



## Nigerian Nursing Students' Readiness to Use Electronic Health Records in Clinical Practice

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<sup>2</sup> This paper is based on a study completed in 2019 by Kazeem Aisha Titilope, who at the time was as an undergraduate nursing student @ the Department of Nursing , University of Ibadan, Oyo State. Nigeria. It was done in partial fulfilment of the required examination to obtain a registered nurse certificate for the Nursing and Midwifery Council of Nigeria examination.

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### Abstract

Most hospitals in Nigeria still rely on paper-based medical records. This aspect has created a lot of challenges to the documentation in the health care system in the country. The purpose of this descriptive cross-sectional study conducted in 2019 was to assess Nursing Students' readiness to use electronic health records in clinical practice. A systematic sampling technique was used to recruit a total of 189 nursing students from two schools of nursing in Ibadan, Oyo State Metropolis in Nigeria; 63 from each year of the three year program. Data collection involved a self-constructed questionnaire comprised of four sections. Data analysis, which involved SPSS, version 21.0, included frequency counts and percentages. The findings of the study included the following: less than half of the respondents (49%), mostly female (78%) were within the age range 16-20; a significant number of respondents (86.2%) were ready to utilize electronic health records in clinical practice; the perceived barriers to electronic health records use were computer illiteracy, lack of training, unstable power supply, and cost of maintenance and implementation (64.0%; 56.6%; 64.0% 56.1%) respectively. In conclusion, the study highlighted nursing

students' readiness to use electronic health records and the substantial impediments to doing so. Therefore, it is recommended that all relevant stakeholders must work together to reduce the obstacles that could prevent the deployment of electronic health records in clinical nursing practice.

**Keywords:** Systematic sampling technique, self-constructed questionnaire, Electronic Health Records

## Background

The use of information and communication technology (ICT) in healthcare is known as electronic health (eHealth). Enhancing information flow through electronic channels will improve the provision of healthcare services and the administration of health systems. 2019 (World Health Organization, 2019). Electronic health includes both indirect services provided by healthcare organizations, professionals, and patients themselves as well as informative, instructional, and commercial content (WHO, 2019). Simply said, e-health improves access to and management of data for patients and professionals, increasing the effectiveness of healthcare. (Bello, Faruk, Oloyede & Popoola, 2016). However, this paper focuses on electronic health records, a subset of eHealth.

Electronic health records (EHR), as defined by Campanella et al. (2017), are a structured electronic repository for patient data, including medical history, pharmaceutical orders, vital signs, laboratory findings, radiological reports, and doctor and nurse comments. According to the Health Information Technology for Economic and Clinical Health (HITECH) Act, the federal government of Nigeria promoted the use of EHRs (Odiawa, 2017). Following this Act, many hospitals in Nigeria tried to adopt the use of EHR as well as demonstrate its effectiveness (Odiawa, 2017).

In Nigeria, Adereti and Olaogun (2018) demonstrated the use of EHR in a tertiary teaching hospital that had a standardised nursing care plan. This study was carried out among nurses and findings show that nurses' quality of documentation was enhanced. Literature has shown that nurses are one of the biggest groups of healthcare professionals and documentation is a key aspect of nursing. Implementation of electronic health records might ease nurses' documentation of care and improve patient quality care (Campanella et al., 2017; Herbert & Connors, 2016).

Nursing programs must also provide students with the skills necessary to obtain and synthesize knowledge, use that knowledge in clinical settings, collaborate with colleagues across disciplines, use clinical information and decision support systems, and offer patients with safe care (Herbert & Connors, 2016). The aforementioned can be achieved if the nursing students can be prepared effectively and highly motivated to utilize EHR. Although many students are at ease

utilizing technology in their daily lives, it cannot be assumed that everyone will be equally knowledgeable about and at ease using EHRs (Jenkins et al, 2018).

As indicated in past reviews, electronic health records (EHRs) afford a lot of benefits that help health professionals provide better health care. For example, According to Campanella et al. (2017), these records offer precise, current, and comprehensive information about patients at every moment of care. Similar advantages have been outlined by Adereti and Olaogun (2018), including quick access to effective, coordinated, and efficient patient care related to aiding medical professionals in creating accurate nursing diagnoses and subsequent documentation of nursing interventions with legible and comprehensive documentation, cost savings from less paperwork, increased safety, and decreased duplication of test results.

The readiness for the use of EHR, however, has been found to be influenced by a variety of conditions in Sub-Saharan Africa. These include the EHR system's expensive acquisition and maintenance costs, a lack of financial incentives, inadequate electricity and internet access, and the computer proficiency of core users (Habibi-Koolae, Safdari & Bouragh, 2015). Furthermore, the authors presume that before EHR can be implemented, it is advisable to conduct a readiness need assessment among the proposed users which are the nursery of the profession (nursing students).

In Nigeria, studies abound on electronic health records knowledge and its integration (Onigbogi et al., 2018; Aloba et al., 2020). However, there are limited published works concerning nursing students' readiness to use EHR in clinical practice. Due to the above-stated piece of information, the present study assessed how prepared nursing students were to use electronic health records in clinical settings.

### **Purpose Statement**

This paper assessed the nursing student's readiness for electronic health records use in clinical practice the following questions were posed: 1) to what extent are participants ready to use electronic health records in practice? 2) what are the perceived barriers of study participants to the utilization of electronic health records in practice.

### **Methods**

#### **Study Design**

Through the gathering of quantitative data, a descriptive cross-sectional design was employed to analyze the factors mentioned in the study's objective.

#### **Study Settings**

The study was carried out in two major nursing schools in Ibadan that is School of Nursing, University College Hospital, and the Oyo State College of Nursing and Midwifery, Eleyele Ibadan.

**School of Nursing, University College Hospital**

The first nursing school in Nigeria was established in Ibadan alongside the country's first teaching hospital. The school was established as a result of the need for a nursing program to train students. As of September 2019, the total number of students under training was 155 (first year, 47; second year, 53; final year; 55).

**Eleyele's Oyo State College of Nursing and Midwifery**

This institution opened its doors in 1949 and is located in the Old Army Barracks in Eleyele, Ibadan, whereas the Oyo State School of Midwifery opened its doors in Yemetu in 1954. The Nursing School The first nursing school in Nigeria is called Eleyele, and it educates future nurses who would care for the populace in both urban and rural locations. A total of 146 students were enrolled in the nursing programme at the Eleyele School of Nursing as of September 2019 (50 in the first year, 50 in the second year, and 46 in the final year, respectively). Furthermore, the training institutions were selected because the schools train students who bagged diploma certificates after their programme. Also, the schools run a similar curriculum which is excluded of electronic health records as a course or subunit in a course.

**Sampling Technique/ Data Collection Procedure**

The target population in the study was nursing students in the two major nursing schools in Ibadan. A systematic sampling method was used to select the students that participated in the study from each level in both schools. Every 5<sup>th</sup> person in the school attendance was selected to fill out the questionnaires in each class.

A total number of 189 students were selected from the two schools. In carrying out the data collection from the participants, a brief introduction about the study and its purpose was explained to the school principals and students. Also, written consent providing information on the purpose, risks, possible benefits, and duration of the study was sought from the school principal and the students before the commencement of the study. The questionnaires were then administered to the respondents in the classroom during their lecture-free periods, the students after filling out the questionnaire returned it to the researcher. This took five minutes to complete, the researcher ensured the questionnaires were filled. Likewise, clarifications were made when necessary. They were informed of their freedom to participate or not.

**Ethical Principles**

Respect for persons, beneficence, non-maleficence, and justice following the National Health Research Ethics Committee. Confidentiality was maintained as there was no identifier attached to the survey. The study protocol was approved by the Research and Ethics Committee with approval number UI/EC/19/0312.

**Inclusion criteria**

Students of the School of Nursing, University College Hospital, Ibadan, and Oyo State College of nursing and midwifery, Eleyele who were in their first, second, and third years were included in the study.

### **Instrument for data collection**

The researchers, medical information health records officers, and a group of specialists in nursing informatics and nursing diagnostics created a self-constructed questionnaire. There are three portions to the 25-item test. Section A comprised six (6) questions that elicited information about the demographic data of participants these include Age, sex and level of training, etc. Section B comprises nine (9) questions that were used to gather information about the readiness of participants to utilize electronic health records in practice. Section C had ten (10) questions that elicited information about the perceived barriers of participants toward the utilization of electronic health records in practice.

During the pilot phase and the main study, the instrument was evaluated by statisticians and subjected to the opinions of professionals in the field of nursing informatics to determine its face and content validity. Both experts examined the test items for content accuracy. A professor of nursing, a professor of nursing informatics, and a professor of nursing diagnostics from Obafemi Awolowo University are among the two teams of specialists, together with an assistant professor of statistics from the University of Ibadan. The content of the instrument was also read several times to compare with the research objectives. This was to ensure that the items on the instrument covered the relevant content of the study. Five medical information health records officers and a statistician were given the instruments to assess and adjudge if they measure what they are expected to measure. By assessing the experts' results, the Content Validity Index (CVI) was created to reflect the degree to which the experts concur on the significance and clarity of the items.

Experts were asked to rate each item on a four-point scale for significance, consistency, simplicity, and complexity: (**A. Relevance**, 1= not relevant, 2 = item needs some revision, 3 = relevant but needs minor revision, 4 = very relevant); (**B. Clarity**, 1= not clear, 2 = item needs some revision; (C. Simplicity; 1 = not simple; 2 = item needs significant revision; 3 = simple but needs a small change; 4 = very simple); (D. Ambiguousness 1 indicates a question, 2 indicates a need for revision, and 3 indicates a certainty but a small revision (4 = message is obvious). Based on the advice of the experts, the items were changed. Items with a CVI of 0.70 to 0.5 were adjusted, while those with a CVI of less than 0.5 were discarded. Items with a CVI of 0.8 or higher were kept. The study's data gathering yielded a Cronbach alpha of 0.76.

### **Data Analysis**

The Statistical Package for Social Sciences (SPSS) version 21.0 was used to easily code, clean, and analyse the obtained data. While other data were presented using frequencies and percentages, factor analysis was utilised to determine the preparedness level. All information was only accessible to the researcher. A week was spent gathering the data.

**Objective 1** of the instrument is developed to measure the level of readiness of study participants toward the utilization of electronic health records in practice. There were 9 items with 'Yes' or 'No' options. Factor analysis was done to ascertain the level of readiness of the respondents.

**Objective 2** of the instrument is developed to the perceived barriers of study participants to the utilization of electronic health records in practice. The section contains 10 items on varying

points. Factor analysis was carried out to ascertain the level of readiness of the respondents. The results were presented in frequency tables.

## Results

### Socio-Demographic characteristics

According to table 1, the greatest proportions of the participants (92%), from both schools were between the ages 16-20 years and the participants were mostly female, 78%. Both schools under study had an equal number of participants across the level of training 33.3%.

**Table 1: Showing the Frequency distribution of the Socio-Demographic Characteristics of Participants N=189**

Variables	n(%)
Name of school	
School of nursing, University College Hospital	97(51.3)
School of Nursing, Eleyele	92(48.7)
Age	
16-20	92(49)
21-25	84(44)
26-30	12(6)
31-35	1(1)
Sex	
Male	41(22)
Female	148(78)
Level of training	
1 <sup>st</sup> -year	63(33.3)
2 <sup>nd</sup> year	63(33.3)
3rd year	63(33.3)

### Readiness to Utilize Electronic Health Records in Practice

Table 2 revealed that a larger proportion of the respondents, 87.8% claimed that they have undergone computer training while 86.2% stated that with adequate knowledge of the use of EHR, they will be willing to utilize it in practice. Sixty-seven percent (67%) claim to have computers in their school to enhance training on EHR. Also, the majority (76.7%) affirmed that they do not prefer paper-based records to electronic health records and a larger percentage (82.0%) said they look forward to EHR use.

**Table 2: Showing the percentage distribution of Participants' Readiness to Use Electronic Health Records in Practice. N= 189**

Questions	Responses	
	Yes f (%)	No f (%)
Do you have any form of computer training?	166(87.8)	23(12.2)
Are computers available in your school of study to facilitate learning about electronic health records?	126(66.7)	63(33.3)
Are there electronic boards and projectors in your school to facilitate electronic health records use readiness?	151(79.9)	38(20.1)
I prefer electronic boards to the conventional chalkboards	150(79.4)	39(20.6)
I believe electronic health records are easy to use	144(76.2)	45(23.8)
I am ready to use electronic health records because they are better than paper-based records	150(79.4)	39(20.6)
I'm willing to use electronic health records in practise if I have the necessary knowledge and skills.	163(86.2)	26(13.8)
I will prefer paper-based records to electronic health records even when EHR is available.	44(23.3)	145(76.7)
I am looking forward to using EHR	155(82.0)	34(18.0)

### **Perceived Barriers to Utilization of Electronic Health Records in Practice**

According to Table 4, more than half of the participants, or 64%, think that a lack of computer knowledge and an unpredictable power source are the biggest obstacles to the adoption of EHR. Additionally, more than half of the participants (56.6%) think that the use of EHR is hindered by a lack of training and expensive maintenance and implementation expenses (56.1%). More than a quarter (42.3%) agreed that EHR is susceptible to technical issues, and lack of continuous training and support from the information communication technology staff 48.7% and 46.6% affirmed that resistance and opposition to change from paper-based records to EHR is a barrier.

**Table 3: Showing distribution of participants' responses as regards Perceived Barriers to Utilization of Electronic Health Records in Practice N=189**

Items	Strongly disagree f (%)	Disagree f (%)	Agree f (%)	Strongly Agree f (%)
Computer illiteracy	3(1.6%)	12(6.3%)	53(28.0%)	121(64.0%)
Lack of training	0(0.0%)	9(4.8%)	73(38.6%)	107(56.6%)

Unstable power supply	3(1.6%)	13(6.9%)	52(27.5%)	121(64.0%)
Complex to use	13(6.9%)	79(41.8%)	52(27.5%)	45(23.8%)
Time-consuming	31(16.4%)	62(32.8%)	58(30.7%)	38(20.1%)
Susceptible to technical issues	5(2.6%)	26(13.8%)	78(41.3%)	80(42.3%)
Poor internet service	5(2.6%)	27(14.3%)	80(42.3%)	77(40.7%)
Lack of continuous training and support from the information communication technology staff	7(3.7%)	18(9.5%)	72(38.1%)	92(48.7%)
High maintenance and implementation costs	4(2.1%)	19(10.1%)	60(31.7%)	106(56.1%)
Resistance and opposition to change	7(3.7%)	40(21.2%)	54(28.6%)	88(46.6%)

## Discussion

### Socio-demographic data

The majority of the respondents were female, with an average age of 20.9 years, according to the survey. The responders were dispersed among academic institutions and degrees of training quite evenly. This is in line with research (Jabour, 2021) that was conducted in Saudi Arabia with a majority of female respondents. Similar to this, more women took part in a Malaysian study on EHR (Chan et al., 2020). Additionally, the findings support a study conducted in Nepal among nursing students, where the mean age of participants was 19.8 years old and they were all female (Sharma, Oli & Thapa, 2019). However, a German study (Herrmann-Werner et al., 2019) found that the average age of responders was 25.6 years old. The recruitment of third-year nursing students may be the source of the variation in the current study.

### Readiness to Use

The majority of respondents were prepared to use electronic health records. This goes in line with a study carried out in Southwestern Ethiopia, which showed that a good number of the respondents were ready to implement electronic health records (Ngusie et al., 2022). In addition, research conducted in Ghana among nurses showed that over half of the participants had core readiness for use of EHRs (Abdulai & Adam, 2020). Similar conclusions were reached by Herlambang, Pertiwi, and Sugiarsih in their study on the EHR preparedness of doctors and nurses that was carried out in Indonesia in 2021. The readiness level to adopt EHR was slightly above half in the study by Ngusie, Kassie, Chereka, and Enyew in southwest Ethiopia in 2022, which yielded lower results than the one in this study. This might be explained by the fact that the study's target group is students, who are primarily young people, as opposed to Ngusie's study's target demographic, which includes primarily older people. The higher level of readiness in this study is due to youths' greater technological aptitude than adults'. Another study conducted in the United States in 2017 by Jacobs, Aggarwal, Juneja & Zoorob found that younger age was associated with technological readiness, which further supported the idea that the participants in this study were students, which contributed to the higher level of readiness

when compared to Nguise's study. Our research, however, differs from that of Mollart, Newell, Noble, and Gaelle (2021), who found that many of the participants were unprepared for electronic health records in clinical practise because of their paper-based university education.

### **Perceived Barriers**

The identified barriers by respondents of this study to readiness for utilization of EHR agree with the findings from other studies in developing countries (Waithera, Muhia, & Rogers, 2017; Alsadi et al 2019; Katurura and Cilliers, 2018; Odekunle et al, 2017; Attah, 2017; Adedeji et al., 2018) where it was found that electronic health records were not fully utilized in developing countries due to similar hurdles, which is also a feat that characterizes Nigeria situation. The findings in this study are in congruence with the finding of the study conducted by Bani-Issa, Yateem, Al Makhzoomy & Ibrahim, 2016 in the United Arab Emirates which identified a lack of basic computer skills and lack of adequate training as the barriers to the implementation of EHR. Also, our findings in this present study are at variance with the study conducted by Mollart et al., 2021 in Australia where it was found that low readiness to utilize EHR was a result of lack of access to EHR on the wards, mentors, and supervising nurses have difficulty finding time to teach students to use EHR in busy wards. Furthermore, the study conducted by Venkataraman, Pamarthy & Jonnalagadda, 2016 is at variance with the present study, where it was identified that the barriers to the adoption of electronic health records are increased medical errors, and cost of implementation. This is a case in developed countries that differs from the Nigerian situation. Therefore, efforts need to be consolidated to surpass these barriers to ensure proper and effective implementation of EHRs and to make the nurseries (nursing students) of the profession embrace and enjoy the EHR system when it is eventually adopted in the country.

### **Strengths of the study**

The study uses a cross-sectional approach and offers important information about Nigerian nursing students' readiness for EHR use in clinical practise. It also offers fresh data for a follow-up intervention study on the adoption of EHR in clinical settings in poor nations.

### **Limitations of the study**

This study is limited by the small sample size. Also, the study was carried out among two hospital-based training schools in southwest Nigeria. Therefore, the interpretation of the findings should be done with caution.

### **Recommendations**

To ensure that nursing students from the study setting have access to training on the use of electronic health records, training on their use must be incorporated into the nursing curriculum. This will help nursing students get ready to use electronic health records in clinical settings. Additionally, when hospitals employ electronic health records, it is possible to incorporate standardised Nursing Care Plans, which may aid to enhance the calibre of nurses' paperwork. Consequently, the standard of patient treatment will improve.

### Conclusion

In government-run hospitals in Nigeria, the adoption of electronic health records is still at an extremely low level. The foregoing needs to be addressed immediately since providing high-quality treatment is crucial and nursing students are being taught using the manual writing approach without any training in the usage of electronic health records. The usage of electronic health records should be taught to nursing students from their first days in school.

### Statement of Interest and Declaration

The authors say they have no competing interests.

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