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Adoption And Usage of Artificial Intelligence Among Doctors in Federal Psychiatric Hospital Benin City, Edo State

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Abstract

The issue of mental illness is increasing at an alarming rate in society and medical experts have attributed the increase in mental illness to the abuse of drugs among other factors. This is because many debilitating conditions such as schizophrenia, and psychosis, have led to psychiatric admissions. Artificial intelligence can act as a potential solution to address this issue. The use of AI is increasingly being utilised in various fields of mental health like affective disorders, psychosis, and geriatric psychiatry. In mental health care, some psychiatrists, psychologists, and social workers believe that AI has the potential to be highly beneficial when it comes to predicting mental health challenges, creating personalised treatment plans, and ensuring compliance on an individualistic basis. Thus, this study examined the adoption and usage of artificial intelligence among Doctors in Federal Psychiatric Hospital Benin City, Edo State. The study's objectives were to: Ascertain the level of knowledge about artificial intelligence among Doctors in Federal Psychiatric Hospital Benin City, Edo State, and, find out their level of adoption of the artificial intelligence technology. The study adopted an in-depth interview method. The data from interviews conducted on the subject matter revealed that most of the medical Doctors at Federal Psychiatric Hospital Benin City were adequately knowledgeable on artificial intelligence and conversant with its use, but it is not deployed in practice with psychiatric patients. Further response revealed that the management is making plans for the adoption of artificial intelligence. The study concludes that the majority of the Doctors in Federal Psychiatric Hospital Benin City, Edo State are knowledgeable about artificial intelligence and the management team is initiating plans to begin its utilization. The researchers recommended that the management of Federal Psychiatric Hospital Benin City, should fast-track the use of artificial intelligence in the hospital and provide necessary logistics that will enhance the smooth utilization of AI in the treatment of psychiatric patients among other things.

Key Words: Adoption, Artificial Intelligence, Doctors, Federal Psychiatric Hospital Benin City.

Introduction

Mental disorder, also called mental illness, psychological disorder, or psychiatric disorder, is a mental or behavioural pattern that causes either suffering or a poor ability to function in ordinary life. The causes of mental disorders are often unclear but common causes include drug abuse, depression, dementia, schizophrenia, as well as stigma and discrimination. A mental expert notes that one in four Nigerians have one form of mental disorder or the other. Prof. Oye Guruje, a psychiatrist with the University of Ibadan, says that "in Nigeria, one out of seven persons will have serious mental illnesses, while one in four persons will have some form of mental disorders; and this is a conservative estimate," he said (www.newsagencyofnigeria.org).

In mental health care, many psychiatrists, psychologists, and social workers believe that AI has the potential to be highly beneficial when it comes to predicting mental health issues, creating personalized treatment plans, and ensuring compliance on an individualistic basis (George, 2023). The merging of Artificial Intelligence (AI) and mental healthcare fields marks a notable transformation in healthcare (Espejo, Reiner, & Wenzinger, 2023). The background against this modification is the advancing pattern of mental health. Drug abuse is a prevailing global public health concern which has been identified to have diverse and devastating effects in the society (Ezeaka, Nwodu & Agbanu 2022). What was once condemned and often ignored is now accepted as a crucial dimension of overall well-being. However, this emerging awareness has also unveiled the scale of the mental health crisis that plagues societies worldwide. According to the World Health Organization (WHO), mental health disorders are now a substantial contributor to the global disease burden, with depression alone representing the leading cause of disability globally (WHO, 2022).The sudden increase in the generality of mental health disorders has placed an unparalleled demand on healthcare systems, revealing the inadequacies of traditional models of mental healthcare (Qin, & Hsieh, 2020). The regular approach, which heavily depends on in-person consultations and therapies, falls short of addressing the increasing demand for accessible, affordable, and easily expandable mental health services. This discrepancy between the demand for and supply of mental healthcare highlights the pressing need for innovative solutions. AI possesses remarkable capabilities, such as efficiently handling extensive datasets and expediting the examination of complex patterns and relationships (Bajwa, Munir, Nori, & Williams, 2021).

More so, in the context of mental healthcare, where understanding complex human behaviors and emotions is paramount, AI offers the potential to revolutionize mental healthcare by providing insights and solutions that were formerly beyond the reach of conventional methods (Nilsen, Svedberg, Nygren, Frideros, Johansson, & Schueller, 2022). It is a transformative tool that provides improved detection approaches, tailored therapies, and virtual therapeutic platforms. It would potentially widen the accessibility of healthcare, reduce stigma, and improve treatment outcomes (Minerva, & Giubilini, 2023).

In Nigeria, for instance, in 2022, the Nigerian Medical Association noted that nearly 60 million out of the country's over 200 million population suffered from different mental health issues, ranging from mild to severe (George, 2023). Drug abuse can lead to anxiety, confusion, insomnia, mood swings and violent behavior from user (Nwammuo, Ezeaka, Anunobi, Ozumba & Aghaebe, 2023). In some developed economies, AI chatbots can provide a non-judgmental listening ear and offer advice based on evidence-based therapies. They can also provide emotional support and companionship for people struggling with mental health issues. However, it is not known if medical doctors in Nigeria, especially Federal Psychiatric Hospital Benin City, Edo State (FNPH) have started using AI in their hospitals. An attempt to find out these issues prompted this study.

Statement of the Problem

Artificial intelligence (AI) is a speedily developing field that has the potential to modify healthcare. AI encompasses a wide range of technologies that enable computers to perform tasks that typically require human intelligence, such as learning, reasoning, and problem-solving. Artificial intelligence (AI) is being incorporated into every aspect of human endeavour with benefits in diverse ways. Its application has brought a revolutionary dimension to healthcare delivery services across the globe. The use of AI in healthcare has already shown promise in improving patient outcomes, reducing costs, and enhancing efficiency. AI technologies, such as machine learning, natural language processing, and computer vision, have revolutionized various aspects of healthcare delivery. These advancements have the potential to significantly improve patient care, enhance diagnostics, streamline administrative processes, and drive medical research and innovation (Ramalingam, Victoire, & Pavithra, 2023).

There have been related works several studies and research papers published on the use of AI in healthcare. For instance, Ramalingam, Victoire, & Pavithra, (2023) studied the impact of artificial intelligence on healthcare: A review of current applications and future possibilities, Al-Hadithy, AL-Lawati, AL-Zadjali, & AI-Sinawi (2023) examined knowledge, attitudes, and perceptions of artificial intelligence in healthcare among medical students at Sultan Qaboos University, Oman and Bajwa, Munir, Nori & Williams (2021) investigated artificial intelligence in healthcare: Transforming the practice of medicine. All these studies were carried out in Asia and not in Nigeria. There is little or no study yet on the adoption and usage of artificial intelligence among Doctors in Federal Psychiatric Hospital Benin City, Edo State. This study was aimed at filling the lacuna in the research gap by investigating the issue.

Objectives of the Study

The objectives of the study were to:

1. Ascertain the level of knowledge about artificial intelligence among Doctors in Federal Psychiatric Hospital Benin City, Edo State.

2. Find out the level of adoption of artificial intelligence technology among Doctors at Federal Psychiatric Hospital Benin City, Edo State.

3. Determine the challenges associated with the application of artificial intelligence technology at Federal Psychiatric Hospital Benin City, Edo State.

Theoretical Framework

The study was hinged on the Technology Adoption Model (TAM). TAM was propounded by Davis (1989). The theory was used to explain user adoption of technology and how it is used in various environments. Wixom & Todd (2005 cited in Ezegwu, Chiaghana, & Nwodu, (2021) posit that the basis of the theory was built on the premise that when users are presented with a new technology, (in this case artificial intelligence) three major factors are considered as determinants of key predictors that influences users' decision on how to and when they use it. These are perceived usefulness (PU), perceived ease of use (PEoU), and Attitude towards user (ATU).

 Perceived Usefulness (PU) is the degree to which a user believes that using a particular system would enhance his/her work or job performance. Davis (1989, p.320 cited Onyike, Ezegwu, and Abdul, 2018) considers what the users perceive and how easily their work will be improved when a new technology is used. It is the subjective probability that there will be improvement in the way users carry out their work when using a particular technology.

 Perceived Ease of Use (PEOU) "is the degree to which a user believes that using a particular technology or system would be free of effort." It considers how a user perceives a system to be better than its substitute (Davis, 1989, p. 320 cited Onyike, Ezegwu, and Abdul, 2018).

 Attitude towards Use (ATU): Fishbein & Ajzen (1975, p.216 cited in Ezegwu, et al, 2021) describe ATU as "an individual's positive or negative feeling about performing the target behaviour (e.g., using a system)."

This theory agrees with the fact that when users are presented with a new technology, they do not just automatically accept it and get carried away using it. Several factors influence their decision on whether to accept it and how and when they will use it. The model aims not only to explain key factors of user acceptance of ICTs but also, to predict the relative importance of such factors. Davis (1989 cited Onyike, Ezegwu, and Abdul, 2018) states that TAM explores the factors that affect behavioural intention to use a particular technology and that, the information or computer systems have a causal linkage with how easily they find the usability of that system. Matching this side by side, this theory is relevant to this study because it agrees with the fact that medical Doctors will develop a positive intention of using artificial intelligence if they find it easy to use and if the technology will enhance their job. This means that, similarly users' (in this case, doctors) positive attitude toward a specific technology leads them to develop an intention to use the technology.

Literature Review

Concept of Artificial Intelligence

Artificial intelligence refers to the various processes involved in the programming of machines that enable them to act like humans and mimic their actions. These activities may include carrying out tasks, processing information, and making decisions based on past events (Mahomed, 2018). According to technological advancements, artificial intelligence may be classified into various systems, including artificial narrow intelligence and artificial general intelligence. Artificial

narrow intelligence also called “weak” artificial intelligence, refers to systems that perform a single unique task with human-like proficiency, they have a limited range of capabilities (Harwood et al., 2019). Artificial general intelligence systems have abilities to learn and understand, respond to human emotions, as well as perform multiple tasks like humans (Wahl et al., 2018).

Machine learning is a subset of artificial intelligence that utilises a set of algorithms and statistical models to enhance computers' abilities to execute relevant tasks (Sanchez & Peters, 2023). The process by which computers are trained to identify patterns in datasets is known as the machine learning method and is divided into several broad classifications, including supervised learning, unsupervised learning, and reinforcement learning (Jovel & Greiner, 2021). The process of supervised learning entails labeling the data used to train the algorithms with the proper answers, if the actual results differ from this, the algorithm learns from it and improves its efficiency (Manne & Kantheti, 2021). Artificial intelligence (AI) in medicine refers to using computers and advanced technology, such as machine learning algorithms, to assemble and process data input from experts and analyze it, producing critical thinking comparable to that of a human being (Ahuja, & Peer, 2019). AI has been primarily employed for tasks involving visual imagery, where it can analyze images and detect any abnormal phenotypic characteristics in them to formulate a hypothesis regarding the patient's underlying condition (Pinto, Giese, Brodehl, 2019).

AI as a Prediction Tool in Psychiatry

Despite concerted efforts to address mental health problems, several challenges persist. Limited access to mental health services, especially in resource-limited countries, resulted in a huge treatment gap in mental health care (Espejo, Reiner, & Wenzinger, 2023). The lack of sufficient trained mental health professionals further exacerbates this problem, leading to long waiting times for consultations and inadequate support (Billah, Rutherford, Akhter, & Tanjeela, 2023). In addition, stigma and discrimination surrounding mental health continue to hinder individuals from seeking the help they need. Many individuals feel ashamed or worried about the potential consequences of disclosing their mental health conditions, thus impeding early intervention and treatment (Espejo, Reiner, & Wenzinger, 2023).

In a study by (Bedi, Carrillo, Cecchi, Slezak, Sigman, Mota, 2015 cited in Fakhoury, 2019) automated speech analysis combined with machine learning accurately predicted psychosis development in at-risk youth. This approach surpassed traditional clinical interviews that rely on self-reporting, which can be influenced by the patient's willingness to disclose. Improving psychosis prediction enables earlier identification and better treatment decisions(Eysenbach, 2023). Similarly, machine learning algorithms can predict suicide risk in high-risk individuals. Accounting to roughly 800 thousand deaths worldwide every year, suicide is a major public issue that cannot be ignored (Varnik, 2012 cited Fakhoury, 2019).

However, over the past few years, developments in machine learning techniques have proved efficient in determining with relatively high success the intent of suicide in high-risk individuals. For instance, machine learning algorithms based on linguistic and acoustic characteristics were successfully used to classify a cohort of subjects recruited from medical centers into suicidal, mentally ill but not suicidal, or control group with an accuracy of up to 85% (Pestian , Sorter, Connolly, Bretonnel, McCullumsmith, & Gee, 2017). More recently, Walsh , Ribeiro & Franklin (2017) were able to accurately predict future suicide attempts in a cohort of adult patients with a history of self-injury by applying machine learning to electronic health records. Results have been more than 80% accurate in predicting whether someone will make a suicide attempt within the next two years, and 92% accurate in predicting whether someone will make a suicide attempt within the following 7 days (Walsh et al 2017). Last but not least, computerized text analytics applied to unstructured medical records predicted the risk of suicide in veterans with more than 65% accuracy, thereby allowing clinicians to better screen seemingly healthy individuals and to evaluate their risk for attempting suicide in the future (Poulin, Shiner, Thompson, Vepstas, Young-Xu, & Goertzel, cited Fakhoury, 2019).

Empirical Reviews

Al-Hadithy, AL-Lawati, AL-Zadjali, & AI-Sinawi (2023) investigated the knowledge, attitudes, and perceptions of artificial intelligence (AI) in healthcare among medical students at Sultan Qaboos University. Using a validated online questionnaire, the researchers surveyed clinical-year medical students. The questionnaire assessed students' demographic information, AI knowledge, and their perceptions and attitudes towards AI. The results showed that most students (75.4%) had no previous experience with AI in healthcare. The median knowledge score for AI was 3.25 out of 5, which did not significantly improve over the previous year. Despite concerns about AI's impact on jobs and ethics, medical students in Oman generally viewed AI positively and supported its integration into their education. A substantial majority (78.7%) believed that all medical trainees should receive AI competency training. Researchers suggest that medical educators in Oman should consider implementing AI in medical school programs to prepare future physicians for its use in healthcare. However, further research with more diverse samples across institutions is needed to expand the findings' generalizability in Oman.The scope, subject matter, and methodology of the reviewed study differ from the current one. The reviewed work was carried in in Oman, and the researcher's studied knowledge, attitudes, and perceptions of artificial intelligence in healthcare among medical students. The current study examined the adoption and usage of artificial intelligence among doctors in Federal Psychiatric Hospital Benin City, Edo State.

Ntim (2023) examined the progress and potential future path of AL-augmented healthcare systems in the UK. The researcher utilized a library research approach. The researcher notes that Artificial intelligence (AI) is a disruptive field of computer science that can mimic human intelligence and carry out intricate automated activities using computers and machine learning techniques. The researcher concluded that AI-enabled devices can sort through massive amounts of big medical data to find patterns, anomalies, and trends that have the potential to drastically alter medical practice and healthcare delivery. The study by Ntim (2023) is different from the current study in terms of methodology. The researcher used a library research method while the current study used an in-depth interview method. Both studies focused on AI.

Ramalingam, Victoire, & Pavithra (2023) examined the impact of artificial intelligence on healthcare: A review of current applications and future possibilities. The researchers relied on reviewed literature. The researchers opined that artificial intelligence (AI) has the potential to revolutionize healthcare by improving patient outcomes, reducing costs, and enhancing efficiency. The paper also explored the future possibilities of AI in healthcare, such as personalized medicine, disease prediction and prevention, and drug discovery. The researchers suggested that ethical and regulatory concerns must be addressed to ensure the safe and effective use of AI in healthcare. By developing a robust regulatory framework and addressing ethical concerns, we can harness the power of AI to improve patient care and advance medical research while ensuring that the technology is used responsibly and equitably. The work by Ramalingam, et al (2023) is different from the current study in terms of subject matter and methodological approach. The current study focused on the adoption and usage of artificial intelligence among Doctors in Federal Psychiatric Hospital Benin City, Edo State and it used an in-depth interview method. The reviewed work did not use a theory while the current study used a theory.

Brief Overview of Federal Psychiatric Hospital Benin City, Edo State (FNPH).

There are only eight Federal neuropsychiatric hospitals in Nigeria. One such is Federal Psychiatric Hospital Benin City, Edo State (FNPH). It was established in 1975. It is a national and regional mental health resources centre known as one of the apex centre for psychiatry in Nigeria (Kesi, 2018). It offers such medical services as Occupational Therapy, Drug Addiction Treatment, Adolescent Mental Health, Physiotherapy, Forensic Psychiatry, Electroencephalography (EEG), Radio-Diagnostics, in addition to its school of psychiatric Nursing, Clinical Nursing, and Psychiatry Residency. The hospital is located at number 39 Uselu, New Lagos Road, before Medical Junction, Benin City, Urora Road, Off Iduomwinna and Benin-Agbor Roads, Benin City, Edo State.

Data Presentation, Analysis, and Discussion

What is the level of knowledge about artificial intelligence among Doctors in Federal Psychiatric Hospital Benin City, Edo State?Data from interviews conducted on the subject matter revealed that majority of the medical Doctors at Federal Psychiatric Hospital Benin City, Edo State, were adequately knowledgeable on artificial intelligence and conversant with its use, but it is not deployed in practice with psychiatric patients. Also, a few of the respondents refused to grant the interview on the subject matter because they needed to do more research before they could speak about it. This showed that a significant number of Doctors at Federal Psychiatric Hospital Benin City, Edo State, were adequately knowledgeable on artificial intelligence and conversant with its use. In a similar study, Al-medfa, Al-Ansari, Darwish, Qreeballa & Jahrami (2023) found that Physicians in Bahrain have knowledge about artificial intelligence in medicine and showed positive attitude towards it use in medicine as well.

What is the level of adoption of the artificial intelligence technology among Doctors at Federal Psychiatric Hospital Benin City, Edo State?

The respondents said they have not started adopting artificial intelligence technology. Further response revealed that the management is making plans for the adoption of artificial intelligence in the hospital. According to a source, during the interview sessions, "There is awareness on artificial intelligence technology, but as a hospital, we have not started using it and also been able to come together to put down policies that would benefit patients and Doctors who are major users of the technology." This implies that the use of artificial intelligence technology at Federal Psychiatric Hospital Benin City, Edo State is yet to be fully implemented, but the management is making plans to introduce it in the hospital.

However, a recent global survey of 791 psychiatrists, mostly from developed countries, found that 835 of the study sample believed that it was unlikely that future technology could provide empathetic care, and 3.8% of the respondents felt that it would make their jobs obsolete (Doraiswamy, Blease, & Bodner, 2020). In a similar study involving radiologists, 77% of the participants reported favourable attitudes toward the adoption of artificial intelligence and 89% were not afraid of losing their jobs (Coppola, Faggioni, Regge, Giovagnoni, Golfieri, & Bibbolino,

2023). Also, a study from Germany that examined patients' opinions regarding the use of AI in clinical practice revealed a strong preference for physicians overseeing the various clinical tasks as compared to artificial intelligence (Lennartz, Dratsch, Zopfs, Persigehl, Maintz & Hokamp, 2021).

What are the challenges associated with the application of artificial intelligence technology at Federal Psychiatric Hospital Benin City, Edo State?

The respondents argued that, since they have not started using artificial intelligence technology at Federal Psychiatric Hospital Benin City, they would not be able to speak about it. However, two of the Doctors who would not want their names to be mentioned said the use of artificial intelligence technology will lead to an increase in workload for doctors in terms of patient care. They stressed that adoption of the technology would increase physical distance between the doctor and the patient which is against the ideal practice of one-on-one patient examination. Further response from the interview revealed that implementation of the use of artificial intelligence technology at Federal Psychiatric Hospital Benin City, Edo State will require huge logistics, huge technical know-how, huge funding, power supply, and training of the medical personnel.

Another challenge mentioned is the problem of low level of literacy among some of the patients in Federal Psychiatric Hospital Benin City, Edo State. This is contrary to the findings from research by Reem *et al* (2017) which showed that Doctors and patients are quite knowledgeable about Mobile Health Technology (MHT). In a related study, Alimi, Buraimoh, Aladesusi, & Babalola, (2021) found in their study that the majority of university students are not aware of the use of AI for learning in Kwara State, Nigeria.

From one-on-one interactions with Doctors during the in-depth interview, the researchers concludes that physicians' attitude towards the use of artificial intelligence at Federal Psychiatric Hospital Benin City, Edo State, is largely influenced by the three major principles of the theoretical framework for this study which are: perceived usefulness (PU), perceived ease of use (PEOU) and Attitude towards the user (ATU) according to Technology Acceptance Model TAM by propounded Davis (1989).

Conclusion and Recommendations

Artificial Intelligence (AI) has emerged as a transformative force in various fields, and its application in mental healthcare is no exception. The researchers conclude that the majority of the Doctors in Federal Psychiatric Hospital Benin City, Edo State are knowledgeable about artificial intelligence and the management team is initiating plans to begin its utilization.

Thus, the following recommendations are hereby given:

1. The researchers recommended that the management of Federal Psychiatric Hospital Benin City, should fast-track the use of artificial intelligence in the hospital.

2. The government should provide necessary logistics that will enhance the smooth utilization of AI in the treatment of psychiatric patients among other things.

3. There should be a steadier power supply and availability of an internet service network.

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