that heavily influence the implementation and oversight of AI in healthcare (Pesapane *et al.*, 2021). This strategy, which involves the strategic integration of military and civilian technological advancements for dual-use applications, aims to leverage cutting-edge technologies like AI to advance medical fields while also achieving broader national goals (Qi,

Shiping and Jing, 2022). This approach has important implications for how AI technologies are developed, implemented, and monitored within the healthcare sector.

It is worth mentioning that collaboration between provincial authorities is crucial for ensuring consistent standards and regulations regarding the use of AI technologies across all regions. Sharing best practices, knowledge exchange, and establishing unified guidelines can help bridge any gaps caused by regional autonomy(Wang *et al.*, 2022). These regional differences necessitate a nuanced understanding of local regulatory environments. For example, while national policies provide a broad framework for AI development and application, local regulations may address specific regional needs and challenges. In Heilongjiang Province, it is essential to understand the local regulatory landscape to effectively implement AI in healthcare. This includes adherence to regional health policies, data privacy laws, and ethical standards specific to the province.

Aligning AI integration efforts with local policy initiatives can significantly enhance the effectiveness of these technologies. Supportive policies that promote technological innovation, provide funding for AI research, and offer training programs for healthcare professionals can greatly increase AI adoption rates. On the other hand, restrictive regulations or unclear guidelines can impede progress and create barriers to effective implementation.

2.3 Experiences of Healthcare Administrators and Personnel

2.3.1 Exploring the Technology Acceptance Model (TAM)

The extensive research efforts have shed light on several key aspects related to the acceptance of AI solutions by healthcare professionals (Scott, Carter and Coiera, 2021).

The Technology Acceptance Model (TAM) is pivotal for identifying the factors that influence healthcare professionals' willingness to adopt and use AI technologies.

The study conducted in Dubai examined the implementation of Electronic Medical Record (EMR) systems within healthcare facilities. It discovered that the intention to use an EMR system was the most significant predictor of its actual use. This underscores the critical role of individual attitudes and perceptions in the adoption of technology. Several factors were found to directly influence the constructs of the Technology Acceptance Model (TAM), which subsequently affected the adoption of EMR systems. These factors included anxiety, innovativeness, self-efficacy, and trust, all of which played a role in shaping individuals' acceptance and use of these systems. Understanding these factors can aid healthcare decision-makers in developing strategies to address potential barriers and promote successful implementation. Additionally, the study observed that a positive behavioral intention towards using an EMR system led to increased actual usage. This implies that individuals with a favorable attitude and motivation towards adopting new technologies are more likely to fully utilize them in their daily practice. Therefore, enhancing users' perceptions of usefulness and ease of use should be a priority when implementing EMR systems.

To comprehensively analyze the adoption process, the study employed both the Unified Theory of Acceptance and Use of Technology (UTAUT) and TAM frameworks, alongside external factors specific to the healthcare sector. By incorporating these various perspectives, researchers provided valuable insights for healthcare decision-makers seeking effective strategies and policies for EMR system implementation(Amina et al.,2022).

Moreover, the implementation of AI technologies in healthcare is greatly influenced by how healthcare professionals perceive the usefulness and ease of use of AI, as well as by wider social and organizational factors. By applying the TAM and taking into account both individual and contextual factors, healthcare organizations can improve the acceptance and effective implementation of AI systems(Thakkar and Bharathi, 2022). This approach ensures a more holistic and inclusive strategy for integrating AI into healthcare practices, ultimately enhancing its effectiveness and efficiency.

2.3.2 The Impact on Operational Efficiency

Current research highlights the perspectives of healthcare administrators and staff on how AI enhances operational efficiency by streamlining administrative tasks, optimizing resource use, and boosting overall efficiency.

Shiv et al. (2022) investigated the benefits of incorporating AI into various operational roles within healthcare. Their study presents real-world examples where

leading medical institutions use AI-driven technologies to enhance the skills and capabilities of healthcare professionals, thereby enabling accurate patient diagnoses and treatments. The research shows that AI systems significantly improve hospital care efficiency by managing administrative functions effectively. These systems streamline numerous processes, cut down on the time needed for routine tasks, and enhance resource distribution. By reducing administrative burdens, AI allows healthcare professionals to focus on more complex, value-adding activities.

62
In another study, Zuo Cheng et al. (2023) investigated the scalability of AI solutions by evaluating their adaptability in various healthcare settings. Their findings highlight AI's transformative potential in medical image analysis, drug discovery, and personalized medicine. AI technologies have shown exceptional efficiency in handling vast amounts of medical data, recognizing patterns, and offering actionable insights that enhance clinical decision-making and patient outcomes. The research indicates that AI can be effectively implemented in various healthcare settings, from large urban hospitals to small rural clinics, thereby improving overall operational efficiency.

The literature consistently points out the diverse benefits of AI integration in healthcare operations. AI-driven systems automate routine administrative tasks, thus decreasing the workload for healthcare staff and allowing them to focus more on patient care and complex problem-solving tasks. This shift not only enhances

operational efficiency but also improves job satisfaction among healthcare professionals, as they can spend more time on their primary duties and patient interactions(Jeyaraj and Narayanan).

2.4 The Influence of AI Adoption on the Quality of Patient Care

2.4.1 Enhanced Clinical Decision-Making and Patient Outcomes

Integrating AI into healthcare presents considerable potential for enhancing clinical decision-making. Studies by Prem et al. (2020) and Zhang et al. (2020) have shown that AI-driven operations management significantly improves clinical decision support by applying machine learning algorithms to large datasets. These technological advancements result in increased diagnostic accuracy and reduced mortality rates.

AI technologies excel at processing large volumes of medical data quickly and accurately, thereby providing healthcare professionals with vital insights that enhance patient diagnosis and treatment. For example, AI algorithms can analyze medical images with greater precision than traditional methods, facilitating the early detection of diseases such as cancer and subsequently improving patient outcomes. Furthermore, AI tools can synthesize patient data from multiple sources, creating a comprehensive overview of patient health that supports more personalized and effective treatment plans. Additionally, AI's predictive capabilities can foresee patient deterioration and identify high-risk individuals, enabling timely interventions. This proactive patient care approach helps prevent complications and boosts survival rates, as evidenced by

Prem et al. (2020) and Zhang et al. (2020).

¹ 2.4.2 Streamlined Workflows and Resource Optimization

The enhancement of operational efficiency in healthcare facilities through AI is closely linked to the improvement of workflows and the optimization of resource allocation. Research by Liuping (2023) demonstrates that AI-driven management systems facilitate seamless resource coordination, eliminate bottlenecks, and boost overall efficiency. By analyzing data on patient flow, bed occupancy, and staff scheduling, AI optimizes resource distribution to ensure effective and efficient management.

AI systems utilize historical data and trend analysis to predict future resource needs, enabling healthcare organizations to allocate resources proactively and prevent shortages or overuse. For instance, AI algorithms can predict peak periods for patient admissions, enabling administrators to adjust staffing levels ahead of time. This proactive strategy ensures that healthcare facilities are well-prepared to handle patient ⁴⁴ volumes efficiently, thereby reducing wait times and enhancing the patient experience. Additionally, by optimizing the use of resources such as medical equipment, hospital beds, and staff, AI promotes more efficient facility operations. This optimization not only improves patient care by facilitating timely interventions but also reduces the administrative burden on healthcare professionals, allowing them to concentrate on delivering quality care.

¹ 2.4.3 Patient-Centric Approaches and Improved Communication

In addition to enhancing communication between healthcare providers and patients, AI-driven systems offer a multitude of other advantages in the realm of patient care. One notable benefit lies in their capacity to augment patient engagement and education. By leveraging AI applications such as chatbots and virtual health assistants, patients can gain access to personalized information pertaining to their medical conditions, treatment alternatives, and preventive measures. Research by ¹John et al. (2023) examines how AI applications, including chatbots and virtual health assistants, enhance patient engagement, education, and communication.

The study's evaluators consistently preferred chatbot responses over those from physicians, noting that chatbots often produced superior responses in terms of quality and empathy. These results suggest that AI assistants like chatbots ²⁹have the potential to enhance the quality of responses, reduce clinician burnout, and improve patient outcomes. AI communication tools facilitate more effective and personalized interactions between patients and healthcare providers. For instance, chatbots can offer immediate responses to common patient queries, provide guidance on medication management, and send reminders for upcoming appointments. This improvement in patient experience enables healthcare professionals to dedicate more time to complex tasks. Additionally, AI applications support continuous patient education by providing accurate and accessible health information. Virtual health

assistants can guide patients through pre- and post-operative care, dietary advice, and chronic disease management. Empowering patients with the knowledge and tools to manage their health can lead to improved patient outcomes and higher satisfaction levels.

Further investigation into the application of AI technology in clinical environments is essential. This includes exploring the use of chatbots to draft responses that doctors can subsequently review and edit. Conducting randomized trials would offer deeper insights into the advantages of AI assistants in healthcare, especially in terms of improving communication, increasing patient engagement, and alleviating the workload of healthcare professionals.

2.5 Barriers, Concerns, and Opportunities in AI Adoption in Healthcare Operations

2.5.1 Challenges Hindering the Acceptance of AI

The implementation of AI in Heilongjiang Province is hindered by several regulatory and human-related obstacles. Antal et al. (2023) identified challenges in incorporating AI-derived evidence into health technology assessments (HTA) and the slow adoption of AI in healthcare environments. Their study highlights the importance of creating tailored regulatory frameworks that balance innovation with compliance. The lack of standardized protocols for AI implementation further complicates these efforts, underscoring the need for guidelines tailored to the specific healthcare context of Heilongjiang Province (Nilsen et al., 2023).

Human factors also present considerable barriers. Medical professionals often resist AI adoption due to fears of job displacement and unfamiliarity with the technology. This resistance is rooted in concerns that AI could replace human roles, leading to job insecurity(Jussupow, Spohrer and Heinzl, 2022). Additionally, there is often a lack of understanding and trust in AI technologies, which hinders their acceptance and effective use. Overcoming these challenges requires a focus on comprehensive training and change management strategies(Bencsik, Hargitai and Kulachinskaya, 2022). Training initiatives should educate healthcare professionals on the advantages of AI, how to use these systems effectively, and how AI can complement rather than replace their roles. Change management strategies should involve healthcare professionals in the AI implementation process, fostering trust and reducing resistance by demonstrating the practical benefits of AI in their daily tasks.

2.5.2 Focus on AI Implementation

Although AI-driven operations in healthcare have substantial potential benefits, stakeholders have raised significant concerns regarding privacy, data security, and ethical issues(Gerke, Minssen and Cohen, 2020). Given the sensitive nature of healthcare data, implementing robust data protection measures is crucial(Verhenneman, 2021). Transparent algorithms and responsible decision-making processes are essential to ensure AI applications in healthcare are governed by a solid ethical framework.

Researchers have raised concerns about the potential exacerbation of existing healthcare disparities due to AI. For instance, an analysis of 2,554 COVID-19 positive patients admitted to Yale-New Haven healthcare system found that Black patients had higher Sequential Organ Failure Assessment (SOFA) scores compared to patients from other ethnic backgrounds (Röösli, Rice and Hernandez-Boussard, 2021). However, there was no significant difference in hospital mortality or ICU admission rates between Black patients and other ethnic groups. This underscores the critical need for fair AI implementation to ensure that all segments of society can reap the benefits of AI advancements.

In regions characterized by diverse populations, such as Heilongjiang Province, it is crucial to develop culturally sensitive AI solutions to minimize disparities and guarantee equitable access to high-quality healthcare services. AI systems must be designed and implemented with cultural awareness to effectively address the specific healthcare needs and preferences of different patient populations in Heilongjiang.

METHODS

3.1 Study Design

This preliminary investigation utilizes a qualitative research approach to examine the effects of AI-powered solutions for managing operations in healthcare facilities located in Heilongjiang Province, China. The selection of a qualitative approach is based on its efficacy in capturing the depth and complexity of participants'

experiences and perceptions. This design facilitates an extensive exploration of how the integration of AI influences healthcare operations from the perspective of those directly involved.

The main approach used for gathering data in this research involves conducting semi-structured interviews. This method has been selected due to its ability to maintain uniformity throughout the interviews, while also granting participants the freedom to openly articulate their perspectives and ideas (Kvale and Brinkmann, 2009). This approach is crucial for comprehending the nuanced impacts of AI technologies on healthcare operations. Interviews were conducted using a secure online platform based on participants' availability and preferences, thereby accommodating the demanding schedules of healthcare professionals and ensuring high participation rates.

With the participants' consent, all ²⁸interviews were recorded and subsequently transcribed verbatim to facilitate a comprehensive analysis.

The interview data were subjected to a systematic and iterative process of thematic analysis. This method is particularly effective for identifying and interpreting patterns and themes within qualitative data (Morgan and Nica, 2020). The analytical procedure encompassed several stages: initial coding of the data, categorization of codes into broader themes, and meticulous analysis to refine and interpret these themes. This methodology enables the extraction of significant themes that encapsulate the fundamental aspects of participants' experiences and perceptions.

Selection Criteria

Direct Experience with AI Systems: *Only individuals who had direct involvement with AI-driven operations management systems were considered.*

Role specific: *The selection aimed to include a range of roles to capture a holistic view of AI's impact across different levels of the healthcare organization.*

Willingness to Participate: *Participants had to demonstrate a willingness to engage in the study and provide detailed, reflective responses during the interviews.*

3.2 Sampling

The study aimed to capture diverse perspectives within healthcare facilities in Heilongjiang Province, with a specific focus on participants who possessed direct experience in implementing AI technologies in their respective roles. This selection criterion is crucial for ensuring that the insights gathered are firmly grounded in actual experiences and observations of AI integration within healthcare settings. The sample consisted of five carefully chosen healthcare professionals, each selected based on their unique positions and roles within the healthcare facilities.

These roles included:

- **Healthcare Researcher:** The participation of a healthcare researcher, responsible for studying and evaluating the implementation of AI technologies within the institution as well as developing TCM medical software applications, is indispensable in comprehending the wider organizational impact and policy

considerations associated with integrating AI.

- **Nurses:** Among the participants, three were nurses, including two general nurses and one specialized in pediatric care at a children's hospital. Their valuable insights offer a practical perspective on the impact of AI on clinical workflows, patient care, and job satisfaction. The inclusion of a nurse from a children's hospital ensures that this study comprehensively addresses the unique challenges and benefits associated with implementing AI in pediatric healthcare.
- **X-ray Doctor:** One participant, an X-ray specialist who actively engages with AI-driven systems in their daily clinical practice, provides invaluable insights into the impact of AI on diagnostic accuracy, workflow efficiency, and patient outcomes.

3.3 Approval of Ethical Standards and Consent for Participation

The study was carried out with utmost adherence to ethical protocols, guaranteeing the safeguarding of participants' rights and maintaining the research process's integrity. The pilot study plan, information sheet, and consent form were designed to meet the requirements outlined in UWTSD Research Data Management Policy. The ethics committee thoroughly reviewed various aspects including research design, sampling methods, data collection procedures, and consent process to ensure full compliance with ethical standards governing research involving human subjects.

3.4 Interviews

The interviews were semi-structured, the questions on the topic covered several key

areas:

Impact of AI on Operational Efficiency: Questions addressed how AI-driven operations management systems influenced workflow efficiency, resource allocation, and administrative tasks.

Job Satisfaction and Role Changes: Participants were asked to reflect on how AI implementation affected their job roles, satisfaction levels, and any changes in their daily responsibilities.

Perceived Benefits and Challenges: Discussions aimed to uncover the advantages and obstacles encountered during AI adoption, including technological, organizational, and personal factors.

Patient Care Quality: The queries investigated the impact of AI on patient results, care procedures, and overall patient contentment.

To determine participants' understanding and use of AI in their workflows, questions were designed to be indirect, avoiding any sense of testing their knowledge. This ethical consideration aimed to prevent participants from feeling embarrassed if they could not provide specific answers. Consequently, the topic guide featured open questions, which facilitated a more narrative style of interviewing (Alowais *et al.*, 2023). Participants were motivated to offer more comprehensive narratives about their encounters with AI-powered systems for managing operations, thereby offering profound perspectives on the practical consequences and obstacles associated with integrating AI in healthcare environments.

3.5 Analysis

Data from the interviews were transcribed verbatim from the audio recordings. The initial analysis was conducted by researcher, who read the transcripts multiple times to familiarize themselves with the content and to ensure a deep understanding of the data. Then undertook the coding process, identifying relevant themes and labeling significant segments of text with appropriate codes. The analysis followed an iterative thematic analysis approach, utilizing constant comparison methods as described by Braun and Clarke (2006). This required the continuous refinement and consolidation of codes into more comprehensive categories throughout the coding process, enabling the identification of cohesive patterns that precisely reflected the collected information.

RESULTS

Table 1: Phases of data collection and individuals involved

Type	Participants	Gender
Interviews	Participants 1-Nurse Participants 2-Nurse Participants 3-Doctor Participants 4-Nurse Participants 5-researcher	3 females 2 males

The integration of AI technologies in the healthcare industry has shown substantial effects across different areas, as confirmed by interviews conducted with professionals in the healthcare field. This section presents the consolidated findings organized into six main themes: Presence and Impact of AI Technologies, Integration of AI in Operational Management, Specific AI-Driven Management Systems, Frequency of Interaction with AI Systems, Impact on Job Performance and Workflow,

and Ethical and Privacy Concerns. Each theme aligns with the research objectives aimed at comprehending AI implementation, exploring user experiences, examining impacts on patient care, and evaluating associated challenges and opportunities(see Appendix 7).



Theme 1: Presence and Impact of AI Technologies

Enhancements and Monitoring

Participants consistently reported the significant impact of AI technologies in their workplace environments, reflecting the widespread implementation of AI-driven operations management systems across healthcare facilities. Notably, AI imaging enhancements and monitoring systems have significantly improved reading accuracy and anomaly detection.

"Our imaging tech has gotten a serious upgrade with AI... it helps us catch things on scans that might be tricky to spot otherwise."

"We use AI-driven systems for tasks like patient registration and timekeeping. Compared to before, these systems have made processes more convenient and efficient. AI systems also play a critical role in patient registration and timekeeping, making processes more convenient and efficient."

Personalized Care and Future Impact

AI's ability to tailor treatments to individual patient needs was highlighted, demonstrating improvements in patient care quality.

"AI's helping us tailor treatments to each patient based on their specific details."

"By putting these definitions into a system that is being tested, the system will be able to make a diagnosis based on the symptoms."

The potential for AI to shape the future of medicine through improved diagnostic tools and patient care was recognized as a significant impact, underscoring the transformative potential of AI in healthcare.

Theme 2: Integration of AI in Operational Management

Initial Challenges and Efficiency

The initial skepticism surrounding the integration of AI was a prevalent theme, as participants highlighted resistance to change, particularly within the critical domain of healthcare. Nevertheless, the widely recognized enhancements in operational efficiency brought about by AI-driven management systems have been acknowledged.

"The AI-driven systems for operational management have really started to prove their worth."

"Change always brings a bit of resistance, especially in a field as critical as healthcare. "

This shift highlights the perceived changes in operational efficiency and workflow.

Improving Patient Flow and Inventory Management

AI systems have significantly enhanced patient flow management, resulting in reduced wait times and improved scheduling efficiency. Moreover, AI has optimized

inventory management by accurately predicting future needs based on historical usage rates and upcoming procedures, thereby effectively preventing shortages.

 14 *"The way these systems handle scheduling and patient flow has significantly reduced the wait times."*

 28 *"We spend less time on administrative tasks and more on patient care."*

These enhancements in operational efficiency directly contribute to improved patient care quality.

Theme 3: Specific AI-Driven Management Systems

AI Systems for Patient and Inventory Management

AI-driven patient scheduling systems have been instrumental in minimizing wait times and optimizing doctor schedules. The ability of AI to predict inventory needs has also been beneficial in maintaining adequate supplies.

"Our inventory management system predicts what and how much we'll need based on past usage rates and upcoming procedures."

"The patient scheduling system...automatically adjusts the scheduling to minimize waiting times and ensures that no doctor is either overwhelmed or underutilized."

These implementations reflect the current extent of AI integration in managing healthcare operations.

AI in Diagnostic Tools

The role of AI in diagnostic tools has been pivotal, providing preliminary analyses

that facilitate more precise and expeditious diagnoses. This advancement has effectively mitigated human error while accelerating the diagnostic process.

"AI in our diagnostic tools helps analyze diagnostic images and support our decisions by providing second opinions."

"AI reduces the chances of human error in initial image assessments and speeds up the time it takes to get results to patients."

²⁷ The integration of AI into diagnostics brings about a notable improvement in the clinical workflow and job responsibilities.

Theme 4: Frequency of Interaction with AI Systems

Daily Use and Interaction

The daily interaction with AI systems underscores their indispensable role in healthcare operations. Participants frequently reported employing AI for scheduling, inventory management, and diagnostic purposes.

"The scheduling system is a daily touchpoint for sure. Each morning, I check my schedule on it, and throughout the day, it updates me if there are any changes."

"The inventory management system is a bit more behind the scenes for me personally, but I still interact with it regularly, especially when prepping for surgery."

This frequency of interaction underscores the pervasive integration of AI systems in healthcare settings.

Theme 5: Impact on Job Performance and Workflow

Enhancing Efficiency and Preventive Care

The integration of AI has significantly enhanced job performance through the streamlining of administrative tasks and the improvement of operational efficiency. Particularly noteworthy is AI's pivotal role in preventive care, specifically its ability to facilitate early detection of health issues.

"Catching health issues before they turn serious... preventive care is so much better than trying to fix something after it's gone wrong."

"If the scheduling got even smarter, it would balance our days perfectly."

These improvements in efficiency and preventive care contribute to better patient outcomes and overall healthcare quality.

Positive Influence on Patient Outcomes

The positive impact of artificial intelligence (AI) on patient outcomes emerged as a recurring theme. Participants provided instances where AI demonstrated early anomaly detection, enhanced recovery times, and facilitated precise surgical interventions.

"The AI system flagged a slight anomaly in the heart structure from the echocardiogram that might've been overlooked otherwise."

"The use of 3D imaging and AI in surgery has improved the precision of surgical interventions, making operations quicker and more accurate."

These instances highlight the direct benefits of AI on patient care quality.

Theme 6: Ethical and Privacy Concerns

Ethical Considerations

Ethical concerns were prominently raised, particularly regarding the reliance on AI for treatment decisions and its potential impact on patient quality of life. Participants emphasized the imperative to strike a delicate balance between AI recommendations and human judgment.

"If an AI system recommends a particular course of treatment based on its algorithms, but that course might limit a patient's quality of life... how much should we rely on that AI decision?"

"As much as I trust our IT department, the thought that patient data could potentially be hacked...is always at the back of my mind."

These concerns indicate the difficulties and possibilities linked to the integration of AI.

Data Privacy Concerns

The matter of data privacy arose as a significant worry, with participants underscoring the utmost significance of incorporating strong security measures to protect patient information.

"The thought that patient data could potentially be hacked... is always at the back of my mind."

Ensuring data privacy is crucial to maintaining trust in AI-driven systems.

DISCUSSION-PILOT STUDY RESULTS



5.1 Enhancements in Operational Efficiency

A significant finding of this study is the considerable enhancement in operational efficiency attributed to the integration of AI technologies. Participants consistently reported that AI applications, particularly those related to imaging enhancements and patient monitoring systems, have markedly improved the accuracy and efficiency of diagnostic processes. This observation aligns with previous research by Jiang et al. (2017), which underscored the capacity of AI to enhance diagnostic precision and minimize human error. Furthermore, the implementation of AI-driven systems for tasks such as patient registration and timekeeping has significantly streamlined administrative processes. These systems have effectively reduced the amount of time and effort needed for routine administrative tasks, enabling healthcare professionals to dedicate more of their valuable time to providing direct care to patients. This discovery aligns with the findings of Wamba-Taguimdje et al. (2020), who highlighted significant operational advantages of AI in healthcare environments, such as enhanced workflow efficiencies and resource management.

Participants highlighted specific instances where AI has directly impacted operational procedures. For example, AI-enhanced imaging technologies have facilitated more accurate detection of anomalies in diagnostic scans, which not only improves diagnostic outcomes but also speeds up the overall diagnostic process. One participant noted, "Our imaging tech has gotten a serious upgrade with AI... it helps us catch

things on scans that might be tricky to spot otherwise." This highlights the crucial significance of AI in improving the precision and dependability of diagnostic instruments.

5.2 Impact on Patient Care and Outcomes

AI technologies significantly enhance personalized patient care by enabling tailored treatments based on individual patient data, resulting in notable improvements in patient outcomes.

Participants reported that AI-driven diagnostic tools provide preliminary analyses, contributing to more accurate and timely diagnoses, thereby reducing the likelihood of human error. These advancements in diagnostic accuracy are crucial for early detection and intervention of medical conditions, essential for improving patient recovery times and outcomes. The early and precise identification of health issues allows for prompt and appropriate medical responses, which is critical in managing and mitigating potential complications. Furthermore, the integration of AI in diagnostic processes supports healthcare professionals by offering second opinions and reinforcing their clinical decisions. This collaborative interaction between AI technologies and healthcare providers not only enhances diagnostic confidence but also streamlines the decision-making process, leading to more effective and efficient patient care.

The potential of artificial intelligence (AI) in healthcare was emphasized by the participants of the study, particularly its ability to enhance the precision and personalization of medical treatments. These advancements underscore the importance of integrating advanced AI technologies into clinical settings to improve health outcomes and elevate patient care quality. These findings strongly support the ongoing adoption and integration of AI solutions in healthcare, facilitating a shift towards more personalized and effective medical care.

5.3 Integration Challenges and Workforce Adaptation

The integration of AI technologies in healthcare settings has demonstrated significant benefits, particularly in the domain of personalized patient care. The capacity of AI to customize treatments based on individual patient data has led to significantly improved patient outcomes. In a study, participants emphasized the pivotal role of AI-driven diagnostic tools in providing preliminary analyses that support more accurate and timely diagnoses, thereby reducing the likelihood of human error. AI systems can utilize vast amounts of data and advanced algorithms to detect patterns and irregularities that may go unnoticed by human professionals. This is particularly important for timely identification and intervention, which play a crucial role in improving patient recovery rates and overall results.

In addition to these benefits, the study identified various obstacles linked to the incorporation of AI technologies. Initial skepticism and resistance from healthcare

professionals were prevalent, primarily due to concerns regarding job displacement and the unfamiliarity of AI systems. Addressing these challenges necessitates a multifaceted approach. It is essential to provide comprehensive training programs for healthcare professionals, enabling them to acquire the necessary skills and knowledge for efficient utilization of AI tools. Moreover, effective implementation of change management strategies plays a vital role in fostering a culture that embraces collaboration and acceptance. This involves transparently communicating how AI supports and enhances the capabilities of healthcare professionals rather than replacing them.

5.4 Practical Implication

²⁵ The findings of this study offer several practical implications for healthcare administrators, policymakers, and other stakeholders involved in the integration of AI-driven operations management solutions in healthcare settings. For healthcare administrators, the demonstrated improvements in operational efficiency and patient care quality underscore the potential benefits of adopting AI technologies. Administrators can leverage these insights to prioritize the implementation of AI systems that streamline administrative tasks, optimize resource allocation, and enhance diagnostic accuracy. By investing in AI-driven tools, healthcare facilities can reduce operational bottlenecks and improve overall service delivery.

Policymakers can use the study's findings to develop supportive regulatory

frameworks that facilitate ²⁹ the safe and effective integration of AI in healthcare. The identified ethical and privacy concerns highlight the need for robust data protection policies and transparent algorithms. Policymakers should consider creating guidelines that balance innovation with ethical standards, ensuring that AI applications enhance rather than compromise patient care.

Furthermore, the study's insights can inform the development of comprehensive training programs for healthcare professionals. Effective change management strategies are essential to overcome initial skepticism and resistance to AI adoption. By providing targeted training and continuous support, healthcare organizations can ensure that their staff are well-equipped to utilize AI technologies effectively, leading to improved job performance and satisfaction.

For other stakeholders, including technology developers and patient advocacy groups, the findings highlight the importance of creating culturally sensitive AI solutions that address ⁴⁰ the specific needs and preferences of diverse patient populations.

Collaboration between technology developers, healthcare providers, and patients can drive the design of AI systems that are both effective and acceptable to end-users.

5.5 Ethical and Privacy Concerns

The ethical implications of integrating AI into healthcare have emerged as a prominent concern among the study participants. Specifically, the use of AI for

treatment decision-making has raised critical questions regarding the balance between algorithmic recommendations and human clinical judgment. This concern is extensively documented in existing literature. Gerke et al. (2020) emphasize the necessity for ethical frameworks that ensure AI technologies support, rather than replace, human decision-making processes. The apprehensions expressed by the participants underscore the significance of maintaining this equilibrium to uphold both integrity and personalization in patient care provision.

Participants identified data privacy as a critical concern, emphasizing the necessity for strong security measures to protect sensitive patient information. The increasing reliance on AI systems, which require large amounts of data, exacerbates the risk of data breaches and unauthorized access (Farayola, Olorunfemi and Shoetan, 2024).

The observations shared by the contributors highlight the simultaneous challenges of upholding ethical principles and ensuring data protection when incorporating AI in healthcare environments. It is crucial to establish comprehensive ethical frameworks and enforce rigorous data protection protocols to address these issues effectively. These frameworks should be designed to support clinical decision-making while preserving the essential role of healthcare professionals. Additionally, robust data protection protocols must be established to mitigate potential risks associated with the increased utilization of data in AI systems.

Ethical guidelines should encompass explicit policies on informed consent, ensuring that patients are thoroughly informed about how their data will be utilized and the role of AI in their treatment plans. It is also crucial to maintain transparency in AI algorithms, enabling healthcare providers and patients to comprehend how decisions are reached. Addressing potential biases in AI systems is another critical component; regular audits and updates of AI algorithms can help ensure that they remain fair and unbiased.

By implementing these ethical guidelines and data protection measures, healthcare organizations can build trust in AI technologies and ensure that they are used responsibly and effectively. This approach not only safeguards patient information but also maintains the human element in healthcare, ensuring that AI serves as a tool to enhance, rather than diminish, the quality of patient care.

5.6 Future Research Suggestions

Future research should prioritize investigating the efficacy of targeted training programs specifically designed to enhance AI acceptance among healthcare professionals. The initial skepticism and resistance observed in this study underscore the imperative for comprehensive education and training initiatives. By systematically evaluating these programs, researchers can discern optimal strategies for training that effectively address healthcare professionals' concerns and augment their proficiency with AI technologies.

Investigating the role of culturally sensitive AI solutions in mitigating healthcare disparities in diverse regions, such as Heilongjiang Province, is crucial. To ensure equitable access to healthcare, AI systems must be adaptable to the cultural and socio-economic contexts of different patient populations. Research should investigate the customization of AI to address the distinct requirements of different communities, thus fostering inclusiveness and diminishing inequalities in healthcare provision.

Including the ethical and privacy concerns related AI in healthcare should be considered as part of future research, alongside these domains. The development of robust frameworks for safeguarding data and deploying AI ethically will be crucial for establishing and upholding public trust. Investigating the implementation of these frameworks in real-world settings could offer practical guidelines for policymakers and healthcare administrators.

5.7 Applicability of the Findings

Although this study primarily examines the integration of AI-driven operations management solutions in healthcare facilities in Heilongjiang Province, its findings could also be relevant to other regions with comparable characteristics. The socio-economic and cultural context of Heilongjiang provides a unique backdrop that informs the implementation and outcomes of AI technologies in healthcare. However, to consider the potential generalizability of these findings, it is crucial to acknowledge

both the similarities and differences that other regions might present.

In provinces with comparable healthcare infrastructure and economic conditions, such as Jilin or Liaoning, the results of this study might offer valuable insights. These regions, like Heilongjiang, are part of northeastern China and share certain socio-economic traits, which could influence the adoption and effectiveness of AI in healthcare similarly. However, each region's specific regulatory environment and policy framework must be considered, as variations in governance could impact AI integration outcomes. Moreover, extending the applicability of these findings requires a cautious approach, particularly when considering regions with different healthcare systems, demographic profiles, or levels of technological advancement. For instance, provinces with more advanced healthcare infrastructure or those that have already implemented significant digital health initiatives might experience different challenges and benefits from AI integration compared to Heilongjiang.

STUDY LIMITATIONS



6.1 Size of the Sample and Inclusiveness



One of the main drawbacks of this pilot study is its limited sample size, which consists of only five participants. Consequently, the findings may not accurately represent the wider population of healthcare professionals in Heilongjiang Province. Employing a larger sample would have facilitated more comprehensive statistical analysis and increased the applicability of the results. Additionally, there was limited

diversity among participants as the study included healthcare medical staff, nurses, and researchers; however, it failed to capture perspectives from other critical stakeholders such as IT specialists. Encompassing a broader range of participants would yield a more holistic comprehension of the effects brought about by AI-powered solutions for operations management.

6.2 Hospital Size and Setting

The study focused on healthcare facilities of varying sizes, encompassing both urban hospitals and rural clinics. However, it is important to acknowledge that the limited number of facilities involved may not sufficiently capture the entire spectrum of hospital sizes and settings in Heilongjiang Province. It is plausible that larger hospitals with greater resources might encounter distinct challenges and benefits when integrating AI compared to smaller, resource-constrained clinics. Therefore, future research endeavors should strive to incorporate a broader range of hospital sizes and settings in order to gain a more comprehensive understanding of how AI impacts different types of healthcare facilities.

6.3 Cultural Aspects

Cultural elements significantly influence the level of acceptance and integration of AI technologies in the healthcare sector. However, this study lacks an in-depth exploration of the intricate cultural nuances that potentially influence healthcare professionals' attitudes towards AI. Cultural perspectives regarding technology,

innovation, and change management can exhibit substantial variations, thereby significantly impacting the process of integration. A thorough analysis of the cultural elements could provide valuable perspectives on how these factors influence the integration and application of AI in healthcare environments.

6.4 Generalizability

Given the specific geographical and socio-economic context of Heilongjiang Province, caution must be exercised when generalizing these findings to other regions with distinct socio-economic, cultural, and healthcare environments. The unique regulatory and policy landscape in Heilongjiang Province further complicates the transferability of these results to areas governed by different healthcare regulations and policies. Future research should encompass a broader range of geographical locations to facilitate comparative analyses and develop a more universally applicable understanding of AI integration in healthcare. Such efforts will help ensure that the insights gained are relevant and beneficial across diverse healthcare systems and populations.

CONCLUSION



The application of AI-powered operational management solutions in healthcare establishments within Heilongjiang Province has exhibited considerable promise in augmenting operational effectiveness and enhancing the quality of patient care. AI technologies have effectively streamlined administrative tasks, optimized resource

allocation, and personalized treatments, leading to improved patient outcomes.

Despite initial skepticism, healthcare professionals are gradually embracing AI through comprehensive training and support programs. However, ethical and privacy concerns pertaining to clinical decision-making and data security remain critical challenges that must be addressed through robust frameworks and policies. This pilot study highlights the potential of AI to revolutionize healthcare, while stressing the importance of ongoing exploration and policy formulation in order to fully capitalize on its advantages.



REFERENCES

- ²⁰ Aleid, A., Alhussaini, K., Alanazi, R., Altwaimi, M., Altwijri, O. and Saad, A. S. (2023) 'Artificial intelligence approach for early detection of brain tumors using MRI images', *Applied Sciences*, 13(6), pp. 3808.
- ⁷ Alowais, S. A., Alghamdi, S. S., Alsuhebany, N., Alqahtani, T., Alshaya, A. I., Almohareb, S. N., Aldairem, A., Alrashed, M., Bin Saleh, K. and Badreldin, H. A. (2023) 'Revolutionizing healthcare: the role of artificial intelligence in clinical practice', *BMC medical education*, 23(1), pp. 689.
- ⁴ Bencsik, A., Hargitai, D. M. and Kulachinskaya, A. (2022) 'Trust in and risk of technology in organizational digitalization', *Risks*, 10(5), pp. 90.
- ¹⁹ Buddha, G. P. and Pulimamidi, R. (2023) 'The Future Of Healthcare: Artificial Intelligence's Role In Smart Hospitals And Wearable Health Devices', *Tuijin Jishu/Journal of Propulsion Technology*, 44(5), pp. 2498-2504.
- ²² Casey, J. D., Courtright, K. R., Rice, T. W. and Semler, M. W. (2021) 'What can a learning healthcare system teach us about improving outcomes?', *Current opinion in critical care*, 27(5), pp. 527-536.
- ¹³ Cheng, M., Li, X. and Xu, J. (2022) 'Promoting Healthcare Workers' Adoption Intention of Artificial-Intelligence-Assisted Diagnosis and Treatment: The Chain Mediation of Social Influence and Human-Computer Trust', *International Journal of Environmental Research and Public Health*, 19(20), pp. 13311.
- Davenport, T. and Kalakota, R. (2019) 'The potential for artificial intelligence in healthcare', *Future healthcare journal*, 6(2), pp. 94.

² Farayola, O. A., Olorunfemi, O. L. and Shoetan, P. O. (2024) 'Data privacy and security in IT: a review of techniques and challenges', *Computer Science & IT Research Journal*, 5(3), pp. 606-615.

Gerke, S., Minssen, T. and Cohen, G. (2020) 'Ethical and legal challenges of artificial intelligence-driven healthcare', *Artificial intelligence in healthcare: Elsevier*, pp. 295-336.

⁴ Ghaleb, E. A., Dominic, P. D. and SARLAN, A. 'Impact of emerging technology innovations on healthcare transformation in developing countries'. *2020 Second International Sustainability and Resilience Conference: Technology and Innovation in Building Designs (51154)*: IEEE, 1-5.

Greenhalgh, T., Wherton, J., Papoutsis, C., Lynch, J., Hughes, G., Hinder, S., Fahy, N., Procter, R. and Shaw, S. (2017) 'Beyond adoption: a new framework for theorizing and evaluating nonadoption, abandonment, and challenges to the scale-up, spread, and sustainability of health and care technologies', *Journal of medical Internet research*, 19(11), pp. e8775.

¹⁸ He, J., Baxter, S. L., Xu, J., Xu, J., Zhou, X. and Zhang, K. (2019) 'The practical implementation of artificial intelligence technologies in medicine', *Nature medicine*, 25(1), pp. 30-36.

⁴⁹ Jeyaraj, P. and Narayanan, T. 'Role of Artificial Intelligence in Enhancing Healthcare Delivery'.

Jeyaraman, M., Balaji, S., Jeyaraman, N. and Yadav, S. (2023) 'Unraveling the ethical enigma: artificial intelligence in healthcare', *Cureus*, 15(8).

³ Jiang, F., Jiang, Y., Zhi, H., Dong, Y., Li, H., Ma, S., Wang, Y., Dong, Q., Shen, H. and Wang, Y. (2017) 'Artificial intelligence in healthcare: past, present and future', *Stroke and vascular neurology*, 2(4).

Jussupow, E., Spohrer, K. and Heinzl, A. (2022) 'Identity threats as a reason for resistance to artificial intelligence: survey study with medical students and professionals', *JMIR formative research*, 6(3), pp. e28750.

³⁰ Kalra, J. and Seitzinger, P. (2023) 'Expanding Our Grasp: Artificial Intelligence as the Next Leap Forward in Healthcare Quality', *Healthcare and Medical Devices*, 79(79).

¹⁵ Knop, M., Weber, S., Mueller, M. and Niehaves, B. (2022) 'Human factors and technological characteristics influencing the interaction of medical professionals with artificial intelligence-enabled clinical decision support systems: literature review', *JMIR Human Factors*, 9(1), pp. e28639.

⁴² Kvale, S. and Brinkmann, S. (2009) *Interviews: Learning the craft of qualitative research interviewing*. sage.

¹ Lee, D. and 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), pp. 271.

² Liu, D., Yang, X., Zhang, C., Zhang, W., Tang, Q., Xie, Y. and Shi, L. (2022) 'Impact of job satisfaction and social support on job performance among primary care providers in Northeast China: a cross-sectional study', *Frontiers in Public Health*, 10, pp. 884955.

¹² Mehta, V. (2023) 'Artificial Intelligence in Medicine: Revolutionizing Healthcare for Improved Patient Outcomes', *Journal of Medical Research and Innovation*, 7(2), pp. e000292-e000292.

²⁶ Morgan, D. L. and Nica, A. (2020) 'Iterative thematic inquiry: A new method for analyzing qualitative data', *International Journal of Qualitative Methods*, 19, pp. 1609406920955118.

¹² Naveed, M. A. (2023) 'Transforming healthcare through artificial intelligence and machine learning', *Pakistan Journal of Health Sciences*, pp. 01-01.

¹⁴ Nilsen, P., Svedberg, P., Neher, M., Nair, M., Larsson, I., Petersson, L. and Nygren, J. (2023) 'A Framework to Guide Implementation of AI in Health Care: Protocol for a Cocreation Research Project', *JMIR Research Protocols*, 12(1), pp. e50216.

⁶ Pesapane, F., Bracchi, D. A., Mulligan, J. F., Linnikov, A., Maslennikov, O., Lanzavecchia, M. B., Tantrige, P., Stasolla, A., Biondetti, P. and Giuggioli, P. F. (2021) 'Legal and regulatory framework for AI solutions in healthcare in EU, US, China, and Russia: new scenarios after a pandemic', *Radiation*, 1(4), pp. 261-276.

²⁴ Qi, N., Shiping, L. and Jing, H. (2022) 'An evolutionary game simulation of a composite subsidy policy to promote military-civilian integration: a national system of innovation with Chinese characteristics', *IEEE Access*, 10, pp. 88276-88294.

Röösli, E., Rice, B. and Hernandez-Boussard, T. (2021) 'Bias at warp speed: how AI may contribute to the disparities gap in the time of COVID-19', *Journal of the American Medical Informatics Association*, 28(1), pp. 190-192.

38
Scott, I. A., Carter, S. M. and Coiera, E. (2021) 'Exploring stakeholder attitudes towards AI in clinical practice', *BMJ Health & Care Informatics*, 28(1).

21
Seidman, D., Maor, R., Tauber, Y., Amar, Y. and Gilboa, D. (2023) 'O-243 Personalized pregnancy odds estimation can be obtained using AI embryo evaluation and individual patient characteristics', *Human Reproduction*, 38(Supplement_1), pp. dead093. 297.

16
Simon, G., DiNardo, C. D., Takahashi, K., Cascone, T., Powers, C., Stevens, R., Allen, J., Antonoff, M. B., Gomez, D. and Keane, P. (2019) 'Applying artificial intelligence to address the knowledge gaps in cancer care', *The oncologist*, 24(6), pp. 772-782.

33
Sodhro, A. H. and Zahid, N. (2021) 'AI-enabled framework for fog computing driven e-healthcare applications', *Sensors*, 21(23), pp. 8039.

23
Sun, T. Q. and Medaglia, R. (2019) 'Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare', *Government Information Quarterly*, 36(2), pp. 368-383.

31
Thakkar, B. and Bharathi, V. S. (2022) 'Medical Specialists' Perception About Adoption of Artificial Intelligence in the Healthcare Sector', *Cardiometry*, (25), pp. 426-434.

36
Verhenneman, G. (2021) 'The patient, data protection and changing healthcare models'.

Wang, C., Zhang, J., Lassi, N. and Zhang, X. 'Privacy protection in using artificial intelligence for healthcare: Chinese regulation in comparative perspective'.

Healthcare. MDPI, 1878.

⁶⁰ Wolff, J., Pauling, J., Keck, A. and Baumbach, J. (2021) 'Success factors of artificial intelligence implementation in healthcare', *Frontiers in digital health*, 3, pp. 594971.

⁸ Yin, J., Ngiam, K. Y. and Teo, H. H. (2021) 'Role of artificial intelligence applications in real-life clinical practice: systematic review', *Journal of medical Internet research*, 23(4), pp. e25759.

APPENDIX

Appendix 1: Journal of Medical Internet Research

The leading peer-reviewed journal for digital medicine and health and health care in the internet age.

Editor-in-Chief:

Gunther Eysenbach, MD, MPH, FACMI, Founding Editor and Publisher, Adjunct Professor, School of Health Information Science, University of Victoria, Canada

Impact Factor 7.4

The Journal of Medical Internet Research (JMIR) is the pioneer open access eHealth journal and is the flagship journal of JMIR Publications. It is a leading health services and digital health journal globally in terms of quality/visibility (Journal Impact Factor™ 7.4 (Clarivate, 2023)) and is also the largest journal in the field. The journal is ranked #1 on Google Scholar in the 'Medical Informatics' discipline. The journal focuses on emerging technologies, medical devices, apps, engineering, telehealth and informatics applications for patient education, prevention, population health and clinical care.

JMIR is indexed in all major literature indices including National Library of Medicine(NLM)/MEDLINE, Sherpa/Romeo, PubMed, PMC, Scopus, Psycinfo, Clarivate (which includes Web of Science (WoS)/ESCI/SCIE, EBSCO/EBSCO Essentials, DOAJ, GoOA and others. As a leading high-impact journal in its disciplines, ranking Q1 in both the 'Medical Informatics' and 'Health Care Sciences and Services' categories, it is a selective journal complemented by almost 30 specialty JMIR sister journals, which have a broader scope, and which together receive over 6,000 submissions a year.

As an open access journal, we are read by clinicians, allied health professionals, informal caregivers, and patients alike, and have (as with all JMIR journals) a focus on readable and applied science reporting the design and evaluation of health innovations and emerging technologies. We publish original research, viewpoints, and reviews (both literature reviews and medical device/technology/app reviews). Peer-review reports are portable across JMIR journals and papers can be transferred, so authors save time by not having to resubmit a paper to a different journal but can simply transfer it between journals.

We are also a leader in participatory and open science approaches, and offer the option to publish new submissions immediately as preprints, which receive DOIs for immediate citation (eg. in grant proposals), and for open peer review purposes. We also invite patients to participate (eg. as peer-reviewers) and have patient representatives on editorial boards.

As all JMIR journals, the journal encourages Open Science principles and strongly encourages publication of a protocol before data collection. Authors who have published a protocol in JMIR Research Protocols get a discount of 20% on the Article Processing Fee when publishing a subsequent results paper in any JMIR journal.

Appendix 2: Focus and group

About the Journal

- Focus and Scope
- Editorial Board
- Publication Frequency
- About the Publisher
- Article Processing Fees
- Indexing and Impact Factor

Author Information

- Instructions for Authors
- Submissions
 - Online Submissions
 - Submission Preparation Checklist
- Peer Review Process
- Publication Ethics and Malpractice
- Author Self-Archiving

Publishing Policies

- Section Policies
- Open Access Policy
- Editorial Policies
 - Criteria for Selection of Manuscripts
 - Ethical Issues and Considerations

Focus and Scope

The 'Journal of Medical Internet Research' (JMIR; ISSN 1438-8871, Medline-abbreviation: *J Med Internet Res*) (founded in 1999, now in its 25th year!) is a leading health informatics and health services/health policy journal (ranking in the first quartile Q1 by Impact Factor in these disciplines) focusing on digital health, data science, health informatics and emerging technologies for health, medicine, and biomedical research. The journal is ranked #1 on Google Scholar in the 'Medical Informatics' discipline.

JMIR was the first open access journal covering health informatics, and the first international scientific peer-reviewed journal on all aspects of research, information and communication in the healthcare field using Internet and Internet-related technologies; a broad field, which is known as 'eHealth' [see also What is eHealth and What is eHealth 2.0], or now also **'digital health'**, which includes mHealth (mobile health). This field also has significant overlaps with what is called 'consumer health informatics', health 2.0/medicine 2.0, or participatory medicine. This focus makes JMIR unique among other medical or medical informatics journals, which tend to focus on clinical informatics or clinical applications. As eHealth/mHealth is a highly interdisciplinary field we are not only inviting research papers from the medical sciences, but also from the computer, behavioral, social and communication sciences, psychology, library sciences, informatics, human-computer interaction studies, and related fields.

The term 'Internet' is used in its broadest sense, so we are also interested in high impact studies and applications of digital medicine, mobile technologies, social media, novel wearable devices and sensors, connected home appliances, domotics etc.

The journal invites manuscripts that deal with the following topics (the main themes/topics covered by this journal and sample papers can also be found here):

- novel digital health approaches, methods, and devices
- large digital medicine / digital therapeutics trials with clinical impact
- data science, open data
- studies evaluating the impact of Internet/social media use or specific eHealth/mHealth interventions on individual health-related or social outcomes
- evaluations and implementations of innovative mHealth (mobile health) applications, social media apps, ubiquitous computing, or innovative and emerging technologies in health



Appendix 3: Editorial Board

About the Journal

- Focus and Scope
- Editorial Board
- Publication Frequency
- About the Publisher
- Article Processing Fees
- Indexing and Impact Factor

Author Information

- Instructions for Authors
- Submissions
 - Online Submissions
 - Submission Preparation Checklist
- Peer Review Process
- Publication Ethics and Malpractice
- Author Self-Archiving

Publishing Policies

- Section Policies
- Open Access Policy
- Editorial Policies
 - Criteria for Selection of Manuscripts
 - Ethical Issues and Considerations

Editorial Board

Founding Editor and Publisher

Gunther Eysenbach, MD, MPH, FACMI

Adjunct Professor, School of Health Information Science, University of Victoria, Canada

[View Gunther Eysenbach's profile](#)

Dr. Gunther Eysenbach, MD MPH FACMI is founder, executive editor and CEO of JMIR Publications, a digital health and open science publisher, founded more than 20 years ago. Gunther is also recognized by many as one of the leading academics in the field of digital health and eHealth, is a known open access and open science pioneer, and is producer, editor and publisher of influential knowledge translation products. According to Ioannidis et al (Plos Biol 2019) he is the most cited academic in medical informatics of all times and globally. He is an Adjunct Professor at the School of Health Information at the University of Victoria (Canada). He created a new scientific discipline in 2002 called "infodemiology" (<https://www.jmir.org/2009/1/e11/>), now recognized by WHO as a core area of practice when dealing with an "infodemic." He is CEO at JMIR Publications, a leading digital open-science publisher with more than 100 employees, and Growth500 company, which he founded in 1999. He also cofounded TrendMD, a Knowledge Translation tool (<https://doi.org/10.1002/asi.24330>). He is also an angel investor in Digital Science and Digital Health startups.

Submissions are accepted via our web-based submission system

The *Journal of Medical Internet Research* is seeking a Co-Editor-in-Chief to work with Dr. Eysenbach and contribute to the journal's success and impact. Interested applicants can read more and apply [here](#).

Appendix 4: Publisher

About the Journal

- Focus and Scope
- Editorial Board
- Publication Frequency
- About the Publisher
- Article Processing Fees
- Indexing and Impact Factor

Author Information

- Instructions for Authors
- Submissions
 - Online Submissions
 - Submission Preparation Checklist
- Peer Review Process
- Publication Ethics and Malpractice
- Author Self-Archiving

Publishing Policies

- Section Policies
- Open Access Policy
- Editorial Policies
 - Criteria for Selection of Manuscripts

About the Publisher

Vision

At JMIR Publications we envision a world where people are empowered by health research and technology to make effective, informed decisions, take control of their health and well-being, and live happier and healthier lives.

Mission Statement

Through leading-edge thinking, community involvement, and continuous innovation, we help leaders in the health technology space to collaborate and disseminate their ideas and research results. We connect vetted, quality research outputs in novel, effective, and timely ways with those who need it.

History

JMIR Publications is a rapidly growing, leading open access publisher. The company was built on the success of JMIR (Journal of Medical Internet Research), which started in 1998 as a pioneering, small independent open access project hosted at a university, which subsequently grew into the most influential journal in medical informatics (ranked in Q1 by Impact Factor by Thomson Reuters as well as Scimago) and e-health services research. Due to the growth in influence and submissions, and to make the operations more sustainable and professional, the journal was incorporated as a company in 2011. Shortly after incorporation, several sister journals were launched. Currently, JMIR Publications Inc. publishes more than 3,500 articles annually in more than 30 journals. See the [JMIR Publications site](#) for more details.

Appendix 5: Raw transcript-participant 5

1. Yes, because the direction of my own research is the medical cross direction, so now it is using some artificial intelligence technology to diagnose some diseases, which is also very common in hospitals. The AI techniques within the medical field mainly include the processing of images and the analysis of fields, such as natural language processing to analyze medical cases, and deep learning from known data.

Some training models are also tested to perform machine diagnosis and develop diagnostic equipment.

2. From a medical point of view, I think it is a good thing. Artificial intelligence technology and the equipment trained through artificial intelligence technology and processing methods, can be decentralized to various cities and even more remote areas, you can achieve the universalization of medical resources, so that the people in remote areas to enjoy the treatment of senior specialists, I'm very optimistic about this prospect.

3. Because this may involve confidentiality I can disclose some general information, for example, in Chinese medicine diagnosis, we have a term called "ZHENG SU", for example, the doctor will put "phlegm coagulation and blood stasis" in the "phlegm coagulation and blood stasis". For example, doctors will define "phlegm coagulation" and "blood stasis" in "phlegm coagulation and blood stasis" as "ZHENG SU". By putting these definitions into a system that is being tested, the system will be able to make a diagnosis based on the symptoms. Including some oriented, tongue picture analysis, through the means of machine learning and deep learning, to make accurate judgments.

4. Because I am in this research field, so I deal with it every day for a very long time, how to have more than six hours a day.

5. It can provide doctors with a pre-diagnosis service, that is, in advance to determine what disease this patient may have and assigned to the relevant departments, to improve the outpatient clinic receiving efficiency, and the patient's return visit record

after the end of the treatment, which can improve the patient's satisfaction.

6. It will have some positive impacts, for example, we will put a certain number of intelligent equipment in the outpatient clinic, according to the diagnostic results of this intelligent equipment and combined with the doctor's clinical judgment can reduce the rate of misdiagnosis, and indeed improve the clinical cure rate of patients.

7.

8. At present, artificial intelligence diagnosis is not popular and many doctors do not recognize the diagnostic results of the machine. Therefore, the training related to it may only exist in large hospitals with relatively rapid development.

9. First of all, there are concerns and challenges, such as models that do not guarantee diagnostic accuracy, which may affect patient outcomes. The favorable aspects are like what I said before, it can improve the efficiency of outpatient consultation, the distribution of medical resources in remote areas is more evenly distributed, and all the people can enjoy the medical treatment equally. On the other hand, if some intelligent inheritance equipment can be used at home, it is also possible to alleviate the burden of patients to a certain extent, patients can not have to trek to the hospital to register, consultation, such a process. Patients can also have a general grasp of their own condition through such technology, which also allows doctors to be more cautious in giving treatment plans during the interview.

10. First of all, patients and doctors are, in my opinion, the biggest beneficiaries. The administrative staff, including nurses, in my opinion, are still assisting the doctor in

the treatment based on the doctor's written instructions. Therefore, they ⁷⁴do not play a key role in the diagnostic process.

11. It may be a trend, like our research team began to study the original intention of intelligent diagnosis of Chinese medicine is because good Chinese medicine in China is not as popular as Western medicine, and Chinese medicine in the "look 'smell, ask, cut" for some of the old so-called old Chinese medicine, he may not be able to make a good physical make a good response, such as presbyopia ah, back of the ear ah such.

⁷⁸Therefore, in order to ensure that the initial judgment process is not biased, the reference of artificial intelligence is meaningful, because the machine will not be fatigued, its memory is accurate, learning efficiency is very high. So to a certain extent, the risk of misdiagnosis can be avoided, and to a certain extent, the anxiety caused by age can be alleviated. Thus improving the inequality of medical resources in our country.

12. I think this prospect is still very optimistic because after all, AI as a new industry, many disciplines also try to do an interaction with AI. So the nature of AI still ⁵⁷has a wide range of prospects for the medical industry, such as we mentioned before the application of Chinese medicine diagnosis, to improve the correct rate of clinical diagnosis of doctors, reduce the mortality rate of patients, there will be some positive impact.

13. Two aspects, one is that in the diagnosis will be stuck in a bug situation, for example, there is a blank about the diagnostic results A or some of the information collection is not a way to take the normal, then the whole process will be interrupted,

and may even appear to be the case of a dead computer, then from the beginning will be a waste of resources and time. Another point is that the test data is not enough, the AI will reply indiscriminately, then the information obtained will not be accurate. Probably these two.

15. I hope that hospitals can set up a special intelligent clinic, and patients who are willing to participate can go to this intelligent clinic for a pre-test. Then they can meet with the doctor as an auxiliary diagnosis. Of course, if the patient is not willing to accept, we can also provide the traditional channels of consultation, I think the layout will probably tend to this kind.

16. There will be some concern, but our country's policy in this regard is relatively perfect, and for the medical field, any experiment in the field of medicine, whether it is research and development equipment or the development of new drugs, even if it is to do biological experiments with mice are required to go through the test of medical ethics, then the humanitarian spirit of the ethical, the power of doctors and patients to regulate the boundaries of all the medical aspects will be All the boundaries of medicine will be clearly labeled. To a large extent, unethical and even inhumane situations can be avoided.

Appendix 6: Interview questions

	Interview Questions	Research Objectives	References
1	Do you notice the presence or impact of AI technologies in your workplace environment?	Objectives 1 and 2	Adoption and implementation of AI technologies in healthcare settings (e.g., Jiang et al., 2017; Ngiam & Khor, 2019)
2	How do you feel about the integration of AI-driven operational management	Objectives 1 and 2	Impact of AI on operational efficiency, patient care quality,

	systems in your healthcare facility?		and healthcare accessibility (e.g., Dash et al., 2019; Davenport & Kalakota, 2019)
3	Can you describe the specific AI-driven management systems currently implemented in your healthcare facility, and how they are utilized?	Objectives 1 and 2	Adoption and implementation of AI technologies in healthcare settings (e.g., Jiang et al., 2017; Ngiam & Khor, 2019)
4	How frequently do you interact with the AI-driven operational management systems mentioned above?	Objectives 1 and 2	Impact of AI on operational efficiency, patient care quality, and healthcare accessibility (e.g., Dash et al., 2019; Davenport & Kalakota, 2019)
5	In what ways do you believe an AI-guided operations management system could improve your job performance or workflow?	Objectives 2 and 3	Challenges and opportunities associated with AI integration in healthcare (e.g., Mehta et al., 2018; Reddy et al., 2020)
6	Could you provide specific examples or instances where AI-driven management systems have positively influenced patient outcomes or healthcare services?	Objectives 2 and 3	Impact of AI on operational efficiency, patient care quality, and healthcare accessibility (e.g., Dash et al., 2019; Davenport & Kalakota, 2019)
7	Can you provide examples or data illustrating the specific impacts or outcomes resulting from the integration of AI-driven systems in your work or healthcare facility?	Objectives 3 and 4	Challenges and opportunities associated with AI integration in healthcare (e.g., Mehta et al., 2018; Reddy et al., 2020)
8	How do you think healthcare professionals in Heilongjiang Province have adapted to the use of AI-driven management systems, and what forms of training or support have been provided?	Objectives 3 and 4	Challenges and opportunities associated with AI integration in healthcare (e.g., Mehta et al., 2018; Reddy et al., 2020)
9	How do you envision patients benefiting from the adoption of AI operations management systems, and what are the potential challenges or concerns associated with this?	Objectives 2 and 3	Impact of AI on operational efficiency, patient care quality, and healthcare accessibility (e.g., Dash et al., 2019; Davenport & Kalakota, 2019)
10	Based on your experience, which stakeholders or groups of individuals do you believe will be most impacted by the implementation of AI-guided operations management systems?	Objectives 3 and 4	Challenges and opportunities associated with AI integration in healthcare (e.g., Mehta et al., 2018; Reddy et al., 2020)
11	In what ways do you believe AI-guided operations management systems will contribute to future developments or improvements in the healthcare sector of Heilongjiang Province?	Objective 4	Future developments and long-term impact of AI in the healthcare sector (e.g., Topol, 2019; Yu et al., 2018)
12	What do you foresee as the long-term impact of AI-driven management systems on the healthcare landscape in Heilongjiang Province?	Objective 4	Future developments and long-term impact of AI in the healthcare sector (e.g., Topol, 2019; Yu et al., 2018)
13	Are there any particular situations or scenarios where you feel uncertain or challenged by the use of AI-driven systems in healthcare management?	Objective 4	Ethical considerations and best practices for implementing AI in healthcare (e.g., Char et al., 2018; Vayena et al., 2018)
14	Could you share any significant experiences or observations regarding the impact of AI-driven management	Objectives 3 and 4	Challenges and opportunities associated with AI integration in healthcare (e.g., Mehta et al.,

	systems on your work or healthcare facility?		2018; Reddy et al., 2020)
15	From your perspective, what recommendations would you offer to enhance the effectiveness and efficiency of AI-driven management systems in healthcare?	Objective 4	Ethical considerations and best practices for implementing AI in healthcare (e.g., Char et al., 2018; Vayena et al., 2018)
16	Do you have any concerns or considerations regarding the ethical or privacy implications of AI in healthcare management?	Objective 4	Ethical considerations and best practices for implementing AI in healthcare (e.g., Char et al., 2018; Vayena et al., 2018)

Appendix 7: Final Codes and Themes

Theme	Sub theme	Codes	Quotes
Theme 1: Presence and Impact of AI Technologies	Enhancements and Monitoring	AI Imaging Enhancements, AI Monitoring Systems, AI Patient Registration, AI Timekeeping, AI Detection Support, AI Enhanced Accuracy, AI Technology, Image Processing, Natural Language Processing, Symptom Analysis, Diagnostic Tools	"For instance, our imaging tech has gotten a serious upgrade with AI...it helps us catch things on scans that might be tricky to spot otherwise." "Smart systems now monitor vital signs, which are kind of like having an extra set of eyes that never get tired." "We use AI-driven systems for tasks like patient registration and timekeeping. Compared to before, these systems have made processes more convenient and efficient. "We've integrated AI into our appointment scheduling and patient record management. It helps us predict patient flow and manage appointments more efficiently. "AI helps highlight areas of concern on scans that might be easy to miss." "The AI techniques within the medical field mainly include the processing of images and the analysis of fields, such as natural language processing to analyze medical cases, and deep learning from known data." "By putting these definitions into a system that is being tested, the system will be able to make a diagnosis based on the symptoms."
Theme 2: Integration of AI in Operational Management	Personalized Care and Future Impact	AI Initial Skepticism, AI Impact on Operational Efficiency	"Initially, there was a bit of skepticism, naturally. Change always brings a bit of resistance, especially in a field as critical as healthcare. "The AI-driven systems for operational management have really started to prove their worth."

		AI Improve Patient Flow, AI in Inventory Management, AI-Driven Management System, AI Queue Management	"The way these systems handle scheduling and patient flow has significantly reduced the wait times." "AI has significantly reduced waiting times by managing queues more efficiently." "We spend less time on administrative tasks and more on patient care."
Theme 3: Specific AI-Driven Management Systems	AI Systems for Patient and Inventory Management	AI Patient System, AI Inventory Management System	"The patient scheduling system...automatically adjusts the scheduling to minimize waiting times and ensures that no doctor is either overwhelmed or underutilized." "Our inventory management system predicts what and how much we'll need based on past usage rates and upcoming procedures."
	AI in Diagnostic Tools	AI in Diagnostic Tools, AI Preliminary Diagnoses, AI Preliminary Image Analysis, AI Reducing Human Error, AI Speeding Up Results, AI-Assisted Decision Making	"AI in our diagnostic tools helps analyze diagnostic images and support our decisions by providing second opinions." "AI-driven systems also provide preliminary diagnoses, which help doctors prepare and improve their efficiency when seeing patients." "AI reduces the chances of human error in initial image assessments and speeds up the time it takes to get results to patients." "If the AI could chime in with advice based on the latest research or similar cases, it'd be like having a super knowledgeable colleague."
Theme 4: Frequency of Interaction with AI Systems	Daily Use and Interaction	AI-Driven Scheduling System Interaction, AI-Driven Inventory Management Interaction, AI in Diagnostic Tools	"The scheduling system is a daily touchpoint for sure. Each morning, I check my schedule on it, and throughout the day, it updates me if there are any changes." "The inventory management system is a bit more behind the scenes for me personally, but I still interact with it regularly, especially when prepping for surgery." "The diagnostic tools are a daily usage scenario too...the AI components of those tools are assisting." "AI has transformed many aspects of nursing, from handling routine orders to managing complex treatment protocols."
Theme 5: Impact on Job	Enhancing	AI Impact on	"If the scheduling got even smarter, it

Performance and Workflow	Efficiency and Preventive Care	Efficiency, AI in Preventive Care, Reducing Administrative Burden	would balance our days perfectly." "Catching health issues before they turn serious...preventive care is so much better than trying to fix something after it's gone wrong." "This technology has significantly eased the administrative burden, allowing nurses to focus more on patient care."
	Positive Influence on Patient Outcomes	AI Diagnostic Detection, AI Preventive Action, AI in Continuous Monitoring, AI Early Warning, AI Effective Intervention, AI Improved Recovery Time	"The AI system flagged a slight anomaly in the heart structure from the echocardiogram that might've been overlooked otherwise." "Our patient monitoring system continuously analyzes the vital signs of patients in critical care...alerted us to subtle changes in a patient's heart rate." "AI has positively impacted patient outcomes, especially in diagnostics and surgical planning." "The use of 3D imaging and AI in surgery has improved the precision of surgical interventions, making operations quicker and more accurate. "One particular instance that stands out is how AI helped us during a peak flu season." "This early detection allowed for immediate treatment, which significantly improved the patient's recovery time."
Theme 6: Ethical and Privacy Concerns	Ethical Considerations	AI Ethical Concerns, AI Data Privacy Concerns	"If an AI system recommends a particular course of treatment based on its algorithms, but that course might limit a patient's quality of life...how much should we rely on that AI decision?" "As much as I trust our IT department, the thought that patient data could potentially be hacked...is always at the back of my mind." "We need to ensure that AI supports but does not replace the human elements of patient care." "There's also a valid concern about data privacy and how securely patient information is being handled with these new systems."

2000319

ORIGINALITY REPORT

16%

SIMILARITY INDEX

12%

INTERNET SOURCES

8%

PUBLICATIONS

12%

STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Wales, Lampeter Student Paper	4%
2	Submitted to University of Ulster Student Paper	1%
3	Submitted to E-Learning Group Student Paper	<1%
4	Submitted to University of Central Lancashire Student Paper	<1%
5	Submitted to University of Birmingham Student Paper	<1%
6	Submitted to University of Leeds Student Paper	<1%
7	Submitted to De Montfort University Student Paper	<1%
8	Submitted to University of Teesside Student Paper	<1%
9	www.mdpi.com Internet Source	<1%
10	www.sweetstudy.com Internet Source	<1%
11	Submitted to King's College Student Paper	<1%
12	Submitted to University of Bradford Student Paper	<1%

13	Submitted to University of East Anglia Student Paper	<1 %
14	Submitted to University of Hertfordshire Student Paper	<1 %
15	Submitted to University of West London Student Paper	<1 %
16	Zhuozhao Li, Ryan Chard, Logan Ward, Kyle Chard et al. "DLHub: Simplifying publication, discovery, and use of machine learning models in science", Journal of Parallel and Distributed Computing, 2020 Publication	<1 %
17	tuprints.ulb.tu-darmstadt.de Internet Source	<1 %
18	Submitted to Brunel University Student Paper	<1 %
19	Submitted to Napier University Student Paper	<1 %
20	Submitted to Queen Mary and Westfield College Student Paper	<1 %
21	Submitted to University of Canberra Student Paper	<1 %
22	Submitted to Wilkes University Student Paper	<1 %
23	Submitted to University of Northampton Student Paper	<1 %
24	Submitted to The Citadel Student Paper	<1 %
25	www.jptcp.com	

Internet Source

<1 %

26

repository.up.ac.za

Internet Source

<1 %

27

conference.euas.eu

Internet Source

<1 %

28

essay.utwente.nl

Internet Source

<1 %

29

migrationletters.com

Internet Source

<1 %

30

openaccess.cms-conferences.org

Internet Source

<1 %

31

Submitted to University of Sussex

Student Paper

<1 %

32

Submitted to Buckinghamshire Chilterns
University College

Student Paper

<1 %

33

Submitted to Intercollege

Student Paper

<1 %

34

danielsilalahi124.wixsite.com

Internet Source

<1 %

35

link.springer.com

Internet Source

<1 %

36

www.frontiersin.org

Internet Source

<1 %

37

www.healthdatanerd.org

Internet Source

<1 %

38

healthsystemsustainability.com.au

Internet Source

<1 %

39	www.researchgate.net Internet Source	<1 %
40	Md. Mahfujur Rahman. "chapter 15 Ensuring Halal Compliance in AI-Driven Healthcare Solutions", IGI Global, 2023 Publication	<1 %
41	www.medrxiv.org Internet Source	<1 %
42	research-api.cbs.dk Internet Source	<1 %
43	"Xu Jianqin's Medication Rules of Safflower in the Treatment of Diabetes Mellitus and Its Complications Based on the Traditional Chinese Medicine Inheritance Assistance Platform", MEDS Chinese Medicine, 2023 Publication	<1 %
44	Submitted to Western Governors University Student Paper	<1 %
45	erepository.uonbi.ac.ke Internet Source	<1 %
46	5dok.org Internet Source	<1 %
47	Submitted to Robert Kennedy College AG Student Paper	<1 %
48	jmir.org Internet Source	<1 %
49	Submitted to RMIT University Student Paper	<1 %
50	Submitted to University of Bolton Student Paper	<1 %

51	covid19literature.reviews Internet Source	<1 %
52	thejas.com.pk Internet Source	<1 %
53	www.europeanpublisher.com Internet Source	<1 %
54	Sangeeta Singhal. "chapter 9 Data Privacy, Compliance, and Security Including AI ML", IGI Global, 2024 Publication	<1 %
55	Sebastian Weber, Marc Wyszynski, Marie Godefroid, Ralf Plattfaut, Bjoern Niehaves. "How do medical professionals make sense (or not) of AI? A social-media-based computational grounded theory study and an online survey", Computational and Structural Biotechnology Journal, 2024 Publication	<1 %
56	"Economic Recovery, Consolidation, and Sustainable Growth", Springer Science and Business Media LLC, 2023 Publication	<1 %
57	Ali Fenwick, Gabor Molnar, Piper Frangos. "The critical role of HRM in AI-driven digital transformation: a paradigm shift to enable firms to move from AI implementation to human-centric adoption", Discover Artificial Intelligence, 2024 Publication	<1 %
58	Jenks, Jeffrey T.. "The Development of Mind-Wandering Prayer Within a Christian	<1 %

Meditation Protocol", Center for Bioethics and Research, 2024

Publication

59	Nathan A. Shlobin, Max Ward, Harshal A. Shah, Ethan D.L. Brown, Daniel M. Sciubba, David Langer, Randy S. D'Amico. "Ethical Incorporation of Artificial Intelligence into Neurosurgery: A Generative Pretrained Transformer Chatbot-Based, Human-Modified Approach", World Neurosurgery, 2024	<1 %
60	Submitted to University of Wales Institute, Cardiff	<1 %
61	Xiaoyue Ma, Yudi Huo. "Are users willing to embrace ChatGPT? Exploring the factors on the acceptance of chatbots from the perspective of AIDUA framework", Technology in Society, 2023	<1 %
62	atuder.org.tr	<1 %
63	dialnet.unirioja.es	<1 %
64	ebin.pub	<1 %
65	eprints.usq.edu.au	<1 %
66	frontiersrj.com	<1 %
67	ir.unimas.my	<1 %

68	joinup.ec.europa.eu Internet Source	<1 %
69	journalppw.com Internet Source	<1 %
70	nrl.northumbria.ac.uk Internet Source	<1 %
71	ntnuopen.ntnu.no Internet Source	<1 %
72	ojs.literacyinstitute.org Internet Source	<1 %
73	osnadoes.ub.uni-osnabrueck.de Internet Source	<1 %
74	paksom.cosrec.org Internet Source	<1 %
75	studenttheses.uu.nl Internet Source	<1 %
76	ugspace.ug.edu.gh:8080 Internet Source	<1 %
77	www-emerald-com-443.webvpn.sxu.edu.cn Internet Source	<1 %
78	www.springerprofessional.de Internet Source	<1 %
79	www.thescope.org Internet Source	<1 %
80	www.umsh.edu.al Internet Source	<1 %
81	Milad Mirbabaie, Lennart Hofeditz, Nicholas R. J. Frick, Stefan Stieglitz. "Artificial intelligence in hospitals: providing a status	<1 %

quo of ethical considerations in academia to guide future research", AI & SOCIETY, 2021

Publication

82 Muhammad Daniyal, Moiz Qureshi, Roy Rillera Marzo, Mohammed Aljuaid, Duaa Shahid. "Exploring clinical specialists' perspectives on the future role of AI: evaluating replacement perceptions, benefits, and drawbacks", BMC Health Services Research, 2024

Publication

83 Pounds, Leonard J.. "A Framework for Artificial Intelligence Applications in the Healthcare Revenue Management Cycle", Nova Southeastern University, 2021

Publication

84 Sushama, Sooraj. "Initiating Change in Care: Socially Assistive Robots", Pepperdine University, 2023

Publication

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off

FINAL GRADE

70/100

GENERAL COMMENTS

Thank you Olivia for your pilot study on the influence of AI-driven operations management solutions on healthcare facilities in Heilongjiang Province, China, in this feedback it will focus on some key points.

The work has successfully identified literature gaps regarding the lack of qualitative research on AI in healthcare, particularly in capturing stakeholder perceptions and experiences. The study also addresses the need for localized understanding of AI integration in Heilongjiang Province, considering its unique socioeconomic and cultural context. The pilot study topic is well-formulated, aiming to explore the impact of AI-driven operations management systems on healthcare facilities in the region, with a focus on stakeholder perspectives and experiences.

The work has adopted a qualitative research approach using semi-structured interviews for data collection and thematic analysis for data interpretation. The selection criteria for participants are clearly defined, ensuring the inclusion of individuals with direct experience in implementing AI technologies. The study also addresses ethical considerations, such as obtaining approval from the ethics committee and ensuring participants' consent and confidentiality. However, the initial feasibility testing and primary discovery phases could be more clearly distinguished in the methodology section.

The literature review is comprehensive and well-structured, covering key aspects of AI adoption in global healthcare, contextual factors, experiences of healthcare administrators and personnel, the influence of AI on patient care quality, and barriers and opportunities in AI adoption. The researcher engages with relevant theories, such as the Technology Acceptance Model (TAM), and identifies gaps in the current research, particularly in the context of Heilongjiang Province. The literature review provides a solid foundation for the study and contextualizes the research within the broader field of AI in healthcare.

The work has addressed ethical considerations by obtaining approval from the ethics committee and designing the pilot study plan, information sheet,

and consent form to meet the requirements outlined in the UWTSD Research Data Management Policy. The study ensures participants' rights and maintains the integrity of the research process.

The results section presents a detailed analysis of the pilot study data, organized into six main themes: presence and impact of AI technologies, integration of AI in operational management, specific AI-driven management systems, frequency of interaction with AI systems, impact on job performance and workflow, and ethical and privacy concerns. The researcher has adhered to ethical practices by maintaining participant confidentiality and securely storing data.

The work has employed thematic analysis as a qualitative data analysis method, which involves an iterative process of identifying, analyzing, and reporting patterns in the data. However, the researcher could consider additional validation techniques, such as member checking or triangulation, to further enhance the credibility and trustworthiness of the findings.

The discussion section effectively synthesizes the empirical findings with the existing literature, discussing key aspects such as enhancements in operational efficiency, impact on patient care and outcomes, integration challenges and workforce adaptation, practical implications, and ethical and privacy concerns. The researcher relates the findings to relevant theories and highlights the contribution of the study to understanding the impact of AI-driven operations management solutions on healthcare facilities in Heilongjiang Province. The article follows a clear and structured format, with well-defined sections for the introduction, literature review, methodology, results, discussion, limitations, and conclusion.

The reflective commentary is not explicitly included in the provided document for which you have lost marks. You should consider adding a reflective section to discuss their personal learning, skill development, ethical dimensions, and academic growth throughout the research process.

In conclusion, this pilot study on the influence of AI-driven operations management solutions on healthcare facilities in Heilongjiang Province, China, demonstrates a strong engagement with the relevant literature, a well-developed qualitative

research design, and a rigorous analysis of the pilot data using thematic analysis. The researcher has successfully addressed several key points, including formulating a relevant topic based on literature gaps, undertaking a systematic literature review, adhering to ethical practices, and synthesizing empirical findings with the literature. The study contributes valuable insights into the impact of AI integration on healthcare operations, patient care quality, and stakeholder experiences in the specific context of Heilongjiang Province.

However, there are a few areas that could be strengthened, such as clearly distinguishing between the initial feasibility testing and primary discovery phases, considering additional validation techniques to support the findings, addressing the limitations of the study more thoroughly, and including a reflective commentary on the research process.

Second marker comments: Overall, this pilot study provides a solid foundation for further research on AI-driven operations management in healthcare facilities, particularly in the context of Heilongjiang Province. The findings have practical implications for healthcare administrators, policymakers, and other stakeholders involved in the integration of AI technologies in healthcare settings. With some refinements and the inclusion of a reflective commentary, this study has the potential to inform future research and practice in the field of AI in healthcare operations management.

PAGE 1

PAGE 2



Comment 1

So this should be the executive summary - outlining everything in the assignment. The preamble of your journal choice and then an article - all in the executive summary !

PAGE 3



Comment 2

The abstract provides a clear overview of the study, including the target journal, research objectives, methodology, and key findings. However, it could be more concise to fit within the typical word count for an abstract.

See also, that you needed an executive summary - and a well-written Executive Summary should be a **comprehensive summary of a longer document**.

PAGE 4



Comment 3

Remember Olivia, a pilot study provides necessary information not only for calculating the sample size, but also for assessment of all other aspects of the main study, minimizing unnecessary effort from the researchers and participants, as well as the dissipation of research resources. In order for the pilot study to play its role, factors introduced in the text must be clearly defined before proceeding with the pilot study, and demonstrate a high level of completion. Furthermore, a pilot study provides valuable information, not only for the researcher's main study, but also for other similar studies; therefore, it is crucial to include complete information on the feasibility of the study.



Comment 4

A pilot study is a preliminary investigation designed to test the feasibility and design of a larger, more comprehensive study. It's essentially a 'trial run' conducted on a smaller scale, aiming to identify any potential issues and make necessary adjustments before the main research is undertaken. This type of study can be used in both qualitative research and quantitative research methodologies, serving to refine research questions, methods, and even the practicalities of data collection.

Pilot studies are not intended to provide definitive data or outcomes but rather to illuminate the path for smoother execution of the subsequent full-scale investigation.

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10



Comment 5

The introduction effectively highlights the significance of AI in healthcare and the need for qualitative research in this area. However, the research problem statement could be more focused and specific to the context of Heilongjiang Province.

PAGE 11

PAGE 12

PAGE 13

PAGE 14



Comment 6

How do the specific socioeconomic and cultural characteristics of Heilongjiang Province influence the adoption and implementation of AI in healthcare facilities in this region?



Comment 7

The literature review covers a wide range of relevant topics related to AI adoption in healthcare. However, some sections (e.g., 2.2.1) could benefit from more synthesis and critical analysis rather than simply reporting the findings of individual studies.

PAGE 15

PAGE 16



Comment 8

- The literature review provides a good overview of the current state of AI adoption in healthcare globally and in China specifically. However, it could benefit from a more critical analysis of the methodological limitations and potential biases of the studies cited, particularly in sections 2.3 and 2.4.
-
- While the literature review touches on important themes such as ethical considerations and data privacy concerns, these topics could be more thoroughly explored and connected to the specific context of AI adoption in healthcare facilities in Heilongjiang Province. A more in-depth discussion of these issues could help to better frame the research objectives and inform the interpretation of the study findings.



Comment 9

What are the key differences between the adoption of AI in healthcare in China compared to other countries, and how do these differences inform the research objectives of this study?



Comment 10

The study design and sampling methods are clearly described. However, more detail could be provided on the data analysis process, such as how themes were derived from the codes.



Comment 11

How were the interview questions developed, and were they pilot-tested before being used in the study?

WOW WE WORKED SO LONG ON THIS !!

PAGE 33



Comment 12

The results section presents the key themes that emerged from the interviews, supported by relevant quotes. However, some themes (e.g., Theme 4) could be more thoroughly developed and connected to the research objectives.

PAGE 34



Comment 13

How did the researcher ensure the trustworthiness and credibility of the qualitative data analysis process?

PAGE 35

PAGE 36



Comment 14

Participant ?? 1, 2, 3 ??

PAGE 37

PAGE 38

PAGE 39



Comment 15

Were there any notable differences in the experiences and perceptions of AI among participants with different roles (e.g., nurses vs. doctors)?

PAGE 40



Comment 16

The discussion section effectively relates the study findings to the existing literature and highlights the practical implications. However, some sections (e.g., 5.6) could be more focused on the specific findings of this study rather than general recommendations.



Comment 17

Two questions:

- How do the findings of this study compare to similar qualitative studies on AI adoption in healthcare in other regions of China or other countries?
-
- What are the potential unintended consequences or risks associated with the widespread adoption of AI in healthcare facilities in Heilongjiang Province?

PAGE 41

PAGE 42

PAGE 43

PAGE 44

PAGE 45

PAGE 46

PAGE 47

PAGE 48



Comment 18

The limitations section identifies several important limitations of the study, such as the small sample size and lack of diversity among participants. However, it could also acknowledge the potential limitations of the qualitative approach itself.



Comment 19

How might the researcher's own background and biases have influenced the data collection and analysis process?

PAGE 49

PAGE 50



Comment 20

The conclusion summarizes the main findings and emphasizes the importance of ongoing research and policy development in this area. However, it could be more concise and avoid introducing new information.

PAGE 51



Comment 21

What are the next steps for research in this area, and how can the findings of this study inform future research designs?



Comment 22

How might the COVID-19 pandemic have influenced the adoption and perception of AI in healthcare facilities in Heilongjiang Province, and how could this be addressed in future research?

PAGE 52



Sp.
Spelling error



Comment 23

Two points:

- References: The reference list includes a wide range of relevant sources. However, some references (e.g., Farayola et al., 2024) have publication dates in the future, which should be corrected.
-
- Appendices: The appendices provide useful supplementary information, such as the interview questions and final codes and themes. However, some appendices (e.g., Appendix 5) could be more clearly labeled and formatted for readability

PAGE 53

PAGE 54

PAGE 55

PAGE 56

PAGE 57

PAGE 58

PAGE 59

PAGE 60

PAGE 61

PAGE 62

PAGE 63

PAGE 64

PAGE 65

PAGE 66

PAGE 67

RUBRIC: L7 GENERIC ASSESSMENT RUBRIC

CATEGORY

FAIL	0-29%
FAIL	30-44%
MARGINAL FAIL	45-49%
SATISFACTORY (PASS)	50-59%
GOOD TO VERY GOOD (MERIT)	60-69%
EXCELLENT (DISTINCTION)	70-84%
EXCEPTIONAL (DISTINCTION)	85-100%

1. ENGAGEMENT

(including reading, referencing, academic conventions and academic honesty).

FAIL	Little or no evidence of reading and/or reliance on inappropriate sources. Little or no evidence of reading and/or reliance on inappropriate sources. Views and findings mostly unsupported and non-authoritative. Referencing conventions used incoherently or largely absent.
FAIL	Poor engagement with essential reading. No evidence of wider reading. Reliance on inappropriate sources, and/or indiscriminate use of sources. Heavily reliant on information gained through class contact. Inconsistent and weak use of referencing.
MARGINAL FAIL	Engagement with a limited range of mostly relevant and credible sources. Some omissions and minor errors. Referencing conventions evident though not always applied accurately or consistently.
SATISFACTORY (PASS)	Engagement with an appropriate range of research-informed literature, including sources retrieved independently. Some over-reliance on texts. Referencing may show minor inaccuracies or inconsistencies.
GOOD TO VERY GOOD (MERIT)	Engagement with a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing, with no/very few inaccuracies or inconsistencies. Engagement with an appropriate range of research-informed literature, including sources retrieved independently. Some over-reliance on texts. Referencing may show minor inaccuracies or inconsistencies.
EXCELLENT (DISTINCTION)	Engagement with an extensive range of relevant and credible literature, informed by the latest research. Consistently accurate application of referencing.
EXCEPTIONAL (DISTINCTION)	Exceptional engagement with an extensive range of relevant and credible literature, informed by the latest research. High-level referencing skills consistently and professionally applied.

2. KNOWLEDGE

FAIL	Major gaps in knowledge and understanding of the subject matter is not systematic. Substantial inaccuracies. No awareness of current problems, insights or the latest research and/or advanced scholarship within the discipline.
------	---

FAIL	Gaps in knowledge, with only superficial systematic understanding. Some significant inaccuracies and/or irrelevant material. No critical awareness of current problems, insights, or latest research within the discipline.
MARGINAL FAIL	Limited knowledge and systematic understanding of the concepts and principles within the subject area, which to some marginal extent, is informed by current research and scholarship. Some critical awareness of current problems and/or new insights, but often under-developed.
SATISFACTORY (PASS)	Knowledge is accurate and reasonably detailed. A systematic understanding of the field of study informed by, to some extent, current research and scholarship. A critical awareness of current problems and/or new insights though this may be under-developed occasionally.
GOOD TO VERY GOOD (MERIT)	Knowledge has a well-defined focus, which is reasonably extensive, coherent and detailed, with a critical awareness of current problems and/or new insights. Exhibits good understanding of the breadth and depth of contemporary and established views, and the work is, at least in part, well-informed by current research and scholarship.
EXCELLENT (DISTINCTION)	Excellent mastery of a complex and specialised area of knowledge. A systematic, excellent understanding of the concepts of the subject informed by current research and scholarship. Highly critical awareness of current problems and/or new insights. A critical, awareness of how the boundaries of knowledge are advanced through research.
EXCEPTIONAL (DISTINCTION)	Exceptional mastery of a complex and specialised area of knowledge. An exceptionally critical awareness of current problems and/or new insights. An outstanding understanding of the concepts of the subject, well-informed by current research and scholarship. A critical, sophisticated and nuanced awareness of how the boundaries of knowledge are advanced through research.

3. COGNITIVE

(Critical evaluation of current research and methodologies and develop critiques of them and, where appropriate, to propose new hypotheses; make sound judgements in the absence of complete data.)

FAIL	Wholly or largely wholly descriptive work. Little or no evaluation or critique or attempt at a systematic approach. Failure to develop arguments, leading to illogical or invalid judgements. Unsubstantiated generalisations, made without use of credible evidence.
FAIL	Largely descriptive work, with superficial use of critical evaluation of research and methodologies. Absent or weak development of hypotheses and judgements. Information accepted uncritically, uses generalised statements made with scant evidence and unsubstantiated opinions. Ideas sometimes illogical and contradictory.
MARGINAL FAIL	Limited attempt at critical evaluation/ critique of current research and methodologies, tending towards description. Limited attempt to propose new hypotheses. Can deal with complex issues but not systematically or creatively. Some evidence to support emerging judgements but these may be underdeveloped or with a little inconsistency / mis-interpretation. May assert rather than argue a case.
SATISFACTORY (PASS)	Some critical evaluation/ critique of current research and methodologies, though slightly underdeveloped in places, Proposes adequate but limited new hypotheses, where relevant. Can deal with complex issues but not fully systematically or creatively. Ability to make judgements based on data (that may be incomplete) but with some tendency to assert/state opinion rather than argue on the basis of reason and evidence.
GOOD TO VERY GOOD (MERIT)	Sound critical evaluation/ critique of current research and methodologies, Proposes new hypotheses, where appropriate. Can deal with complex issues systematically and

with some creativity. Ability to make sound judgements based on data (that may be incomplete)

EXCELLENT
(DISTINCTION)

Excellent critical evaluation/ critique of current research and methodologies, Proposes innovative hypotheses, where appropriate. Can synthesise complex issues systematically and creatively. Ability to investigate contradictory or incomplete information and make strong, persuasive, arguments and sophisticated judgements.

EXCEPTIONAL
(DISTINCTION)

Exceptional critical evaluation/ critique of current research and methodologies, Proposes innovative hypotheses, where appropriate. Exemplary systematic and creative synthesis of complex issues.

4. PRACTICAL

FAIL

Limited or no use of methods, materials, tools and/or techniques.
Little or no appreciation of the context of the application.
Limited understanding of the application of theory to practice or making appropriate links between the two.
Very weak problem-solving skills in complex and unpredictable contexts.

FAIL

Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application.
Weak understanding of the application of theory to practice, with only occasional evidence of making appropriate links between the two. Weak problem-solving skills in complex and unpredictable contexts.

MARGINAL FAIL

An awareness and mostly appropriate application of well-established methods, materials, tools and/or techniques, with occasional errors.
Basic appreciation of the context of the application. Theoretical knowledge and understanding applied in practice, but not always making logical links between the two.
Can identify problems and propose basic solutions without fully appreciating the complexity of unpredictable contexts.

SATISFACTORY (PASS) An appropriate application of standard methods, materials, tools and/or techniques.
Clear appreciation of the context of the application. Mainly consistent, accurate and logical application of theory to practice, making appropriate links between the two.
Can identify problems and propose mostly appropriate solutions in complex and unpredictable contexts, with elements of originality.

GOOD TO VERY GOOD (MERIT) A very good application of a range of methods, materials, tools and/or techniques.
Very good consideration of the context of the application, with perceptive insights. Can identify problems and propose appropriate solutions in complex and unpredictable contexts.
Evidence of originality and creativity.

EXCELLENT
(DISTINCTION)

An advanced application of knowledge, methods, materials, tools and/or techniques.
The context of the application is well considered, and insightful.
Can identify complex problems and propose excellent solutions. An excellent grasp of techniques applicable to own research or advanced scholarship.
Shows originality in application of knowledge and techniques, and of how established techniques of enquiry create and interpret knowledge in the discipline.

EXCEPTIONAL
(DISTINCTION)

Exceptional application skills in complex, unpredictable, contexts, drawing skilfully on the latest research within the discipline. Can identify complex problems and propose sophisticated, original solutions.
An outstanding application of techniques applicable to own research or advanced scholarship.
Shows originality in application of knowledge and techniques, and of how established techniques of enquiry create and interpret knowledge in the discipline with assimilation and development of cutting edge processes and techniques.

5. TRANSFERAB

FAIL	Communication medium is inappropriate or misapplied. Work is poorly structured, disorganised and/or confusingly expressed. Very weak use of language and/or very inappropriate style. Little or no evidence of autonomy (or collaboration, where relevant) in the completion of tasks. Little or no evidence of the skills required in professional, postgraduate employment
FAIL	Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application. Weak understanding of the application of theory to practice, with only occasional evidence of making appropriate links between the two. Weak problem-solving skills in complex and unpredictable contexts. Communication medium is poorly designed and/or not suitable for the audience. Work is poorly presented in a disjointed manner. It is loosely, and at times incoherently, structured, with information and ideas often poorly expressed. Weak use of language and/or inappropriate style. Weak independent initiative (or collaboration, if relevant). Limited evidence of the skills required in professional, postgraduate employment.
MARGINAL FAIL	Can communicate in a suitable medium but with some room for improvement. Mostly ordered presentation and structure in which relevant ideas / concepts are reasonably expressed. Work may lack coherence in places. Can work as part of a team, but with limited involvement in group activities. Demonstrates some but not all of the basic skills required in professional, postgraduate employment, with some areas of minor weakness.
SATISFACTORY (PASS)	Can communicate effectively in a suitable format, but may have minor errors. Mostly coherent, organised work, in a suitable structure and is for the most part clearly expressed. Can work effectively independently and/or as part of a team, with clear contribution to group activities. Demonstrates the skills required in professional, postgraduate employment, with some areas of strength and some of minor weakness.
GOOD TO VERY GOOD (MERIT)	Can communicate well, confidently and consistently in a suitable format. Work is coherent, fluent, well-structured and organised. Can work very well autonomously and/or as part of a team, with a good contribution to group activities. Demonstrates comprehensive professional, postgraduate employment skills.
EXCELLENT (DISTINCTION)	Can communicate professionally confidently and consistently in a suitable format. Work is coherent, very fluent and is presented professionally. Can work autonomously with initiative. Where relevant can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Demonstrates excellent professional, postgraduate employment skills and a strong appetite for further development. Work is coherent, very fluent and is presented professionally. Can work autonomously with initiative. Where relevant can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Demonstrates excellent professional, postgraduate employment skills and a strong appetite for further development.
EXCEPTIONAL (DISTINCTION)	Can communicate with an exceptionally high level of professionalism. Work is remarkably coherent, very fluent and is presented professionally. Can work outstandingly well and professionally within a team, showing advanced leadership skills. Demonstrates exemplary professional, postgraduate employment skills and a strong appetite for further development.