Healthcare Professionals' Perceptions of Artificial Intelligence Integration: A Case Study of Lagos State, Nigeria

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ABSTRACT

This study investigated professional healthcare workers' perceptions of Artificial Intelligence (AI) integration in healthcare services within Lagos State, Nigeria. Guided by two research questions, the study employed a descriptive survey design. A sample of 45 professional health workers was selected using a stratified sampling technique. Data were collected via a self-designed instrument, the 'Perception of Professional on Artificial Intelligence (AI) Integration on Healthcare Services Questionnaire (PPAIIHSQ),' which demonstrated high reliability (coefficient of 0.98). Descriptive statistics were used for data analysis. Findings revealed that professionals perceived significant benefits of AI integration, including enhanced diagnosing and treatment planning, predictive analytics, accelerated drug discovery and development, the utility of virtual assistants and chatbots, and improved medical record keeping. However, the study also identified several critical challenges hindering effective AI integration. These include the absence of standard guidelines, concerns regarding data privacy and security, the risk of data breaches, issues of bias and fairness in training data, potential for misdiagnosis, and the poor state of health infrastructure development. Based on these findings, the study recommends that government and healthcare stakeholders collaborate to improve health infrastructure to facilitate AI adoption. Additionally, international organizations such as the World Health Organization (WHO) are encouraged to support the Nigerian health sector by providing necessary AI resources for healthcare services across the country.

Keywords: Artificial Intelligence, Integration, Healthcare Services

1.0 INTRODUCTION

Healthcare, or healthcare, is the improvement of health via the prevention, diagnosis, treatment, amelioration or cure of disease, illness, injury, and other physical and mental impairments in people. Health care is delivered by health professionals and allied health fields. Healthcare delivery in Nigeria is both a private and government business. The Federal and State government are allowed to set up hospitals and other health facilities. Effective healthcare delivery is usually a function of the quality, accessibility and affordability of the service. Nigeria's healthcare system has been bedeviled by lack of adequately trained personnel available to carry out medical work as well as lack of required medical equipment needed to aid the delivery of qualitative healthcare (Darlynton, 2024). The introduction of Information and communication technology (ICT) into the health care services with the view to improve delivery as it was done in developed nation currently receiving more attentions from the stakeholders in Nigeria health sector (Ojedokun, *et al* 2024). However, the deployment of Artificial Intelligence (AI) in the healthcare sector in Nigeria is in an emerging and evolving state. Its use in the medical industry promises many benefits to all; however, AI has been adopted in medical practice primarily in developed countries (Ojedokun *et al*., 2024).

Artificial intelligence (AI) is the next wave of ICT innovation impacting the healthcare setting as part of the fourth industrial revolution and in the last decade, the advancements of AI in healthcare have been widely published (Shinners, *et al* 2022). In the past, technology implementation has providedconsiderable benefits to clinicians, but has also beenshown to cause changes in cognitive structures, social interactions and clinical workflow efficiencies whichcreates unintended risk.However, as many healthcare professionals havehad little exposure to AI, they are often concerned aboutthe

ethical implications of AI, the management of data,the disruption of the patient-physician relationship, andthe development of professional knowledge. According to Shinners *et al*., (2022), healthcareprofessionals primarily agreed that AI could support the health and well-being of their patients but suspect it willhave organisational and professional impacts that they are not prepared for. There are concerns that these perceptionscould undermine the potential benefits of AI beforethey have been implemented, and at great cost to theorganization.

The replication of human intellectual processes by machines, particularly computer systems, is known as Artificial Intelligence, and it is one of the modern world's fastest developing technologies (Harry, 2023). Artificial intelligence applications are considered as a part of an organization's competitive intelligence of organizations (Ranjan & Foropon, 2021). Artificial intelligence in influencing innovation, the first dimension indicated that artificial intelligence explores the success of search and innovation algorithms and then disseminates them through commercially available smart devices and services, and the second dimension is the impact of automation research and artificial intelligence to explore existing best practices and their reflection on the organization's ability to launch services based on artificial intelligence, while the third dimension relates to shaping the business context using artificial intelligence (Harry, 2023). This indicated that artificial intelligence can contribute to raising the ability of organizations to provide organizational innovations (Lee, 2021).

In recent years, Artificial Intelligence (AI) has emerged as a transformative technology with the potential to revolutionize various sectors, including healthcare. In Nigeria, a country facing unique challenges in its health system, the adoption of AI-driven innovations holds the promise of significantly improving efficiency, accessibility, and outcomes in these critical areas (Al-Hawamdeh & Alshaer, 2022). Artificial intelligence is superior to natural intelligence in that it is more consistent, durable, faster in processing and publishing, every step it takes can be documented, and it can perform certain tasks much faster and better than humans (Al-Hawamdeh &Alshaer, 2022). AI is used to simplify the management of IT processes and accelerate, automate problem-solving in modern and complex IT operating environments. Harry, (2023) defined artificial intelligence as a set of techniques and models that are used to build machines capable of simulating human intelligence with the help of technological devices to reproduce advanced knowledge that facilitates and accelerates the achievement of goals. Artificial intelligence is also based on the development of smart programs capable of learning, thinking, collecting, and perceiving knowledge, and these complex programs perform tasks through environmental sensing and response processes and can simulate the behaviors of individuals, thinking and acting smart decisions (Kamble & Shah, 2018).

Based on these definitions, the concept of AI refers to the introduction to making machines think and act as human beings, making it possible for the machines to perform human tasks and adapt to or interact with its surrounding environment (Kamble & Shah, 2018). However, it is important to note that what we call AI changes with time as technology advances. When certain AI technologies become highly accessible to us, it is taken for granted and not called AI anymore. This is because the term AI is perceived as a future technology. Some of the goals of AI is learning, reasoning and perception. Using these characteristics enables AI to rationalize and take actions towards the highest probability of achieving its goal (Frankenfield, 2020). The above-mentioned characteristics give AI enormous potential regarding problem solving. With the ability to think and act as human beings, solving problems that human beings do becomes accessible to AI programming focuses on three cognitive skills: learning, reasoning and self-correction.

According to Lee (2021), AI can be used to analyze imaging, such as X-rays and MRIs, to help doctors identify diseases and plan treatment. For example, AI-powered algorithms can detect signs of cancer in mammograms with a high degree of accuracy, which can help doctors make a diagnosis and plan treatment more quickly. Electronic health records and other patient data can be analyzed by AI to predict which patients are at risk of developing certain conditions. This may help doctors intervene early, before a condition becomes more serious, and can also help healthcare organizations allocate resources more effectively (Kim & Huh, 2021). AI can be used to examine data on drug interactions and side effects, as well as to predict which compounds will be most effective in treating certain conditions. This can speed up the drug discovery and development process, which may ultimately lead to new treatments for patients. AI-powered virtual assistants and chatbots can help patient's access

healthcare information and services more easily. For example, a chatbot can answer patients' questions about their symptoms or help them schedule an appointment with a doctor (Kim & Huh, 2021).

There is a need to prepare the healthcare professional (workforce) to acquire knowledge on artificial intelligence (AI) into the healthcare setting. Hence, this study sought to examine the perception of health professionals on artificial intelligence (AI) integration into healthcare services in Lagos state, Nigeria.

The main objective of the study was to examine the perception of professional on Artificial Intelligence (AI) integration into healthcare services in Lagos state, Nigeria. Specifically, the study sought to:

Identify the perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services and to find out the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state, Nigeria.

2.0 METHODOLOGY

The following research questions guided this study.

1. What are the perceptions of healthcare professionals regarding the benefits of Artificial Intelligence (AI) integration in healthcare services in Lagos State?
2. What are the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state?

Data collection

A descriptive research design of survey type was used for the study. The justification for using this design was that it helped the study to collect responses from the respondents towards answering the research questions without any means of manipulation. The population of the study comprised only professional health workers such as dietitian, audiologist, dentist, physician, optometrist, nurses, physiotherapist and dental hygienist in Lagos state, Nigeria. Using stratified sampling technique, a total of forty-five professional health workforce were selected as sample size of the study. The stratifications were based on gender, that is, the researcher ensured that gender sensitivity was taken care of. Self-designed instrument tagged 'Perception of Professional on Artificial Intelligence (AI) Integration on Healthcare Services Questionnaire (PPAIIHSQ) was used for data collection. The questionnaire was divided into three sections namely A, B and C. Section A explained items on demographic characteristics of the respondents. Sections B and C focused on items regarding perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services as well as the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state.The questionnaire was based on 4 Likert scales such as Strongly Agreed (SA), Agreed (A), Strongly Disagreed (SD) and Disagreed (D).

Performance evaluation

To ensure face and content validity of the questionnaire (PPAIIHSQ), copies of the instrument were given to three experts in the field of environmental health and its allied. After all the identified corrections have been made and corrected by the researcher, the final drafts were used to gather the required data for the study. Reliability test of the instrument was done using a test-retest method. In this case, 5 copies of the instrument (PPAIIHSQ) were administered twice on 5 professional healthcare in State hospital in Abeokuta, Ogun State, Nigeria that are not part of the sample size within three weeks interval. The collected data from the dual administration of the instrument were compared using Pearson moment reliability statistic. Their respective reliability estimates were reported as 0.96 and 0.98 respectively. This implied that the instrument (PPAIIHSQ) was reliable and can elicit required data for the study. Procedure for data collection was done within two (2) weeks with the help of five trained research assistants. A total of 45 copies of the questionnaires were administered and only 41 copies were retrieved and retrieval rate was 91.1%. Descriptive statistics of mean and standard deviation were used for answering research questions. Any mean score of 2.5 and above was regarded as agreed while any one below 2.5 regarded as disagreed.

3.0 RESULTS

Research Question 1: What are the perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services in Lagos state?

Table 1: Descriptive statistics on the perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services in Lagos state.

Items	Mean	SD	Decisions

Health professional perceived AI to helped in diagnosing and treatment planning.	2.98	0.989	Agreed
Health professional perceived AI to helped predictive analytics	2.76	0.899	Agreed
Health professional perceived AI to helped drug discovery and development	3.01	0.567	Agreed
Health professional perceived AI to helped virtual assistants and chatbots	3.14	0.666	Agreed
Health professional perceived AI to helped medical records.	3.18	0.612	Agreed
Health professional perceived AI to helped clinical guidance.	2.88	0.923	Agreed
Health professional perceived AI to helped patients monitoring.	2.66	0.977	Agreed
Health professional perceived AI to helped in detecting cancer.	2.59	0.888	Agreed
Cluster Mean	**2.90**		Agreed

Source: Field Survey, 2024

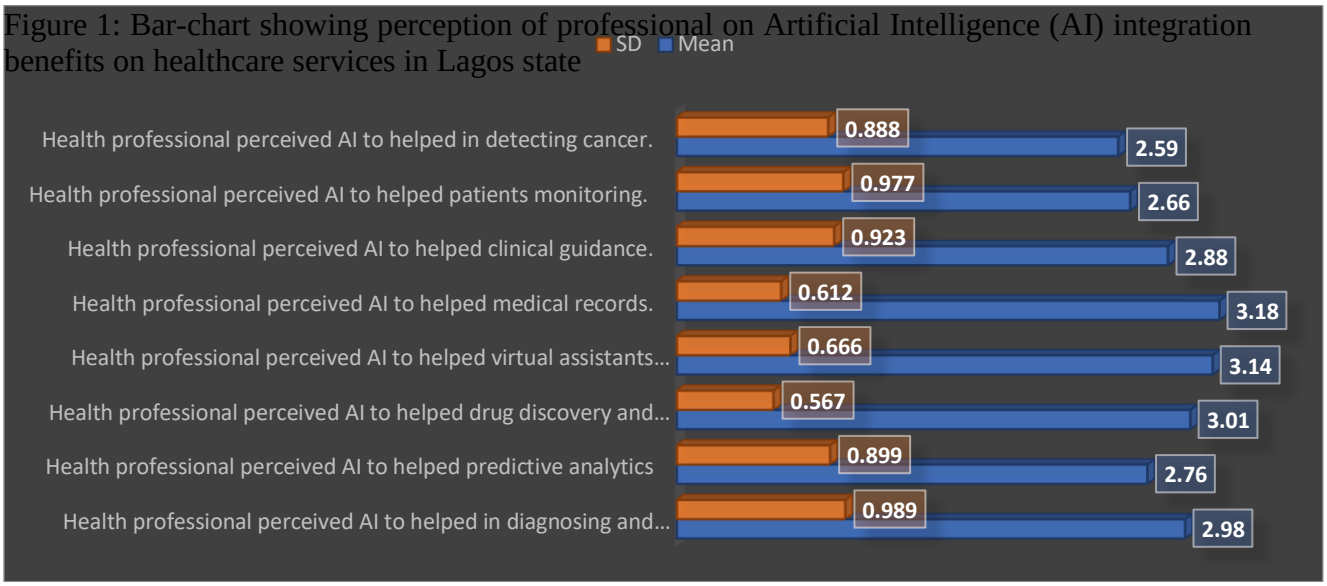


Figure 1: Bar-chart showing perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services in Lagos state

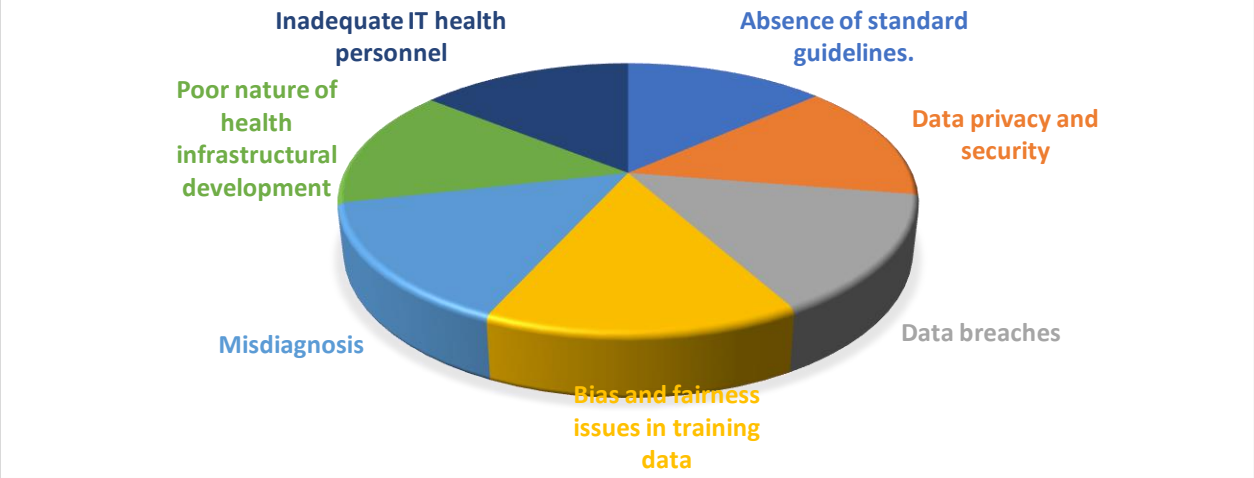
Table 1 indicated that cluster mean was 2.90 which greater than bench mark mean value 2.50. This implied that diagnosing and treatment planning,predictive analytics, helped drug discovery and development, virtual assistants and chatbots, keeping medical records, clinical guidance, patients monitoring and detecting cancer were among the perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services in Lagos state.

Research Question 2: What are the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state?

Table 2: Descriptive statistics on the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state

Items	Mean	SD	Decisions
Absence of standard guidelines.	3.00	0.593	Agreed
Data privacy and security	3.15	0.601	Agreed
Data breaches	3.20	0.578	Agreed
Bias and fairness issues in training data	3.33	0.519	Agreed
Misdiagnosis	3.28	0.566	Agreed
Poor nature of health infrastructural development	3.19	0.594	Agreed
Inadequate IT health personnel	3.18	0.556	Agreed
Cluster Mean	3.19		Agreed

Source: Field Survey, 2024



Bar-chart showing issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state

Table 2 indicated that cluster mean was 3.19 which was greater than bench mark mean value 2.50. The implication of these results was that absence of standard guidelines, data privacy and security, data breaches, bias and fairness issues in training data, misdiagnosis, poor nature of health infrastructural development and inadequate IT health personnel were among the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state.

Discussion of Findings

The findings of the study revealed that diagnosing and treatment planning,predictive analytics, helped drug discovery and development, virtual assistants and chatbots, keeping medical records, clinical guidance, patients monitoring and detecting cancer were among the perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services in Lagos state. These findings were in support to Ojedokun *et al* (2024) who found that adoption of AI in healthcare services may help the organization in chatbots and in keeping needed medical information. As well as Shinners *et al* (2022) findings indicated that AI could help health sector quick discovery of drug research results, keeping in space for virtual medical learning and very good in early detection of cancer.

The findings also revealed that absence of standard guidelines, data privacy and security, data breaches, bias and fairness issues in training data, misdiagnosis, poor nature of health infrastructural development and inadequate IT health personnel were among the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos state. These findings were in consonants with Bangul, Hajira, Sanjay, Abdul, Jawad and Saad (2023) who examined drawbacks of Artificial Intelligence and their potential solutions in the healthcare sector and they found that data security and privacy, health data-hackers, data breaches, lack of moral use of AI in healthcare were among drawbacks of Artificial Intelligence in the healthcare sector.

4.0 CONCLUSIONS

This study examined the perception of professional on Artificial Intelligence (AI) integration on healthcare services in Lagos state, Nigeria. This study was descriptive in nature and the following conclusion were drawn based on the findings that diagnosing and treatment planning,predictive analytics, helped drug discovery and development, virtual assistants and chatbots, keeping medical records, clinical guidance, patients monitoring and detecting cancer were among the perception of professional on Artificial Intelligence (AI) integration benefits on healthcare services in Lagos state. Standard guidelines, data privacy and security, data breaches, bias and fairness issues in training data, misdiagnosis, poor nature of health infrastructural development and inadequate IT health personnel were among the issues militating against the effective integration of Artificial Intelligence (AI) on healthcare services in Lagos

The following recommendations were raised for the purpose of this study:

Firstly, Government and stakeholders in health sector should join hands in providing adequate health infrastructure in hospital to accommodate the

effective usage of AI in healthcare services in Lagos state.

Secondly, International organizations such as World Health Organization (WHO) should assists Nigerian health sector through provision of needed AI to support healthcare services in the country and

Government and World Health Organization (WHO) should also help in training and retraining professional health workforce in effective integration of AI in healthcare service on the issues of clinical guidance, patients monitoring, detecting cancer,data privacy and security risk, avoiding data breaches, bias and fairness issues in training data

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