Journal of Biomedical Sciences | ISSN: 2960-9356
Research Article Peer-review, Open Access

Relevance of Electronic Health Records in Upscaling Health Outcomes in Health Facilities in Bamenda, Cameroon

Inaku K. Egere[1],
Budzee Appolonia Dzelabvem[2]

Abstract

In an age of increasing digitization, every profession seeks to contextualize the applicability of digital technologies. Digitization is the process of transforming hard information into a language of 0s and 1s, readable by digital devices. Africa, despite the numerous challenges, is improving the adoption of digital communication as more people come to understand its benefits in social and professional life, such as healthcare, education, management, religion and culture. Numerous challenges in patient management in health facilities are related to the poor or absence of health information system, including electronic health records. Some of the challenges include: inconsistencies and errors in medical follow-up, untimely tracking of disease outbreak, disordered manual files that makes retrieval cumbersome, risk of information loss in verbal communication among health teams and with patients, verbal violence in the populated urban health facilities. This paper therefore aims at exploring the effectiveness of electronic health records (EHR) in health facilities of the Archdiocese of Bamenda (Cameroon) as a factor for improving healthcare outcomes. The objectives of this research paper are to investigate the factors that favour the usage of electronic health records in Bamenda, the importance of monitoring health outcomes in public health and the contribution of electronic health records in stabilizing healthcare outcomes. The methodology of non-participant observation, survey and secondary sources was applied. The diffusion of innovation and action-network theories were employed in the study. The population consisted of staff from the two campuses of the St. Blaise hospitals in the North West Region of Cameroon. The hospitals were chosen using the purposive sampling and the 60 respondents, by stratified random sampling technique. The instrument for data collection was a structured questionnaire. The instrument was tested by content validity and the Cronbach's alpha correlation coefficient whereby the result was 0.77, which provided the basis for the instruments reliability. Simple description statistics of mean and standard deviation were employed. The findings, among others showed that electronic health records can enhance treatment outcomes, such as overall clinical wellness of the population, socio-economic stability and disease control. The paper recommended that healthcare policy makers, practitioners and governance structures should invest in learning and procurement of infrastructures for producing electronic health records in order to ensure a holistic healthy population.

Keywords: Digital, Digitalization, Electronic, Health, Healthcare, Outcomes, Records.

[1] Department of Pastoral Communication in the Catholic Institute of West Africa, Port Harcourt
[2] Ph.D candidate at the Center for the Study of African Culture and Communication (CESACC), Catholic Institute of West Africa

Introduction

As the digital communication era continues to ramify, characterized by an outburst of Information and Communication Technologies (ICTs), the internet, social media, automation and Artificial Intelligence (AI), their influence on every profession and on the overall social life is clearly evident. ICTs are versatile and relevant, applicable in an unlimited variety and spheres of human life and work. To this effect, professionals from every discipline are strategizing reflections on its exploring and application for development. Egere describes the scenario of reception of the new media as one that has brought "much excitement and also trepidations …over its unprecedented potentials with the capacity to revolutionalise aspects of human existence" (Egere 2024, p 72).

Healthcare has, like other disciplines, become an information-intensive industry, requiring timely and reliable information for timely decision-making. Healthcare is a vital and delicate discipline because it deals directly with the human person at their most vulnerable moments. The survival of the human person depends on the quality of healthcare in all its dimensions: mental, physical, emotional, psychological, etc. Healthcare also deals with disease and treatment, medication, medical machines or technologies, education of health personnel, policies, partnerships, communication and health financing. All these dimensions are inter-related for an optimal healthcare platform.

An electronic health record (EHR) is a digital version of a patient's manual health chart, transformed into digital language and rendered readable and transmissible through digital devices; such as computers, digital phones and tablets (Bacorro, Gutierez, Escuadra, Sgono, Agas, Que, & Ortin, 2018). EHRs are inclusive of electronic medical records (EMRs), but moreover, they cover of a broader spectrum of a patient's information; such as patient's medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory and test results. They are evidence-based tools that providers can use to make decisions about a patient's treatment. Efficient healthcare practices require appropriate health information management which, before the digital age, was manual (Holmes, 2009). Health records management, a subset of Healthcare Management Information Systems (HMIS), contributes to the overall health system strengthening. The Cameroonian practice encourages people to carry their health records in their wallet or their digital devices for reference in cases of emergency and for medial follow-up.

Digital or electronic health records are operated within the health communication department as a communication channel, and tool, but impacts healthcare outcomes, which could be clinical, psychological, social and economic. These records are equally a storage device of healthcare information for health professionals or for the individuals. Like any other record, the reliability of health records depends on factors such as the source, the collection tools, processing, transmission and storage.

The debate regarding digitization of patients' information has relaxed since the benefits have been portrayed to outweigh the fears. Abdul & Wang (2019) confirm that businesses that have adopted ICTs are operating faster and more cost effectively. These have been concurred to have solved their problems of efficiency, accuracy and secure retention of data (Nde, Raymond, Saidu, Cheng, Nzuobontane, Atemnkeng & Mbacham, 2019). "Electronic records have minimized errors in diagnoses and ameliorated allocation of treatment" (Abdul & Wang, 2019, p.2). However, the laggard attitude of health personnel towards the adoption of digital records suggests the necessity of critical reforms to ensure quality professional training regarding ICTs in healthcare.

The Cameroonian health sector is organized under the Ministry of Public Health with various departments. The Ministry controls the Regional Delegations of health in each of the ten Regions and then the District Medical Officers in the 159 Health Districts. The responsibility of the Cameroon's Ministry of Health is to formulate, implement and supervise the Government's public health policy throughout the Country (Health Sector Strategy 2016-2027). This makes every health institution (public or private) accountable to the Ministry of Public Health. Personnel of the health sector are subdivided into health promotion, disease prevention and case management of various degree. Some strategic

documents governing the healthcare vision in Cameroon include the Health Sector Strategy 2016-2027, National Health Development Plan 2021-2025, National Strategic Plan for the fight against HIV/AIDS and STIs, National Digital Health Strategic Plan, etc. issued by the Ministry of Public Health.

This research aims therefore at investigating the role of electronic medical records in Bamenda Archdiocesan health facilities as a strategy for improving health service efficiency. The choice of urban Bamenda is informed by our assurance of their engagement in the application of ICTs and the availability power supply that make digitalization possible. This research paper intends to expose the benefits and challenges of EHR in improving health outcomes. understood as the status of a person's health following medical intervention, event or action; such as, clinical status, quality of life, patient-reported outcome, functional and economic status.

Statement of the Problem

As sickness affects all aspects of life, so are healthcare interventions. In order words, the effectiveness of healthcare interventions is evaluated by judging their holistic outcome on a patient's clinical status, quality of life, patient-reported outcomes, functional and economic status.

The scenario of healthcare in Bamenda, Cameroon is characterized by a panoply of health facilities of which some operate without authorization from the Ministry of Public Health. Licenced or not, there exists quite some systemic disorder in health facilities related to the absence or poor management of electronic healthcare records: loss or forgotten health records leading to inconsistent follow up of disease history; inaccessible patient manual records due to illegible handwriting of doctors; long patients' waiting time in health facilities, tedious access to health records for researchers, financial leakages and corruption, poor verbal information transmission among health personnel and with patients, leading to wrong diagnoses, prescription and application of treatment instructions (Abdul & Wang, 2019), outburst of verbal violence between nervous health professionals and patients. The application of allergic medications in emergency situations has caused the loss of lives owing to the absence of records showing healthcare history. In contrast, manual records are easily invaded by unauthorized persons, violating owner's privacy. The disposal of manual records also raises environmental concerns (Gyamfi, Mensahb, Oduroc, Donkord, Mockf, 2016). Fortunately, the shift from paper-based to electronic medical records is sure and steady (Alshammari, Alouthah, Alrshidi, Alshammari, Alrasheidi, Alshammari, Alsudais, Alsaadi & Alshammari, 2020).

Lastly the prospects of e-health, envisioned in the 2020-2024 National Digital health Strategic Plan of Cameroon's Ministry of Public Health, cannot be attainable without the installation of Health Management Information System wherein EMR are an integral part. E-Health is slow in Cameroon due to infrastructural limitation, insufficient training, poor access to equipment and supplies, and lack of knowledge on what their impact could really be (2020-2024 National Digital Health Strategy Plan). The production and use of digital healthcare records is therefore, compromised by technical, professional and infrastructural factors of systems. Government's digitization planning needs to take cognizance of these related factors in order to guarantee a holistic approach. The slow pace of adoption and optimization of HMIS in Cameroon urges our research in its possibilities of upscaling health outcomes.

Research Aim and Objectives

This research paper aims at exploring the role of electronic health records in improving health outcomes among the health facilities under the coordination of the Archdiocese of Bamenda, Cameroon. The objectives are:

1. To investigate factors that favour the usage of electronic health records in Bamenda;
2. To examine the importance of monitoring health outcomes in public health and
3. To explore the contribution of electronic health records in improving healthcare outcomes.

Research Questions

1. Which are the factors that favour the use of electronic health records in the facilities coordinated by the Archdiocese of Bamenda?

2. What are the benefits of monitoring health outcomes in public health?
3. In which ways can electronic health records contribute to improving health outcomes?

Review of Related Literature

This section revokes related literature on the relevance of electronic health records for improving healthcare outcomes.

Electronic Health Records and its benefits to health outcomes

Health records, digital or manual, are produced and disseminated to serve crucial health management functions of enhancing reliability, accountability, efficiency, customer care, research, and strengthening the health system as a whole (Abdul & Wang, 2019). Egwudo (2025) in a scoping review of 31 studies, found out that electronic health records, as an element of digital health, improved data quality and "contributed to better health outcomes" (p.2). This study further elucidated that EHR in Nigeria have "improved healthcare quality by digitizing patient data, enhancing care continuity, reducing medica errors and supporting efficient decision-making" (p.3). Electronic records are meant to enhance electronic health (e-health) whereby health care is carried out through electronic processes of information (text, video, audio) and communication. Engaging information and communication technologies at every step, electronic data is collected, analysed and transmitted electronically to a consultant for review, analyses and prescription. Feedback is returned to the patient in record time electronically. E-health takes place at various levels depending on the needs of the clients and the available technologies in the facility. In fact, without electronic health records, every effort on e-health is unachievable.

The World Health Organisation defines HMIS as an "information system specially designed to assist in the planning and management of health programs, and delivery of care" (WHO, 2000). At the intra-institutional level, EHR are optimized through a networked information system with backup, created among the selected priority areas with the help of software, generally referred to as Health Management Information System (HMIS) (Gibbons, Weiss, Frank, & Kupfer, 2015). The networked departments, patients and care-givers can access the information and equally input treatment actions carried out (Blumenthal & Tavenner, 2020) so that all authorized points can make use of up-to-date information for quality service (Abdul & Wang, 2019). In some hospitals in urban Cameron, networked departments include reception, consultation rooms, laboratory, dispensary, bill-making, wards, ultrasound, x-ray and other diagnostic departments. A patient receives a code when registered at the reception, which is presented at every department visited (Abdul & Wang, 2019). Inputting the code gives the user access to the health records of the individual patient for action and documentation of feedback and observation. These are keyed into the network for the next intervener. The e-health involves accessing, interpretation, inputting actions and uploading it in the network (Abdul & Wang).

This EHR system saves patients' waiting time. Providers can call patients by name to enhance customer care and effective communication (Nde et al, 2019). Using electronic records is cost-effective, environmentally friendly, which imparts overall financing of the health care procedure and that of the particular patient. Electronic records also improve the clinical status of the patient as the health professionals gains timely access to the relevant information necessary for evidence-based decision-making on the treatment options including best practices for the patient (Abdul & Wang, 2019). Analysed EHR equally provide stronger justification for donor-support as well as resource mobilization and allocation; it tracks and predicts disease outbreaks, targets research priorities and serves as institutional memory. They assist in the control of mortality rate and ensure financial risk protection by preventing catastrophic healthcare spending brought about by out-of-pocket healthcare financing. In fact, according to Nde et al (2019), catastrophic healthcare spending has increased poverty rate in Cameroon by 2 %. Nde et al discovered that only 4.6 % of Cameroonians had healthcare insurance offered by over 40 community health insurance schemes. When patients recover and resume their responsibilities in community, quality of life is better for all. Electronic health records facilitate the analyses of huge health records at the service of lobbying for change among healthcare policy makers, such as the adoption of the

Universal Health Coverage strategy of the Cameroonian Government. Abdul & Wang (2019 p.298) outline four dimensions where ICTs improve healthcare: "improved usability, accessibility, operational efficiency and stimulated economic development". In the same vein, Alshammari et al (2020, p. 2832) observe that EHR "enhance energy conservation, optimize usability, guarantee adherence, authenticity and contentment". The adoption of the Universal Health Coverage by 2035 by Cameroon's Ministry of Public Health is a glaring illustration of the role of EMR in upscaling healthcare outcomes in Cameroon.

Another level of e-health network is inter-facility. In this case, health facilities partner and network so that the electronic records of patients who consult or are referred to one facility are shared with the others (Nde et al, 2019). Physicians could attend to patients beyond their geographical confines, consequently increasing their outreach, revenue (Goldzweig, Towfigh, Maglione & Shekelle, 2009) and scope of healthcare interventions. Interaction between the health professional and the patient is enhanced; automated; and personalized reminders can be sent to the patients on their health issues (Alshammari et al., 2020).

In the case of computerized-diagnosis network, sensors and advanced algorithms are employed to diagnose illness and interpret tests (Abdul & Wang, 2019). Such networks have been created between some diagnostic stations in Cameroon and expert interpreters abroad using EHR or diagnostic tools such as electronic microscope and phonocardiogram. This utility is also most appropriate in cases of infectious diseases as the infected patient can receive treatment with minimal contact with the health personnel (Abdul, et Wang, 2019). This computer-diagnosis model carries the same impact like the intra-facility level, yet with an added advantage of expanded networks of intervention and discussion, mutual support and referrals thus increasing patient satisfaction beyond a single facility (Andel, Davidow, Hollander, & Moreno, 2012).

Notwithstanding these benefits, Djam, Tabah, Bekolo & Bate (2014) had identified lapses in Cameroon's National Health Information System; such as labour intensive work, poor storage, inaptitude of personnel to analyse and use data to address gaps in healthcare, lack of incentives, etc. These recommended that these challenges be addressed before delving into EHR because they are behavioral and can be carried over. For most healthcare professionals, introducing electronic health record-keeping is rather a disturbance as it slows down their work and adds to their numerous tasks. Some argue that depending solely on EHR is rather risky and unproductive due to frequent breakdown of tools, of HMIS software or electricity failure. Another underlying challenge is the minimal computer or typing skills of most healthcare workers on the provision chain. These take a lot of time and stress to key the information into the platform (Gyamfi et al, 2017). Additionally, the challenge of securing funding for up-front investment in the complete package of Health Management Information System has compromised the goodwill of most healthcare investors in Cameroon. On another note, the use of EHR and e-health in general dissociate physical contact, traditionally upheld as "irreplaceable element" in healthcare practice (Pepito, Babate & Dator, 2023). To overcome the challenges, some developing Countries like Kenya and Botswana have reviewed the curriculum of higher professional training, identified gaps in policy and regulation and set up programs for re-training health professionals in ICTs. While the use of sustainable solar energy is on the rise in the Cameroonian business milieu, the Country cannot yet boast of reliable electricity to guarantee sustainable use of EHR.

Relationship between Electronic Health Record and Health Outcomes

Healthcare is a collection of efforts and activities by health professionals to promote, prevent, diagnose and treat diseases and injuries in order to restore or maintain the physical, psychological and mental wellbeing of individuals and of communities. (National Library of Medicines, www.ncbi.nlm.nih.gov). Health care is broad and contains many structural levels or sub divisions. The six healthcare pillars (service delivery, health workforce, technologies/ access to essential medicines, health information system, governance/partnership and financing) provide strategic areas of intervention in healthcare (Elizabeth Glaser Foundation). Health is not only the absence of disease, but also the presence of the

above elements in the correct proportion, accessible to all.

Pearson, Colombo, Murakami & James (2016) hold that health outcomes denote the changes in an individual or community health after an intervention, action or event. They can be measured in terms of clinical, quality of life, patient-reported outcomes, functional and economic status. These measurements determine the effectiveness of the intervention (Nelson, Butterly, Collacchio & Mastandun, 2022). For example, the Universal Health Coverage and Cheque Santé— ongoing health initiatives by Cameroon's Ministry of Public Health, have been developed from analysing health records to determining the economic impact of healthcare spending on the population. It led to the understanding that out-of-pocket spending is increasing poverty level by 2%. EHR can enhance patient satisfaction when patients have the possibility to ask questions, understand their situation and participate through electronic interchange with health personnel, in contributing to decisions about their health. EHR can be used to identify specific non-clinical causes and triggers of their illnesses so that effective counseling, dieting and other personalized life-saving alternatives are designed. Obviously, EHR can be analysed to verify the clinical outcome: wellness and ability to carry out one's normal functions. Beyond the individual patient, analysing health records can determine trends of a particular sickness in a population (Alshammari et al., 2020). The management of HIV/AIDs in African has been a records-intensive program. The meticulous analyses of electronic health records relating to HIV/AIDs has led to the development of several wellness and lifestyle modifications to sustain persons living with the condition, keeping it largely under control. In order to fulfill its function of upscaling health outcomes, policy makers, health personnel, software developers and the general public need to be capacitated to better understand the potentials of electronic health records and imbibe it. Through this model, the overall welfare and development of the nation can be planned and guaranteed (Middleton, Bloomrosen, Dente, Hashmat, Koppel, Overhage, & Zhang, 2013). As healthcare covers a vast spectrum of issues, the evaluation of healthcare interventions is based on the records generated.

Health outcomes cannot, therefore be limited to clinical evaluations. If one is clinically well, but has sold a business to pay for treatment, a situation of financial catastrophe has ensued, which makes the person poorer and more vulnerable even though his life has been saved from the illness. In like manner, the patient-reported outcomes refer to the patient's evaluation of their degree of wellness. There are situations where a physician declares the patient well, but the patient testifies the contrary, which indicates that the illness has not been handled from the roots. This disparity calls for deeper evaluation to ascertain that the correct diagnoses, treatment and prescriptions were applied (Abdul & Wang, 2019). By determining the gaps and limitations in healthcare interventions through the EHR, the evaluation of health outcomes goes further to strengthen health system as a whole.

Regulations regarding electronic medical records

The necessity of regulations in any aspect of healthcare stems from its relationship to human life, sacred from conception to natural death (CCC, 2259). Regulations regarding healthcare records are similar to those guiding other pillars of healthcare. They include confidentiality, integrity, independence, respect, transparency, timeliness (Alshammari et al., 2020). Document retention and destruction policies (Alshammari et al., 2020) should also be respected. As guiding principles and based on professional application, these can leverage electronic health records for upscaling healthcare outcomes and the overall health system strengthening in developing Countries.

Empirical considerations

Chilota (2025) conducted qualitative research into information literacy skills and utilization of electronic health records by nurses in the Federal Tertiary Medical Institutions in South-East Nigeria, which revealed that the nurses had moderate competence in identifying information needs for effective utilization of EHR; show some capacity for evaluating information in the EHR; possess the ability to detect biased information and group information according to relevance to patient care; they also possess speed in using computers and digital devices in utilization of EHR. These findings align with those of

Abdullahi, Buba & Mohammed (2020), carried out on Nurses Information Literacy Skills on the Use of Electronic Information Resources for Healthcare Services Delivery in Federal Medical Centers in North-East, Nigeria, which revealed nurses' ability to locate information and distinguish sources. Nurses with such capacities to use EHR will be enhancers of e-health.

Lee, Alving & Thrysosee (2019) conducted research on Information Retrieval as a Part of Evidence-Based Practice at a large University Hospital in New Jersey. Majority assessed their retrieval skills as good while a third said they lacked the skills. The inability to retrieve information already input, can frustrate the process of EHR usage.

Abdul & Wang (2019) studied the use of EHR in primary health in doctor-patient interactions in a Cameroonian hospital using qualitative and quantitative research methods. The use of codes was helpful for patient privacy and in producing a central server database. It showed the feasibility of EHR in Cameroon as it improved overall healthcare delivery. This group also studied the use of sensors to detect cardiac murmur in babies in a hospital in urban Cameroon. It was found to enhance e-health and treatment of the affected babies.

Theoretical Framework

The diffusion of innovation and the Actor Network theories have been used. The diffusion of innovation theory propounded by Everett Rogers (1931-2004) explains how people come to integrate new technologies. It posits that innovation is adopted at various speeds depending on its perceived usefulness and ease of understanding and application. Influenced by the media and personal contacts, some people are the early adopters, early majority, later majority and laggards. This theory was adopted in this study to enhance our verification of the slow adoption of electronic health records despite its potential and how to motivate the laggards. The theory can aid in framing more contextualized recommendations. Some health professionals have been pathfinders in the acceptance and application of electronic health records, but others do not have the motivation for digitalizing medical records because the rationale is not clear, they lack the infrastructures and know-how or just because they are conservative; so they consider it as an additional burden that serves no purpose (Jeilani & Hussein, 2025). Since most healthcare managers have probably understood that digitalization is non-negotiable for strengthening the health system, the early adaptors should be encouraged to coach the laggards for a more collective mobilization and implementation.

Through the various stages of diffusion, EHR seem to have the highest level of implementation among other forms of healthcare innovations, perhaps because they are more cost-effective (Rameshwara, Kumar & Raghavendra, 2015) in contrast with the computerized diagnoses (Lee et al, 2011), which requires more investment. Cameroon's Ministry of Public Health expects the percentage of adoption to continue to rise.

The Actor-Network theory by Bruno Latour stipulates that both human and non-human actors are required for effective communication. This theory was convoked to examine the complementarity between the human and technological elements in driving the production and usage of EHR. ICTs can combine with human persons to provide an efficient chain in the production, preservation and dissemination of electronic health records to ameliorate healthcare outcomes (Abdul & Wang, 2019). The actor-network theory consolidates that the creation of technologies that analyze and store health records can promote connectivity in health network. In this way, health practitioners can access health information from any point as long as its network is within coverage. Thus, the full implementation of the technology is successful to the extent to which human and non-human actors demonstrate commitment and proficiency in the implementation process (Abdul et Wang., 2019). It is not as though the human and non-human can be placed at the same level. Irrespective of the big data analyses of Artificial Intelligence, the human actor's ability to procure, utilize and engage ICTs and AI; to analyse EHR in connection with the socio-economic situation of the patient can have no substitute. Therefore, capacitating the human actor for this task through formal healthcare education and media and information literacy should be

prioritized.

Methodology

The non-probabilistic purposive sampling technique was used in choosing the health facilities based on the degree of their exposure and usage of the elements of electronic health records, which were St. Balise Hospital Big Mankon and Ndamukong, both located within Bamenda urban area. The timeframe of the study was from October 6-19, 2025. The stratified random sampling was used in selecting the respondents from the departments that have been networked by the HMIS. The instrument for data collection was a structured questionnaire, addressed through whatsApp to 60 health personnel in the target facilities. Non-participant observation was equally applied. The research instrument was tested by content validity, and reliability was tested using Cronbach's alpha correlation coefficient, and the result was 0.77. The coefficient had an "acceptable" internal consistency, which provided a basis for the instrument's reliability. Simple description statistics of mean and standard deviation were used in analysing the data to answer the three research questions. The data procured were analysed on a Likert's 4-point scale. A mean benchmark of 3.0 was used to make the decision; therefore, any score below the cut-off mark is considered insignificant.

Results and Preliminary Analysis

The following themes emerged from data analyses:

RQ 1. What are the factors that favour the adoption of electronic health records?

Table 1: Mean and Standard Deviation of factors that favour the adoption of EHR

No	Item description	SA	A	D	SD	Mean	STD	Decision
1.	Availability of a software	25	33	1	1	3.33	0.65	Accepted
2.	Personnels' openness to learning the software and computer skills	18	38	2	2	3.21	0.61	Accepted
3.	Availability of software designers for installation, training and maintenance	19	35	3	1	3.18	0.72	Accepted
	Cluster Mean/ Standard Deviation					**9.73**	**1.99**	

Table 1 shows the mean ratings for Numbers 1-3, which are 3.33, 3.21 and 3.18 and the standard deviation of 0.65, 0.16 and 0.72 respectively. The cluster Mean and Standard Deviation are 9.73 and 1.99 respectively. The mean exceeds the benchmark of 3.0, thus confirming that availability of software, personnel openness to learning digital skills and availability of competent software technicians are basic factors that can favour the adoption of electronic health records.

RQ 2: What are the benefits of monitoring health outcomes?

Table 2: Mean and Standard Deviation of the benefits of monitoring health outcomes

No	Item description	SA	A	D	SD	Mean	STD	Decision
4.	Healthcare outcomes constitute the goal of health interventions	14	36	7	3	3.01	0.75	Accepted
5.	Healthcare outcomes enable the healthcare providers to modify their approach and type of interventions.	15	41	2	2	3.20	0.54	Accepted
6.	They enable policy makers and governing structures to discover gaps in the healthcare operations and to address them accordingly	26	32	1	1	3.33	0.70	Accepted
7.	They facilitate the mapping of developmental variables such as population's health optimization and economic viability.	21	32	6	1	3.21	0.69	Accepted
	Cluster Mean / Standard Deviation					**12.71**	**2.68**	

Table 2 shows Items 4-7 and the mean as 3.01, 3.20, 3.33, and 3.21 and the standard deviation of 0.75, 0.54, 0.70 and 0.69 respectively. Equally the cluster Mean and Standard Deviation are 12.71 and 2.68. The mean ratings are above the benchmark of 3.0 indicating the respondents' acceptance of the benefits of monitoring health outcomes: they constitute the goal of health interventions, enable healthcare providers to modify their health interventions, help healthcare stakeholders to discover gaps in healthcare operations and facilitate the mapping of developmental variables relating to health outcomes.

RQ 3: What is the contribution of EHR in stabilizing health outcomes?

Table 3: Mean and standard deviation of how EHR can improve health outcomes:

No	Item description	SA	A	D	SD	Mean	STD	Decision
8.	They enable quick access into patients' records for emergencies and medical follow-up	28	24	10	2	3.23	0.78	Accepted
9.	They enable standardized statistics and easy retrieval for research	25	24	7	4	3.20	0.83	Accepted
10.	They enhance administrative efficiency; such as transparent billing, accountability and corruption control	22	31	4	3	3.20	0.77	Accepted
11.	They facilitate the monitoring of disease prevalence, which enable timely intervention for disease control or other public health issues such as drug resistance	22	36	1	1	3.30	061	Accepted
12.	They set the stage for AI analyses of large datasets and e-health.	26	28	4	2	3.33	0.74	Accepted
	Cluster Mean/ Standard Deviation					**16.23**	**3.76**	

Table 3 shows the mean and standard deviation ratings for Numbers 9-12 as 3.23, 3.20, 3.20, 3.33, 3.33 and 0.78, 0.83, 0.77. 0.61 and 0.74 respectively. These are above the benchmark of 3.0, which means the respondents agree that electronic health records can improve healthcare outcomes by enabling quick access to patients' records for emergency intervention and follow-up, standardize statistics for easy retrieval and usage, enhance administrative efficiency, facilitate monitoring of disease prevalence and other public health issues and set the stage for AI analyses and introduction of e-health.

Discussion of Findings

The first finding of this research revealed the principal factors required for the installation of electronic. The need for appropriate software, personnel openness to digitalization and ICT technicians for installation and maintenance tallies with Alshammari et al (2020) who found the reasons for low adaptability of EHR to be behavioral issues such as a lack of perceived advantages, poor confidence, discontent, lack of stakeholders' engagement, and ignorance about more sophisticated systems and technical factors, such as interoperability, lack of financial support or financial incentives, and lack of technology infrastructure. The 2021-2024 National Health Strategic Plan for Cameroon's Ministry of Public Health accentuate the case by indicating that Bamenda (North West Region of Cameroon) ranks third with 55.3% among the four Regions with the highest poverty rates in Cameroon. Financial viability is most likely to mitigate the acquisition of the above requirements for EHR adaptation. Conforming with the actor-network theory, Gyamfi et al (2017) highlight how financial and other barriers can hamper engagement with e-health especially in Sub-Saharan Africa. The facilities also need a strong motivation which comes from recognizing the relative advantage in engaging with HMIS and specifically, electronic health records. This ties up with Sy (2003) who argues that the digital divide exists partly because a population is not so sure of the ways digital devices would benefit them.

Secondly the research found that health outcomes need to be monitored because they constitute the goal of health interventions, enable healthcare providers to modify health interventions, help healthcare stakeholders to discover gaps in healthcare operations and facilitate the mapping of developmental

variables relating to health outcomes. The importance of assessing health outcomes is confirmed by Alshammari et al (2020) and Babatope, Adewumi, Ajisafe, Adepoju, & Bapatope (2024) who recommend that other structural barriers that interfere with the implementation of EHR processes be addressed since they inter-relate. One of the gaps consists of catastrophic healthcare spending, which Nde et al (2019) identify as responsible for 2% poverty in Cameroon. This is very relevant for the Bamenda Church that runs a health insurance scheme (BEPHA) to ensure universal access to healthcare and to reduce catastrophic health spending (Obiamaka, Mom, Myin, 2020).

Thirdly, the research highlights the benefits of EHR to health outcomes, which are: to enable quick access into patients' records for emergency intervention and follow-up, standardize statistics for easy retrieval and usage, enhance administrative efficiency, facilitate monitoring of disease prevalence and other public health issues and sets the stage for AI analyses and introduction of e-health. This tallies with Alshammari et al (2020) who found out that EHR improved overall quality of care through access to consistent and reliable information for quick decision making and patient safety. Similarly, the discovery ties with Egwud, Jegede, Oyeniyi, Ezekwwelu, Bduoguye, Okwauraiwe (2025) and Nelson et al (2022) who identify the spectrum of health outcome to be clinical status, quality of life, patient-reported outcome, functional and economic status, covering clinical, psycho-social and socio-economic dimensions. In the same line, the 2021-2024 National Digital Health Strategic Plan of Cameroon's Ministry of Health, holds that digital technologies contain great potential for advancing sustainable development goals, particularly in support of health systems, improving the quality of health services as well as their accessibility both geographic and financial. Furthermore, Babatope et al (2024) discovered that EHR improve patient wellness, increase diagnosis accuracy and facilitate efficient information exchange among healthcare practitioners. One of the added knowledge areas brought by this research is its identification of how EHR close the gaps for corruption in health facilities. Such a contribution partly responds to the concerns of U4Issue (2008) that studied corruption practice in 60 Countries and discovered that it was more rampant in low-income countries such as Cameroon, which ranked 140th of 180 in the 2024 corruption perception index of Transparency International than in the developed countries. It indicates that "corruption reduces the resources effectively available for health, lowers the quality, equity and effectiveness of health care services, decreases the volume and increases the cost of provided services" (U4Issue, p. 1). He argues that reducing corruption will make resources available for health and improve the general healthcare system. By upscaling EHR, many gaps of bribery and corruption will be sealed as also projected by Yamb & Biyemi (2016). Thus, EHR can really upscale healthcare outcomes.

Conclusion

Information is power in every discipline because it generates knowledge and ideas for innovative initiatives and improves the existing ones. Healthcare is a discipline where every decision should be quick, evidence-based and not imaginary, hap-hazard or fictitious. Logically, such evidence depends on research which feeds on healthcare information. Health records, though often neglected by poorly trained health professionals, with little understanding of its relevance (Alshammari et al (2022), are to be taken seriously because they capture the health status of individuals and of the population at large. These records are helpful in situational analyses and for projection of further actions that impact the clinical, economic, social and psychological healthcare state of the population (Buntin, Jain & Blumenthal, 2010). Many challenges experienced at the level of healthcare interventions and outcomes in Cameroon are caused by the negligence on health records. However, Abdul & Wang (2019, p.6) confirm in their case study of EHR in primary healthcare that ICTs, particularly EHR has "improved quality of service delivery" in a Cameroonian hospital. Within the pervading climate of digitalization, Cameroon's Ministry of Public Health has been on a strategic movement towards the digitalization of healthcare records. In some urban Health Districts, there exists a platform for uploading monthly statistics, which should enable the timely intervention of healthcare stakeholders. E-health as well as networking among health facilities presupposes the collection of bigger electronic health data whose benefits are outreaching nationwide and

beyond. Every health facility in Cameroon, is supposed to benefit from associated amenities; such as electricity and internet connectivity, necessary for digitalizing their services. Every challenge in this regard is supposed to be overcome so that the health facility and the population it covers are not excluded from the digitalizing evolution and the benefits involved. For in fact, the use of ICTs and EHR in particular, does enhance agility, improves operational efficiency, facilitates access to healthcare and ensure cost-effectiveness (Abdul & Wang, 2019). Above all, the ability of health personnel to analyze and interpret EHR within the context of healthcare outcomes, can drive the overall development of the nation's population: clinical, economic, psychological, socio-political.

Recommendations

The research work recommends that:

1. Healthcare professionals should change their perceptions and invest time and other resources in acquiring computer skills in order to key into the production, processing, accessing and analyses of electronic health records as they are capable of facilitating health procedures of diagnoses, treatment, evaluation and decisions for the improvement of health outcomes in the context of the progressing digital race.
2. Policy makers and governing structures should capacitate themselves to utilize ICTs that can facilitate their analyses of EHR for decision-making, evaluating and supervising the competencies of health education programs by learning from the early adopters like the health coordination of the Archdiocese of Bamenda
3. Software developers need to innovate HMIS that are appropriate for the socio-economic realities of Cameroon and boost their affordability, utilization and sustainability.

References

1. 2020-2024 National Digital Health Strategy Plan, Ministry of Public Health
2. Abdul C. & Wang, W., (2019). Information technology on healthcare: case study in electronic health records and computerized diagnosis. *Make, Learn & TIIM*, 297-306
3. Ackoff, R., (1989). From Data to Wisdom, *Journal of Applied Systems Analysis*, 16, 3-9
4. Alshammari, N., Alouthah, M., Alrshidi, A., Alshammari, M., Alrasheidi, B., Alshammari, M. F., Alsudais, A., Alsaadi, H., & Alshammari, H. (2022). The Role of Medical Records in Supporting Healthcare Quality Reporting and Performance Metrics. *Med. J. Cairo Univ.*, 90(9) www.medicaljournalcairouniversity.org
5. Andel, C., Davidow, S., Hollander, M., & Moreno, D., (2012). The economics of healthcare quality and medical errors. *Journal of healthcare finance*, 39(1), 39.
6. Alving, B. E., Lee, A. & Thrysoee, L. (2019). Information retrieval as part of evidence-based practice: retrieval skills, behavior and needs among nurses at a large university hospital. *Nordic journal of nursing research*. https://doi.org/10.1177/2057158519866612
7. Babatope, A. E., Adewumi, I. P., Ajisafe, D. O., Adepoju, K. O., Bapatope, A. R. (2024). Assessing the factors militating against the effective implementation of electronic health records (EHR) in Nigeria. *Scientific Report Nature Portforlio*.
8. Bacorro, W., Gutierrez, R., Escuadra, C., Sogono, P., Agas, R., Que, J,. Ortin, T., (2018). Internet-based computerized patient assessment system (iComPAssS): A cross-sectional analysis of need acceptance and readiness among adult cancer patients in a tertiary care center. *Journal of Hospital Management and Health Policy* 2(6).
9. Blumenthal, D. & Tavenner, M. (2020). The "meaningful use" regulation for electronic health records. *New England Journal of Medicine*, 36(6), 501-504

10. Buntin, M., Jain, S., & Blumenthal, D (2010). Health IT: laying the infrastructure for national health reform. *Health Affairs*, 29(6), 1214-1219.

11. *Catechism of the Catholic Church*, (2nd ed.). (1997). Libreria Editrice Vaticana.

12. Chilota, Okeke. Information literacy skills and utilization of electronic health records by nurses in the Federal Tertiary Medical Institutions in South-East Nigeria, Doctoral thesis. Abia State University, Uturu.

13. Djam, C. A., Tabah, E. N., Bekolo, C. E., Bate, A. E. (2014). Challenges to implementing a National Health Information System in Cameroon: Perspectives of stakeholders. *Journal of Public Health in Africa*, 5(1).

14. Egere, I., (2024). *Demystifying emerging media theory for remediating contextualizations of digital communication and artificial intelligence in Africa*. CIWA Press.

15. Egwudo, E., Jegede, O., Oyeniyi, T., Ezekwwelu, NJ., Bduoguye S., Okwauraiwe, P., et al. (2025). Integrating digital health technologies into the healthcare system: challenges and opportunity in Nigeria. *PLOS Digital Health* 4(7).

16. Elizabeth Glaser Foundation (2015). *Health System Strengthening*. HSS2015_Oct3.pdf

17. Gibbons R., Weiss, D., Frank, E., & Kupfer, D. (2016). Computerized adaptive diagnosis and testing of mental health disorders. *Annual Review of Clinical Psychology*, 12.

18. Goldzweig, C., Towfigh, A., Maglione, M., & Shekelle, P. (2009). Costs and benefits of health IT: new trends form the literature. *Health Affairs*, 28(2), 282-293.

19. Gyamfi, A., Mensahb, K. A., Oduroc, G., Donkord, P., Mockf, C. N. (2017). Barriers and facilitators to Electronic Medical Records usage in the Emergency Centre at Komfo Anokye Teaching Hospital, Kumasi-Ghana. *African Journal of Emergency Medicines*, 177-182

20. *Health Sector Strategy 2016-2027*. Ministry of Public Health, Cameroon

21. Holmes, P., Lau, K., Crossett, M. Low, C., Buchanan, D., Hamilton, G., Bardin, P., (2009). Diagnoses of vocal cord dysfunction in asthma with high resolution dynamic volume computerized tomography of the larynx, *Respiratory*, 14(8), 1106-1113.

22. Jeilani, A., & Hussein, A. (2025). Impact of digital health technologies adoption on healthcare workers' performance and workload: perspective with DOI and TOE models. *BMC Health Services Research*. https://doi.org/10.1186/s12913-025-12414-4

23. Middleton, B., Bloomrosen, M., Dente, M. Hashmat, B., Koppel, R., Overhage, J., & Zhang, J. (2018). Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA. *Journal of the American Medical Informatics Association*, 20(e1), e2-38.

24. Nde, C., Raymond, A., Saidu, Y., Cheng, N., Nzuobontane, D., Atemnkeng, J., Mbacham, W. (2019). Reaching Universal Health Coverage by 2035: Is Cameroon on track? *Universal Journal of Public Health* 7(3): 110-117

25. Nelson, E., Butterly J., Collacchio T., Mastandun M., (2022). Better patient and population outcome, in *Sustainably improving healthcare* 11-31,

26. Obiamaka, O. V., Mom, N. A., Myin, K. B. (2020). The effect of adequate funding and health service provision on micro health insurance growth: the case of BEPHA in the NWR of Cameroon, *European Journal of Health Sciences*

27. Oke, G. I., Sibomana, O. (2025). Adoption of digital health technology in Nigeria: A scoping review of current trends and future directions. *Advances in Public health*, 2025(1).

28. Ondogan, A. G., Sargin, M, Canoz, K. (2023). Use of electronic medical records in the digital healthcare system and its role in communication and medical information sharing among healthcare professionals. *Elsevier*, 42(2023) 101373, www.elsevier.com/locate/imc
29. Pearson, M., Colombo, F., Murakami, Y., James, C. (2016). Universal Health Coverage and health outcomes, *OECD Final Report. www.oecd.org*
30. Pepito, J. A., Babate, F. J., Dator, W. L. (2023). The nurses' touch: An irreplaceable component of caring. *PubMed Central.* 10(9):5838–5842. http://pmc.ncbi.nlm.gov/articles/pmc10416036
31. Rameshwara, G. N., Kumar, N., & Raghavendra, B. (2015). Effects of computerized patient records on patients. *Bonfring International Journal of Man Machine Interface*, 3(3), 25.
32. Ratwani, R., Fairbanks, R., Hettinger, A., Brenda N. (2015). Electronic health record usability: analyses of the user-centered design processes of eleven electronic health record vendors. *Journal of the American Medical Informatics Association*, 22(6), 1179-1182.
33. SCORE for health data technical package, 2000, World Health Organisation. www.who.int
34. Nordberg, Carin and Vian, Taryn (2008), Corruption in the health sector. *U4Issue anti-corruption center.*
35. Yamb, B. & Bayemi, O. (2016). Bribery in Cameroonian public hospitals: who pays and how much? *Asian Journal of Social Sciences and Management*, 3(1), 7-17