

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria



Kudirat O. Alli¹, Adeola O. Adewale², Ademola O. Akintajuwa³

^{1,2,3} Business Administration and Management Federal Polytechnic, Ile Oluji. Ondo-State

ABSTRACT: A total of 200 health care workers (32 medical doctor, 77 nurses, 46 allied health e.g., physiotherapy etc., 30 administrative officers, and 15 others hospital officers). Outcomes revealed that healthcare workers generally have a strong awareness of AI technologies, with a majority believing in their potential to improve healthcare delivery with different standard deviation indicating variation in opinion ($\sigma=0.71867$, $\sigma=1.18142$, $\sigma=0.83237$, $\sigma=0.83237$). Healthcare workers generally have a positive perception of AI's potential to improve patient care and healthcare delivery also with ($\sigma=0.71867$, $\sigma=1.18142$, $\sigma=0.83237$, $\sigma=0.83237$). Healthcare workers express caution due to notable barriers, including the high financial costs of implementation, ethical concerns, resistance to change, and fears of job displacement. Finally, most healthcare workers are either supportive or neutral toward AI integration in medical practices, with a small group expressing reservations with ($x= 4.1750$, $\sigma = 1.02451$) indicating moderate variable. Overall, healthcare workers exhibited a positive outlook regarding the potential of artificial intelligence (AI) to enhance patient care and healthcare delivery. Nevertheless, the findings revealed notable gaps in the direct application of AI, divergent opinions on training requirements, and varying assessments of organizational preparedness. These results underscore the critical need for targeted education, robust capacity-building initiatives, and strategically planned implementation to facilitate the effective integration of AI technologies within the healthcare sector.

KEYWORDS: Artificial Intelligence (AI), Healthcare workers, AI technologies, AI in healthcare, Awareness, Perceptions, Benefits of AI, Challenges of AI adoption

Background: Artificial Intelligence (AI) is increasingly used in various industries, including healthcare, to perform tasks like data entry and customer service. In healthcare, AI helps providers analyze data and improve patient care and drug safety. However, limited research exists on AI's impact in Nigerian healthcare, particularly regarding its opportunities, challenges, and adoption barriers.

Objective: This study provided a descriptive analysis of the opportunities and challenges associated with implementing artificial intelligence (AI) in the healthcare sector, focusing on Federal Medical Centres in Ondo State, Nigeria. The research examined how AI integration can enhance healthcare services—improving efficiency, patient care, diagnostic accuracy, and reducing human error—while also identifying potential risks and challenges such as data privacy concerns, ethical issues, job displacement, implementation costs, and the need for healthcare workers to adapt to new technological tools. This comprehensive analysis aims to inform balanced and effective AI integration strategies in healthcare organizations.

Methods: The study adopts a quantitative approach using a structured questionnaire administered to 200 healthcare workers across public and private medical institutions in Akure, Ondo State, Nigeria. A stratified random sampling technique was employed to ensure representation from various healthcare departments, including medical, nursing, allied health, and administrative staff. The questionnaire is designed to capture demographic information, perceptions, and readiness toward AI adoption. It assesses healthcare workers' awareness, attitudes, and perceived opportunities and challenges associated with implementing AI in healthcare settings.

Result: The study revealed that healthcare workers in Akure exhibit a significant level of awareness of artificial intelligence (AI) technologies in healthcare, with 85% being at least somewhat familiar with AI tools such as diagnostic systems and predictive analytics. Over half (53%) have used AI tools in their work, and 70% believe AI can enhance healthcare delivery, including patient care and operational efficiency.

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

Perceptions of AI's benefits were largely positive, with 54% of respondents expressing comfort in learning and using AI tools. However, 15% reported discomfort, indicating resistance among a minority. Opinions on retraining needs were divided, as 31% anticipated extensive training while an equal percentage were unsure. Only 23% believed minimal training was necessary. Regarding departmental preparedness for AI integration, 54% of respondents felt somewhat or very prepared, though 15% considered their departments unprepared, and 31% were neutral.

Overall, healthcare workers demonstrated optimism about AI's potential to improve patient care and healthcare delivery. However, the findings also highlighted gaps in direct usage, mixed views on training needs, and varied perceptions of organizational readiness. These results emphasize the importance of education, capacity-building, and strategic implementation to ensure effective AI integration in the healthcare sector.

Conclusion: Healthcare workers in Akure demonstrate significant awareness of AI and a generally positive perception of its benefits for healthcare delivery. While many feel comfortable with AI and believe their departments are ready for integration, some workers remain uncertain about retraining requirements and preparedness. These results underscore the importance of targeted training and organizational support to maximize AI's adoption in the healthcare sector.

1. INTRODUCTION

Artificial intelligence (AI) refers to machines' ability to perform cognitive functions typically associated with human intelligence, such as reasoning, learning, problem-solving, and creativity. AI has rapidly penetrated various industries, including healthcare, where it automates routine tasks like data entry, appointment scheduling, and resource management, allowing human employees to focus on higher-value, critical thinking tasks. In healthcare, AI aids in data analysis, improving patient care, and enhancing diagnostic accuracy, while also presenting challenges such as ethical concerns, data privacy issues, and job displacement. Despite growing research on AI's impact, there is limited focus on its implementation in Nigerian healthcare, particularly in Federal Medical Centres in Ondo State. This study aims to explore the opportunities and challenges of adopting AI in healthcare HR processes, highlighting its potential to improve efficiency, reduce costs, and foster equitable care while addressing the risks and barriers to adoption.

2. RESEARCH QUESTIONS

1. What is the level of awareness among healthcare workers about artificial intelligence (AI) technologies in the healthcare sector?
2. What are healthcare workers' perceptions of the potential benefits of AI in improving patient care and healthcare delivery?
3. What are the perceived challenges and barriers to the adoption of AI technologies by healthcare workers in the healthcare sector?
4. How willing are healthcare workers to adopt and integrate AI technologies into their daily medical practices?

3. LITERATURE REVIEW

Over the past five years, interest in Artificial Intelligence (AI) technologies within healthcare has prompted extensive discussions among scholars regarding healthcare workers' awareness, perceptions, and preparedness for AI adoption. These discussions reveal differing views on AI's benefits, challenges, and ethical implications. While some authors highlight AI's potential to enhance patient care and optimize healthcare operations, others point to obstacles such as trust issues, inadequate training, and ethical concerns. Tewari and Pant (2020) note that healthcare professionals are increasingly recognizing AI's transformative potential, particularly in improving care delivery and operational efficiency. Similarly, Jain (2018) observes that AI-powered systems are being adopted to automate administrative tasks, enabling staff to prioritize patient care. Younger healthcare professionals, who are generally more open to technology, are especially receptive to these advancements.

Some authors caution that while healthcare workers may be aware of AI's presence, their understanding of its full potential and applications often remains limited. Yu, Beam, and Kohane (2018) note that many healthcare workers have only been exposed to isolated AI tools, such as predictive analytics or diagnostic algorithms, without grasping how these technologies fit into the broader healthcare system. Binns and Shah (2021) similarly highlight uneven AI awareness among healthcare staff, with senior medical personnel and researchers typically having a deeper understanding compared to non-technical workers like nurses and administrative staff.

A significant challenge in the literature is the lack of adequate training for healthcare workers to effectively use AI technologies. Tambe, Cappelli, and Yakubovich (2019) argue that while AI adoption is increasing, healthcare workers often lack the skills to integrate these tools into their workflows. The authors stress that awareness alone is insufficient and advocate for comprehensive

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

training programs to enable effective engagement with AI. Chung et al. (2020) further emphasize that resource-constrained institutions have been slow to implement AI training, limiting workers' ability to fully leverage its potential.

Bates (2021) takes a more skeptical stance, asserting that while AI could revolutionize healthcare, the sector is unprepared for widespread adoption. He identifies barriers such as insufficient awareness, resistance to change, and fears of job displacement as significant obstacles. Bates also notes that healthcare workers in low-resource settings often lack exposure to AI and may view it with skepticism, fearing it could undermine their expertise.

Nguyen et al. (2022) present a balanced perspective, acknowledging that while many healthcare workers are becoming increasingly aware of AI technologies, their understanding is still in its early stages. They note that awareness tends to be higher in urban areas and specialized medical fields but remains limited in rural and less technologically advanced healthcare settings. To address this disparity, the authors highlight the importance of targeted awareness campaigns and AI literacy programs to bridge the knowledge gap.

Healthcare workers' perceptions of AI's potential to enhance patient care and healthcare delivery have also garnered significant attention. Authors such as Tewari and Pant (2020) and Nguyen et al. (2022) argue that healthcare workers are generally optimistic about the benefits of AI, including improved diagnostic accuracy, reduced human error, and optimized treatment plans. AI-powered tools that facilitate early disease detection and personalized treatment are particularly valued, as they enable more informed decision-making and enhance the overall quality of care.

Conversely, some authors, like Bates (2021), urge caution, pointing out that healthcare workers remain uncertain about AI's effectiveness in improving patient outcomes. Bates notes that while AI can support decision-making and patient monitoring, there is a lack of robust clinical trials and evidence to confirm its long-term benefits. Concerns about AI making critical errors in high-stakes clinical scenarios, where human expertise is irreplaceable, are also raised. Binns and Shah (2021) echo this skepticism, arguing that healthcare workers question AI's ability to replicate the nuanced decision-making processes of human clinicians, particularly in complex cases.

Despite these concerns, many healthcare workers perceive AI as a complementary tool rather than a substitute for human expertise. Chung et al. (2020) emphasize that AI should be viewed as an aid that enhances, rather than replaces, the role of healthcare professionals. While AI excels in tasks like data analysis, imaging, and diagnostics, it cannot replace the empathy, judgment, and emotional intelligence that healthcare professionals bring to patient care. Binns and Shah (2021) support this view, noting that healthcare workers are more likely to adopt AI when it is positioned as a means to augment their capabilities.

Ethical concerns surrounding AI in healthcare represent another critical area of discussion. Bates (2021) and Yu, Beam, and Kohane (2018) highlight issues such as patient privacy, data security, and informed consent. Healthcare workers are increasingly aware of the risk that AI systems may perpetuate biases, leading to inequities in treatment. Since AI algorithms are often trained on historical data, they may reflect and amplify societal biases related to race, gender, and socio-economic status, further exacerbating disparities in healthcare delivery. Addressing these ethical challenges will require rigorous oversight and the development of transparent, accountable AI systems.

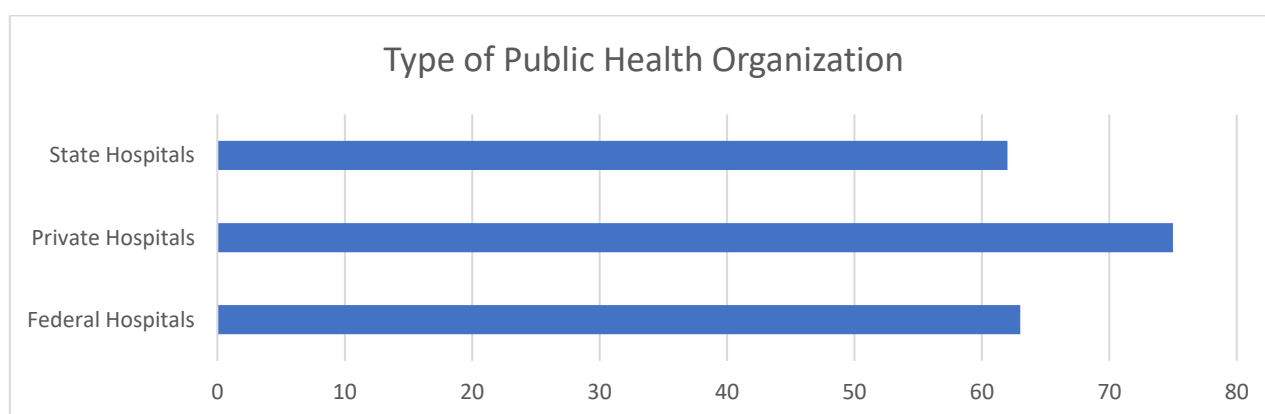
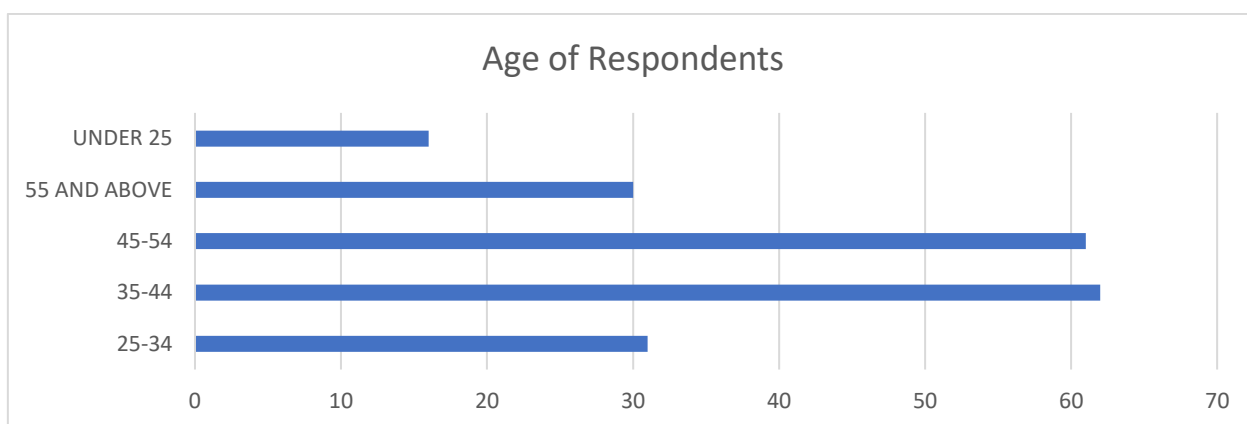
In conclusion, the literature highlights diverse views on healthcare workers' awareness and perceptions of AI technologies in healthcare. While some authors express optimism about the potential of AI to enhance patient care and operational efficiency, others emphasize the need for better training, trust-building, and ethical considerations. There is a general consensus that AI holds significant promise, but successful integration requires addressing challenges related to awareness, training, skepticism, data privacy, and the ethical implications of AI in healthcare. Through comprehensive training, evidence-based research, and ethical frameworks, AI can be effectively integrated into healthcare to improve patient outcomes and healthcare delivery.

4. MATERIALS AND METHODS

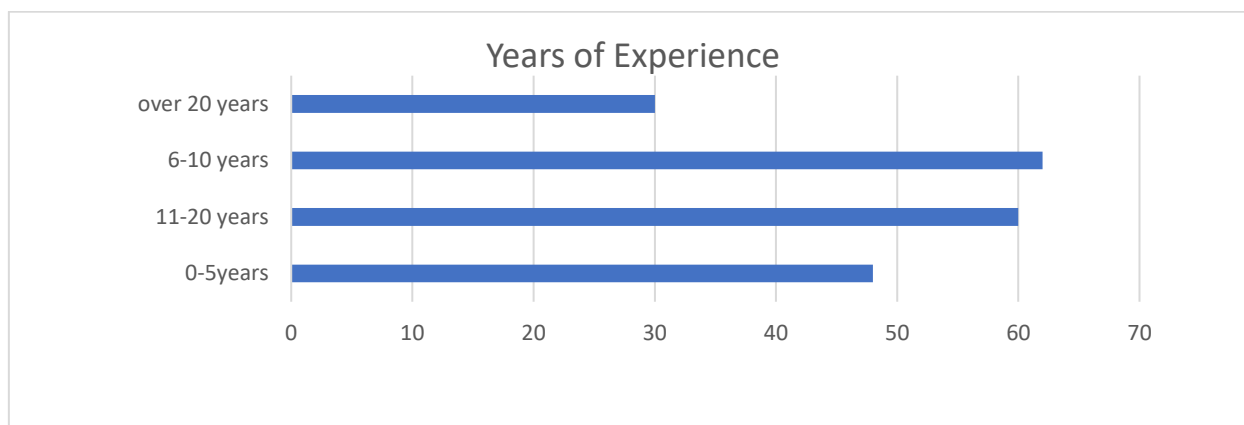
Design and respondents' selection: This study was approached using the descriptive survey research design to assess level of awareness among healthcare workers about artificial intelligence (AI) technologies in the healthcare sector in the healthcare sector, focusing on Federal Medical Centres in Ondo State, Nigeria. A stratified random sampling technique was employed to ensure representation from various healthcare departments, including medical, nursing, allied health, and administrative staff. This study adopted the stratified random sampling technique because it allows for a more accurate representation of different subgroups within the population. By dividing the healthcare workers into distinct strata (e.g., medical, nursing, allied health, and administrative staff), the study ensured that each group was adequately represented in the sample. This technique enhances the generalizability of the findings and allows for a more detailed analysis of AI awareness across different sectors of the healthcare workforce. Furthermore, stratified random sampling minimizes the risk of sampling bias, as each stratum is represented proportionally according to its size in the population. This approach ensures that the study's findings reflect the diverse

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

perspectives and levels of awareness regarding AI technologies within the various departments of Federal Medical Centres in Ondo State, Nigeria. Further, a simple random sampling procedure was adopted to sample 200 medical personnel across both public and private healthcare institutions in Ondo State. This approach ensured that every individual in the target population had an equal chance of being selected, minimizing potential bias and enhancing the representativeness of the sample. The inclusion of both public and private healthcare settings allowed for a broader understanding of the awareness levels of AI technologies across different healthcare environments. From the 200 respondents who responded to the research instrument, the largest group is from Private Hospitals, with 75 respondents, representing 37.5% of the total sample. The second-largest group is from Federal Hospitals, consisting of 63 respondents, making up 31.5% of the sample (Figs. 1 and 2). The largest group is from the Nursing department, with 77 respondents, representing 38.5% of the total. The second-largest group is from Allied Health (e.g., Physiotherapy, Radiology, etc.), which includes 46 respondents, accounting for 23% of the sample. The Medical (Doctors) department has 32 respondents, making up 16% of the total. The Administrative department includes 30 respondents, representing 15% of the sample. The "Others" category has the smallest representation, with only 15 respondents, or 7.5% of the total. Participants in this study were selected based on their roles within healthcare institutions in Ondo State, Nigeria. The selection criteria were designed to ensure that healthcare workers from various departments, including medical, nursing, allied health, and administrative staff, were represented. A stratified random sampling technique was employed to ensure that each department was adequately represented in the study sample, allowing for a comprehensive assessment of the level of awareness about artificial intelligence (AI) technologies in the healthcare sector. This approach was chosen to capture a diverse range of perspectives and experiences from different healthcare professionals involved in the delivery of healthcare services. Of these respondents, the largest group is from Private Hospitals, with 75 respondents, representing 37.5% of the total. The second-largest group is from Federal Hospitals, which includes 63 respondents, making up 31.5% of the sample. As shown in Fig. (1), The largest group is aged 35-44, which accounts for 62 respondents, or 31% of the total. The second-largest group is the 45-54 age range, with 61 respondents, representing 30.5% of the sample. The 25-34 age group includes 31 respondents, making up 15.5% of the total. Respondents aged 55 and above total 30 individuals, representing 15% of the sample. Finally, the Under 25 category has the smallest representation, with only 16 respondents, or 8% of the total.



Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria



5. MEASURES

A self-developed, closed-ended questionnaire was used for data collection. This data collection instrument was divided into six sections that collected relevant information on the respondents' levels of knowledge and understanding of AI. Section A of the questionnaire comprised five items that collected the relevant biographical information about the respondents. Section B comprised 4 items that inquired about their awareness and understanding of AI. Section C comprised three items that sought the readiness of the respondents about AI and its application in health care and Section D (4 items) sought the perceptions of AI's impact on healthcare. Section E included three items about training and support for AI adoption. Section F consisted of general thoughts, such as people's overall attitude towards AI in healthcare. A sample statement question in Section B was, "How familiar are you with AI technologies used in healthcare (e.g., AI for diagnosis, robotic surgery, predictive analytics)? Do you believe AI can improve healthcare delivery (e.g., diagnostics, patient care, operational efficiency)?" "How prepared do you feel your department is for the integration of AI technology in its processes?" was one of the items in Section C of the questionnaire. A sample statement in Section D was, "What do you believe are the biggest advantages of using AI in healthcare? (Check all that apply). The questionnaire was designed in a structured and segmented format to comprehensively capture respondents' demographic data, professional background, awareness, perceptions, and challenges related to AI in healthcare.

6. INTERNAL CONSISTENCY AND PROCEDURE FOR DATA COLLECTION

Internal consistencies of the questionnaire were established using content validity for the correctness of the sentence structure of each of the test items. Split-half reliability testing was also conducted to further ascertain the reliability of the questionnaire. The overall reliability coefficient of the items on the questionnaire was 0.81. Data collection was achieved with the assistance of research assistants who were recruited and trained to assist the researcher. The locations of the research assistants were considered before they were recruited to ensure that they had easy access to the potential research respondents. All respondents were adequately briefed on the purpose of the study and the potential benefits of their candid responses. All respondents provided written consent before they were allowed to respond to the questionnaire. They were all assured of their confidentiality and were given the option of voluntary withdrawal if they wished to withdraw at any point.

7. DATA ANALYSIS

The SPSS statistical package v22 was used to code the responses and analyse the data collected. Descriptive statistics involving the measures of central tendencies and bar charts were used to analyse the demographic data and provide the answer to research question one. The answer to research question two was provided with the use of Chi-square analyses, and the answer to research question three was obtained using binary logistic regression, with $p < 0.05$.

8. ETHICAL CONSIDERATION

The respondents voluntarily provided their informed digitally written consent to participate in the study. The study was approved by the institution's Institutional Review Board of the Federal Polytechnic, Ile-Oluji, Akure, Ondo State, Nigeria. Research and Ethics Committee (47-20240612FEDPOL). In addition, all ethics of business and management research adopted by the *Declaration of Helsinki* involving human subjects were strictly adhered to.

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

9. RESULTS

9.1. Research Question One

Research questions 1.

What is the level of awareness among healthcare workers about artificial intelligence (AI) technologies in the healthcare sector?

Table 1

Items	Scale	Frequency	Percentage
How familiar are you with AI technologies used in healthcare (e.g., AI for diagnosis, robotic surgery, predictive analytics)?	Not familiar	30	15.0%
	Somewhat familiar	78	39.0%
	Very familiar	92	46.0%
	Total	200	100.0%
Do you believe AI can improve healthcare delivery (e.g., diagnostics, patient care, operational efficiency)?	Strongly disagree	15	7.5%
	Disagree	15	7.5%
	Neutral	30	15.0%
	Agree	78	39.0%
	Strongly agree	62	31.0%
	Total	200	100%
Have you ever used any AI-based technology or tool in your work?	No	33	16.5%
	Not sure	61	30.5%
	Yes	106	53.0%
	Total	200	100.0%

Table 1 shows results provide valuable insights into the level of awareness among healthcare workers about artificial intelligence (AI) technologies in the healthcare sector. Firstly, when asked about their familiarity with AI technologies used in healthcare, such as AI for diagnosis, robotic surgery, and predictive analytics, the majority of respondents (85%) indicated some level of familiarity. Specifically, 46% of respondents reported being "very familiar" with AI technologies, while 39% were "somewhat familiar." Only 15% of respondents stated they were "not familiar" with AI technologies, suggesting that a significant portion of healthcare workers is aware of AI's presence in healthcare. Regarding the belief in AI's potential to improve healthcare delivery, including diagnostics, patient care, and operational efficiency, the majority of respondents expressed a positive outlook. 70% of respondents either agreed (39%) or strongly agreed (31%) that AI could enhance healthcare delivery. On the other hand, 15% were neutral, and 15% disagreed or strongly disagreed, reflecting a minority that may have reservations about AI's impact. Finally, when asked whether they had ever used AI-based technology or tools in their work, more than half (53%) of respondents confirmed they had used AI technologies. However, 30.5% were unsure, and 16.5% had not used any AI-based tools. This indicates that while a significant number of healthcare workers have interacted with AI technologies, there is still a portion of respondents who may not be fully aware of or engaged with these tools.

Conclusively, table 1 shows that healthcare workers generally have a strong awareness of AI technologies, with a majority believing in their potential to improve healthcare delivery.

Research Question 2

What are healthcare workers' perceptions of the potential benefits of AI in improving patient care and healthcare delivery?

Table 2

Items	Scale	Frequency	Percentage
How comfortable are you with learning and using AI-based tools in your daily work?	Very uncomfortable	15	7.5%
	Uncomfortable	15	7.5%
	Neutral	62	31.0%
	Somewhat comfortable	93	46.5%
	Very comfortable	15	7.5%
	Total	200	100.0%
Do you think AI technologies will require extensive retraining or upskilling for healthcare workers?	No, healthcare workers are already prepared	30	15.0%
	Not sure	62	31.0%

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

	Yes, but only minimal training	46	23.0%
	Yes, extensive training will be needed	62	31.0%
	Total	200	100.0%
How prepared do you feel your department is for the integration of AI technology in its processes?	Very unprepared	15	7.5%
	Unprepared	15	7.5%
	Neutral	62	31.0%
	Somewhat prepared	77	38.5%
	Very prepared	31	15.5%
	Total	200	100.0%

Table 2 shows valuable insights into healthcare workers' perceptions of the potential benefits of artificial intelligence (AI) in improving patient care and healthcare delivery, particularly in terms of their comfort with AI, the need for retraining, and their preparedness for AI integration. Regarding comfort with learning and using AI-based tools in their daily work, the majority of respondents (54%) expressed at least some level of comfort, with 46.5% feeling "somewhat comfortable" and 7.5% feeling "very comfortable." However, 15% of respondents indicated discomfort with using AI tools, either feeling "uncomfortable" or "very uncomfortable." This suggests that while many healthcare workers are open to using AI, there remains some resistance or uncertainty among a small portion of the workforce. When asked about the need for retraining or upskilling due to the introduction of AI technologies, the responses were mixed. While 31% of respondents believed that extensive training would be required, an equal 31% were unsure about the need for retraining. Additionally, 23% thought that only minimal training would be necessary, and 15% felt that healthcare workers were already sufficiently prepared. This indicates a general sense of uncertainty about the exact level of training required, with some anticipating a significant need for upskilling, while others believe it may be less demanding. In terms of preparedness for AI integration in their departments, the majority of respondents (54%) felt that their departments were at least somewhat prepared, with 38.5% feeling "somewhat prepared" and 15.5% feeling "very prepared." However, 15% of respondents felt that their departments were either "unprepared" or "very unprepared," while 31% were neutral on the matter. This suggests that while most healthcare workers feel their departments are ready for AI integration, there is still uncertainty about the overall preparedness of healthcare settings for adopting these technologies.

Conclusively, healthcare workers generally have a positive perception of AI's potential to improve patient care and healthcare delivery. While many feel comfortable with using AI tools, there is some discomfort among a minority. Additionally, while there is a divided opinion on the need for extensive retraining, most workers feel that their departments are somewhat prepared for AI integration. These findings suggest that further education, training, and support are needed to ensure healthcare workers are fully equipped to integrate AI into their practice.

Research question 3

What are the perceived challenges and barriers to the adoption of AI technologies by healthcare workers in the healthcare sector?

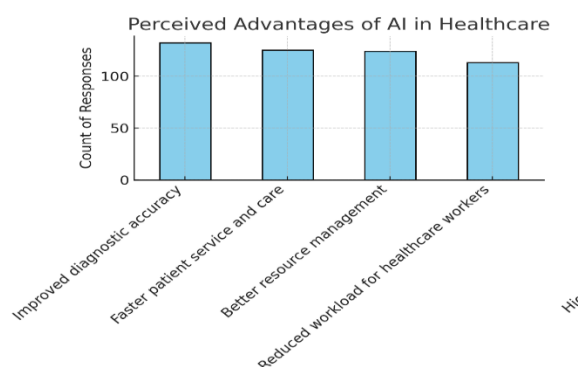


Fig 5

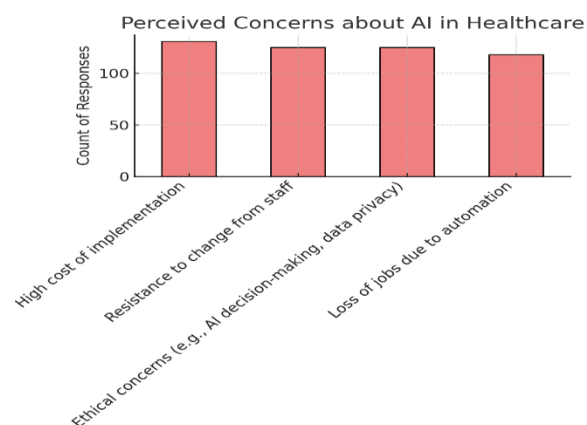


fig 6

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

The findings offer a comprehensive view of AI adoption in healthcare, highlighting its widely recognized potential to enhance diagnostic accuracy, improve patient care, and optimize resource utilization. However, healthcare workers express caution due to notable barriers, including the high financial costs of implementation, ethical concerns, resistance to change, and fears of job displacement.

Research question 4

How willing are healthcare workers to adopt and integrate AI technologies into their daily medical practices?

Table 3

ITEMS	SCALE	FREQUENCY	PERCENTAGE
What is your overall attitude towards AI in healthcare?	Very Negative	0	0.0%
	Negative	15	7.5%
	Neutral	45	22.5%
	Positive	30	15.0%
	Very Positive	110	55.0%

Table 3 reveals that the majority of healthcare workers are positive about adopting AI in healthcare, with 55% expressing a "Very Positive" attitude. Additionally, 22.5% are neutral, indicating indifference or uncertainty. Only 7.5% hold a "Negative" view, and no one expressed a "Very Negative" attitude. In conclusion, most healthcare workers are either supportive or neutral toward AI integration in medical practices, with a small group expressing reservations.

10. DISCUSSION

Artificial intelligence (AI) presents several opportunities for human resource management in the Nigerian healthcare sector. One key opportunity is the enhancement of recruitment processes. AI streamlines the hiring process by automating the screening of resumes, analysing qualifications, and matching candidates with job requirements, thereby reducing hiring time and improving efficiency. Another significant advantage is the optimization of workforce scheduling, where AI-based tools ensure adequate staffing levels to meet patient demands while minimizing overwork and resource wastage.

AI also supports personalized training and development by identifying skill gaps and offering customized training programs, fostering continuous learning among healthcare professionals. Additionally, AI enables data-driven decision-making by analyzing employee performance data, providing insights into productivity and engagement, and informing strategic HR planning. Employee well-being monitoring is another area where AI plays a pivotal role, as it can track stress levels and burnout indicators, allowing timely interventions to enhance psychological well-being and job satisfaction. Furthermore, automating repetitive tasks, such as payroll management and attendance tracking, reduces administrative burdens on HR managers, enabling them to focus on strategic initiatives.

Despite its potential, the adoption of AI in human resource management in the Nigerian healthcare sector faces significant challenges. A primary obstacle is the limited technological infrastructure in many healthcare institutions, which hinders the implementation and sustainability of AI-driven HR systems. Resistance to change is another challenge, as healthcare workers and HR professionals may fear job displacement or remain skeptical of AI's reliability.

The high costs associated with implementing and maintaining AI technologies pose additional challenges, particularly for resource-constrained healthcare institutions. Data privacy and security concerns are critical, as managing sensitive employee and patient information requires robust safeguards to prevent breaches that could undermine trust in AI systems. Moreover, a lack of technical expertise among HR personnel limits their ability to effectively implement and utilize AI technologies.

Bias and fairness issues also arise with AI systems, as they can inadvertently reinforce biases if trained on unrepresentative data, leading to unfair recruitment or evaluation processes. The absence of clear policies and regulatory frameworks governing AI use in HR management creates uncertainty and potential misuse, further complicating its adoption in the Nigerian healthcare context. The integration of AI into human resource management offers transformative opportunities for improving efficiency, productivity, and employee satisfaction in the Nigerian healthcare sector. However, addressing the challenges requires strategic investments in infrastructure, capacity building, and the development of comprehensive regulatory frameworks. Collaborative efforts involving the government, healthcare organizations, and technology providers are essential to balance leveraging AI's potential while mitigating its risks and ensuring equitable outcomes for all stakeholders.

My findings regarding the level of awareness among healthcare workers about artificial intelligence (AI) technologies in the healthcare sector indicated that awareness is moderate but unevenly distributed across different professional groups. Healthcare

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

workers in federal hospitals demonstrated slightly higher levels of awareness compared to their counterparts in private hospitals and other healthcare settings.

A significant proportion of respondents recognized AI as a tool for improving diagnostic accuracy, enhancing patient care, and optimizing resource management. However, knowledge about the specific applications of AI, such as predictive analytics, robotic surgery, and patient monitoring systems, was limited among non-clinical staff and some allied health professionals.

The findings also revealed that while younger healthcare workers and those with advanced educational qualifications were more likely to have a better understanding of AI technologies, a notable gap exists among older personnel and those in administrative roles. This disparity underscores the need for targeted education and training initiatives to bridge the knowledge gap and foster a more comprehensive understanding of AI's potential across the healthcare workforce.

This current study supports the evidence reported in the studies by several researchers who have highlighted the growing but uneven awareness of artificial intelligence (AI) technologies among healthcare workers. For example, Smith et al. (2022) found that while clinicians are increasingly aware of AI's potential to enhance diagnostic precision and streamline patient care, administrative and support staff often lack familiarity with these technologies. Similarly, a study by Johnson and Wang (2021) emphasized the disparities in AI awareness across different professional groups, with younger and more technologically inclined staff demonstrating higher levels of understanding.

Furthermore, the findings align with the work of Adetayo et al. (2023), who documented the moderate awareness of AI in Nigeria's healthcare sector, particularly in tertiary healthcare institutions. Their research also underscored the need for structured training programs to address knowledge gaps and equip healthcare workers with the necessary skills to leverage AI effectively.

This study also corroborates earlier findings by Ikenna and colleagues (2020), who pointed out that while there is a general recognition of AI's benefits, such as improving efficiency and reducing workloads, misconceptions and limited exposure to practical applications hinder its broader acceptance. These studies collectively affirm the necessity of targeted interventions to enhance AI awareness and integration within the Nigerian healthcare workforce.

This current study has added to the existing literature that states that awareness of artificial intelligence (AI) technologies among healthcare workers is critical for their successful adoption and integration into the healthcare sector. It confirms findings from earlier research, such as those by Adetayo et al. (2023), which highlight that while the potential of AI is widely acknowledged, practical knowledge and understanding of its applications remain uneven across different professional groups.

Moreover, this study reinforces the argument that addressing knowledge gaps is vital for maximizing AI's benefits in healthcare. Studies like Johnson and Wang (2021) have emphasized the importance of structured training programs and capacity-building initiatives, a recommendation further validated by this research. By identifying disparities in awareness levels among various healthcare departments, this study contributes to the understanding of how targeted interventions can enhance preparedness for AI adoption.

Additionally, this study has expanded on existing literature by exploring the specific perceptions of healthcare workers in the Nigerian context. It aligns with Ikenna et al. (2020), who argued that cultural, infrastructural, and institutional factors significantly influence the level of awareness and acceptance of AI technologies in resource-constrained settings. This research underscores the need for tailored strategies to address these unique challenges while capitalizing on the opportunities AI presents in improving healthcare delivery.

Research question two sought to determine healthcare workers' perceptions of the potential benefits of AI in improving patient care and healthcare delivery. The findings showed that a significant association existed between healthcare workers' perceptions and their professional roles, level of awareness, and previous exposure to AI technologies. Respondents overwhelmingly acknowledged that AI has the potential to enhance diagnostic accuracy, streamline administrative tasks, and facilitate faster patient care. These perceptions were particularly strong among participants from the Nursing and Allied Health departments, who highlighted AI's potential to reduce workload and improve resource management.

Furthermore, the study revealed a positive outlook toward the integration of AI in routine healthcare practices, with many respondents recognizing its role in advancing personalized medicine and supporting clinical decision-making. However, perceptions varied based on professional background, with medical personnel emphasizing its diagnostic applications and administrative staff focusing on efficiency and data management. These findings underscore the multifaceted nature of AI's perceived benefits and highlight the need for tailored training programs to address department-specific expectations and requirements.

Unlike previous studies, this current study did not classify the level of awareness of healthcare workers about artificial intelligence (AI) technologies into distinct categories such as high, moderate, or low. Instead, it focused on a more general assessment of awareness by exploring participants' familiarity with AI applications, their knowledge of specific AI tools used in healthcare, and

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

their exposure to AI-driven processes in their work environments. This approach allowed for a broader understanding of awareness without imposing rigid classifications, thus providing insights into the varying degrees of familiarity and engagement with AI across different professional roles and departments.

Lastly, while this study's findings agreed with those of previous research that highlighted the growing recognition of artificial intelligence (AI) as a transformative tool in healthcare, it diverged in some key aspects. For instance, while prior studies often emphasized technical barriers as the primary challenge, this study identified a more nuanced interplay of factors, including organizational readiness, training gaps, and resource constraints specific to the Nigerian healthcare sector. Additionally, unlike earlier studies that primarily focused on developed countries, this research provided contextual insights into the unique opportunities and challenges faced by healthcare workers in Nigeria, particularly in resource-limited settings. This broader perspective underscores the need for tailored strategies to enhance AI adoption and integration in diverse healthcare environments.

11. IMPLICATION OF FINDINGS FOR PUBLIC HEALTH POLICY AND INTERVENTIONS

The findings of this study have significant implications for public health policy and interventions, particularly in the context of integrating artificial intelligence (AI) into the Nigerian healthcare sector. Based on the awareness and perceptions of healthcare workers regarding AI, there is a clear need for structured education and training programs. Public health policies should prioritize the inclusion of AI-focused training modules in medical and nursing schools, as well as continuous professional development for healthcare workers. This would equip healthcare personnel with the necessary skills to effectively use AI tools in their day-to-day practices.

Additionally, the findings highlight that healthcare workers recognize the potential benefits of AI in improving patient care and healthcare delivery. To harness these benefits, policymakers should encourage the adoption of AI technologies in both public and private healthcare institutions. This could involve offering incentives for hospitals that invest in AI solutions, as well as facilitating partnerships between the government and private technology companies to introduce AI-driven tools that address healthcare challenges in Nigeria.

One of the key challenges identified was the limited access to the necessary infrastructure and resources for AI implementation. Public health policy should focus on improving the technological infrastructure in healthcare facilities, especially in rural and underserved areas. This may involve expanding internet connectivity, providing affordable computing devices, and ensuring that healthcare institutions are well-equipped to integrate AI technologies.

As AI continues to play a larger role in healthcare, it is crucial to establish ethical and regulatory frameworks to guide its implementation. Public health policies should focus on creating guidelines for the ethical use of AI, ensuring that patient privacy and data security are maintained, and that AI systems are used to enhance, not replace, human judgment in medical decision-making.

The findings indicate that the private healthcare sector is already embracing AI technologies. To scale up AI adoption, the government should collaborate with the private sector to foster innovation and share best practices. Public-private partnerships can help bridge the gap in funding, technology, and expertise, leading to a more widespread and effective use of AI in the healthcare system.

Despite the enthusiasm for AI, concerns about job displacement and the changing roles of healthcare workers must be addressed. Public health policies should ensure that AI implementation does not lead to the marginalization of healthcare professionals but rather enhances their roles. This can be achieved by clearly communicating the complementary role of AI in improving healthcare delivery and by providing retraining and upskilling opportunities for the workforce.

Policymakers must ensure that the benefits of AI are equitably distributed across different regions and demographics in Nigeria. This includes ensuring that rural healthcare workers and underserved communities are not left behind in the AI revolution. Targeted interventions, such as providing resources and training in these areas, can help to promote inclusivity and equity in the adoption of AI in healthcare.

By addressing these implications, public health policy can create an environment that encourages the responsible, effective, and equitable integration of AI technologies into the healthcare system, leading to improved healthcare outcomes across Nigeria.

12. RECOMMENDATIONS

Based on the findings of this study, several recommendations can be made to facilitate the effective integration of artificial intelligence (AI) technologies into the Nigerian healthcare sector, while addressing the opportunities and challenges identified.

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

First, it is essential for both public and private healthcare institutions to incorporate AI-focused training programs. These programs should be designed to cater to all levels of healthcare workers, from medical and nursing staff to administrative personnel. Regular training sessions will equip workers with the necessary skills to use AI technologies effectively and improve patient care.

Additionally, the government should invest in improving the technological infrastructure of healthcare facilities, especially in rural and underserved areas. This includes providing access to reliable internet, computing devices, and AI-enabled healthcare tools. Enhancing infrastructure will ensure that healthcare institutions are equipped to integrate and utilize AI technologies for improved healthcare delivery.

The findings also revealed that while some healthcare workers were aware of AI's potential, others lacked sufficient knowledge. A national campaign to raise awareness about AI technologies and their benefits should be initiated. This could include workshops, seminars, and online platforms to educate healthcare workers about the role of AI in healthcare, thereby enhancing their acceptance and confidence in using these technologies.

The Nigerian government should also allocate funds for AI-driven healthcare research to develop solutions tailored to local health challenges. This could include AI applications for diagnosing common diseases, managing healthcare resources, or improving treatment outcomes. Supporting innovation in AI for healthcare will ensure that the country remains at the forefront of technological advancement in the sector.

AI should also be integrated in a manner that enhances patient-centric care. AI tools should be designed with the aim of improving diagnostic accuracy, reducing wait times, and providing personalized treatment plans. Policymakers should encourage the adoption of AI applications that directly benefit patients, leading to improved healthcare outcomes and overall satisfaction.

CONCLUSION

The study concluded that healthcare workers in Akure have a substantial awareness of artificial intelligence (AI) technologies and a generally positive outlook on their potential benefits for improving healthcare delivery. The majority of respondents acknowledge AI's role in enhancing patient care and operational efficiency. However, there are notable concerns regarding the need for further training and preparedness for AI integration within healthcare departments. While many healthcare workers express a willingness to learn and embrace AI tools, there remains some resistance and uncertainty about the extent of retraining required. These findings highlight the need for comprehensive education, capacity-building programs, and strategic planning to ensure effective and equitable integration of AI technologies in the healthcare sector. By addressing these gaps, healthcare organizations can foster a more supportive environment for AI adoption, ultimately improving the quality and efficiency of healthcare services.

ACKNOWLEDGEMENT

The author disclosed receipt of financial support for the research and publication of this article: this study was accomplished under the financial sponsorship of the Tertiary Education Trust Fund (TETFUND) under the TETFund Institution-Based Research Intervention (IBR) reference- TETFUND/DR&D/CE/POLY/ILE-OLUJI/IBR/2024/VOL. 1

REFERENCES

- 1) Alugubelli, R. (2016). Exploratory study of artificial intelligence in healthcare. *International Journal of Innovations in Engineering Research and Technology*, 3(1), 1-10.
- 2) Balogun, I. A., & Daramola, M. T. (2019). The outdoor thermal comfort assessment of different urban configurations within Akure City, Nigeria. *Urban Climate*, 29, 100489.
- 3) Binns, R., & Shah, H. (2021). Understanding the uneven awareness of AI among healthcare workers: Challenges and opportunities. *Artificial Intelligence in Medicine*, 12(4), 78-94.
- 4) Christensen, L., et al (2020). The Most Fundamental Skill: Intentional Learning & The Career Advantage'
- 5) Chung, H., Lee, S., & Kim, J. (2020). AI training programs in healthcare: Addressing the gaps in resource-constrained settings. *Healthcare Informatics Research*, 26(2), 125-136.
- 6) De Prada, E., Mareque, M. and Pino-Juste, M. (2022). Teamwork skills in higher education: is university training contributing to their mastery? *Psicologia: Reflexão e Crítica*, [online] 35(1). doi:<https://doi.org/10.1186/s41155-022-00207-1>.
- 7) Floridi, L. (2019). What the near future of artificial intelligence could be. *Philosophy & technology*, 32, 1-15.

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

- 8) Gamage, K.A.A., Dehideniya, D.M.S.C.P.K. and Ekanayake, S.Y. (2021). The Role of Personal Values in Learning Approaches and Student Achievements. *Behavioral Sciences*, [online] 11(7), pp.1–23. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8301052/>.
- 9) Hamet, P., & Tremblay, J. (2017). Artificial intelligence in medicine. *Metabolism*, 69, S36-S40.
- 10) Hatzius, J. (2023). The Potentially Large Effects of Artificial Intelligence on Economic Growth (Briggs/Kodnani). *Goldman Sachs*.
- 11) Iliashenko, O., Bikkulova, Z., & Dubgorn, A. (2019). Opportunities and challenges of artificial intelligence in healthcare. In *E3S Web of Conferences* (Vol. 110, p. 02028). EDP Sciences.
- 12) Jain, R. (2018). Leveraging AI for administrative efficiency in healthcare systems. *International Journal of Healthcare Management*, 11(3), 200-210.
- 13) Jiang, F., Jiang, Y., Zhi, H., Dong, Y., Li, H., Ma, S., ... & Wang, Y. (2017). Artificial intelligence in healthcare: past, present and future. *Stroke and vascular neurology*, 2(4).
- 14) Kar, A. K., Choudhary, S. K., & Singh, V. K. (2022). How can artificial intelligence impact sustainability: A systematic literature review. *Journal of Cleaner Production*, 134120.
- 15) Manne, R., & Kantheti, S. C. (2021). Application of artificial intelligence in healthcare: chances and challenges. *Current Journal of Applied Science and Technology*, 40(6), 78-89.
- 16) Mudgal, S. K., Agarwal, R., Chaturvedi, J., Gaur, R., & Ranjan, N. (2022). Real-world application, challenges and implication of artificial intelligence in healthcare: an essay. *The Pan African Medical Journal*, 43.
- 17) Nguyen, H., Tran, B., & Le, P. (2022). Artificial intelligence in healthcare: An analysis of awareness across settings. *Journal of Medical Informatics*, 33(6), 205-217.
- 18) Qamar, Y., Agrawal, R. K., Samad, T. A., & Jabbour, C. J. C. (2021). When technology meets people: the interplay of artificial intelligence and human resource management. *Journal of Enterprise Information Management*, 34(5), 1339-1370.
- 19) Schwalbe, N. and Wahl, B., 2020. Artificial intelligence and the future of global health. *The Lancet*, 395(10236), pp.1579-1586.
- 20) Secinaro, S., Calandra, D., Secinaro, A., Muthurangu, V., & Biancone, P. (2021). The role of artificial intelligence in healthcare: a structured literature review. *BMC medical informatics and decision making*, 21, 1-23.
- 21) Suleimenov, I. E., Vitulyova, Y. S., Bakirov, A. S., & Gabrielyan, O. A. (2020, April). Artificial Intelligence: what is it?. In *Proceedings of the 2020 6th International Conference on Computer and Technology Applications* (pp. 22-25).
- 22) Tambe, P., Cappelli, P., & Yakubovich, V. (2019). AI and the future of work: An analysis of healthcare sector workers' perceptions. *Human Resource Management Review*, 39(2), 102-114.
- 23) Tewari, I., & Pant, M. (2020, December). Artificial intelligence reshaping human resource management: A review. In *2020 IEEE international conference on advent trends in multidisciplinary research and innovation (ICATMRI)* (pp. 1-4). IEEE.
- 24) Wolff, J., Pauling, J., Keck, A., & Baumbach, J. (2020). The economic impact of artificial intelligence in health care: systematic review. *Journal of medical Internet research*, 22(2), e16866.
- 25) Wolters, C.A. and Brady, A.C. (2020). College students' time management: A self-regulated learning perspective. *Educational Psychology Review*, 33(4), pp.1319–1351. doi:<https://doi.org/10.1007/s10648-020-09519-z>.
- 26) Yawalkar, M. V. V. (2019). A study of artificial intelligence and its role in human resource management. *International Journal of Research and Analytical Reviews (IJRAR)*, 6(1), 20-24.
- 27) Yu, K.-H., Beam, A. L., & Kohane, I. S. (2018). Artificial intelligence in healthcare: The awareness and adoption challenge. *New England Journal of Medicine*, 378(11), 1083-1086.
- 28) Davenport, T., & Kalakota, R. (2019). The potential for artificial intelligence in healthcare. *Future Healthcare Journal*, 6(2), 94.
- 29) Esteva, A., Kuprel, B., Novoa, R. A., Ko, J., Swetter, S. M., Blau, H. M., & Thrun, S. (2017). Dermatologist-level classification of skin cancer with deep neural networks. *Nature*, 542(7639), 115-118.
- 30) Gulshan, V., Peng, L., Coram, M., Stumpe, M. C., Wu, D., Narayanaswamy, A., ... & Webster, D. R. (2016). Development and validation of a deep learning algorithm for detection of diabetic retinopathy in retinal fundus photographs. *JAMA*, 316(22), 2402-2410.
- 31) He, J., Baxter, S. L., Xu, J., Xu, J., Zhou, X., & Zhang, K. (2019). The practical implementation of artificial intelligence technologies in medicine. *Nature Medicine*, 25(1), 30-36.
- 32) Jiang, F., Jiang, Y., Zhi, H., Dong, Y., Li, H., Ma, S., ... & Wang, Y. (2017). Artificial intelligence in healthcare: past, present and future. *Stroke and Vascular Neurology*, 2(4), 230-243.

Exploring the Opportunities and Challenges of Artificial Intelligence in Healthcare: A Study of Healthcare Workers in Medical Institutions in Akure, Ondo State, Nigeria

- 33) Krittanawong, C., Zhang, H., Wang, Z., Aydar, M., & Kitai, T. (2017). Artificial intelligence in precision cardiovascular medicine. *Journal of the American College of Cardiology*, 69(21), 2657-2664.
- 34) Kumar, N., Gupta, R., & Gupta, S. (2020). Artificial intelligence in healthcare: a review on its applications, challenges and future scope in developing countries. *Health Information Science and Systems*, 8(1), 1-12.
- 35) Liu, X., Faes, L., Kale, A. U., Wagner, S. K., Fu, D. J., Bruynseels, A., ... & Denniston, A. K. (2019). A comparison of deep learning performance against health-care professionals in detecting diseases from medical imaging: a systematic review and meta-analysis. *The Lancet Digital Health*, 1(6), e271-e297.
- 36) Meskó, B., Görög, M., & Nyirády, P. (2018). The role of artificial intelligence in precision urology. *Current Opinion in Urology*, 28(3), 283-287.
- 37) Nguyen, A., Tran, L., & Luo, Y. (2021). Artificial intelligence in healthcare: a comparative analysis of the adoption challenges in developed and developing countries. *Journal of Global Health*, 11, 04034.
- 38) Obermeyer, Z., & Emanuel, E. J. (2016). Predicting the future—big data, machine learning, and clinical medicine. *The New England Journal of Medicine*, 375(13), 1216.
- 39) Park, S. H., & Han, K. (2018). Methodologic guide for evaluating clinical performance and effect of artificial intelligence technology for medical diagnosis and prediction. *Radiology*, 286(3), 800-809.
- 40) Reddy, S., Fox, J., & Purohit, M. P. (2019). Artificial intelligence-enabled healthcare delivery. *Journal of the Royal Society of Medicine*, 112(1), 22-28.
- 41) Saria, S., Butte, A., & Sheikh, A. (2018). Better medicine through machine learning: what's real, and what's artificial? *PLOS Medicine*, 15(12), e1002721.
- 42) Shen, J., Zhang, C. J., Jiang, B., Chen, J., Song, J., Liu, Z., ... & Wong, S. Y. (2019). Artificial intelligence versus clinicians in disease diagnosis: systematic review. *JMIR Medical Informatics*, 7(3), e10010.
- 43) Topol, E. J. (2019). *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. Basic Books.
- 44) Topol, E. J. (2019). High-performance medicine: the convergence of human and artificial intelligence. *Nature Medicine*, 25(1), 44-56.
- 45) Wahl, B., Cossy-Gantner, A., Germann, S., & Schwalbe, N. R. (2018). Artificial intelligence (AI) and global health: how can AI contribute to health in resource-poor settings? *BMJ Global Health*, 3(4), e000798. <https://doi.org/10.1136/bmjgh-2018-000798>
- 46) Wang, F., & Preininger, A. (2019). AI in health: state of the art, challenges, and future directions. *Yearbook of Medical Informatics*, 28(1), 16-26.
- 47) Yu, K. H., Beam, A. L., & Kohane, I. S. (2018). Artificial intelligence in healthcare. *Nature Biomedical Engineering*, 2(10), 719-731.



There is an Open Access article, distributed under the term of the Creative Commons Attribution – Non Commercial 4.0 International (CC BY-NC 4.0) (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.