PERCEPTION, ACCEPTANCE AND READINESS TO IMPLEMENT ELECTRONIC HEALTH MANAGEMENT INFORMATION SYSTEM (E.H.M.I.S.) AMONG HEALTH PROFESSIONALS IN LAUTECH TEACHING HOSPITAL, OGBOMOSO, OYO STATE, Nigeria

ABSTRACT

Background: Manual storage of patients' records comes with several challenges. In developing countries like Nigeria, it is a pressing time to establish a solid and context-based health information management system through innovative approaches. Electronic health management information systems are crucial for increasing the accessibility and management of medical information.

Methods: A cross-sectional survey was done among health professionals in L.A.U.T.E.C.H. Teaching hospital Ogbomosho. The study included health professionals who have been working in the hospital for not less than a year. However, the study excluded health professionals who were sick during the study, contract staff, and those who were on leave during the study. Consent was taken from every participant during the study. Ethical clearance for the study was obtained from the Ethical Review Committee of L.A.U.T.E.C.H. Teaching Hospital, Ogbomosho. Statistical Package for social sciences (SPSS 25.0) was used for the statistical computations of the data. P-values less than 0.05 are considered statistically significant.

Results: Two hundred thirty (230) questionnaires were distributed, but 209 were retrieved and available for analysis which translates to a response rate of 90.87%. A majority, 56.9% of the health workers, have practised for 1-10 years. Most of the respondents (79.4%) are aware of E.H.M.I.S. and have good knowledge (72%) of E.H.M.I.S. 84% of the respondents have a good perception of E.H.M.I.S. The challenges of E.H.M.I.S. perceived by respondents include lack of capital, computer illiteracy, cost of running, human resources issues, epileptic power supply, lack of awareness of E.H.M.I.S., lack of facilities, and maintenance issues. 80% are ready to implement E.H.M.I.S. in patient care, while 20% still need to be ready.

Conclusion: This study showed that health workers in L.A.U.T.E.C.H. Teaching Hospital, Ogbomoso, have a good knowledge of Electronic Health Management and Information Systems (E.H.M.I.S.), with the majority aware of the benefits. Also, there is a good perception of E.H.M.I.S. The majority are willing to accept and ready to implement the usage of E.H.M.I.S. if the hospital provides support. However, there are challenges perceived by health workers.

KEYWORDS: Health Information, Health Policy, Electronic System

INTRODUCTION

One of the foundational elements of a health system is health information management. A successful health information management system through evidence-based practice raises the accessibility and calibre of service delivery. The health information system is an integrated process of gathering, processing, analysing, reporting, and using health data in the health system (1). A healthy health system depends on more than just data accessibility. Information that is trustworthy, correct, and timely is also essential. Over time, more people have come to understand how crucial health information management systems are to providing healthcare to everyone (2). Decentralisation and health reforms in several nations have changed how data processing is viewed due to shifting expectations for data collection, processing, analysis, and dissemination. Effective health system policy creation and execution, governance and regulation, health research, human resource development, health education and training, service delivery and funding have been brought to the centre of the issue.

The introduction of information and technology into the field of health information management has attracted different names which have been used synonymous, although with slight differences, over the years; Electronic Health Record (E.H.R.), Electronic Medical Record (E.M.R.), Computer-based Patient Record (C.B.P.R.), Hospital Information System (HIS), and Electronic Health Management Information System (E.H.M.I.S.).

E.H.M.I.S. is a large-scale, integrated system that helps hospitals manage their information needs for the patient, clinical, ancillary, and even financial administration (3). It could be viewed as just one component of a more extensive, comprehensive health information system intended to store, process, and retrieve clinical and administrative data. The ideal E.H.M.I.S. is used at the point of care to support clinical decision-making and collect data from various computer systems within the healthcare organisation.

Manual storage of patients' records comes with problems (4). Over the years, challenges ranging from inconsistencies in data entry, time-consuming and costly materials for documentation, space-occupying, dependency on good individuals, lack of backups and limited security have been identified (5). Additionally, it is the conservative nature of Africans when it comes to trying new things. Resource distribution and regulations concentrating on health information management systems are still relatively new in underdeveloped nations. Although there is a growing need for health information, it is difficult to get it, and the collected data could be of better quality (6). They need help to meet users' needs.

Systems for managing electronic health information are essential for improving access to and administration of medical data (7). Healthcare organisations worldwide acknowledge the value of investing in information technology as a cost-effective way to deliver high-quality care through quick information retrieval and effective data management. Studies have demonstrated that the traditional paper-based health information system may be replaced with flexible electronic methods thanks to the development of information technology, which will result in lower costs and more efficient and timely delivery of healthcare services. (8)

According to research, implementing E.H.M.I.S. will accelerate digitisation, making it easier to manage comprehensive medical records, including patient information, diagnostic care, and prescription days (9). Additionally, it has great potential to enhance patient security, patient satisfaction, and organisational effectiveness, all of which will improve patient health outcomes.

It has been acknowledged as a system with numerous advantages, including efficient use of doctor time, increased effectiveness, and improved patient safety and health outcomes. With the help of a sizable database that includes genome sequencing and electronically exchangeable medical images, it has created several potentials for health research. When wholly implemented, E.H.M.I.S. is linked to a decrease in in-patient mortality, readmission, and patient safety, improving patient outcomes and quality of care overall (10).

Innovation is necessary now more than ever because Nigeria's current data management method, which relies on paper, could be more effective (11). In medicine, consultative care is a speciality of tertiary-level healthcare, typically based on referrals from primary or secondary medical care providers by specialists operating in a centre with staff and resources for specialised investigations and treatments. They are also important centres for research and teaching with extensive and diverse clinical care experience. It will be challenging to perform the duties expected of a teaching hospital without a well-designed, functional, and practical health information management system. The increase in patients seeking medical attention necessitates quick and effective record-keeping. This is the motivating factor behind this research. The study aims to determine whether or not health professionals are willing to use E.H.M.I.S. in their practice.

METHODS

Study Design

The study was a cross-sectional descriptive survey conducted among healthcare professionals at L.A.U.T.E.C.H. Teaching Hospital, Ogbomoso, Oyo State, Nigeria. The study sought to ascertain health workers' knowledge, perception and readiness to implement E.H.M.I.S. in their practice.

Study setting/population/sampling

The study was carried out at Ladoke Akintola University of Technology (L.A.U.T.E.C.H.) Teaching Hospital, Ogbomoso, Oyo State, Nigeria. Oyo State is an inland state in southwestern Nigeria. Ogbomoṣo is a city in Oyo State, southwestern Nigeria, on the A1 highway, with five local government areas and a three-degree-awarding institution of higher learning.

L.A.U.T.E.C.H. Teaching Hospital is an Oyo state-owned tertiary healthcare facility affiliated with the Ladoke Akintola University of Technology, Ogbomoso. It was established in the year 2011. The hospital has over 300-bed capacity, 510 health care workers, 30 departments, 20 wards and ten clinic areas. It provides comprehensive services in the areas of Surgery, Community Medicine, Pediatrics, Obstetrics & Gynecology, Radiology, Ophthalmology, Internal Medicine, Microbiology, Chemical Pathology, Mental Health, Hematology, Physiotherapy, Pharmacy, ORL/ENT, Histopathology, Community Medicine.

The study population included health professionals in L.A.U.T.E.C.H. Teaching hospital Ogbomosho. This study targeted health workers in different Arms and Departments; Physicians, Surgeons, Nurses, Pathologists, Radiologists, Pharmacists, Physiotherapists, Medical Laboratory Scientists and Medical Record workers. Staff included must have been working in the hospital for not less than a year. We excluded the health professionals who were ill during the study, contract staff, and staff on leave as of the time of the survey.

Data Collection

The questionnaire was pretested among health professionals in the Osun State Teaching Hospital in Osogbo, Osun state. This was done to detect and correct any ambiguity in the questionnaire. This served as a pretest as well as a guide.

Data was collected over two months (July and August 2022). Participants were selected from L.A.U.T.E.C.H. Teaching Hospital, Ogbomoso. Following this, participants were given a questionnaire to fill out. The questionnaires were collected from the respondents at their workstations.

Data Analysis

Statistical Package for social sciences (SPSS 25.0) was used for the statistical computations of the data. P-values less than 0.05 are considered statistically significant.

RESULTS

Two hundred thirty (230) questionnaires were distributed, but 209 were retrieved and available for analysis which translates to a response rate of 90.87%. The data were analysed and presented using percentages, charts and frequency tables. This was done objectively.

Sociodemographic Characteristics

Table 1: List of **Sociodemographic Characteristics**

Variables		Frequency	Per cent (%)
Age group (in years)	less than 20	4	1.9
	20-35	92	44.0
	36-50	99	47.4
	above 50	14	6.7
Sex	Male	81	38.8
	Female	128	61.2
Marital Status	Single	53	25.4
	Married	155	74.2
	Divorced	1	0.4
Religion	Christianity	176	84.0
	Islam	33	16.0

Tribe	Yoruba	195	93.5
	Igbo	14	6.5
Duration of practice (in years)	1-10	119	56.9
	11-20	63	30.1
	21-30	23	11.0
	More than 30	4	2.0
	Total	209	100.0

From the sociodemographic variables (Table 1), 4 (1.9%) of the respondents are less than 20 years old, 92 (44%) are between 20 and 35 years, 99 (47.4%) are between 36 and 50 years, 14 (6.7%) are above 50 years old. The majority, 128 (61.2%), are females, while 81 (38.8%) are males. Close to three-quarters of the respondents (74.2%) are married, 53 (25.4%) are single, and 1 (0.4%) are divorced. Based on religion, 176 (84%) are Christians, and 33 (16%) are Islam. 195 (933.5%) are Yoruba, and 14 (6.5%) are Igbo. A majority, 56.9% of the health workers, have practised for 1-10 years, 63 (30.1%) between 11 and 20 years, 23 (11%) for 21-30 years, while only 4 (2%) have practised for more than 30 years.

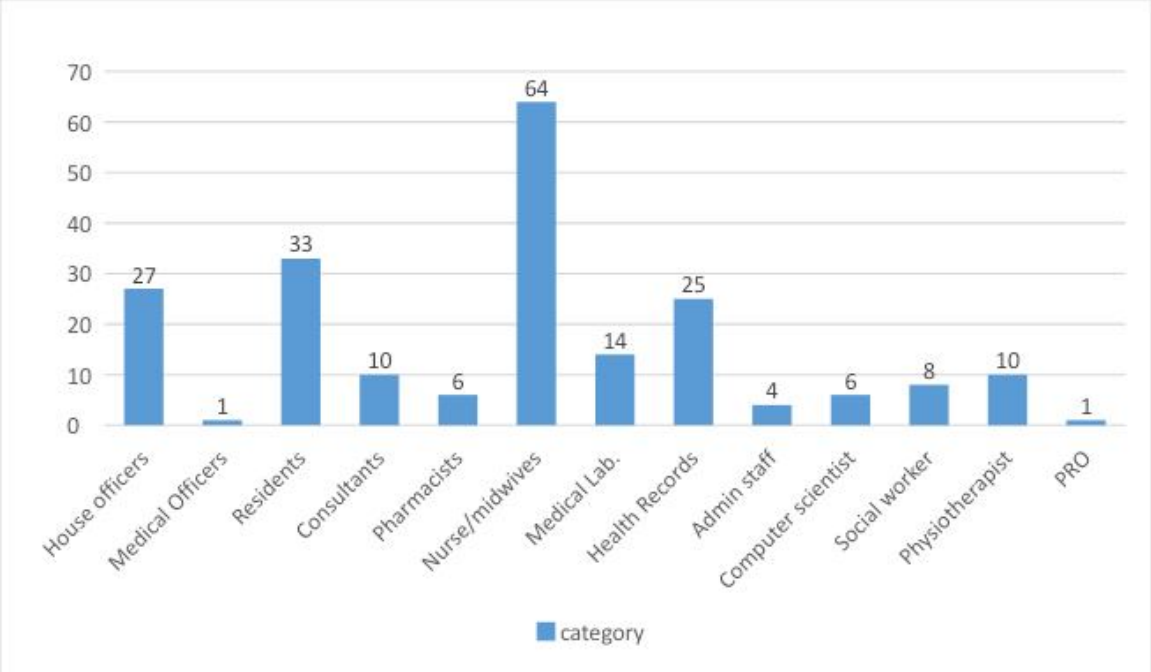

Figure 1: Graphical presentation showing sociodemographic variables

From Figure 1, 27 (12.9%) are house officers, 1 (0.5%) are medical officers, 33 (15.8%) are resident doctors, 10 (4.8%) are consultants, 6 (2.9%) are pharmacists, 64 (30.6%) are nurse/midwives, 14 (6.7%) are medical laboratory scientists, 25 (11.9%) are health records officer, 4 (1.9%) are admin officers, 6 (2.9%) are computer scientists, 8 (3.8%) are social workers, 10 (4.8%) are physiotherapists. In comparison, 1 (0.5%) are public relations officers.

Knowledge of Respondents on E.H.M.I.S.

Table 2: Electronic health management information system

Variables		Yes	No
Are you aware of E.H.M.I.S.?		166(79.4%)	43(20.6%)
If yes, what is it?	Automated collection, storage, planning and management of data	2(1.2%)	
	Automated health information system	4(2.4%)	
	Collection of patient data using computer	18(10.8%)	
	Digital health management	4(2.4%)	
	Electronic devices	14(8.4%)	
	Electronic health management information system	110(66.4%)	
	Facility-based data system for public health-related decision making	4(2.4%)	
	Patients record	2(1.2%)	
	Patients' paper charts used to store health data	4(2.4%)	
	S.A.N.W.O.	2(1.2%)	
	Virtual way of managing patient	2(1.2%)	
Previously used E.H.M.I.S.		75(35.9%)	134(64.1%)
Previously attended training on E.H.M.I.S.		54(25.8%)	155(74.2%)
The following are areas of application of E.H.M.I.S.	Patient record	192(91.8%)	
	Laboratory results	172(82.2%)	
	Treatment/drug management	172(82.2%)	
	Data management and repository	162(77.5%)	
Which hospital personnel(s) use E.H.M.I.S.?	Doctors	141(67.5%)	
	Nurses/Midwives	132(63.2%)	
	Pharmacists	125(59.8%)	
	Medical Laboratory Scientists	134(64.1%)	
	Health Record Officers	179(85.6%)	

The majority of the respondents (79.4%) are aware of E.H.M.I.S., with a majority (64.4%) describing it as an electronic health management information system, 10.8% describing it as a means of collecting patients' data using a computer, 2.4% as an automated health information system and 2.4% described as digital health management. However, only 35.9% and 25.8% have previously used E.H.M.I.S. and attended training, respectively. 91.8% indicated that E.H.M.I.S. could be applied in patient recording, 82.2% indicated in laboratory results, 82.2% shown in treatment and drug management, and 77.5% stated that it could be used in data management and repository. 67.5% believed doctors could use E.H.M.I.S., 63.2% indicated nurses/midwives, 59.8% indicated pharmacists, 64.1% indicated medical laboratory scientists and 85.6% stated health record officers (Table 2).

Table 3: **Perception and Acceptance of Electronic Health Management Information**

Variables	SA	A	D	SD
Time spent using E.H.M.I.S. will be out of proportion with benefits	41(19.6%)	11(5.3%)	92(44.0%)	65(31.1%)
Health professionals are at risk of more lawsuits because of E.H.M.I.S.	41(19.6%)	20(9.6%)	108(51.7%)	40(19.1%)
E.H.M.I.S. will lead to fewer jobs for health professionals	76(36.4%)	20(9.6%)	74(35.4%)	39(18.6%)
E.H.M.I.S. will improve communication between health professionals in patient care	97(46.4%)	97(46.4%)	12(5.7%)	3(1.5%)
The patient's history is safer with E.H.M.I.S.	103(49.3%)	77(36.8%)	15(7.2%)	14(6.7%)
E.H.M.I.S. is cost efficient for the hospital than paper-based medical record	88(42.1%)	87(41.6%)	28(13.4%)	6(2.9%)
E.H.M.I.S. will increase the privacy of patient records	109(52.2%)	78(37.3%)	14(6.7%)	8(3.8%)
E.H.M.I.S. will reduce the waiting time for patients	103(49.3%)	85(40.7%)	16(7.7%)	5(2.3%)
E.H.M.I.S. will lead to an increase in the cost of care on the patients' part	45(21.5%)	27(12.9%)	110(52.6%)	27(13%)
E.H.M.I.S. is prone to	57(27.2%)	19(9.1%)	105(50.2%)	28(13.5%)

medical errors				
E.H.M.I.S. can help in easy accessibility of patients' history	88(42.2%)	108(51.7%)	8(3.8%)	5(2.3%)

19.6% strongly agreed that the time spent using E.H.M.I.S. would be out of proportion to the benefits, while 44% disagreed. The majority, 51.7%, disagreed that health professionals risk more lawsuits because of E.H.M.I.S. In comparison, 36.4% strongly agreed that E.H.M.I.S. would lead to fewer jobs for health professionals, and 46.4% strongly agreed that E.H.M.I.S. would improve communication between health professionals in patient care. Furthermore, nearly half (49.3%) strongly agreed that patients' history is safer with E.H.M.I.S., and 42.1% strongly agreed that E.H.M.I.S. is more cost-efficient for the hospital than a paper-based medical record. More than half (52.2%) strongly agreed that E.H.M.I.S. would increase the privacy of patient records, and 49.3% strongly agreed that E.H.M.I.S. would reduce patients' waiting time. More than half (52.6%) disagreed that E.H.M.I.S. would lead to an increased cost of care on patients' part. 50.2% disagreed that E.H.M.I.S. is prone to medical errors, and a half (51.7%) indicated that E.H.M.I.S. could help in the easy accessibility of patients' histories (Table 3).

Table 4: **Readiness to Implement E.H.M.I.S.**

Variables		Yes	No	I do not know
Have you had formal training in computer usage?		130(62.2%)	27(13%)	52(24.8%)
If yes, when?	As an undergraduate	45(34.6%)		
	By attending formal computer training courses	27(20.8%)		
	Self-guided learning	58(44.6%)		
Do you own a personal computer?		146(69.9%)	63(30.1%)	0(0.0%)
Do you use a computer outside of the hospital?		152(72.7%)	32(15.3%)	25(12%)
How good are you at using the computer?	Excellent	49(23.4%)		
	Good	128(61.2%)		
	Fair	20(9.6%)		
	Poor	10(4.8%)		
	Not at all	2(1.0%)		
What application do you use on the	M.S.M.S. Word	106(50.7%)		
	M.S.M.S. PowerPoint	146(69.9%)		
	M.S.M.S. Excel	32(15.3%)		
	Corel Draw	4(1.9%)		

computer?	PhotoShop	0(0.0%)		
The hospital will be willing to support the implementation of E.H.M.I.S.		62(29.7%)	9(4.3%)	138(66%)
The hospital has the infrastructure in place to implement E.H.M.I.S.		61(29%)	38(18.2%)	110(52.8%)
I am willing to undergo formal training on E.H.M.I.S. in healthcare		156(74.6%)	9(4.1%)	44(21.3%)
I am willing to support and promote the use of E.H.M.I.S. if provided by the hospital management		167(79.9%)	4(1.9%)	38(18.2%)
Do you think the hospital is ready to implement E.H.M.I.S.?		33(15.8%)	85(40.7%)	91(43.5%)
I will be willing to convince patients to use E.H.M.I.S.		147(70.3%)	5(2.4%)	57(27.3%)

62.2% indicated that they had had formal training in computer usage, with most of them (44.6%) doing so as self-guided learning, 34.6% during undergraduate days and 20.8% attending traditional computer training courses. Also, most respondents (69.9%) owned a personal computer, while 72.7% used computers outside the hospital. Based on usage of computers, 23.4% graded their proficiency as excellent, 61.2% as good, 9.6% as fair and 4.8% as poor. The most used application by the respondent is M.S.M.S. PowerPoint (69.9%), followed by M.S.M.S. Word (50.7%), then M.S.M.S. Excel (15.3%) and Corel Draw (1.9%). 29.7% indicated that the hospital would be willing to support the implementation of E.H.M.I.S., while 66% did not know. 29% indicated that the hospital has the infrastructure to implement E.H.M.I.S., while 52.8% did not know. About three-quarters (74.6%) are willing to undergo formal training on E.H.M.I.S. in healthcare, while 79.9% are willing to support and promote the use of E.H.M.I.S. if provided by the hospital management. Only 15.8% said the hospital is ready to implement E.H.M.I.S. 70.3% are willing to convince patients to use E.H.M.I.S. (Table 4).

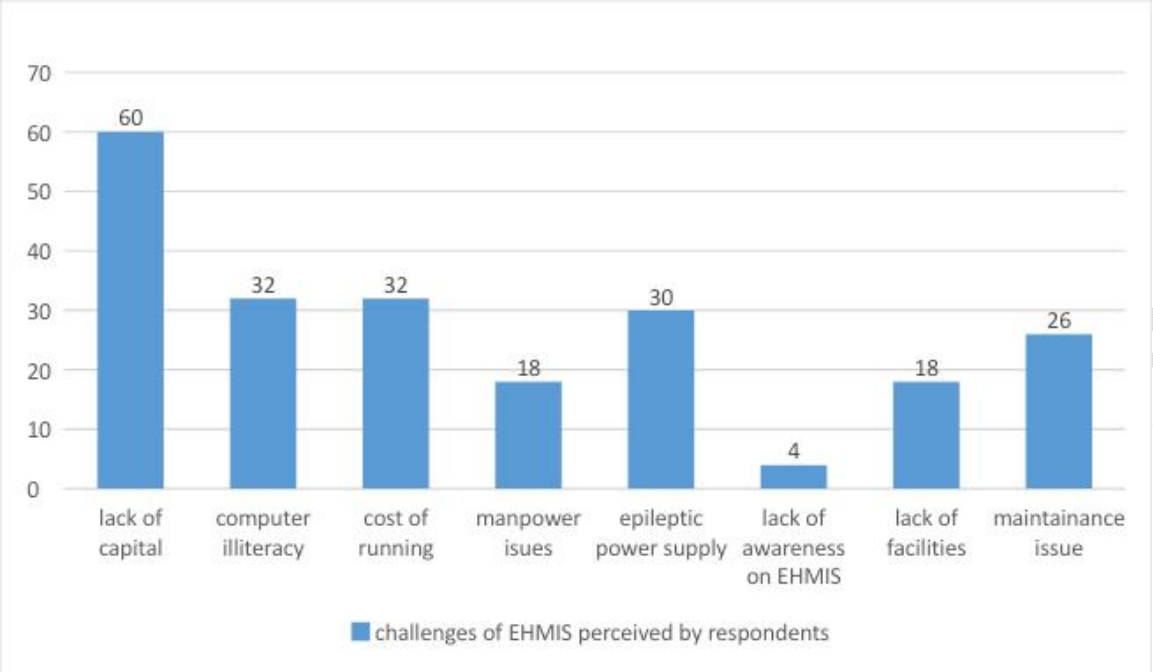

Figure 2: **Challenges of E.H.M.I.S. as perceived by the respondents**

This includes lack of capital, 60(28.7%); computer illiteracy, 32(15.3%); cost of running, 32(15.3%); human resources issues, 18(8.6%); epileptic power supply, 30(14.6%); lack of awareness on EHMIS 4(1.9%). Lack of facilities 18(8.6%) and maintenance issues 26(12.4%) (Figure 2).

DISCUSSION

This study aims to determine the perception, acceptance and readiness to implement an Electronic Health Management Information System (E.H.M.I.S.) among health professionals in L.A.U.T.E.C.H. Teaching Hospital, Ogbomosho. Sociodemographic findings revealed that most of the respondents (47.4%) are between 36 and 50 years, the majority are females, and the large majority are Christians and are of Yoruba origin; this might be due to the location of the study, which is in a Southwestern state of Nigeria. However, more than half of the respondents have only practised for less than ten years. This is also concerning a study in Lagos, where most of their respondents were between 30 and 39 years, more than half were married, and the majority had worked for more than 12 months in the hospital (12). More than one-third of the respondents were nurses/midwives, which aligns with what is obtainable globally, as nurses and midwives comprise most of the healthcare workforce.

Based on the knowledge of the electronic health information management system, 79.4% were aware, and 66.4% were able to define it clearly as the electronic health management information system. However, only a few have ever used or had training on it. Most of the respondents (72%) have a good knowledge of E.H.M.I.S. It has also been reported by many studies carried out in Nigeria that health workers had good knowledge of E.H.M.I.S. in the hospital (13). A survey in

Lagos revealed that all the 202 health workers in their study are aware of E.H.M.I.S., and most agreed that it would improve the quality of care and reduce medical errors (14). In another study conducted in Jos, the vast majority of the healthcare workers were fully aware of E.H.M.I.S., with about three-quarters being able to define the concept correctly and were able to note the areas of application such as Patients record, laboratory results, treatment/drug management and data management (15).

Furthermore, most of the participants perceived that E.H.M.I.S. would improve communication between health professionals in patient care, patients' history is safe with E.H.M.I.S. and cost-efficient for the hospital than the paper-medical record, increases the privacy of patient records, leading to an increase in the cost of care on patients' part and help in easy accessibility of patients' history. Most respondents had a good perception of E.H.M.I.S. and accepted such in patient care and hospital running. The perception of E.H.M.I.S. has been noted to be good in various studies. This is in agreement with the study of Shehu, Nsereko and Shamsudeen, where it was pointed out that participants accept and use E.H.R.s to enhance their job performance and believed that the system is advantageous in their work (16). Research conducted in Alabama said streamlining procedures would help plan implementation (17). Other advantages mentioned were a decrease in medical errors, a decrease in cost and treatment time, and an increase in revenue. Improvements in patient care through better links to all caregivers and a decline in the demand for file space, supplies, and staff to collect and file medical information were two additional advantages of E.H.R. deployment. Likewise, in a study in LUTH, respondents indicated that it would increase patients' satisfaction with the health care provider and believed that the benefits of E.M.R.s outweigh their costs (18). In a similar study in O.A.U.T.H.C., Ife, health workers widely accepted electronic health information management systems in patient care (19). This indicated that across all studies, health workers had perceived the advantage of E.H.M.I.S. and its application in their work, giving it wider acceptability among them.

Regarding the readiness and willingness to implement E.H.M.I.S. in patient care, most respondents have had formal training in computer usage and owned personal computers. The majority were willing to support and promote using E.H.M.I.S. in providing care. However, only a few perceive that the hospital is ready to use and support the implementation of E.H.M.I.S. due to challenges such as lack of capital, computer illiteracy, cost of running, workforce issues, epileptic power supply, lack of awareness of E.H.M.I.S., lack of facilities and maintenance problem. This is consistent with the systematic study by Alanazi, Butler-Henderson, and Alanazi, which identified the following obstacles to implementing E.H.M.I.S.: higher chance of error, inability to obtain lab findings, longer time to collect health data, and no guarantee of patient confidentiality (20). They were also thought to be sophisticated, making them challenging to use, unreliable due to a power outage, and expensive. Lack of sufficient finance and resources is another issue. Other obstacles were a lack of understanding of E.H.R.s, a lack of support from the medical community, an absence of organised technology, and inadequate team member training. Implementing and interpreting the Health Insurance Portability and Accountability Act (HIPAA) and other privacy issues were also noted as barriers (21). The majority of the participants in the study indicated that they were willing to use E.M.R.s if adequately trained and if the technical infrastructures were made available (22). Lack of computer skills and productivity loss was also noted.

LIMITATION OF STUDY

Our study was limited to health professionals within the main hospital complex of L.A.U.T.E.C.H. Teaching Hospital. As such, there might be an over-generalisation of the result when considered in the light of other health professionals working in other L.A.U.T.E.C.H. Teaching Hospital annexe within Ogbomoso.

CONCLUSION

Our study showed that health workers in L.A.U.T.E.C.H. Teaching Hospital, Ogbomoso, have a good knowledge of E.H.M.I.S., with the majority aware of the benefits. Also, there is a good perception of E.H.M.I.S. The majority are willing to accept and ready to implement the usage of E.H.M.I.S. if the hospital provides support. However, the challenges perceived by the health workers that can hinder the running and implementation of E.H.M.I.S. include lack of capital, computer illiteracy, cost of running, human resources issues, epileptic power supply, lack of awareness of E.H.M.I.S., lack of facilities and maintenance problem.

The following are recommended to increase the hospital usage of the electronic medical record and proffer solutions to some of the challenges of paper records and those identified in our study. There is a need for the administrative arm of the hospital to consider the peculiarities of the various categories of healthcare workers while planning towards implementing E.H.M.I.S., taking into cognisance their respective needs and perceptions. Health professionals need to be equipped with the necessary knowledge and skills to utilise the E.H.M.I.S. to achieve the desired and practical outcomes of improving the quality of healthcare service delivery. Relevant training should be conducted by the Information and Communications Technology Unit (I.C.T.) at regular intervals. Hospital management should ensure adequate implementation tools, such as computer systems, stable electricity supply, finance, sufficient human resources and training, are provided to encourage the system's adoption. Governments and Hospital Management should take the lead in sensitising the general public on the efficacy and advantages of using E.H.M.I.S. to facilitate its acceptance amongst other non-yielding health workers and prospective hospital clients. This research study should be expanded to cover a larger population, thus involving health workers in various levels of health care, including primary health centres.

Ethical Approval

Ethical clearance for the study was obtained from the Ethical Review Committee of L.A.U.T.E.C.H. Teaching Hospital, Ogbomosho.

Consent

Signed consent was obtained from the individual to recruit them into the study.

REFERENCES

1. Leon, N., Balakrishna, Y., Hohlfeld, A., Odendaal, W. A., Schmidt, B. M., Zweigenthal, V., Anstey Watkins, J., & Daniels, K. (2020). Routine Health Information System (R.H.I.S.) improvements for strengthened health system management. The Cochrane database of systematic reviews, 8(8), CD012012. https://doi.org/10.1002/14651858.CD012012.pub2

2. Lemma, S., Janson, A., Persson, L. Å., Wickremasinghe, D., & Källestål, C. (2020). Improving quality and use of routine health information system data in low- and middle-income countries: A scoping review. PloS one, 15(10), e0239683. https://doi.org/10.1371/journal.pone.0239683

3. Bagayoko, C. O., Tchuente, J., Traoré, D., Moukoumbi Lipenguet, G., Ondzigue Mbenga, R., Koumamba, A. P., Ondjani, M. C., Ndjeli, O. L., & Gagnon, M. P. (2020). Implementation of a national electronic health information system in Gabon: a survey of healthcare providers' perceptions. B.M.C. medical informatics and decision making, 20(1), 202. https://doi.org/10.1186/s12911-020-01213-y

4. Zwaanswijk, M., Verheij, R. A., Wiesman, F. J., & Friele, R. D. (2011). Benefits and problems of electronic information exchange as perceived by health care professionals: an interview study. B.M.C. health services research, 11, 256. https://doi.org/10.1186/1472-6963-11-256

5. Salameh, B., Eddy, L. L., Batran, A., Hijaz, A., & Jaser, S. (2019). Nurses' Attitudes Toward the Use of an Electronic Health Information System in a Developing Country. SAGE open nursing, 5, 2377960819843711. https://doi.org/10.1177/2377960819843711

6. Sittig, D. F., Wright, A., Coiera, E., Magrabi, F., Ratwani, R., Bates, D. W., & Singh, H. (2020). Current challenges in health information technology-related patient safety. Health informatics journal, 26(1), 181–189. https://doi.org/10.1177/1460458218814893

7. Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B. D., Richards, M., Taylor, D., Tibble, H., & Mossialos, E. (2021). Health information technology and digital innovation for national learning health and care systems. The Lancet. Digital health, 3(6), e383–e396. https://doi.org/10.1016/S2589-7500(21)00005-4

8. Haux R. (2018). Health Information Systems - from Present to Future?. Methods of information in medicine, 57(S 01), e43–e45. https://doi.org/10.3414/ME18-03-0004

9. Boonstra, A., Versluis, A. & Vos, J.F.J. Implementing electronic health records in hospitals: a systematic literature review. B.M.C. Health Serv Res 14, 370 (2014). https://doi.org/10.1186/1472-6963-14-370

10. Mohammed, A., Franke, K., Boakye Okyere, P., Brinkel, J., Bonačić Marinovic, A., Kreuels, B., Krumkamp, R., Fobil, J., May, J., & Owusu-Dabo, E. (2018). Feasibility of Electronic Health Information and Surveillance System (eHISS) for disease symptom monitoring: A case of rural Ghana. PloS one, 13(5), e0197756. https://doi.org/10.1371/journal.pone.0197756

11. Dhaliwal, B., Neil-Sztramko, S. E., Boston-Fisher, N., Buckeridge, D. L., & Dobbins, M. (2021). Assessing the Electronic Evidence System Needs of Canadian Public Health Professionals: Cross-sectional Study. JMIR public health and surveillance, 7(9), e26503. https://doi.org/10.2196/26503

12. Elikwu, I. M., Igbokwe, A. C., & Emokhare, G. (2020). Effect of electronic health information system on medical records management in Public Healthcare Institutions. UNIZIK JOURNAL OF BUSINESS, 3(1). https://doi.org/10.36108/unizikjb/0202.30.0140

13. Alanazi, B., Butler-Henderson, K., & Alanazi, M. R. (2020). Factors Influencing Healthcare Professionals' Perception towards EHR/EMR Systems in Gulf Cooperation Council Countries: A Systematic Review. Oman medical journal, 35(6), e192. https://doi.org/10.5001/omj.2020.85

14. Houser, S. H., & Johnson, L. A. (2008). Perceptions regarding electronic health record implementation among health information management professionals in Alabama: a statewide survey and analysis. Perspectives in health information management, 5, 6.

15. Afolaranmi, T. O., Hassan, Z. I., Dawar, B. L., Wilson, B. D., Zakari, A. I., Bello, K. K., Ofakunrin, A., & Ogbeyi, G. O. (2020). Knowledge of electronic medical records system among frontline health care workers in Jos University teaching hospital, Plateau State Nigeria. International journal of research in medical sciences, 8(11), 3837–3843. https://doi.org/10.18203/2320-6012.ijrms20204867

16. Onigbogi O.O1, Poluyi A.O2, Poluyi C.O3, & Onigbogi M.O4 (2018). Doctors' Attitude and Willingness to Use Electronic Medical Records at the Lagos University Teaching Hospital,

Lagos, Nigeria. Online journal of public health informatics, 10(2), e211. https://doi.org/10.5210/ojphi.v10i2.8416

17. Berihun, B., Atnafu, D. D., & Sitotaw, G. (2020). Willingness to Use Electronic Medical Record (E.M.R.) System in Healthcare Facilities of Bahir Dar City, Northwest Ethiopia. BioMed research international, 2020, 3827328. https://doi.org/10.1155/2020/3827328

18. Biruk, S., Yilma, T., Andualem, M., & Tilahun, B. (2014). Health Professionals' readiness to implement electronic medical record system at three hospitals in Ethiopia: a cross sectional study. B.M.C. medical informatics and decision making, 14, 115. https://doi.org/10.1186/s12911-014-0115-5

19. Ojo, A. I., & Popoola, S. O. (2015). Some correlates of electronic health information management system success in nigerian teaching hospitals. Biomedical informatics insights, 7, 1–9. https://doi.org/10.4137/BII.S20229

20. Ajuwon, G. A., & Popoola, S. O. (2014). Influence of Internet Accessibility and Demographic factors on utilisation of Web-based Health Information Resources by Resident Doctors in Nigeria. African journal of medicine and medical sciences, 43(Suppl 1), 61–71.

21. Ogbonna M.A, Oluwafemi O.M & Ojo, P.O.P.O. (2020), acceptance and barrier of electronic health records in a tertiary hospital in Nigeria. European Journal of Social Sciences Studies. Vol 5, issue 6.

22. Bossen, C., Jensen, L. G., & Udsen, F. W. (2013). Evaluation of a comprehensive E.H.R. based on the DeLone and McLean model for I.S.I.S. success: approach, results, and success factors. International journal of medical informatics, 82(10), 940–953. https://doi.org/10.1016/j.ijmedinf.2013.05.010