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Information and Communication Technology Proficiency and Utilization of Electronic Resources among Practicing Nurses in South-South, Nigeria

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Abstract

This study examines Information and Communication Technology (ICT) proficiency and electronic resource utilization among practicing nurses in South-South Nigeria. The study was driven by three research questions, and the relevant literature was reviewed accordingly. A descriptive research design was used to target nurses in Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers states. 600 nurses were chosen using stratified random sampling (100 from each state). A self-structured questionnaire was used to collect data, and descriptive statistics including frequencies, percentages, and arithmetic means were used in the analysis. The findings reveal that nurses have inadequate ICT skill, particularly in basic computer operations, word processing, spreadsheets, presentation software, internet use, email communication, electronic medical records, and telemedicine platforms. Electronic resource consumption is also low, with little interest in clinical decision support systems, telehealth services, and hospital intranet resources. Adoption barriers include inadequate ICT infrastructure, insufficient training, aversion to change, data privacy concerns, high expenses, unpredictable power supply, lack of technical support, time restrictions, system incompatibility, and a scarcity of relevant digital resources. Addressing these difficulties necessitates enhanced infrastructure, ongoing training, and supportive policies that promote digital competency. The study emphasizes the critical need to improve digital literacy, increase resource availability, and promote institutional support in order to match nursing practice with current healthcare demands.

Keywords: Information and Communication Technology (ICT), ICT Proficiency, Electronic Resources (ERs), Nurses, Healthcare Service Delivery & Electronic Health Records (EHRs).

1. Introduction

Information is a key aspect in all industries, playing an important role in the survival and longevity of companies. It provides the foundation for decision-making, planning, and operational efficiency in a variety of industries, including commerce, transportation, agriculture, and healthcare. Information is critical in healthcare, particularly for nurses, because it improves patient care, decision-making, and overall health outcomes. Nurses rely on accurate and timely data to evaluate patients, deliver treatments, and track progress. Electronic health records, medical databases, and research findings all provide valuable

insights into evidence-based practice. Information also facilitates communication between healthcare workers, resulting in coordinated and efficient care. Nurses also use information for continual learning, professional growth, and remaining current on medical advances. In an emergency, immediate access to precise data can save lives. As a result, good information management is critical for nurses to provide safe and excellent treatment (Muhammed et al., 2021).

The rapid expansion of technology has had a tremendous impact on practically every aspect of human existence, including healthcare information, which is critical for nurses' everyday work. The move from paper-based or manual records to electronic information systems has transformed how Nurses access, store, and use patient data (Oye et al., 2023). According to Ahmed and Al-Reyaee (2017), electronic resources (e-resources) are digital materials that allow users to access information via electronic devices such as computers, tablets, and smartphones. They improve research, learning, and professional practice by providing rapid and efficient access to massive amounts of information. Muhammed et al. (2021), electronic resources in health refer to digital tools and databases that give healthcare practitioners with access to medical literature, patient records, and clinical decision-support systems. These tools include electronic health records (EHRs), telemedicine platforms, medical research databases, and e-learning materials, all of which increase healthcare delivery, patient management, and medical research. They increase efficiency, enable evidence-based practice, and encourage knowledge sharing among healthcare workers. The use of electronic resources in healthcare has considerably improved patient care by providing rapid access to correct information, resulting in better clinical outcomes.

According to Anyanwu et al. (2016), the value of electronic resources for nurses cannot be emphasized. These digital tools improve productivity, accuracy, and communication, allowing nurses to deliver timely, evidence-based treatment. Electronic health records allow for seamless documentation and retrieval of patient information, decreasing errors and enhancing continuity of care. Medical databases provide nurses with access to current research, recommendations, and treatment regimens, allowing them to make more educated decisions. Furthermore, telemedicine solutions enable remote consultations, increasing healthcare accessibility, particularly in underdeveloped areas. These devices also help with patient monitoring, enabling for early detection of problems and prompt interventions. As technology advances, nurses must stay current on emerging digital solutions to streamline healthcare delivery and improve patient outcomes (Ricks & Ten, 2015).

To use electronic resources effectively and efficiently, nurses must obtain strong information and communication technology (ICT) skills (Abdullahi et al., 2020). Adams (2015) defines Information and Communication Technology (ICT) competency as the capacity to effectively use digital technology, communication tools, and networks to access, manage, produce, and share information. It includes knowledge of computer operation, software program usage, internet navigation, digital communication platforms management, and data security. ICT competency also includes the ability to critically analyze digital content, troubleshoot technological issues, and adapt to new technologies. In professional settings, it improves productivity, teamwork, and decision-making, allowing people to complete activities that need digital literacy more efficiently. According to Jouparinejad et al. (2020), Information and Communication Technology (ICT) competency for nurses is defined as the capacity to effectively use digital tools, electronic health systems, and communication technologies to improve patient care and healthcare service delivery. It comprises the ability to access and manage electronic health records (EHRs), use medical databases, operate telemedicine

platforms, and ensure data security and confidentiality. ICT proficiency allows nurses to accurately document patient information, acquire clinical guidelines, connect with healthcare teams, and monitor patient conditions via digital technology. It also includes the capacity to critically evaluate health information, fix technical issues, and adapt to new healthcare technologies. In modern healthcare facilities, high ICT competency increases productivity, improves decision-making, and provides improved patient outcomes (Georgsson 2020).

According to Jayousi et al. (2024), it entails developing digital literacy skills in order to access healthcare databases, electronic health records (EHRs), and medical research platforms. Nurses should receive ongoing training in e-resource usage, such as accessing online publications, using telemedicine capabilities, and using clinical decision-support systems. Familiarity with data security measures promotes patient confidentiality when using digital platforms. Nurses must also learn how to look for and evaluate credible medical information. Mastering ICT skills allows nurses to maximize electronic resources for better patient care, research, and professional development. Despite the relevance of electronic resources and Information and Communication Technology (ICT) competency in improving healthcare service delivery, both appear to be deficient in Nigeria for a variety of reasons (Ubalaeze et al., 2024). Onoja, et al. (2021) Limited access to digital infrastructure, such as unstable internet connectivity and inadequate computer systems, impedes the efficient use of electronic resources. Furthermore, many healthcare institutions lack sufficient resources, making it difficult to invest in new ICT tools and training programs for nurses and other medical personnel. A lack of formal ICT education and hands-on training further inhibits healthcare workers' capacity to properly use electronic health records (EHRs), online medical databases, and telemedicine platforms. Moreover, opposition to technology adoption, coupled with worries about data security and privacy, also adds to the delayed integration of ICT in Nigeria's healthcare system. Addressing these challenges demands smart investments and policy reforms. However, because all of the aforementioned studies were done outside the scope of the current research, it is important to undertake a study to investigate information and communication technology proficiency and use of electronic resources by practicing nurses in South-South Nigeria.

2. Review of Literature

Electronic resources are becoming the most important information carriers in many aspects of life, including healthcare, where their use by practitioners is critical. According to Tech World (2020), electronic resources in health include digital tools, databases, and online platforms that give healthcare practitioners access to medical information, patient records, research materials, and clinical decision-support systems. These resources include EHRs, medical research databases (e.g., PubMed, CINAHL), telemedicine platforms, e-books, e-journals, and multimedia learning tools. They improve healthcare delivery by increasing efficiency, supporting evidence-based practice, and facilitating knowledge sharing among health practitioners. Electronic resources are critical in-patient care, medical research, and professional development, providing rapid access to accurate and reliable healthcare information. United States Food and Drug Administration (2020) Electronic resources in health are digital tools and platforms that improve healthcare delivery, research, and teaching. These include electronic health records (EHRs), telemedicine systems, mobile health apps, wearable devices, and medical databases such as PubMed. EHRs centralize patient data for easy access across several sites, whereas telemedicine enhances distant care. Mobile apps and wearable technology provide real-time health monitoring, which promotes individualized care. Electronic resources have become indispensable in modern healthcare, providing nurses

with tools to improve patient care and optimize operations. Yogesh and Karthikeyan (2022); (Tesfa et al. 2021) some important electronic resources used in nursing practice:

- Electronic Health Records (EHRs) provide real-time, patient-centered records for authorized users. They compile data on a patient's medical history, diagnosis, prescriptions, treatment plans, immunization dates, allergies, radiological pictures, and lab findings.
- Telemedicine: telemedicine platforms enable nurses to interact with patients, monitor chronic illnesses, and provide education remotely, eliminating the need for in-person visits. Telemedicine improves access to care, particularly for patients in distant places, and has become increasingly important during times like the COVID-19 epidemic.
- Mobile Health Applications: Nurses employ several mobile apps for duties such as drug reference, medical calculations, and clinical guidelines. These apps allow instant access to critical information, aiding in accurate drug administration, patient education, and staying informed with the newest medical practices.
- Patient Monitoring Devices: Wearable and remote monitoring devices provide real-time data on patient vital indicators, including heart rate, blood pressure, and oxygen saturation. Nurses can use this data to identify early indicators of deterioration, allowing for prompt treatments and reducing hospital readmissions.
- Online Continuing Education Platforms: Nurses use online Continuing Education Platforms to stay up-to-date on healthcare innovations and maintain their proficiency. These platforms provide flexibility and a diverse selection of topics, promoting professional development and license compliance.

The usage of electronic resources is becoming more common in developing countries, where nurses rely on them to support and improve their everyday activities due to the multiple benefits. According to Tesfa et al. (2021), electronic resources play an important role in modern healthcare by improving the accessibility, accuracy, and efficiency of medical services provided by nurses. These digital tools give healthcare practitioners instant access to medical research, patient records, and clinical guidelines, allowing them to make informed choices. E-health technologies promote evidence-based practice by providing rapid access to research findings, clinical procedures, and treatment recommendations, minimizing reliance on out-of-date information. EHRs also improve data administration, reduce errors, and promote continuity of care by centralizing patient information. Telemedicine technologies and online medical databases enable remote consultations, which improves healthcare delivery in disadvantaged areas. Integrating these tools into daily practice allows healthcare workers, including nurses and doctors, to improve patient care, expedite workflows, and create greater communication among stakeholders, ultimately resulting to improved health outcomes for nurses (Robinson & Lee, 2024).

Several studies have investigated the use of electronic health records (EHRs) among Nigerian nurses, identifying characteristics that influence its adoption. Adedeji (2018) conducted a cross-sectional survey with 206 nurses from Obafemi Awolowo University Teaching Hospitals in Ile-Ife. The findings found that 80.1% had never used the Made-In-Nigeria Primary Healthcare and Hospital Information System (MINPHIS), despite 79.6% expressing a propensity to use EHRs. Significant factors influencing utilization were age ($p = 0.045$), experience ($p = 0.007$), computer availability ($p = 0.000$), and training ($p = 0.000$). The study

suggested on-the-job training, essential equipment, and a supportive environment for EHR adoption. Babale et al. (2021) examined 128 healthcare professionals at Ahmadu Bello University Teaching Hospital in Zaria. The results showed that, while 60% had strong awareness of EMRs, only 40% had a positive attitude toward their use. Inadequate training, resistance to change, and a lack of technical support were among the issues encountered. To enhance uptake, the report recommended frequent training programs as well as improved technical assistance. Ayamolowo et al. (2023) conducted a mixed-methods study in a faith-based teaching hospital in Ilishan with 240 nurses. Despite the fact that 62.8% of EHR software was available and 84.2% had internet connectivity, only 27.3% used EHRs. Gender, educational qualification, and training were key factors influencing utilization. Barriers observed included insufficient EHR software features, a lack of institutional enforcement, and confusing EHR rules. The report suggested complete EHR packages and policy formulation. Akosa and Sani (2024) studied nurses at National Hospital in Abuja and discovered that they were aware of EMR but did not utilize it consistently due to training gaps, system usability concerns, and poor technical support. The recommendations included focused actions to improve training and infrastructure, resulting in better patient care.

However, the use and non-use of electronic resources can be associated with ICT competency (Abdullahi et al., 2020). Yoo and Lee (2022) define Information and Communication Technology (ICT) competency in the use of electronic resources as the ability to effectively navigate, access, use, and manage digital tools and platforms for retrieving, storing, and processing information. In healthcare, digital literacy refers to nurses and other professionals' ability to use electronic health records (EHRs), medical databases, telemedicine platforms, and other health informatics systems. ICT proficiency include data entry, information retrieval, cyber security awareness, and critical evaluation of electronic resources. High ICT competency facilitates efficient use of digital technologies, enhances decision-making, and improves patient care results. Addo and Agyepong (2020) claimed that ICT knowledge is crucial for nurses to properly utilize electronic resources in healthcare. It allows for efficient patient data management via electronic health records (EHRs), ensuring quick access to medical histories while eliminating errors. Nurses can access evidence-based information from medical databases, which improves decision-making and patient care. ICT skills provide smooth communication via telemedicine and digital platforms, resulting in improved collaboration with healthcare teams.

Tanko and Zaki (2024) also said that ICT competency improves nurses' ability to use modern electronic resources such as computerized decision-support systems, online training modules, and virtual simulations for skill development. It increases efficiency in scheduling, drug delivery, and remote patient monitoring, resulting in prompt interventions. Proficient nurses can also use artificial intelligence (AI) tools to perform predictive analytics and improve patient outcomes. Furthermore, ICT skills enable nurses to participate in telehealth programs, increasing healthcare access in rural locations. By mastering the use of electronic resources, nurses contribute to a more data-driven, evidence-based, and patient-centered healthcare system. Investing in ongoing ICT training promotes professional development, increases job satisfaction, and guarantees that nurses remain proficient in a changing digital healthcare context. Several studies have been conducted to study the Information and Communication Technology (ICT) proficiency of Nigerian practicing nurses in terms of the effective use of electronic resources in healthcare service delivery. The findings show various degrees of ICT skills and several impediments to optimal adoption, Adedeji et al. (2018) evaluated the factors impacting nurses' adoption of electronic health records (EHR) at a Nigerian teaching hospital. The study discovered that 80.1% of nurses have never utilized the Made-in-Nigeria

Primary Healthcare and Hospital Information System (MINPHIS), despite 79.6% showing a willingness to use EHRs. Lack of training, insufficient access to computer systems, and poor institutional support were all significant variables influencing use. Aleke et al. (2023) investigated nurses' knowledge and attitudes toward ICT use in healthcare delivery at the Federal Teaching Hospital Abakaliki (FETHA). The findings revealed that nurses had an average level of knowledge (44.1%) and a negative attitude toward ICT use (grand mean score of 2.32). The study advocated arranging seminars and workshops to promote knowledge and use of ICT among healthcare providers.

3. Statement of the Problem

Modern healthcare delivery requires nurses to be proficient in information and communication technology (ICT), allowing them to easily access, analyze, and use electronic resources (ERs) for evidence-based practice. The use of electronic health records (EHRs), medical databases, and telemedicine systems can improve patient care, decision-making, and clinical workflow efficiency. Nurses with advanced ICT skills can efficiently navigate these digital platforms, resulting in improved healthcare outcomes, data security, and efficient service delivery. Despite these benefits, ICT competency and use of electronic resources among practicing nurses in South-South Nigeria remain low. Preliminary observations and talks with healthcare professionals indicate that many nurses struggle with digital literacy, which limits their capacity to efficiently use EHRs, medical databases, and telehealth platforms. This weakness has an impact on patient care quality, diminishes workflow efficiency, and increases reliance on antiquated, manual record-keeping systems. Several reasons may contribute to this problem, including insufficient ICT skills, limited access to electronic resources, poor internet connectivity, and institutional opposition to digital transformation. Despite the importance of ICT proficiency in nursing, there has been little empirical research on its relationship with the usage of electronic resources among nurses in South-South Nigeria. The purpose of this study is to look into the level of ICT proficiency among practicing nurses and the use of electronic resources.

4. Research Questions

The research questions for the study are as follows:

1. To what extent do nurses in South-South, Nigeria utilize electronic resources in their professional practice?
2. To what extent do practicing nurses in South-South possess ICT proficiency for the effective utilization of electronic resources in healthcare service delivery?
3. What are the challenges affecting the adoption and effective use of electronic resources by nurses in South-South?

5. Methods and Procedure

This study used a descriptive research approach to thoroughly examine practicing nurses' proficiency in Information and Communication Technology (ICT) and their use of electronic resources in healthcare service delivery in Nigeria's South-South region. This methodology was deemed most appropriate because it allows for the immediate and objective collection of empirical data from participants. The study's target population consisted of practicing nurses working in various healthcare facilities throughout Nigeria's South-South area, which

includes Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers states. As a result, a stratified random sampling procedure was used to assure representative participation from each state. A sample of 600 nurses was chosen, with 100 individuals recruited from each state to ensure equitable representation throughout the region. The primary data collection tool was a precisely constructed, self-structured questionnaire called "Nurses' ICT Proficiency and Use of Electronic Resources in Healthcare Service Delivery Questionnaire" (NICTPUERHSDQ). This instrument was carefully divided into six sections: Section A gathered demographic information on the respondents, while Sections B through D focused on the study topics. To achieve maximum response rates, the researchers, together with trained research assistants, personally gave the questionnaire to respondents at the specified healthcare facilities, retrieving completed copies immediately after completion. The acquired data was rigorously analyzed using descriptive statistical approaches such as frequencies, percentages, and arithmetic mean. A criterion means of 2.50 was established as the barrier for interpretative analysis, serving as the benchmark for analyzing respondents' perspectives, with any mean score less than 2.49 being insufficient and so rejected.

6. Data Analysis, Presentation of Results and Discussion of Findings

This section looks at the presentation of results and the discussion of findings in relation to the research questions that were raised.

Questionnaire Response Rate of Respondents

Table - 1: Questionnaires Response Rate

Number of the Questionnaires Administered	Number of the Questionnaires Returned	Percentage of the Copies of Questionnaire Returned
600	532	88.67%

A total of 600 questionnaires were distributed, of which 532 were returned and declared usable, producing an 88.67% response rate. The high return rate ensures data dependability. According to Dulle, Minish-Majanja, and Cloete (2010), a response rate of 60% or more is regarded appropriate for research investigations, indicating that the obtained rate is sufficient for relevant analysis.

Research Question Three: To what extent do practicing nurses in South-South, Nigria possess ICT proficiency for the effective utilization of electronic resources in healthcare service delivery?

Table - 2: Extent of ICT Proficiency among Practicing Nurses

ICT Skills	Expert	Intermediate	Beginner	Novice	$\bar{x}$
Basic computer operations (e.g., turning on/off, navigating desktop)	86	78	159	209	2.08
Word processing (e.g., Microsoft Word)	59	58	163	252	1.86
Spreadsheet management (e.g., Microsoft Excel)	46	84	169	233	1.89
Presentation software (e.g., Microsoft PowerPoint)	28	39	153	312	1.59
Internet browsing and online research	34	47	149	302	1.65

Email communication	44	75	159	254	1.83
Use of electronic medical records (EMR) systems	47	55	153	278	1.76
Data entry and retrieval from healthcare databases	40	54	128	310	1.67
Telemedicine platforms usage	39	47	155	291	1.69
Mobile health applications usage	29	42	132	329	1.57
Aggregate Mean					1.76
Criterion Mean					2.50

Table 2 shows that the aggregate mean of 1.76 is lower than the criterion mean of 2.50, indicating that practicing nurses in Delta State have limited ICT competency for effective use of electronic resources in healthcare service delivery. The survey found that nurses are the most proficient in basic computer operations ($\bar{x}$ = 2.08), spreadsheet management ($\bar{x}$ = 1.89), word processing ($\bar{x}$ = 1.86), and email communication ($\bar{x}$ = 1.83). However, their proficiency is significantly low in using electronic medical records ($\bar{x}$ = 1.76), data entry and retrieval from healthcare databases ($\bar{x}$ = 1.67), internet browsing and online research ($\bar{x}$ = 1.65), telemedicine platforms ($\bar{x}$ = 1.69), presentation software ($\bar{x}$ = 1.59), and mobile health applications ($\bar{x}$ = 1.57).

Research Question Two: To what extent do nurses in South-South, Nigeria utilize electronic resources in their professional practice?

Table - 3: Extent of Electronic Resource Utilization by Nurses

Electronic Resources	Very Often	Often	Sometimes	Never	$\bar{x}$
Electronic Health Records (EHR)	88	96	279	69	2.42
Online medical journals and databases (e.g., PubMed, Medline)	33	58	311	130	1.47
Clinical decision support systems	41	62	342	87	1.52
E-learning platforms for continuous education	80	101	328	23	2.35
Online drug reference guides	73	96	283	80	2.32
Telehealth services	33	47	332	120	1.27
Mobile health applications for patient monitoring	41	46	349	96	1.27
Hospital intranet resources	22	33	324	153	1.01
Online patient education materials	37	46	276	173	1.38
Digital imaging and radiology systems	33	47	333	119	1.27
Aggregate Mean					1.63
Criterion Mean					2.50

Table 3 shows that the aggregate mean of 1.63 is less than the criterion mean of 2.50, showing that nurses in South-South, Nigeria use electronic resources infrequently. The study found that nurses use electronic health records ($\bar{x}$ = 2.42), e-learning platforms for continuing education ($\bar{x}$ = 2.35), and online medication reference guides ($\bar{x}$ = 2.32) more frequently than other electronic resources. The use of online medical journals and databases ($\bar{x}$ = 1.47), clinical decision support systems ($\bar{x}$ = 1.52), telehealth services ($\bar{x}$ = 1.27), mobile health

applications for patient monitoring ($\bar{x}$ = 1.27), hospital intranet resources ($\bar{x}$ = 1.01), online patient education materials ($\bar{x}$ = 1.38), and digital imaging and radiology systems ($\bar{x}$ = 1.27) is significantly low.

Research Question Three: What are the challenges affecting the adoption and effective use of electronic resources by nurses in South-South, Nigeria?

Table - 4: Challenges Affecting the Adoption and Effective Use of Electronic Resources

Challenges	Strongly Agree	Agree	Disagree	Strongly Disagree	$\bar{x}$
Limited access to necessary ICT infrastructure (e.g., computers, internet)	256	240	22	14	3.39
Insufficient training on the use of electronic resources	224	265	25	18	3.31
Resistance to change from traditional methods to electronic systems	301	193	30	8	3.48
Concerns about data privacy and security	328	162	19	23	3.49
High cost of implementation and maintenance of electronic systems	310	180	31	11	3.48
Unreliable power supply affecting the use of electronic resources	322	182	14	14	3.53
Lack of technical support for troubleshooting ICT issues	349	148	22	13	3.57
Time constraints in learning and integrating new technologies	324	177	22	9	3.53
Incompatibility of electronic systems with existing workflows	276	209	37	13	3.42
Limited availability of relevant electronic resources tailored to nursing practice	297	193	23	19	3.44
Aggregate Mean					3.46
Criterion Mean					2.50

Table 4 shows that the aggregate mean of 3.46 is more than the criterion mean of 2.50, indicating that nurses in the research region experience significant barriers to adopting and efficiently using electronic resources. The survey found that main challenges include a lack of technical support for addressing ICT issues ($\bar{x}$ = 3.57), unstable power supply ($\bar{x}$ = 3.53), and time limits in learning and integrating new technologies ($\bar{x}$ = 3.53). Adoption is hindered by worries about data privacy and security ($\bar{x}$ = 3.49), high implementation and maintenance expenses ($\bar{x}$ = 3.48), and aversion to change from old techniques. Other hurdles include incompatibility of electronic systems with existing workflows ($\bar{x}$ = 3.42), limited availability of essential electronic resources ($\bar{x}$ = 3.44), inadequate training ($\bar{x}$ = 3.31), and limited access to ICT infrastructure ($\bar{x}$ = 3.39).

7. Discussion & Findings

Extent of ICT Proficiency among Practicing Nurses

The findings show a poor level of ICT competency among practicing nurses in this location, indicating considerable gaps in their ability to successfully use digital tools in healthcare.

Many respondents lacked proficiency in critical ICT skills such as basic computer operations, word processing, spreadsheet management, and presentation software. Additionally, flaws were discovered in internet surfing, email communication, electronic medical records (EMRs), data entry, telemedicine platforms, and mobile health applications. This lack of ICT competencies can have a negative influence on patient care, documentation, and remote consultations, lowering the quality, speed, and accuracy of healthcare delivery. Research supports this result, indicating that practicing nurses in Nigeria have a generally poor level of ICT competency, which may impede the delivery of appropriate healthcare. Olajubu et al. (2014) discovered that 55.4% of nurses at various healthcare settings had only fair knowledge of nursing informatics, with 55% citing poor computer access as a key barrier. Similarly, Aleke et al. (2023) discovered that nurses at the Federal Teaching Hospital Abakaliki had an average level of ICT knowledge (44.1%) and a negative attitude toward ICT adoption.

Extent of Electronic Resource Utilization by Nurses

The findings also show a low level of electronic resource consumption among nurses in these six states. While certain electronic resources, such as electronic health records (EHRs), e-learning platforms, and online medication reference guides, are used in some capacity, others, such as clinical decision support systems, telemedicine services, and hospital intranet tools, are substantially underutilized. This low level of acceptance emphasizes the need for increased access, training, and infrastructure support to improve the effective use of electronic resources in healthcare service delivery. Several researches have confirmed this tendency in Nigeria. Agbedia (2012) discovered that information technology was mostly used for administrative tasks, such as scheduling and leave management, rather than for direct patient care. Clinical ICT utilization was significantly low, ranging from 20% to 35%, with the majority occurring in critical care, operating rooms, and obstetrics units. Furthermore, just 30% of nurses claimed awareness of common ICT apps, and only 14% used them in their practice. Similarly, Ayamolowo, Irinoye, and Olaniyan (2023) discovered that, despite the availability of EHR software (62.8%), internet (84.2%), and desktop computers (76.3%) in an Ilishan faith-based teaching hospital, only 27.3% of nurses actively used EHRs. Inadequate training, with 86.9% of nurses lacking EHR-related training, and the lack of institutional regulations requiring EHR use were both contributing problems.

Challenges Affecting the Adoption and Effective Use of Electronic Resources

Key barriers include limited access to ICT infrastructure, inadequate training, resistance to change, concerns about data privacy and security, high implementation and maintenance costs, unreliable power supply, a lack of technical support, time constraints, system incompatibility with existing workflows, and a scarcity of relevant electronic resources. Nurses in Nigeria's South-South states encounter issues that are consistent with findings from research conducted throughout the country. Babatope et al. (2024) found budgetary restrictions (mean 2.63, SD 0.486) and a lack of ICT resources (mean 2.62, SD 0.516) as major barriers to EHR adoption in Nigerian healthcare facilities. Similarly, Onyia (2016) found that nurses in Ekpoma faced substantial problems such as frequent power outages, high fees for information resources, inadequate search skills, and costly internet access. These factors, taken together, impede the successful use of electronic resources for patient care, emphasizing the importance of systemic modifications to enable the adoption of digital technologies in healthcare settings.

Practical Implications of the Study

This study provides critical insights into the level of ICT proficiency and the utilization of electronic resources by nurses in South-South Nigeria. The findings carry significant practical implications for healthcare delivery, nursing education, hospital management, and digital policy development.

1. **Curriculum Reform and Professional Training**: The results reveal significant gaps in nurses' ICT skills, highlighting the need for integrating comprehensive digital literacy modules into nursing school curricula and continuous professional development programs. Nursing councils and institutions can use these findings to mandate hands-on ICT workshops and e-health training sessions to equip nurses with practical skills in EHRs, telemedicine, and data management.
2. **Infrastructure Enhancement and Resource Provision**: With nurses reporting poor access to ICT tools and digital platforms, government bodies, hospital administrators, and donor agencies should prioritize infrastructural upgrades. This includes ensuring consistent power supply, internet access, and availability of devices such as computers and tablets in health centers.
3. **Policy Development and Digital Integration**: Policymakers can leverage these findings to formulate enforceable ICT usage policies in healthcare institutions. Standard protocols for the adoption of electronic health systems, privacy protection guidelines, and monitoring of ICT engagement by health professionals can improve consistency and effectiveness in digital healthcare delivery.
4. **Technical Support and Change Management**: Since resistance to change and lack of support are major barriers, hospitals should establish dedicated ICT support units to assist nurses in troubleshooting technical challenges. Leadership should also foster a positive digital culture that promotes acceptance of innovation through incentive structures and participatory planning.
5. **Collaborative Innovation for Patient-Centered Care**: The study underscores the potential of electronic resources to enhance patient care, yet usage remains low. Collaborations between ICT firms, health ministries, and academic institutions can help develop tailored digital solutions for nurses, such as simplified clinical decision-support tools, mobile monitoring apps, and localized medical databases to improve efficiency and health outcomes.

8. Conclusion

The study found a worrying disparity in ICT skill and electronic resource utilization among practicing nurses in South-South Nigeria. The findings show that nurses lack critical digital skills, which limits their capacity to use technology to improve healthcare delivery. Their lack of skill in basic computer operations, internet use, electronic medical records, and telemedicine platforms indicates an urgent need for improved ICT training programs. Furthermore, the underutilization of electronic resources such as clinical decision support systems and telehealth services reveals structural impediments such as insufficient infrastructure, inadequate training, and aversion to change. The highlighted challenges—such as inconsistent power supply, high costs, data privacy issues, and a lack of technical support—present substantial barriers to digital healthcare implementation. Addressing these difficulties necessitates a multifaceted approach that includes government and institutional

investments in ICT infrastructure, ongoing professional development programs for nurses, and legislative changes to promote e-health integration.

9. Recommendations

Based on the findings of the study, the following recommendations are offered to promote ICT competency and electronic resource use among practicing nurses in Delta State and the larger South-South region of Nigeria:

- ❖ To improve nurses' proficiency in electronic health records, telemedicine, and data management, nursing schools and hospitals should require required digital literacy training, such as hands-on workshops and e-learning platforms.
- ❖ To maximize electronic resource use, governments and healthcare institutions should invest in reliable ICT infrastructure such as computers, internet connectivity, and alternative power options, as well as subsidize gadgets such as tablets.
- ❖ Collaboration among governments, IT corporations, healthcare institutions, and NGOs can boost funding, training, and infrastructure, leading to long-term advances in digital healthcare integration.

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