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CYBER SECURITY AND APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE MEDICAL DIAGNOSTIC IN ENUGU STATE

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Keywords: *Cyber security, application of artificial intelligence, network security and electronic health records and training*

Abstract: *The study evaluated cyber security and application of artificial intelligence in the medical diagnostic centers in Enugu State. The specific objectives were to: examine the relationship between network security and electronic health records and valuate the relationship between ongoing employee training and problem solving in medical diagnostic in Enugu State. The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. A total population of 243 selected staff of the study organisations. The whole population was used to due small number. Two hundred and twenty two (222) staff returned the questionnaire and accurately filled. Data was presented and analyzed using Likert Scale and the hypotheses using Z - test. The findings indicated that Network security had significant positive relationship with electronic health records Z (95, n = 222), 6.779 < 7.718 = p. < 0.05 and Ongoing employee training had significant positive relationship with problem solving in medical diagnostic centers in Enugu State Z (95, n = 222), 5.973 < 9.094 = p. < 0.05. The study concluded that network security and ongoing employee training had significant positive relationship with electronic health records and problem solving in medical diagnostic centers in Enugu State. The study recommended among others that for proper protecting of network and data from breaches, intrusions and other threats there is need for network security.*

INTRODUCTION

1.1 Background of the Study

Organizations transmit sensitive data across networks and to other devices in the course of doing business, and cyber security describe the discipline dedicated to protecting that information and the systems used to process or store it. Cyber security refers to the body of technologies, processes, and practices designed to protect networks, devices, programs, and data from attack, damage, or unauthorized access (De groot, 2020). As healthcare professionals and institutions strive to provide more accurate diagnoses, personalized treatment plans, and

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streamlined administrative operations, the role of AI becomes not only apparent but indispensable. AI, marked by its capacity to mimic human cognitive functions and perform tasks that traditionally necessitated human intelligence, holds significant promise within the healthcare landscape. By harnessing these capabilities, healthcare providers can enhance clinical decision-making, optimize treatment strategies, and streamline resource allocation, ultimately leading to improved patient outcomes and a more efficient healthcare ecosystem (Esteva et al., 2017). Cyber security may also be referred to as information technology security. Cyber security is important because government, military, corporate, financial, and medical organizations collect, process, and store unprecedented amounts of data on computers and other devices. A significant portion of that data can be sensitive information, whether that be intellectual property, financial data, personal information, or other types of data for which unauthorized access or exposure could have negative consequences, (De groot, 2020). As the volume and sophistication of cyber-attacks grow, companies and organizations, especially those that are tasked with safeguarding information relating to national security, health, or financial records, need to take steps to protect their sensitive business and personnel information. As early as March 2013, the nation's top intelligence officials cautioned that cyber-attacks and digital spying are the top threat to national security, eclipsing even terrorism, (De groot, 2020).

In organizational context, performance usually is explained as the length to which a member of an organization puts in his efforts towards the achievement of the objectives of that organization.

The efficiency of the organization's top management team is measured by the performance of the company hence reflecting the role of every individual working in the company and performing a particular task assigned to him. Hence performance is the indicator of how efficiently the organization is managed and how effectively and efficiently the human and other resources are utilized in the firm (Eneizan et al., 2015). The purpose of performance management is to ensure employees and teams are given the resources they need to develop, the recognition they deserve to be motivated, and the accountability to know what is expected. Performance management ensures that teams are aligned on priorities and that the organization's values are reinforced in practice (Carpi et al., 2017).

Cyber security is all about protecting data and applications. As healthcare professionals and institutions strive to provide more accurate diagnoses, personalized treatment plans, and streamlined administrative operations, the role of AI becomes not only apparent but indispensable (International, 2023). In a time of unprecedented technological advancement, the intersection of AI and cyber security in healthcare stands as a pivotal crossroads, dictating the trajectory of healthcare innovation

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and patient-centric care. Hence, the need to evaluate cyber security and application of artificial intelligence in the medical diagnostic in Enugu State.

1.2 Statement of problem

Cyber security in healthcare involves the protecting of electronic information and assets from unauthorized access, use and disclosure. AI systems are pivotal in modern healthcare, serving as critical tools for diagnosis and treatment. They allow healthcare professionals to view the body's internal structures non-invasively, providing crucial information that informs medical decisions. AI, marked by its capacity to mimic human cognitive functions and perform tasks that traditionally necessitated human intelligence holds significant promise within the healthcare landscape.

The integration of these systems with digital technology has significantly enhanced their capabilities but has also introduced cyber security risks. As healthcare systems become increasingly interconnected and reliant on digital platforms, the exposure to cyber-attacks, data breaches, and other malicious activities escalates. Also, the study deduced that problems of cyber security and artificial intelligence also arise as a result of insecurity in network and lack of ongoing employee training. Medical devices and associated networks they operate in can never be completely cyber secure, and that because of the share responsibility of cyber security, medical device users may represent a potential threat.

Cyber-attacks, like ransom ware, can disrupt the availability of medical imaging systems, delaying critical diagnostic procedures and potentially leading to adverse patient outcomes. Unlike many other fields, cyber security often lacks labeled data, making supervised learning challenging. Hence the need to tackle/devise means of solving existing and evolving problems of cyber security and AI as it can lead to errors in electronic health records and lack of problem solving among health workers and patients. Strategies to safeguard against cyber threats must be carefully designed and integrated to preserve the trust patients place in healthcare systems.

1.3 Objectives of the study

The main of the study was to evaluate cyber security and application of artificial intelligence in the medical diagnostic centers in Enugu State.

i. Examine the relationship between network security and electronic health records in medical diagnostic in Enugu State

ii. Evaluate the relationship between ongoing employee training and problem solving in medical diagnostic in Enugu State

1.4 Research Question

The following research questions guided the study

i. What is the relationship between network security and electronic health records in medical diagnostic centers in Enugu State

ii. What is the relationship between ongoing employee training and problem solving in medical diagnostic centers in Enugu State?

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1.5 Statement of Hypotheses

i. Network security has relationship with electronic health records in medical diagnostic centers in Enugu State

ii. Ongoing employee training has relationship with problem solving in medical diagnostic centers in Enugu State

1.6 Significance of the study

The study on cyber security will be of great importance to all medical diagnostic in Enugu State, business owners, employees and researchers. As modern technology is taking over every aspect of business, the study will help medical diagnostic in Enugu State, business owners and employees to know the importance of Cyber Security and application of artificial intelligence in any medical diagnostic centre in Enugu State

The study will help organization to know the impact of cyber security and as such employ talented individuals with cyber security. They can as well train the existing employees to acquire the cyber security which will help to protect the organizations technical activities.

The study will also serve as a reference material to future researchers.

1.6 Scope of the study

The study was specifically on cyber security and application of artificial intelligence in the medical diagnostic in Enugu State. The key variables of the study were the components of the dependent - cyber security and independent variable - artificial intelligence of the study. Components of cyber security includes - network security and ongoing employee training while the components of artificial intelligence were electronic health records and problem solving. The study was carried out in medical diagnostic centers in Enugu State.

2.0 Review of Related Literature

2.1 Conceptual Review

2.1.1 Cyber

The word "cyber" denotes a relationship with information technology (IT), i.e., computers. (It can relate to all aspects of computing, including storing data, protecting data, accessing data, processing data, transmitting data, and linking data). Cyber can be attached to almost anything to make it sound futuristic or technical, but its origins are ancient: it can be found in Greek translations of the Old Testament. Dawkins, (2022) noted that cyber is a neologism based on cybernetics, and from that, a slew of derivative words came into existence to describe everything from internet jobs to types of crime, and even retail events. Two of the earliest derivations from cyber that came into common usage were cyberspace and cyberpunk.

2.1.2 Security

Security also deters crime and criminals. Security has to do with the process connected with assuaging any kind of threat to people and their precious values. It involves freedom from threat and ability of states to maintain independent identity and their functional integrity against forces of change, which they see as hostile while its bottom line is survival (Bodunde et al., 2014). Security is protection

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from, or resilience against, potential harm (or other unwanted coercion) caused by others, by restraining the freedom of others to act. It has to do with the presence of peace, safety, gladness and the protection of human and physical resources or absence of crisis or threats to human dignity, all of which facilitate development and progress of any human society (Afolabi, 2015). The most crucial purpose of security is to protect people and their property. This includes both their physical safety and their possessions. Good security measures will make it difficult for criminals to target a person or a place (Xpress, 2022).

2.1.3 Cyber security

Cyber security also known as information technology security or electronic information security is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attacks. Cyber security skill is an In-demand skill. With businesses increasingly moving online and shifting to cloud storage, the demand for cyber security is currently at its peak. Good cyber security professional must possess a rich and diverse skill set (Jena, 2023).

2.1.3.1 Network security

Network security is the protection of the underlying networking infrastructure from unauthorized access, misuse, or theft. It involves creating a secure infrastructure for devices, applications, users, and applications to work in a secure manner. Network security combines multiple layers of defenses at the edge and in the network. Each network security layer implements policies and controls. An authorized user gain access to network resources, but malicious actors is blocked from carrying out exploits and threats, (Cisco, 2024). Network security encompasses all the steps taken to protect the integrity of a computer network and the data within it. Network security is important because it keeps sensitive data safe from cyber-attacks and ensures the network is usable and trustworthy. Successful network security strategies employ multiple security solutions to protect users and organizations from malware and cyber-attacks, like distributed denial of service. Network security is critical because it prevents cybercriminals from gaining access to valuable data and sensitive information. When hackers get hold of such data, they can cause a variety of problems, including identity theft, stolen assets and reputational harm, (Nick, 2023).

Network security is a broad term that covers a multitude of technologies, devices and processes. In its simplest term, it is a set of rules and configurations designed to protect the integrity, confidentiality and accessibility of computer networks and data using both software and hardware technologies. Every organization, regardless of size, industry or infrastructure, requires a degree of network security solutions in place to protect it from the ever-growing landscape of cyber threats in the wild today. Today's network architecture is complex and is faced with a threat environment that is always

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changing and attackers that are always trying to find and exploit vulnerabilities. These vulnerabilities can exist in a broad number of areas, including devices, data, applications, users and locations. For this reason, there are many network security management tools and applications in use today that address individual threats and exploits and also regulatory non-compliance. When just a few minutes of downtime can cause widespread disruption and massive damage to an organization's bottom line and reputation, it is essential that these protection measures are in place, (Forcepoint, 2022).

2.1.3.2 Ongoing Employee training

Medical staff training teaches your employees new skills and techniques that can increase their efficiency as professionals. As such, medical staff training helps your employees to be more productive, which can bring more profit to your practice.

Employee training is an essential process in any organization, large or small. It is designed to give employees the skills and knowledge they need to do their jobs effectively. The training may be in-house or outside the organization. It may be provided by the organization itself or by a third party. Training can cover a wide range of topics, from the basics of the job to more specialized skills. It is important to ensure that the training is appropriate for the employees' level of experience and knowledge. It is also important to make sure that the training is relevant to the job they are doing. Training can help employees to learn new skills, to keep up with changes in the organization, and to develop their knowledge and abilities. It can also help to improve communication and teamwork within the organization. Employee training is an important part of any organization. It helps employees to learn new skills and knowledge, and to keep up with changes in the organization. It can also help to improve communication and teamwork, (Pelago, 2023). Employee training is the structured process of providing employees with the knowledge and skills needed for their current or future roles. It's a vital aspect of professional development, aiming to enhance an employee's capabilities, productivity and performance. Companies engage in employee training for various reasons, including keeping pace with industry changes, improving job satisfaction and maintaining a competitive edge in the marketplace. This proactive approach to learning fosters a culture of continuous improvement and adaptability, essential for both individual and organizational growth. Employee training equips individuals with the skills and knowledge essential for success in their roles. Evolving with technology, this process now blends traditional methods, such as on-the-job training and mentorship, with modern digital techniques, adapting to various learning styles and organizational requirements. This approach ensures employees are continuously developing, keeping pace with the changing demands of their professions, (Haan, 2024).

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2.1.4 Application of artificial intelligence

Artificial intelligence in medicine is the use of machine learning models to help process medical data and give medical professionals important insights, improving health outcomes and patient experiences. The most common roles for AI in medical settings are clinical decision support and imaging analysis. Clinical decision support tools help providers make decisions about treatments, medications, mental health and other patient needs by providing them with quick access to information or research that's relevant to their patient. In medical imaging, AI tools are being used to analyze CT scans, x-rays, MRIs and other images for lesions or other findings that a human radiologist might miss, (IBM, 2024).

Artificial intelligence (AI) with machine learning tools are used to search, store, and analyze medical data to benefit both physicians and the health of patients in various ways. With the advancement in machine learning algorithms and bioinformatics techniques, AI has become an essential part of modern healthcare society. AI algorithms and deep learning applications support clinicians with managing health records, making diagnoses and clinical decisions, prescribing medication, determining mental health, and imaging analysis. Clinicians gain rapid access to information and research relevant to the needs of the patients. As some algorithms compete with and sometimes outperform clinicians, it is necessary to fully integrate this technology into daily medical practices, (Srivastava, 2024).

2.1.4.1 Electronic Health Records

The Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via interface, including evidence-based decision support, quality management, and outcome's reporting. The benefits of an electronic health record include a gain in healthcare efficiencies, large gains in quality and safety, and lower healthcare costs for consumers. Electronic health record challenges include costly software packages, system security, patient confidentiality, and unknown future government regulations. Future technologies for electronic health records include bar coding, radio-frequency identification, and speech recognition, (Tom et al, 2012).

2.1.4.2 Problem Solving

Problem solving is the act of defining a problem; determining the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; and implementing a solution. The problem-solving processes are: Find the Problem. The first step is quite obvious,

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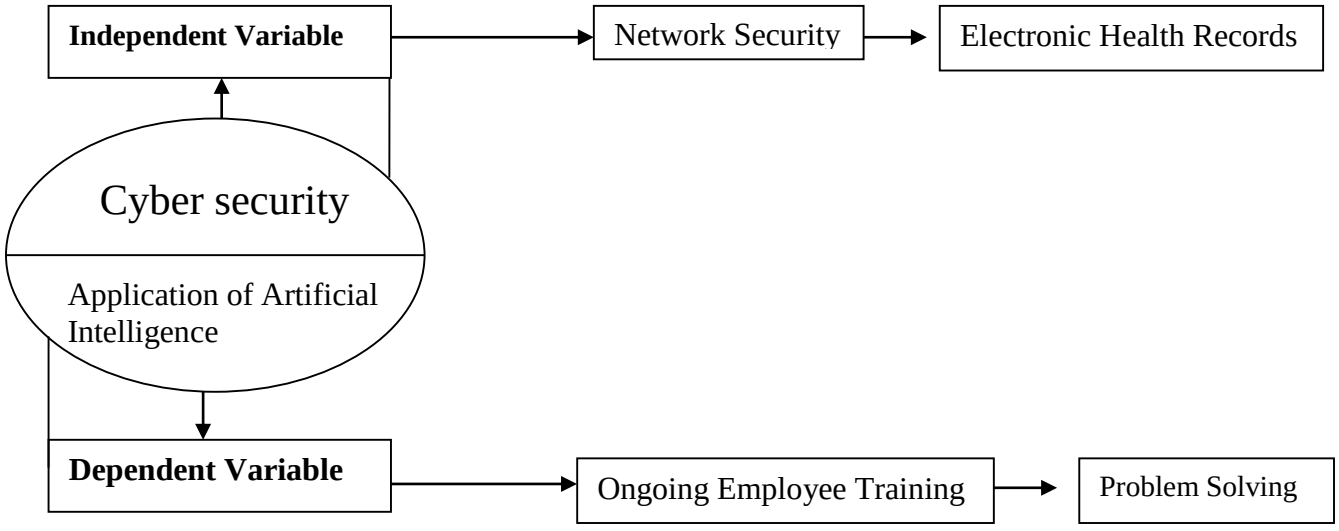
disassemble the Problem, prioritize Problem Branches, and plan the Work, Analyze the Process, Summarize the Analysis, Develop the solution and Conclusion. (ASQ, 2024). Problem solving is the process of identifying an existing problem, determining the root cause or causes of the problem, deciding the best course of action in order to solve the problem, and then finally implementing it to solve the problem. Another problem solving meaning is that it is simply a methodology for solving everyday issues. Problem-solving is crucially important for the basic continued survival of all living creatures, especially human beings. We use it throughout our everyday lives to solve basic needs, such as food and water, as well as more complex issues such as changing a light fixture on the International Space Station. There are various types of problem solving that are used in countless ways and in countless fields of study such as mathematics and physics to determine to solve complex equations and theoretical issues. It is also widely used in a variety of professional fields such as construction and plumbing where workers must be able to adapt to meet the needs of specific clients. There are many ways to solve problems. The countless number of everyday solutions are as diverse and specialized as the problems themselves, (Warren, 2023).

Problem solving in medicine refers to the process doctors use to figure out what is causing a patient's symptoms and how to treat them. It involves gathering information about the patient's health, considering different possible causes, and then deciding on the most likely cause.

2.1.5 Conceptual Framework



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2.2 Theoretical Review

The study was anchored on Vroom's Expectancy theory

2.2.1 Technology Acceptance Model

Fred Davis's Technology Acceptance Model (TAM), developed in 1986, constitutes a seminal framework aimed at elucidating the underlying factors that influence individuals' intentions to adopt new technologies. At its core, TAM asserts that an individual's inclination towards embracing a novel technology hinges upon two primary constructs: perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness pertains to the extent to which an individual believes that utilizing the technology will enhance their job performance or productivity, while perceived ease of use refers to the individual's perception of the effortlessness associated with using the technology.

Central to TAM is the notion that attitudes and beliefs regarding technology adoption are shaped not only by intrinsic perceptions and experiences but also by external influences, including social norms and organizational support. Individuals often evaluate the anticipated benefits and potential challenges associated with adopting a new technology through a lens molded by their interactions with peers, supervisors, and the broader organizational culture (Davis, 1989). Moreover, TAM posits a rational decision-making process wherein individuals weigh the perceived advantages against the perceived complexities of integrating the technology into their existing workflows.

In the context of the study focusing on digital entrepreneurship practices within medical diagostics, TAM serves as a valuable lens through which to explore the dynamics of technology adoption.

2.3 Empirical Review

2.3.1 Network security and electronic health records

Adebayo, Bankole and Adebayo (2019) conducted a study on The accessibility and utilization of e-healthcare services in Nigeria is very low thus, the need to improve on the application Information Communication Technology (ICT) in healthcare delivery in Nigerian hospitals is very essential. E-health is the application of information communication technology in health care management. ICT application in health sector will promote healthcare services support, improve monitoring of patients' conditions, improve adequate storage of patients' records, time saving, increase resources and aid referral system, ensure reduction in medical error and so on. However, most of the Nigerian hospitals still operate on paper-based healthcare delivery system despite the challenges of meeting increasingly demands of citizens who are in need of medical attention due to the large population. Many factors contribute to the poor state of ICT in medical sector of Nigeria, such as epileptic power supply, Illiteracy, high cost of ICTs equipment, lack of clear-cut law and policy, lack of expertise, corruption and so on. This paper adopts a doctrinal method of research which involves the

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use of primary and secondary sources of materials such as statutes, online publications, text books, articles, online dissertation and so on. However, this work concludes that the dream of ICT drive in health sector will be realizable in Nigeria if the present and subsequent government can reduce corruption, improve national infrastructures, especially in the areas of e- health technology and electricity.

Ogbonna, Oluwafemi and Ojo (2020) conducted a study on the performance; determine the barriers and effects of electronic health records on the staff of Obafemi Awolowo Teaching Hospital, Ile-Ife, Osun State, Nigeria. This study was designed to explore the experiences of staff that practiced a computerized or electronic health record in Obafemi Awolowo Teaching Hospital, Osun State, Nigeria (OAUTH). This study utilized a quantitative method. The study sample includes 10 respondents from the intensive care unit, 40 respondents from the health information department, 25 respondents from nurses and 25 respondents from the medical doctors of the hospital. The respondents were purposively selected and the instrument (questionnaire) was administered using the random sampling technique. This study showed that there is a high performance (80%) of EHR in the hospital. Most respondents (65%) opined that EHR is easy to use. The assessment of the respondents about the ability of EHR to reduce medical error revealed that about 75% said EHR will reduce medical error. In addition to this, about 80% of the respondents said EHR is important in the transmission of patient prescription. The barrier to the implementation of electronic health record includes an inadequate computer (50%), lack of uniform hospital standard (55%), start-up financial costs (60%) and training and productivity loss.

Chukwu, Edeagu, Chijindu, Eneh, Ndu, Ahaneku and Iloanusi (2021) conducted a study on the Internet of Things (IoT) have greatly improved our lives by transforming ordinary devices in our vicinities into smart and intelligent devices that are capable of sensing the activities within the environment, interact with other smart devices and respond reasonably to the changes in their immediate environment. In healthcare, specifically, IoT technologies have assisted immensely in the monitoring, observation and timely decision- making in the treatment processes of patients. Nevertheless, the improvements and conveniences brought by the IoT also come along with huge security and privacy issues. If these security breaches are ignored, they could pose serious unpalatable effects on the different aspects of our lives including fatal exposures of patients' vital data. This paper sheds the light on some of the security and privacy issues that the IoT in healthcare paradigm is exposed to, as well as some appropriate mitigating countermeasures.

Edeh, Otto, Richard-Nnabu, Ugboaja, Umoke and Omachi (2021) conducted a study on the various potentials of IoT and SWTs in the health sector, with a view to creating more awareness regarding its prospects and associated risks, and

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also to assist stakeholders to maximize its possibilities to enrich healthcare delivery. We deduced that both IoT and SWTs harbour promising features that are now being deployed in the health sector to enhance quality service delivery, medical research and innovations, smart health, telemedicine, communications, patient care and effective health outcomes just to mention but a few. We conclude that the adoption and implementation of IoT-based devices and SWTs will be significant in sustainability and improvement of healthcare systems in the future. However, privacy and medical data security remains a major source of concern to many stakeholders.

Bada, Bamigboye and Osundina (2022) conducted a study on the use of Electronic Health Records (EHR) System, the current security techniques available for EHR system and to identify the information security problems that exist with use of EHR in Health Information Management practice. Descriptive Design and Total Enumeration methods were being employed for this research. One hundred military and non-military personnel of Health Information staff and EHR users in the Military Hospitals in Lagos State served as the respondents for this research because the Military Hospitals comprises of both civilian and military personnel who has undergone series of training on data security management issues. Findings from the study revealed that 97% of the respondent agreed that Health Information Management practice uses Electronic Health Records system for managing patient's information at Nigerian Military Hospitals while 3% disagreed. The entire respondents agreed that Electronic Health Records improves the quality of health care in the hospital. 82% agreed that the current information securities available for electronic health records are adequate, while 18% disagreed. 70% agreed that lack of records management standard and policy is a problem encountered in the management of electronic health records in the hospitals while 30% disagreed while 100% agreed that inadequate funding, training of personnel and storage facility are the major problems encountered in the management of EHR in the hospitals. This study concludes that electronic health records provide healthcare workers with considerable resource for improving patient healthcare and information. Security is very essential in maintaining Electronic Health Records because it strengthens confidentiality, privacy, integrity of patience information and restriction of unauthorized or illegal access to electronic medical records.

2.3.2 Ongoing employee training and problem solving

Ghasi, Onyejiaku and Nkwonta (2018) conducted a study on In any corporate structure be it private or public, the effects of organizational culture on employee behavior and performance cannot be overemphasized since a positive and strong organizational culture may affect the employee commitment to the organization's philosophy and values. In many

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Nigerian public service institutions, emphases are placed mostly on compensation and remuneration packages in managing workforce with little diagnosis on organizational culture and the implication of it on the overall performance. This study in line with the identified gaps, investigates the effects of organizational culture on workers' performance of tertiary health institutions in Nigeria. The study determines the extent to which team work affect health workers' commitment in the tertiary hospitals particularly in Enugu state. It establishes the nature of relationship between periodic training and health workers output in tertiary hospitals in Enugu state; and as well ascertains the extent to which patient-health focus culture affects development in the Nigerian tertiary hospitals in Enugu state, Nigeria. The study employed cross-sectional survey design. Data was collected through a structured questionnaire from a number of 325 respondents who were hospital staff of two selected tertiary health institutions Enugu State University Teaching Hospital (ESUTH) and University of Nigeria Teaching Hospital (UNTH) in Enugu State, Nigeria. Analysis of the data revealed that team work has a significant

Salami, Daniel, Muritala, Ibrahim and Nwoye (2022) conducted a study on Today, the business environment is highly competitive and faced with continuously changing technology. Globalization and the changing needs of customers contribute to the challenges of business organizations. To meet up these challenges, organizations need to properly and continuously train and develop their employees. As a result, this research looks into the impact of training and development on the performance of public hospitals in Abuja-FCT, Nigeria. The distribution of a structured questionnaire was required by a survey research design of a (5-point Likert scale). 353 from the total population of 2997 randomly selected employees in the Fourteen (14) general hospitals in Abuja-FCT, Nigeria. 305 questionnaires were filled out by the respondents. Hypotheses tests were carried out and they revealed that there was a major connection between orientation as a training and development method and patient waiting time.

Nze, Udenta and Eneh (2024) conducted a study on Contract Employment an Service Delivery in Tertiary Healthcare Institutions in Enugu State. Specifically, the study sought to: determine the contribution of contract employment to healthcare delivery in tertiary healthcare institutions, examine the extent to which contract employment has assisted healthcare delivery in regard to emergency response in the tertiary healthcare institutions and ascertain the effect of contract employment on Equipment maintenance for special procedure in tertiary healthcare institutions in Enugu State Nigeria. The study adopted descriptive research design. The population of the study was 3694. Freund and Williams formular was adopted in determining the sample size of 3342. Tables, frequency distribution and Mean Scores were adopted in the analysis of data while z-test

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analysis was used in testing the hypotheses. The findings revealed that Contract employment has significantly contributed to healthcare delivery in tertiary healthcare institutions in Enugu State, Nigeria (where Z- value = 5.215 and the critical Z- value= 1.96), that contract employment had assisted in healthcare delivery in regard to emergency response time in tertiary healthcare institutions in Enugu State, Nigeria ((whereZ-value = 4.096 and the critical Z-value= 1.96) and that Contract employment had significant positive effect on Equipment maintenance for special procedure in tertiary healthcare institutions in Enugu State Nigeria (where Z-value = 5.983 and the critical Z- value= 1.96). The study concluded that judicious use of contract employment can enhance service delivery in these institutions by providing specialized expertise, promoting efficiency, and managing costs effectively.

Anikeze, Ugwunwangwu and Abonyi (2024) conducted a study on the Impact of Employee Training and Development on the Performance of ESUT, from 2015 – 2020. Specifically the study seek to; examine the extent which mentorship has helped to improve the quality of Enugu State University of Science and Technology (ESUT) graduates, determine the effect of employee participation on quality and timely decisions in Enugu State University of Science and Technology (ESUT), ascertain the extent to which staff training has improved the contributions of Enugu State University of Science and Technology (ESUT) on the development of Science and Technology The study adopted survey research design, while 172 staff of the Faculty of Management, Enugu State University of Science and Technology served as the population for the study. A sample of 120 respondents were drawn using Taro Yamane sampling techniques, a structured questionnaire designed by the researcher served as the instrument for data collection. Data elicited from the respondents were analyzed using simple percentage while the test of the hypothesis was done using chi-square (X2) at 0.0 5level of significance and 2 Degree of freedom. The findings of the study revealed that: mentorship has helped to improve the quality of Enugu state university of science and technology (ESUT) graduates; employee participation has positive effect on quality and time decision in Enugu State University of Science and Technology (ESUT), staff training has positive significant effect to the contribution of Enugu State University of Science and Technology (ESUT) on the development of Science and Technology.

Amanawa and Amanawa (2024) conducted a study on the intelligent cognition stage of artificial intelligence (AI) development has started. A new age of computer-assisted support in medicine has begun with the advent of AI in education, bringing new opportunities for public health education instruction and learning. In time, medical research might be entirely transformed by artificial intelligence (AI), which can automate data processing, produce fresh perspectives, and advance knowledge. This

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exploratory research gathers the top areas where AI contributes to public health communication. In this study, we covered the strategic role of communication in public health promotion in Nigeria and the present state and limits of artificial intelligence (AI). We also provided an overview of the broad implementation of AI in public health practice. Given the speed at which technology is developing, we think artificial intelligence (AI) will transform public health education and facilitate handling public health emergencies.

3.0 Methodology

The area of the study was Enugu state, Nigeria. The study was conducted among 53 health facilities' laboratories in Enugu metropolis, Enugu state of Nigeria. Randomly selected sample of secondary health facilities' laboratories of private health facilities and who had been providing ART services to clients for a minimum of three years, were included in the study The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. A total population of 243 selected staff of the study organizations. The whole population was used to due small number. Two hundred and twenty two (222) staff returned the questionnaire and accurately filled. That gave 95 percent response rate. The validity of the instrument was tested using content analysis and the result was good. The reliability was tested using the Pearson correlation coefficient (r). It gave a reliability coefficient of 0.80 which was also good. Data was presented and analyzed by mean score (3.0 and above agreed while below 3.0 disagreed) and standard deviation using Sprint Likert Scale. The hypotheses were analyzed using Z – test statistic tool.

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4.0 Data Analyses and presentation

4.1 The relationship between network security and electronic health records in medical diagnostic in Enugu State

Table 4.1.1: Responses on the relationship between network security and electronic health records in medical diagnostic in Enugu State

		5 SA	4 A	3 N	2 DA	1 SD	∑FX	- X	SD	Decision
1	Network security focused of protecting files and documents	575 115 51.8	116 29 13.1	96 32 14.4	38 19 8.6	27 27 27	852 222 100.0	3.84	1.443	Agree
2	Information from those types of attacks are protected through network	525 105 47.3	116 29 13.1	105 35 15.8	38 19 8.6	34 34 15.3	818 222 100.0	3.68	1.504	Agree
3	Secure networks protects organization intervals but and also any clients	505 101 45.5	116 29 13.1	138 46 20.7	16 8 3.6	38 38 17.1	813 222 100.0	3.66	1.498	Agree
4	Reliable networks helps organization operation and patients who exchange information with the organization	555 111 50.0	176 44 19.8	87 29 13.1	12 6 2.7	32 32 14.4	862 222 100.0	3.88	1.425	Agree
5	The right network security solution help the business stay compliant with business and government regulations	550 110 49.5	184 46 20.7	54 18 8.1	40 20 9.0	28 28 12.6	856 222 100.0	3.86	1.435	Agree
	Total Grand mean and standard deviation									

Source: Field Survey, 2024

Table 4.1.1, 144 respondents out of 222 representing 64.9 percent agreed that Network security focused on protecting files and documents with the mean score of 3.84 and standard deviation of 1.443.134 respondents representing 60.4 percent agreed that Information from those types of attacks are protected through network with mean score of 3.68 and standard deviation of 1.504. 130 respondents representing 58.6 percent agreed that Secure networks protects organization intervals but and also any clients with mean score of 3.66 and standard deviation of 1.498.155 respondents representing 69.8 percent agreed that Reliable networks helps organization operation and patients who exchange

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information with the organization with mean score of 3.88 and standard deviation of 1.425. 156 respondents representing 70.2 percent agreed that The right network security solution help the business stay compliant with business and government regulations with a mean score of 3.86 and standard deviation 1.435.

4.1.2 The relationship between ongoing employee training and problem solving in medical diagnostic in Enugu State

Table 4.1.2: Responses on the relationship between ongoing employee training and problem solving in medical diagnostic in Enugu State

		5 SA	4 A	3 N	2 DA	1 SD	∑FX	- X	SD	Decision
1	Ongoing employee training encourages incident reporting and helps decision making.	445 89 40.1	220 55 24.8	54 18 8.1	54 27 12.2	33 33 14.9	806 222 100.0	3.63	1.476	Agree
2	A successful security awareness program helps to spot a security attack and reporting	475 95 42.8	240 60 27.0	54 18 8.1	16 8 3.6	41 41 18.5	826 222 100.0	3.72	1.499	Agree
3	Cyber security training strengthens the human firewall and creativity	545 109 49.1	328 82 36.9	54 18 8.1	12 6 2.7	7 7 3.2	946 222 100.0	4.26	.949	Agree
4	Training helps safeguarding sensitive information and control over the future	500 100 45.5	364 91 41.0	39 13 5.9	16 8 3.6	10 10 4.5	929 222 100.0	4.18	1.014	Agree
5	Boosting employee confidence through training helps exploit opportunities in environment	445 89 40.1	296 74 33.3	39 13 5.9	46 23 10.4	23 23 10.4	849 222 100.0	3.82	1.335	Agree

Source: Field Survey, 2024

Table 4.1.2, 144 respondents out of 222 representing 64.9 percent agreed that ongoing employee training encourages incident reporting and helps decision making. with the mean score of 3.63 and standard deviation of 1.476.155 respondents representing 69.8 percent agreed that A successful security awareness program helps to spot a security attack and reporting with mean score of 3.72and standard deviation of 1.499.191 respondents representing 86 percent agreed that Cyber security training strengthens the human firewall and creativity with mean score of 4.26 and standard deviation of .949.191 respondents representing 86.5 percent agreed

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that Training helps safeguarding sensitive information and control over the future with mean score of 4.18 and standard deviation of 1.014. 163 respondents representing 73.4s percent agreed that boosting employee confidence through training helps exploit opportunities in environment with a mean score of 3.82 and standard deviation 1.335.

4.3 Test of Hypotheses

4.3.1 Hypothesis One: Network security has relationship with electronic health records in medical diagnostic centers in Enugu State

Table 4.3.1 Z Test Kolmogorov-Smirnov on network security has relationship with electronic health records in medical diagnostic centers in Enugu State

One-Sample Kolmogorov-Smirnov Test

		Network security focused of protecting files and documents	Information from those types of attacks are protected through network	Secure networks protects organizatio n intervals but and also any clients	Reliable networks helps organization operation and patients who exchange information with the organization	The right network security solution help the business stay compliant with business and government regulations
N		222	222	222	222	222
Uniform Parameters[a,b]	Minimum	1	1	1	1	1
	Maximum	5	5	5	5	5
Most Extreme Differences	Absolute	.518	.473	.455	.500	.495
	Positive	.122	.153	.171	.144	.126
	Negative	-.518	-.473	-.455	-.500	-.495
Kolmogorov-Smirnov Z		7.718	7.047	6.779	7.450	7.383
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000

a. Test distribution is Uniform.
b. Calculated from data.

Decision Rule

If the calculated Z-value is greater than the critical Z-value (i.e $Z_{cal} > Z_{critical}$), reject the null hypothesis and accept the alternative hypothesis accordingly.

Result

With Kolmogorov-Smirnon Z – value of 6.779 < 7.718 and on Asymp. Significance of 0.000, the responses from the respondents as display in the table is normally distributed. This affirms the assertion of the most of the respondents that network security had significant positive relationship with electronic health records in medical diagnostic centers in Enugu State

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Decision

Furthermore, comparing the calculated Z- value of 6.779 < 7.718 against the critical Z- value of .000 (2-tailed test at 97percent level of confidence) the null hypothesis were rejected. Thus the alternative hypothesis was accepted which states that network security had significant positive relationship with electronic health records in medical diagnostic centers in Enugu State

4.3.2 Hypothesis two: ongoing employee training has relationship with problem solving in medical diagnostic centers in Enugu State

Table 4.3.2 Z Test Kolmogorov-Smirnov on ongoing employee training has relationship with problem solving in medical diagnostic centers in Enugu State

One-Sample Kolmogorov-Smirnov Test

		Ongoing employee training encourages incident reporting and helps decision making.	A successful security awareness program helps to spot a security attack and reporting	Cyber security training strengthens the human firewall and creativity	Training helps safeguarding sensitive information and control over the future	Boosting employee confidence through training helps exploit opportunities in environment
N		222	222	222	222	222
Uniform Parameters[a,b]	Minimum	1	1	1	1	1
	Maximum	5	5	5	5	5
Most Extreme Differences	Absolute	.401	.448	.610	.610	.484
	Positive	.149	.185	.032	.045	.104
	Negative	-.401	-.448	-.610	-.610	-.484
Kolmogorov-Smirnov Z		5.973	6.678	9.094	9.094	7.215
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000

a. Test distribution is Uniform.
b. Calculated from data.

Decision Rule

If the calculated Z-value is greater than the critical Z-value (i.e $Z_{cal} > Z_{critical}$), reject the null hypothesis and accept the alternative hypothesis accordingly.

Result

With Kolmogorov-Smirnon Z – value of 5.973 < 9.094 and on Asymp. Significance of 0.000, the responses from the respondents as display in the table is normally distributed. This affirms the assertion of the most of the respondents that ongoing employee training had significant

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positive relationship with problem solving in medical diagnostic centers in Enugu State

Decision

Furthermore, comparing the calculated Z- value of 5.973 < 9.094 against the critical Z- value of .000 (2-tailed test at 97percent level of confidence) the null hypothesis were rejected. Thus the alternative hypothesis was accepted which states that ongoing employee training had significant positive relationship with problem solving in medical diagnostic centers in Enugu State

4.3 Discussion of findings

4.3.1 Network security had significant positive relationship with electronic health records in medical diagnostic centers in Enugu State

Electronic health records provide healthcare workers with considerable resource for improving patient healthcare and information. Security is very essential in maintaining Electronic Health Records because it strengthens confidentiality, privacy, integrity of patience information and restriction of unauthorized or illegal access to electronic medical records. Hypotheses one showed Z- value of 6.779 < 7.718 against the critical Z- value of .000. which implies that network security had significant positive relationship with electronic health records in medical diagnostic centers in Enugu State. The study of Ogbonna, Oluwafemi, Ojo (2020) showed that there is a high performance (80%) of EHR in the hospital. Most respondents (65%) opined that EHR is easy to use. The assessment of the respondents about the ability of EHR to reduce medical error revealed that about 75% said EHR will reduce medical error. In addition to this, about 80% of the respondents said EHR is important in the transmission of patient prescription. The barrier to the implementation of electronic health record includes an inadequate computer (50%), lack of uniform hospital standard (55%), start-up financial costs (60%) and training and productivity loss. Health Information Management practice uses Electronic Health Records system for managing patient's information. Electronic Health Records improves the quality of health care in the hospital. The Hospital Management Board should ensure that there is a record management policy and standard in place to guide the electronic record management of its patient's records (Bada, Bamigboye & Osundina, 2022).

4.3.2 Ongoing employee training had significant positive relationship with problem solving in medical diagnostic centers in Enugu State

Hypotheses two revealed the calculated Z- value of 5.973 < 9.094 against the critical Z- value of .000 which states that ongoing employee training had significant positive relationship with problem solving in medical diagnostic centers in Enugu State. In view of this hypothesis Anikeze, Ugwunwangwu and Abonyi (2024) conducted a study on the Impact of Employee

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Training and Development on the Performance of ESUT, from 2015 – 2020. The findings of the study revealed that: mentorship has helped to improve the quality of Enugu state university of science and technology (ESUT) graduates; employee participation has positive effect on quality and time decision in Enugu State University of Science and Technology (ESUT), staff training has positive significant effect to the contribution of Enugu State University of Science and Technology (ESUT) on the development of Science and Technology. A new age of computer-assisted support in medicine has begun with the advent of AI in education, bringing new opportunities for public health education instruction and learning. In time, medical research might be entirely transformed by artificial intelligence (AI), which can automate data processing, produce fresh perspectives, and advance knowledge.

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

i. Network security had significant positive relationship with electronic health records in medical diagnostic centers in Enugu State *Z (95, n = 222),* 6.779 < 7.718 = *p. < 0.05.*

ii. Ongoing employee training had significant positive relationship with problem solving in medical diagnostic centers in Enugu State *Z (95, n = 222),* 5.973 < 9.094 = *p. < 0.05.*

5.2 Conclusion

The study concluded that network security and ongoing employee training had significant positive relationship with electronic health records and problem solving in medical diagnostic centers in Enugu State. In a time of unprecedented technological advancement, the intersection of AI and cyber security in healthcare stands as a pivotal crossroads, dictating the trajectory of healthcare innovation and patient-centric care. The purpose of performance management is to ensure employees and teams are given the resources they need to develop, the recognition they deserve to be motivated, and the accountability to know what is expected

5.3 Recommendations

The study recommended that:

i. For proper protecting of network and data from breaches, intrusions and other threats there is need for network security. Without adequate network security, organizations face a significant risk that sensitive information will be stolen or compromised. Personally identifiable information (PII) and intellectual property are valuable to hackers and frequent targets of attacks.

ii. The management of medical diagnostic centres should be encouraged to have Ongoing training to help reduce the gaps in skills between employees, provides structure to employee development, boosts staff productivity and morale.

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