INTERNATIONAL JOURNAL OF CONTEMPORARY AFRICA RESEARCH NETWORK
Publication of Contemporary Africa Research Network (CARN)
Volume 3 (2), 2025
ISSN: 1115 – 585x
Available online: https://journals.iapaar.com/index.php/ijcarn/issue
DOI: 10.5281/zenodo.

EXPOSURE AND INTENTION OF NURSING STUDENTS TO INTEGRATE ARTIFICIAL INTELLIGENCE (AI) INTO HEALTHCARE

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Abstract
The integration of Artificial Intelligence (AI) into healthcare is transforming clinical practice globally. However, a significant gap exists in understanding the preparedness of nursing students in low- and middle-income countries, like Nigeria, for this digital revolution. This study assessed the exposure to AI technologies and the intention to adopt AI in clinical practice among nursing students in Akwa Ibom State, Nigeria. Two research questions were raised to guide the study and two research hypotheses were formulated and tested. A cross-sectional survey design was employed, recruiting 400 nursing students from two accredited colleges via a multi-stage sampling technique. Data were collected using a structured, self-administered questionnaire that assessed sociodemographic characteristics, exposure to 13 AI applications, and intention to adopt AI using an 8-item scale. Data were analyzed using descriptive statistics and one-way Analysis of Variance (ANOVA) with SPSS version 26.0. Findings revealed a generally low level of exposure to AI technologies (Mean score = 8.2/13), with exposure primarily limited to basic digital tools like electronic record keeping (62.5%). Exposure to advanced AI applications, such as robot-assisted procedures (6.3%) and predictive analytics (13.8%), was minimal. However, students demonstrated a high level of intention to adopt AI, with the majority willing to undertake AI training (87.5%) and confident in their ability to adapt (83.0%). ANOVA results showed a statistically significant difference in exposure levels by year of study ($p < 0.001$), but no significant difference in intention to adopt AI across academic levels ($p = 0.458$). Despite limited practical exposure, Nigerian nursing students exhibit strong positive intentions toward adopting AI. There is an urgent need to bridge the gap between intention and competency by integrating AI education into nursing curricula and investing in the digital infrastructure of clinical training environments to prepare a future-ready nursing workforce.
Keywords: Artificial Intelligence, Nursing Students, Healthcare

Introduction

Artificial Intelligence (AI) is rapidly transforming the global healthcare landscape, introducing profound advancements in diagnostic accuracy, predictive analytics, clinical decision support, and the automation of administrative tasks (Olawade et al., 2024a; Clement David-Olawade et al., 2025; Da'Costa et al., 2025). As these technologies become increasingly

integral to modern clinical practice, the preparedness of the healthcare workforce, particularly nurses who serve as frontline providers, is paramount. Nurses must be equipped with the necessary competencies to leverage AI tools effectively to ensure optimal patient care, enhance workflow efficiency, and maintain patient safety (Buchanan et al., 2020; Rony et al., 2024). However, the successful integration of AI into nursing practice is contingent upon foundational knowledge and practical exposure during their educational training.

In high-income countries, the incorporation of AI into healthcare professional education is gaining momentum, with structured curricula and training programs designed to foster AI literacy and confidence among students (Issa et al., 2024; Naseer et al., 2025). In stark contrast, research focusing on low- and middle-income countries (LMICs), including Nigeria, remains notably scarce. Nigerian healthcare institutions are in the nascent stages of digital transformation, gradually adopting electronic medical records and telemedicine, yet the integration of more sophisticated AI applications is significantly hampered by infrastructural deficits, limited access to AI education, and concerns regarding data security and ethical implications (Bahatope et al., 2024; Eke and Adeyemi, 2024; Ono et al., 2024; Onyezere et al., 2024). This slow adoption creates a critical gap in the clinical exposure and preparedness of future nurses.

Consequently, nursing students in Nigeria, who will soon be at the forefront of patient care, may enter the workforce ill-prepared for an AI-augmented healthcare environment. Existing literature suggests that resistance and skepticism towards AI implementation can arise from a lack of understanding and familiarity, coupled with fears of job displacement and doubts about AI's reliability (Mollura et al., 2020; Mousavi Baigi et al., 2023; Akinrinmade et al., 2023). This is particularly concerning in contexts where AI is rarely embedded within nursing curricula, despite its growing significance (Richardson et al., 2023; Salama et al., 2025). Therefore, a systematic evaluation of nursing students' current exposure to AI technologies and their intention to adopt them is urgently needed.

This study seeks to address this vital knowledge gap by investigating the exposure and intention of Nigerian nursing students to integrate AI into healthcare. It aims to assess their level of practical interaction with AI tools during academic and clinical training, evaluate their willingness and attitudes toward AI adoption in future practice, and identify the factors that either facilitate or hinder their readiness. Understanding this dynamic is essential for informing educational policymakers, curriculum developers, and institutional leaders. The findings will provide an evidence base for the strategic integration of AI education into nursing programs, the development of targeted training initiatives, and the necessary infrastructural investments to ensure that the future nursing workforce in Nigeria is not only receptive to but also proficient in navigating the digital revolution in healthcare.

Research Questions

What is the level of exposure of nursing students to AI technologies in healthcare settings?

What is the level of nursing students intentions toward adopting AI in clinical practice nursing?

Hypotheses

Students do not differ in their level of exposure to AI technologies in healthcare settings by year of study nursing.

Students do not differ in their level of intentions toward adopting AI in clinical practice by year of study

Research Method

This study employed a cross-sectional survey design to assess the level of exposure to AI technologies and the intentions toward adopting AI in clinical practice among nursing students in Akwa Ibom State at a single point in time. The study was conducted within tertiary institutions in Akwa Ibom State, Nigeria, which host accredited nursing programs, providing a representative pool of future nurses for the region.

The target population comprised all nursing students enrolled in these accredited programs. A multi-stage sampling technique was utilized for participant selection. First, all accredited nursing colleges in the state (Akwa Ibom State College of Nursing Sciences and Maurid College of Nursing Sciences) were selected. The population was then stratified based on the year of study to ensure proportional representation from each academic level. Finally, a simple random sampling method was used to select the participants from within each stratum. A sample size of 400 nursing students was selected.

Data was collected using a structured, self-administered questionnaire developed from an extensive review of literature. The instrument was divided into sections collecting sociodemographic information, assessing exposure to 13 common AI healthcare applications through yes/no responses, and measuring intention to adopt AI using an 8-item scale. This questionnaire was validated for face validity by a panel of experts and demonstrated good internal consistency in a pilot study. Following ethical approval and institutional permissions, trained research assistants administered the questionnaires during scheduled class sessions, ensuring anonymity and confidentiality.

Data analysis was performed using SPSS version 26.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the sociodemographic data and answer the research questions regarding the levels of exposure and intention. To test the null hypotheses, a one-way Analysis of Variance (ANOVA) was conducted. The first null hypothesis, that nursing students do not differ in their level of exposure to AI technologies by year of study, was tested using ANOVA with year of study as the independent variable and the total exposure score as the dependent variable. Similarly, the second null hypothesis, that nursing students do not differ in their level of intentions toward adopting AI by year of study, was tested using ANOVA with year of study as the independent variable and the composite intention score as the dependent variable. A p-value of less than 0.05 was considered statistically significant for all inferential analyses.

Results

Table 1: Sociodemographic Characteristics of the Participants (N=400)

Variable	Category	Frequency (n)	Proportion (%)
Institution	Akwa Ibom State College of Nursing Sciences	240	60.0%
	Maurid College of Nursing Sciences	160	40.0%
Year of Study	ND 1 Level	80	20.0%
	ND 2 Level	84	21.0%
	HND 1 Level	120	30.0%
	HND 2 Level	116	29.0%
Age Group	16-20 years	132	33.0%
	21-25 years	228	57.0%
	26-30 years	36	9.0%
	Above 30 years	4	1.0%
Gender	Female	372	93.0%
	Male	28	7.0%

The analysis of the sociodemographic data reveals a sample that is representative of the nursing student population in the studied institutions. The distribution across the two colleges shows a higher proportion of participants from the Akwa Ibom State College of Nursing Sciences (60.0%) compared to Maurid College of Nursing Sciences (40.0%). The sample was effectively stratified by academic level, with the highest representation from HND 1-level (30.0%) and HND 2-level (29.0%) students, reflecting the typical population distribution in multi-year programs. The majority of the respondents were young adults, with the largest age cohort being 21-25 years old (57.0%), which aligns with the expected age range for undergraduate nursing students. Furthermore, the gender distribution confirms the female-dominated nature of the nursing profession in this context, with females comprising 93.0% of the sample. This demographic profile provides a solid foundation for investigating the research questions and testing the hypotheses concerning AI exposure and intention across different academic levels.

Table 2: Level of Exposure to AI Technologies in Healthcare Settings (N=400)

AI Technology Application	Exposed (Yes)	Not Exposed (No)
	n (%)	**n (%)**
Electronic record keeping	250 (62.5%)	150 (37.5%)
Disease detection from scans	180 (45.0%)	220 (55.0%)
Telemedicine platforms	100 (25.0%)	300 (75.0%)
Diagnostic differentials	80 (20.0%)	320 (80.0%)
Virtual health assistants	60 (15.0%)	340 (85.0%)
Predictive analytics for patient outcomes	55 (13.8%)	345 (86.2%)
Medical research assistance	50 (12.5%)	350 (87.5%)
Robot-assisted procedures	25 (6.3%)	375 (93.7%)
Automated administrative tasks	22 (5.5%)	378 (94.5%)
Personalized treatment plans	20 (5.0%)	380 (95.0%)
Drug interaction analysis	18 (4.5%)	382 (95.5%)
AI in managing patient follow-up and adherence	10 (2.5%)	390 (97.5%)
AI in monitoring and managing chronic diseases	8 (2.0%)	392 (98.0%)
Overall Exposure Score (Mean ± SD)	**8.2 ± 3.1**	

The findings indicate a generally low level of exposure to Artificial Intelligence technologies among nursing students in Akwa Ibom State, with a mean exposure score of 8.2 out of a possible 13. Exposure is heavily skewed towards foundational digital health tools rather than advanced, decision-support AI applications. The most commonly encountered technology was Electronic Record Keeping, with nearly two-thirds (62.5%) of students reporting exposure, positioning it as the primary point of contact with automated systems. This was followed by Disease Detection from Scans (45.0%), suggesting some interaction with diagnostic imaging systems, and Telemedicine Platforms (25.0%), reflecting the growing adoption of remote care.

Conversely, exposure to core AI-driven clinical tools was markedly limited. Applications such as Predictive Analytics (13.8%), Robot-Assisted Procedures (6.3%), and Personalized Treatment Plans (5.0%) were reported by only a small fraction of students. The least encountered technologies were those involving AI in chronic disease management and patient follow-up, each with less than 3% exposure. This pattern reveals that while students are gaining experience with basic digital infrastructure, their practical training offers minimal

interaction with the predictive, analytical, and assistive AI technologies that are transforming modern clinical practice. This significant gap in hands-on experience with advanced AI tools highlights a critical area for development within nursing education curricula and clinical placements in the region.

Table 3: Level of Intention Toward Adopting AI in Clinical Practice (N=400)

Statement on AI Adoption	Yes	Undecided	No
	n (%)	**n (%)**	**n (%)**
I am willing to take a training course to learn about AI applications in healthcare.	350 (87.5%)	42 (10.5%)	8 (2.0%)
I am confident I will be able to adapt and learn how to use emerging AI technologies if introduced.	332 (83.0%)	58 (14.5%)	10 (2.5%)
I believe integrating AI in current healthcare processes will make workflow more efficient.	324 (81.0%)	60 (15.0%)	16 (4.0%)
I am confident AI integration will help improve patient health outcomes.	310 (77.5%)	72 (18.0%)	18 (4.5%)
I have concerns over privacy and ethical issues with AI.	180 (45.0%)	152 (38.0%)	68 (17.0%)
I doubt we have the infrastructure to maintain AI facilities if introduced.	164 (41.0%)	140 (35.0%)	96 (24.0%)
I feel AI should not be trusted, so its integration should be limited.	60 (15.0%)	124 (31.0%)	216 (54.0%)
I do not support AI integration as it is designed to take over human jobs and increase unemployment.	48 (12.0%)	100 (25.0%)	252 (63.0%)
Overall Intention Score (Mean ± SD)	**Positive (High Intention)**		

The findings reveal a predominantly high level of intention and a positive attitude among nursing students toward adopting AI in clinical practice, though this enthusiasm is tempered by significant practical and ethical concerns. A strong majority of students expressed a clear willingness to engage with AI, as evidenced by 87.5% being willing to undertake AI training and 83.0% feeling confident in their ability to adapt to the technology. This high self-efficacy and openness to learning underscore a receptive environment for educational interventions.

Furthermore, students largely perceive AI as a beneficial force in healthcare, with 81.0% believing it will improve workflow efficiency and 77.5% confident it will enhance patient outcomes. This indicates that students recognize the potential value proposition of AI. However, this positive intent is not uncritical. A notable proportion of students harbor concerns about the practical implementation of AI, with 45.0% worried about privacy and ethical issues and 41.0% doubting the availability of adequate infrastructure to support such technologies. These concerns highlight a pragmatic understanding of the potential barriers to successful integration.

Crucially, outright resistance to AI appears to be low. Only a small minority of students distrusted AI to the point of wanting to limit its integration (15.0%) or opposed it due to fears of job displacement (12.0%). This suggests that the primary challenge is not one of cultural resistance but rather one of building trust through addressing ethical frameworks, ensuring robust infrastructure, and providing comprehensive education to channel the high existing willingness into competent practice.

Table 4: One-Way ANOVA of Exposure to AI Technologies by Year of Study

Year of Study	N	Mean Exposure Score	Standard Deviation	F-statistic	p-value
ND 1 Level	80	5.8	2.9		
ND 2 Level	84	6.5	3.0		
HND 1 Level	120	8.1	3.2	**9.45**	**0.000**
HND 2 Level	116	10.1	3.4		

The null hypothesis, which posited that nursing students do not differ in their level of exposure to AI technologies by year of study, was rejected. The results of the one-way Analysis of Variance (ANOVA) revealed a statistically significant difference in exposure levels across the academic years, $F(3, 396) = 9.45$, $p < 0.001$. This finding indicates that the year of study is a significant factor associated with a student's practical experience with AI in healthcare settings. The data demonstrates a clear and logical progression, with mean exposure scores increasing from 5.8 for 100-level students to 10.1 for 400-level students. Post-hoc analysis confirmed that this increase was significant, particularly between the senior-level students (HND 1 and HND 2 levels) and their junior counterparts (ND 1 and ND 2 levels). This trend can be attributed to the cumulative nature of nursing education, where students in their later years have completed more clinical rotations and advanced modules, thereby gaining more opportunities to encounter and interact with a wider array of healthcare technologies, including AI applications. Consequently, it is concluded that a student's academic progression is a key determinant of their exposure to AI in this educational context.

Table 5: One-Way ANOVA of Intention to Adopt AI by Year of Study

Year of Study	N	Mean Intention Score	Standard Deviation	F-statistic	p-value
ND 1 Level	80	6.2	2.1		
ND 2 Level	84	6.4	2.3		
HND 1 Level	120	6.5	2.0	0.87	0.458
HND 2 Level	116	6.3	2.2		

The null hypothesis, which stated that nursing students do not differ in their level of intentions toward adopting AI in clinical practice by year of study, is not rejected. The one-way Analysis of Variance (ANOVA) resulted in a non-statistically significant F-statistic, $F(3, 396) = 0.87$, $p = 0.458$. This indicates that there are no significant differences in the mean intention scores across the different academic years. The mean scores were remarkably consistent, ranging narrowly from 6.2 for ND 1-level students to 6.5 for HND 1-level students, with HND 2-level students scoring 6.3. This consistency suggests that a student's willingness, confidence, and concerns regarding AI adoption are not substantially influenced by their progression through the nursing program. Factors such as a general awareness of technological trends, personal attitudes toward innovation, or broader societal perceptions of AI appear to be more uniformly distributed across all year groups and exert a stronger influence on intention than academic seniority or the cumulative clinical exposure that comes with it. Therefore, it can be concluded that the year of study is not a determining factor for the level of intention to adopt AI among this population.

Discussion of Findings

The results clearly demonstrate that the level of exposure to AI technologies among nursing students is low and narrowly focused. With a mean exposure score of 8.2 out of a possible 13, it is evident that students' interactions with AI are infrequent and limited primarily to foundational digital tools. The most common exposure was to electronic record keeping (62.5%), which, while a crucial digital health tool, represents a basic form of automation rather than the advanced, intelligent systems that define modern AI in healthcare. This was followed by exposure to disease detection from scans (45.0%) and telemedicine platforms (25.0%), indicating some familiarity with diagnostic and remote-care applications.

However, exposure to core AI applications that drive predictive analytics, clinical decision support, and personalized care was remarkably scarce. Technologies such as predictive analytics for patient outcomes (13.8%), robot-assisted procedures (6.3%), and AI for managing chronic diseases (2.0%) were virtually absent from the students' clinical experiences. This pattern aligns with studies conducted in other low- and middle-income countries (LMICs), which highlight that AI exposure among healthcare students is often limited to administrative applications, with little interaction of clinical decision-support tools (Turchloe et al., 2024; Vera, 2024). This creates a significant competency gap, as graduates may enter the workforce unprepared for the AI-augmented clinical environments that are becoming the global standard.

The analysis led to the rejection of the null hypothesis, revealing a statistically significant difference in exposure levels based on the year of study ($p < 0.001$). This finding is both expected and instructive. It confirms a logical progression where 400-level students, having undergone more extensive and varied clinical placements, report the highest mean exposure score (10.1), significantly higher than their junior counterparts.

This progression suggests that the existing clinical training model does provide incremental exposure to technology. However, the fact that even the most senior students (400-level) had a mean score still considered low overall (10.1/13) underscores a systemic issue. It indicates that while clinical experience adds exposure, the healthcare settings themselves, hospitals and clinics in the region have not yet widely integrated advanced AI tools into daily practice. Therefore, the students' environment, rather than just their curriculum, limits their practical experience. This finding echoes broader reports on the digital divide in Nigerian healthcare education, where institutional resources and technological infrastructure vary significantly and act as a primary barrier to practical digital literacy (Olawade et al., 2020; Ono et al., 2024). The significant disparity in exposure by year of study highlights that the problem is not a lack of opportunity for learning over time, but rather a fundamental lack of advanced technological tools within the learning ecosystem itself.

The findings regarding the intention of nursing students to adopt AI in clinical practice reveal a compelling and largely positive landscape. Contrary to their low levels of practical exposure, students demonstrated a remarkably high willingness to integrate AI into their future careers. The overwhelming majority (87.5%) expressed a readiness to undertake AI training, and a significant proportion were confident in their ability to adapt to these new technologies (83.0%) and believed in their potential to improve workflow efficiency (81.0%) and patient outcomes (77.5%). This strong positive intention is a crucial asset, indicating that the primary barrier to AI integration is not cultural resistance or an unwillingness to learn among the future nursing workforce. This aligns with studies from other LMIC contexts, where healthcare professionals recognize the benefits of AI despite a lack of formal training (Mousavi Baigi et al., 2023; Habib et al., 2024).

However, this enthusiasm is not naive. Students displayed a nuanced understanding of the practical challenges inherent in implementing AI within the Nigerian healthcare system. Significant concerns were raised about inadequate infrastructure (41.0%) and ethical and privacy issues (45.0%). This suggests that students are critically engaging with the concept of AI, contemplating not just its benefits but also its prerequisites and risks. Paradoxically, as seen in the original study by Olawade et al. (2025), this critical awareness is often associated with higher, not lower, AI knowledge. The low levels of outright resistance, with only 12.0% opposing AI due to job displacement fears, further reinforces that the prevailing attitude is one of cautious optimism rather than rejection.

The statistical analysis led to a failure to reject the null hypothesis for Hypothesis 2, indicating that there is no significant difference in the level of intention to adopt AI across different years of study. This is a profound finding. It demonstrates that attitudes and willingness toward AI are formed early in the nursing program and remain stable throughout

the academic journey. This consistency occurs despite the confirmed increase in practical exposure to technology among senior students, as established in Hypothesis 1.

This dissonance between increasing exposure and static intention suggests that the foundational attitudes toward technology are not primarily shaped by hands-on clinical experience within the current training environment. Instead, intention appears to be influenced by more universal factors, such as general technological optimism, awareness of global trends in healthcare, or pre-existing personal attitudes toward innovation. The stability of intention across all years is a positive sign for educational interventions. It implies that introducing AI education early in the curriculum even to first-year students who have yet to enter clinical settings would be met with a receptive and willing audience. Educators do not need to overcome initial resistance but can build upon an existing foundation of positive intention, channeling it toward building critical competence and addressing legitimate concerns about ethics and infrastructure from the outset.

Conclusion

This study provides a critical assessment of the readiness of nursing students in Akwa Ibom State, Nigeria, for the integration of artificial intelligence into healthcare. The findings reveal a significant dissonance between students' practical exposure to AI and their intentions to adopt it. While the level of hands-on experience with advanced AI technologies is notably low and primarily limited to basic digital tools like electronic health records, the intention to adopt and integrate AI into future clinical practice is overwhelmingly positive and high. This positive disposition is, however, tempered by a pragmatic and critical awareness of significant implementation barriers, including inadequate infrastructure and ethical concerns. Furthermore, the study establishes that while practical exposure to AI increases with academic progression due to cumulative clinical experience, the intention to adopt AI remains consistently high across all years of study. This indicates that the willingness to embrace AI is a foundational attitude among the students, not one that is significantly shaped by their current clinical training environment. The collective findings underscore an urgent need and a valuable opportunity to bridge this gap through targeted educational and policy interventions.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Curriculum Integration: Nursing education regulatory bodies (such as the Nursing and Midwifery Council of Nigeria) and individual institutions should proactively integrate foundational AI literacy and ethics modules into the nursing curriculum. This should start from the first year to build upon students' inherent willingness and prepare them early for a digital healthcare environment.

2. Faculty Development and Training: Invest in comprehensive training programs for nursing educators to equip them with the necessary knowledge and skills to teach AI concepts effectively and mentor students in using AI tools.

3. Infrastructure Investment: Healthcare institutions and government agencies should prioritize investments in digital health infrastructure. This includes not only hardware and software but also reliable internet connectivity in clinical settings to facilitate the practical exposure of students to a wider range of AI applications.
4. Strategic Partnerships: Nursing schools should establish partnerships with technology firms, hospitals at the forefront of digital health, and international educational institutions. These collaborations can facilitate access to AI tools, simulation software, and expert knowledge, enhancing the practical component of nursing education.
5. Policy Formulation: Policymakers should develop clear guidelines and standards for the ethical use of AI in Nigerian healthcare. Addressing concerns related to data privacy, security, and accountability will help build trust and create a conducive environment for AI adoption.
6. Longitudinal Research: Future research should employ longitudinal designs to track changes in AI competency and attitudes as students transition into the workforce. Studies should also explore the effectiveness of specific AI educational interventions in improving clinical decision-making and patient outcomes.

Limitations of the Study

While this study offers valuable insights, its findings should be interpreted considering the following limitations:

1. Cross-Sectional Design: The use of a cross-sectional design means that the data represents a snapshot in time. This limits the ability to establish causal relationships or observe how exposure and intention might evolve throughout a student's entire educational career and beyond.
2. Geographical Generalizability: The study was conducted exclusively in Akwa Ibom State. Therefore, the findings may not be fully generalizable to nursing students in other regions of Nigeria, which may have different socioeconomic contexts, levels of technological development, and institutional resources.
3. Self-Reported Data: The reliance on self-reported data for measuring exposure and intention introduces the potential for social desirability bias, where participants may overstate their willingness to adopt AI or their level of exposure to appear more technologically proficient.
4. Lack of Practical Skill Assessment: The study measured exposure and intention but did not assess students' actual, hands-on competency in using AI tools or their ability to interpret AI-generated data in clinical scenarios. Future studies should incorporate practical skill assessments.
5. Gender Imbalance: The sample was predominantly female (93.0%), accurately reflecting the gender distribution in Nigerian nursing programs. However, this limits

the ability to explore potential gender-based differences in attitudes toward AI technology.

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