Adoption of Electronic Medical Records Among Health Workers in Selected Public Health Facilities in Banaadir, Somalia

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ABSTRACT

Background

Electronic Medical Records (EMRs) have emerged as vital tools for enhancing the quality and coordination of healthcare services worldwide. By providing convenient access to patient history, reducing medical errors, and streamlining workflow, these digital systems can significantly improve overall patient outcomes. However, in many developing countries—including Somalia—adoption of EMRs remains slow and inconsistent. Specifically, public health facilities in regions like Banaadir continue to face structural, technical, and organizational barriers that inhibit the rapid and widespread utilization of these technologies.

Objectives

The broad objective of this study was to assess the level of adoption of EMRs among health workers in selected public health facilities in Banaadir. The specific objectives of the study were: To determine the socio-demographic characteristics, technological factors and health system factors associated with adoption of EMRs.

Methodology

A descriptive cross-sectional research design was adopted to provide a snapshot of EMR use in selected Banaadir public hospitals. The study population comprised doctors, nurses, laboratory technicians, and administrative staff who regularly handle patient records. A sample of 150 respondents was drawn using stratified random sampling to ensure representation from each professional cadre. Quantitative data was collected through structured questionnaires. Descriptive statistics were used to determine frequencies, means, and standard deviations. As for inferential statistics, χ^2 test was used to determine the association between independent variables and EMR adoption.

Key Findings

The study achieved a high response rate of 88.9% (n=80). EMR adoption was significantly influenced by age (p=0.001; Cramer's V=0.284), with younger health professionals more likely to adopt the systems. Educational level also played a crucial role (p=0.001; Cramer's V=0.292), as those with higher academic qualifications exhibited higher usage. Furthermore, the frequency of software usage showed a strong positive correlation with adoption (p=0.001; Cramer's V=0.284), demonstrating that routine interaction with digital systems promotes familiarity and integration into clinical workflows. Regarding institutional factors, the extent of EMR implementation within hospitals significantly impacted adoption (p=0.013; Cramer's V=0.328). Facilities with complete or partial EMR systems reported higher staff uptake compared to those without implementation. Notably, 61.3% of respondents indicated that their hospitals operated under a hybrid model combining paper-based and electronic systems, signalling ongoing digital transition. Most respondents (82.5%) reported basic computer literacy, while 81.3% had previous exposure to EMR systems.

However, technological barriers persist. Limited availability of EMR software (Mean=2.44, SD=1.20), concerns over data privacy and internet connectivity (Mean=2.57, SD=1.18), and inconsistent technical support were highlighted as major impediments. Despite these challenges, a majority expressed positive perceptions of EMRs, particularly in enhancing data management and patient care.

Conclusion

This study highlights a critical disconnect between the recognized benefits of EMRs and their actual implementation in routine healthcare practice within Banaadir's public hospitals. While health workers acknowledge the value of digitized records, widespread adoption is constrained by systemic issues such as limited ICT infrastructure, insufficient technical support, and individual challenges like digital illiteracy and resistance to change. As a result, the full potential of EMRs to improve patient care, streamline clinical workflows, and support data-driven decisions remains largely untapped. Addressing these challenges will require coordinated, multi-level strategies—strengthening infrastructure, investing in capacity-building, and cultivating a policy environment that actively supports digital transformation. Without these efforts, EMRs will continue to fall short of delivering their intended impact on Somalia's healthcare system.

Recommendations

To improve EMR adoption in Banaadir's public health facilities, key actions are needed. First, provide regular digital literacy training tailored to different professional and age groups to build user confidence and competence. Second, invest in reliable ICT infrastructure, including stable internet, hardware, and on-site technical support. Full implementation of EMR systems in all hospitals should be prioritized, as partial or no implementation limits adoption. Additionally, policies that promote digital acceptance and accountability should be introduced. Collaboration between government, health institutions, and partners is essential to create a supportive environment for sustained EMR integration.

Keywords: Electronic Medical Records, Health Information Systems, Technology Adoption, Health Workers, Public Health Facilities.

BACKGROUND

Electronic Medical Record (EMR) is a real-time digital representation of the patient's paper chart that includes programs that can be used to analyze patient history information and quickly and securely access information to authorize users. The healthcare sector is among the most complex and ever-changing industries in the contemporary economy. Constant innovation produces cutting-edge technologies, each of which has the potential to significantly improve clinical practice and the healthcare industry [8]. Unfortunately, the healthcare industry continues to lag significantly behind other industries and countries in terms of implementing Information Technology (IT) in the workplace [25].

The idea of EMR usage in clinical settings emerged in the late 1990s. Larry Weed thought of keeping patient records electronically rather than on paper. This was to enable a third party to independently check the diagnoses provided to patients. These EMRs have become a critical factor determining safety and quality of healthcare, cutting treatment costs, minimizing hostile events for patients, streamlining procedures, enhancing clinical research, and achieving best clinical performance [27].

Despite existence of several Research and Development programs and growth of capital investments, effective IT projects in the healthcare industry are still uncommon. It is necessary to have an acceleration strategy for innovation, commencing with a diagnosis of the issue [25]. In a different study on EMR conducted in Germany and Australia, there was a good attitude towards EMR use, but providers believed that the system had information gaps and other problems with data security in spite of widespread media coverage and support.

Regionally, international initiatives play a significant role pertaining to the recent increase of EMR availability in Africa. Majority of Sub-Saharan African nations, especially those that speak French, are trailing behind in terms of implementing EMR. One of the main reasons why electronic health information systems have been developed is because of the need to give aggregate statistics to support organizations or the government. Healthcare delivery in Africa, where paper-based methods are still widely utilized, and the use of computerized patient management systems, is incredibly little [8]. The EMR is a specialized form of accessible EHR system distributed in Somalia that satisfies the conditions outlined by the Somalia Ministry of Health in their 2022 EMR Standards and Guidelines. Further, the system is being developed and has already been set up at close to 50 places around Somalia.

Implementing e-Health has seen Somalia upgrading vital initiatives and enacting important policies. These include the Somalia ICT Policy, Strategy and Action Plan for Healthcare Systems, and Somalia Standards and Guidelines for EMRs. General hospital wide EMRs for all disease conditions have not yet been deployed in Somalia's government hospitals [3]. In Somalia, healthcare is heavily privatized. The federal government of Somalia's Ministry of Health oversees the country's healthcare system. Public hospitals EMR installation is fraught with difficulties. These challenges usually fall into two categories of infrastructure and structure issues such as data transfer, non-adjustment, lack of need assessment, cultural issues, costly software and hardware costs [29].

Statement of The Problem

Global health organizations like the World Health Organization (WHO), World Bank (WB), and the Ministry of Health in Somalia advocate for widespread EMR implementation to enhance health care quality, reduce errors and improve patient outcomes [29]. Despite this, there is low adoption of EMR in public health facilities within Banaadir Region, Somalia. Currently, this stands at 12% in line with the global trends, thus impeding potential benefits for healthcare delivery and patient outcomes. Presently, handwritten records have been noted to lead to errors and inefficiencies, while EMRs offer remote access, quicker retrieval and reduced errors. Challenges in Banaadir include technology resistance, awareness gaps, resource limitations, skill shortages, user resistance, policy hurdles, subpar ICT equipment and maintenance issues. This study aimed to investigate factors influencing EMR adoption in Banaadir's public health facilities, addressing barriers and providing insights into successful adoption strategies to enhance healthcare delivery. By contextualizing the issues and gathering data, this would offer recommendations for improved EMR implementation and better patient health outcomes in the region.

Significance of The Study

This study is significant as it examines the adoption of Electronic Medical Record (EMR) systems in Somalia, where progress remains limited despite efforts by the government and health stakeholders. Public hospitals, especially in the Banaadir region, have little experience with EMR systems, making this research both timely and relevant. Similar studies support the importance of this topic. [1] highlighted the need for readiness among health professionals for successful EMR implementation. [2] discussed challenges faced by physicians in low-resource settings, while [3] identified key factors influencing EMR adoption using the UTAUT2 model. [4] also explored perceptions of EMR systems in Gulf countries, showing how technical and cultural factors impact acceptance. This study adds to the existing body of knowledge by focusing on Somalia's unique context and offers valuable insights for improving healthcare delivery through effective EMR adoption.

Objectives

To assess factors associated with the adoption of electronic medical records among health workers in selected public health facilities in Benaadir, Somalia.

1. To determine the socio-demographic characteristics associated with adoption of EMR among health care workers in selected public hospitals in Benadir, Somalia.
2. To determine the level of adoption of EMR among healthcare workers in selected public hospitals in Banadir, Somalia.
3. To identify the technological factors associated with the adoption of EMR among health care workers in selected public hospitals in Benadir, Somalia.
4. To find out the health system factors associated with the adoption of EMR among health care workers in selected public hospitals in Benadir, Somalia.

Research Questions

1. What socio-demographic characteristics were associated with the adoption of EMR among health care workers in selected public hospitals in Benadir, Somalia?
2. What is the level of adoption of EMR among healthcare workers in selected public hospitals in Banadir, Somalia?
3. What were the technological factors associated with the adoption of EMR among health care workers in selected public hospitals in Benadir, Somalia?
4. What were the health system factors associated with the adoption of EMR among health care workers in selected public hospitals in Benadir, Somalia?

LITERATURE REVIEW

Electronic Medical Record Standards

Somalia's National EMR Standards and Guidelines (ESG) require that EMR systems must support six critical functional areas: clinical decision support, order input, prescription writing, basic demographic and clinical health data, reporting health information, privacy and security, and electronic information sharing [21]. The development of the local EMR quality was based on the ISO/TR 20514: Health Informatics, where the EMR was used as a reference. This guided the definition, range, and configuration of ISO/TS 22220: Health Informatics Identification of Healthcare Subjects.

Reviewing some systems utilized in Somalia's medical institutions revealed they did not meet the six minimum functional areas established by the ESG as critical for determining Somalia's standards for EMR systems. However, these evaluations, which were ordered by NASCOP and HIS, were critical for both identifying systems and categorizing issues with the software under consideration. These included; restricted capacity for input, a wide range of reporting options, long-term sustainability issues, varied functionality degrees and data security, and inconsistent vendor/technical support on EMR system data for patient care, and restricted information sharing between systems [15].

Socio-Demographic Characteristics Associated With EMR Adoption

When entering patient health data into the EMR system, basic computer skills are required. However, some medical professionals lack these abilities, making it challenging to accurately enter patients' medical information [20]. Higher education is required for the EMR application workforce [22]. Studies indicate that a significant factor in doctors' opposition to EMRs is a lack of knowledge and computer abilities [30].

This lack of ICT knowledge and proficiency among medical professionals is attributed to the lack of proper ICT integration into the curricula of most medical programs [9]. As a result, EMR vendors frequently fail to consider this factual reality in their programming and disregard it in order to collect patient medical data and make notes and prescriptions. The systems developed require doctors to have extensive computer skills, such as fast typing skills [2]. At institutions where EMRs are being used, the inability to develop these abilities has given rise to a new kind of medical mistake known as typos [9]. Not only do doctors lack computer skills, but also many other types of staff members work in healthcare institutions as well [6].

When implemented, the systems have a many negative feedback on the delivery of healthcare services. Medical professionals must be well-versed with information technology applications due to the adoption of new medical equipment and the possibility of networking. The rate of depression among Chinese psychiatric medical staff was higher than the general population but lower than the prevalence of depression among Chinese medical staff as a whole, according to another study that examined the prevalence, social-demographic, and cognitive correlates of depression in this group [4].

Clients with a high viral load (VL) encounter numerous barriers that affect their attendance to Individualized Addiction Counseling (IAC), according to a study investigating factors associated with completion of intensive adherence counseling sessions among HIV patients with high viral load in Neno, Malawi. According to another study that looked at factors that influence healthcare workers' decision to get the COVID-19 vaccine, Saudi Arabia has a big problem with getting enough people to get the vaccine. To solve this, they need to spread positive messages about vaccination and the COVID-19 vaccine in particular [7].

Medical professionals in China were the subjects of a study that found a positive correlation between work-related factors and both verbal and physical violence in the workplace. Being a doctor or manager, working nights more often, having a poor impression of the workplace, and having a certain social status were some of the factors that were considered [28]. Medical professionals in China showed a high degree of awareness about monkeypox and had a positive attitude towards encouraging monkeypox vaccination, according to a study that looked at their perceptions and concerns about the disease as well as their attitudes towards monkeypox vaccination [23].

Researchers in Southern Ethiopia's Gamo Zone examined hospital staff members' levels of preparedness to use an EMR system. The purpose of this research was to determine what variables are connected with health professionals' preparation for electronic medical records and to assess their level of preparedness. Despite being deemed insufficient, the survey found that more than half of the participants reported a good level of overall preparedness for the introduction of EMR systems, [12]

Technological Factors Associated With EMR Adoption

The internet serves as the foundation for creating the many EMR applications. The internet is required for facilities that communicate data, telemedicine, and access to health information [18]. A reliable internet connection with a high speed that can improve data recovery and transmission is necessary for regular usage of EMR [24]. The biggest barrier to the adoption of EMR in poor nations is a slow internet connection [18].

The EMR hardware and software must be used in conjunction with coordination of various machines that are compatible with the EMR system [31]. It is well-known that physicians who have utilized electronic medical records have highlighted connection concerns as an impediment to its widespread adoption. In southwestern Ethiopia, researchers looked at healthcare providers' preparedness to adopt electronic health records. They found that while some were good, the majority were not ready [19].

Additionally, almost 40% of healthcare professionals scored above the mean in terms of their desire to utilize electronic medical records (EMR), according to a research that looked at the determinants of EMR adoption among health care providers at referral hospitals in north-west Ethiopia [3]. One important aspect that emerged as a determinant of healthcare providers' inclination to embrace EMRs is performance expectation. Problems with technical, financial, time, legal, organizational, and psychological aspects were among the many barriers to the adoption of electronic medical records (EMR) that a meta-analysis of twenty-one research on the topic found [14]. An integrated method including UTAUT, TAM, and external variables was used to examine the determinants influencing EMR adoption in the UAE healthcare system. The study found that the desire to utilize an EMR system was the main predictor of its actual adoption. Trust, innovativeness, self-efficacy, and anxiety all had direct effects on the TAM construct [5]. A separate research looked at the characteristics that affected the uptake of health IT by community-dwelling seniors and found that performance expectation, effort expectancy, and cost value were the most important. Priorities such as product design and privacy/security were also important [16].

Articles addressing the adoption status, potential, and constraints of electronic medical record (EMR) systems in low-income countries (LICs) were the topic of a systematic review that aimed to improve healthcare quality in these nations through adoption. According to the study, there are several elements that impact the adoption of electronic health record systems. These include people, their surroundings, the tools they use, the jobs they do, and the relationships between these aspects [32]. According to research on the preparedness of healthcare workers to adopt electronic medical record systems and related variables in Sidama region's public general hospitals, the preparedness of healthcare workers is insufficient [1]. Consequently, prior to adopting the system, it is essential to undertake capacity development initiatives to increase knowledge and improve the abilities of health professionals. Perceived usability, utility, user requirements, and individual factors are the most important factors impacting healthcare professionals' attitudes towards electronic health record (EHR) systems in GCC countries, according to another systematic review [4].

Health System Factors Associated With EMR Adoption

Given that EMR is yet to established itself in the country's public healthcare administration, the idea or system of using electronic medical records in clinical management is still relatively new. As a result, the personnel using the EMR system may be very resistant to it. When deploying a new electronic health records (EHR) system, clinics must overcome numerous obstacles. Getting all medical staff especially doctors on board with the new approach is frequently a difficult task. Facilities may initially have trouble maintaining production as a result of this and other issues. Studies have noted that more than 85 percent of solo and group practitioners rejected EMR in favor of paper charts. This is despite existence of numerous EMR apps and vendors. Projections imply that it will take no more than ten years for doctor EMR adoption to reach 80% [10].

In Jordan, it was found that physicians' perceptions of the threat posed by EMRs had an impact on their decision to adopt the system. For doctors who have their own long-established work styles, the adoption of EHRs in medical practices causes a significant transformation, particularly in terms of control over work operations and the relationship they have with their patients. Physicians believe that the EHR's policies and procedures conflict with their independent practice and negatively impact the EHRs. This makes them feel as though their doctor-patient relationship is in danger thus less likely to use the system. As per the researcher carried out in India, doctors were more likely than patients to oppose the adoption of EMRs. However, more than 80% of healthcare professionals who opposed EMRs did so because of the technology's usability and effectiveness and not because of EMRs' purpose or advantages.

The mental health of healthcare personnel was put to the test in the midst of the COVID-19 pandemic. [11] found that healthcare staff treating COVID-19 patients experienced a range of psychological disorders, including sadness, anxiety, sleeplessness, stress, and PTSD. Researchers found that health care professionals' moral resilience might be a useful tool in the fight against the COVID-19 pandemic's devastating effects [26]. Other findings indicate that such healthcare workers (HCWs) and first responders (FR) experiencing Clinical Records Objectivity Scale (CROS) may have treatable psychiatric symptoms, which can affect their well-being and have implications for the healthcare system [13]. A research conducted in Nepal on the effects on mental health in a low-resource context found that during the early phases of the COVID-19 epidemic, a large number of health workers experienced symptoms of anxiety, sadness, and sleeplessness [17].

METHODOLOGY

Study Design

This study employed a descriptive cross-sectional study design, suitable for describing an individual's or a group's characteristics. This therefore informs its adoption, given that this research was primarily concerned with the implementation of EMR in the public hospitals in Banaadir, Somalia.

Study Variables

Dependent Variables

The dependent variable in this study was the adoption of Electronic Medical Records (EMR) in public hospitals within the Banaadir Region of Somalia. EMR adoption refers to the extent to which these hospitals have integrated electronic technologies for documenting and managing patient medical data. This is crucial for understanding the progress of technology and digitalization in healthcare, and it plays a vital role in improving healthcare service delivery, patient safety, and overall treatment quality.The assessment of EMR adoption involved looking at the existence and use of electronic platforms for various medical data, as well as the active participation of healthcare professionals in using these systems in their daily routines. A variety of data collection methods, including interviews, questionnaires, and on-site observations, were employed to evaluate EMR adoption. The hospitals were then classified based on their level of EMR implementation (fully, partially, or not implemented) to provide a clear understanding of the current status of EMR integration in public healthcare facilities.

Independent Variables

The study examined several independent variables that can influence the adoption of EMR in public hospitals in Banaadir Region, Somalia. These included socio-demographic factors such as age, sex, education level, and material position, which may impact healthcare workers' attitudes and familiarity with technology. Additionally, technological skills, particularly computer knowledge, as it can influence the ease of using EMR systems. The study also explored health system factors, including the readiness and availability of EMR systems, the extent of EMR usage in hospitals, and the overall adoptability of EMRs within the healthcare setting. By investigating these independent variables through surveys, interviews, and observations, the study aimed to gain insights into the drivers and barriers affecting EMR adoption, ultimately contributing to the development of targeted strategies to enhance EMR, and improve healthcare service delivery in the region.

Location and Population

The research was carried out in the Banaadir Region of Somalia, which includes the urban Centre of Mogadishu. It functions as the capital city of Somalia and stands as one of the most densely populated urban centers within the nation, with a populace of over 4,288,000 individuals. The historical significance of Mogadishu's strategic position has been attributed to the facilitation of trade and commerce across the Indian Ocean, hence establishing it as a prominent commercial center within the area.

The Banaadir Region, which serves as a significant administrative division within Somalia, includes a number of public hospitals that provide healthcare services to a considerable portion of the population. The region contains prominent hospitals such as Benaadir Hospital, Martini Hospital and SOS Hospital, located in the capital city of Mogadishu. Benaadir hospital is a renowned healthcare establishment and referral center within the locality. The hospital has multifaceted operations and diversified patient demographic population, a valuable prospect for investigating the implementation of EMR inside an intricate healthcare environment.

Benaadir Hospital operates as a versatile institution, fulfilling several roles including those of a public, teaching and specialized facility for maternal and child healthcare, and a national referral Centre. The hospital was established in 1976 as a component of a developmental initiative instigated by the Chinese government with the aim of providing assistance to address the healthcare requirements of Somali population. The hospital is subject to the regulatory authority of the Federal Ministry of Health (FMOH). Despite possessing a total capacity of 700 beds, the present utilization rate is at 550 beds. The hospital has a workforce consisting 398 individuals, including both medical and non-medical professionals. Martini Hospital on the other hand, has a workforce of roughly 600 healthcare professionals while SOS hospital has 450 healthcare providers.

The target population of this study comprises health care workers employed in public hospitals within Banaadir Region, Somalia. The study primarily centers on two prominent public hospitals, namely Martini Hospital and SOS Hospital, located in the capital city of Mogadishu. Martini Hospital, a prominent healthcare institution within the local area, has a workforce of roughly 600 healthcare professionals. This includes 80 doctors, 200 nurses, 50 medical specialists, 70 paramedics, 40 laboratory technicians, and 160 administrative staff members. However, SOS Hospital, a notable public healthcare facility, has a workforce of about 450 healthcare professionals. This includes 60 doctors, 150 nurses, 30 medical specialists, 50 paramedics, 30 laboratory technicians, and 130 administrative staff members. The target demographic population consists of about 1,050 healthcare professionals from both Martini Hospital and SOS Hospital. This heterogeneous assemblage of professionals encompasses a range of positions and responsibilities inside healthcare institutions, including a wide array of specialized knowledge and skills necessary for the provision of comprehensive medical services.

Sampling Techniques

The Banaadir Region was purposively selected as it serves as a significant administrative division within Somalia. It pays home to a number of public hospitals that provide healthcare services to a considerable proportion of the population. Both Martini Hospital and SOS Hospital were randomly selected out of the three prominent hospitals in Benadir Region. Stratified random sampling was used to split the research populace into comparable subclasses based on professional units (cadres) comprising of doctors, medical specialists, nurses, laboratory technicians, paramedics and administrative staff. They were then sampled using simple random sampling with the aid of computer-generated random numbers. The sample size selected from each cadre was proportional to their respective estimated population size.

Table 1: Proportion of respondents selected from each hospital

Cadre	Martini Hospital	SOS Hospital	Martini sample	SOS sample	Total sample
Doctors	80	60	7	5	12
Medical Specialists	50	30	4	3	7
Nurses	200	150	17	13	30
Paramedics	70	50	6	4	10
Lab technicians	40	30	3	3	6
Administrative staff	160	130	14	11	25
Totals	**600**	**450**	**51**	**39**	**90**

Size Determination

The formula applied to calculate sample size in this study was Fishers et.al. (1998).

$$n = \frac{Z^2\, p\, q}{d^2}$$

$$= \frac{1.96^2 \times 0.12 \times 0.88}{(0.05)^2}$$

$$= 162$$

For finite populations;

nf= desired sample size = $n \div (1 + n/N)$

$= 162 \div \{1 + (162/200)\} = 89.5$

= 90 healthcare professionals sampled.

Where;

n= Desired study sample size when the estimate population is more than 10,000

nf= desired sample size for populations less than 10,000

N= Estimate finite populations less than 10,000

z = At 95% CI, the standard normal deviation is 1.96

p = Percentage of the target population which has implemented EMR (12%)

q = p-1=1-0.12=0.88

d = accuracy degree (+/- 0.05)

Research Instruments

Primary data was gathered using a mix of quantitative and qualitative tools. Questionnaires that were semi-structured and included both closed- and open-ended items were used to gather quantitative data (Appendix iv). There were questions on their demographics, health care system, technology, and the extent to which they had adopted electronic medical records. Qualitative data was also gathered through the use of key informant interview guides. The study's aims informed the design of the equipment.

Data Collection Methods

After recruitment of respondents from selected health facility, trained research assistants administered research questionnaires to collect quantitative data on EMR adoption among healthcare workers. The study's purpose was explained and instructions clarified on filling the questionnaires before administration. Those who consented were interviewed in their respective offices. The completed questionnaires were collected, checked for accuracy and stored in locked cabinets accessible only to the principal researcher. Additionally, qualitative data was collected, presided by the principal researcher from key informants comprising of departmental in-charges prior to consenting and on appointment.

Validity and Reliability

The researcher sought expert opinions from her supervisors. The questions were aligned with the specific research objectives guided by a thorough literature review. This informed the content of the instruments to ensure relevance and accuracy. The sampling techniques used ensured random samples were obtained thus representativeness.

This was achieved through proper training and selection of research assistants. The research tools were pre-tested prior to actual study. Test-retest reliability was done by administration of same research instruments twice within a particular time period to the same respondent groups to ensure consistency.

Data Analysis Technique

Prior to analysis, the data underwent a thorough review for consistency and completeness, ensuring that all relevant data points were included and any discrepancies were addressed. Data cleaning and coding were performed to prepare the dataset for statistical analysis. The Statistical Package for Social Sciences (SPSS) version 20 was employed as the primary software for descriptive data organization and analysis. To assess the level of significance between different variables and explore potential associations, χ^2 test was utilized at 95% CI and an error of precision of 0.05. This enabled identification of any statistically significant associations between the independent variables related to EMR adoption. The results were presented in tables, graphs, percentages and pie-charts. The statistical analysis provided evidence-based insights, enabling

drawing meaningful conclusions and making informed recommendations to support successful EMR implementation and integration within the region's healthcare facilities.

Ethical Consideration

The Graduate School of Kenyatta University gave its stamp of approval to the research. We contacted the Kenyatta University Ethics and Review Committee (KUERC) to get their stamp of approval. As a result, we know the study's methodology, design, and ethical concerns were all checked and found to be in compliance with our standards. Prior to data collection, the research also obtained authorization from the relevant facility management in the Banaadir region.

The participants were given explicit information about the study's objective, methods, and any potential risks or benefits, and the data was kept private and confidential. The researcher implemented measures to protect data privacy and ensured that only authorized personnel had access to the collected data.

RESULTS

The section commences by disclosing the response rate achieved during the data collection process as shown in the Table below. Subsequently, it delves into the demographic details, health system factors, technological factors and extent of adoption of Electronic Medical Records (EMRs) prevailing among health workers in selected public health facilities in Banaadir, Somalia.

Table 2: Response Rate

Responses	Frequency	Per cent (%)
Interviewed	80	88.9%
Not interviewed	10	11.1%
Total	90	100%

The researcher distributed 90 questionnaires and received 80 completed ones representing a good response rate of 88.9%. This rate indicates that the sample size was well representative of the population.

Socio-Demographic Factors

In this study, the researcher aimed to collect demographic information from the participants to better understand the background components that may have influenced their perspectives on Electronic Medical Record adoption. This demographic information serves as a fundamental groundwork for drawing conclusions from the research findings.

Gender Respondents

The study sought to determine gender distribution of gender whereby majority (57.5%) of participants were male while 42.5% were female as shown in Figure 1.
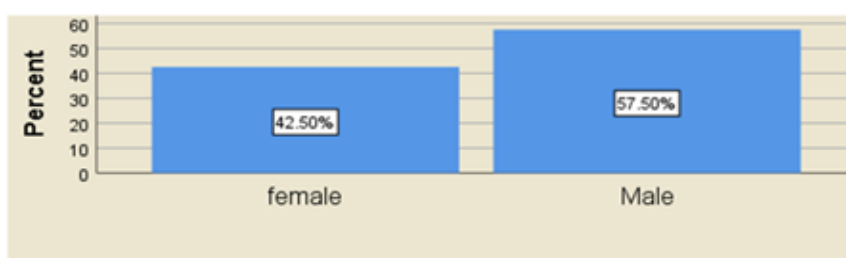

Figure 1: Gender of respondents

Age Respondents

This study's age distribution sheds light on the age composition of healthcare professionals at public institutions in Benaadir, Somalia. The significant proportion of persons in their early thirties may indicate a trend of younger healthcare professionals entering the field. This discovery is significant in understanding the possible impact of demographic disparities, technical familiarity, and adaptation to ICT-based systems such as EMRs as shown in Figure 2.
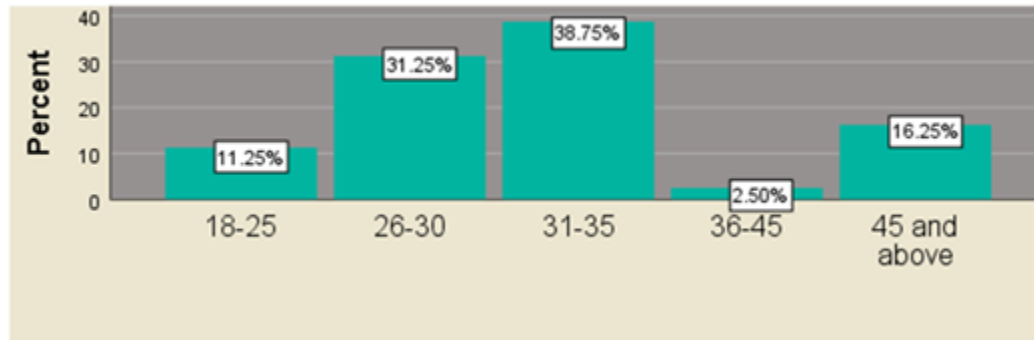

Figure 2: Age of Respondents

Table 3: Professional Qualification of Respondents

Variables	Categories	Frequency	Percentage
Qualification	Clinical officer	19	23.8%
	Nurse	31	38.8%
	HRIO	21	26.3%
	Laboratory technician	5	6.3%
	Pharmaceutical officer	4	5.0%
	Total	**80**	**100.0%**

Highest Educational Level

The participants' different educational backgrounds give insights into their knowledge and abilities, which might impact their adoption and use of Electronic Medical Records (EMRs) in clinical management. Understanding the association between educational degrees and EMR use might help improve healthcare professional training and support programmers as shown in Table 4.

Table 4: Education Level

Variables	Categories	Frequency	Percentage
Educational level	Certificate level	2	2.5%
	Diploma level	19	23.8%
	University graduate	31	38.8%
	Post graduate	28	35.0%
	Total	**80**	**100.0%**

Association between Socio-Demographic Characteristic and EMR Adoption

Regarding the professional qualification, the analysis did not reveal a significant association with the adoption of EMR systems (p = 0.329) and a Cramer's V coefficient of 0.240 indicate a non-significant

relationship. This suggests that participants with different qualifications, such as Clinical Officers, Nurses, HRIOs, Laboratory Technicians, and Pharmaceutical Officers, have similar rates of adoption of EMR systems. Education level, on the other hand, was found to be significantly associated with the adoption of EMR systems (p = 0.001) and Cramer's V coefficient of 0.292 indicates a strong association. This implies that participants with different educational backgrounds, ranging from Certificate level to Postgraduate, have varying rates of adoption and utilization of EMR systems as shown below.

Table 5: Association between Socio-Demographic Characteristic and EMR Adoption

		Yes	No	Total	χ^2	df	p-value	Cramer's V
Gender	Male	28	6	34	0.047[a]	1	0.001	.024
	Female	37	9	46				
Total		**65**	**15**	**80**				
Age	18-25	9	0	9	6.470[a]	4	0.001	.284
	26-30	17	8	25				
	31-35	25	6	31				
	36-45	2	0	2				
	45 and above	12	1	13				
	Total	**65**	**15**	**80**				
Qualification	Clinical Officer	3	16	19	4.612[a]	4	.329	.240
	Nurse	9	22	31				
	HRIO	3	18	21				
	Laboratory technician	0	5	5				
	Pharmaceutical officer	0	4	4				
	Total	**15**	**65**	**80**				
Education level	Certificate level	0	2	2	6.809[a]	3	.001	.292
	Diploma Level	1	18	19				
	University Graduate	10	21	31				
	Post graduate	4	24	28				
	Total	**15**	**65**	**80**				

Table 6: Familiarity with and Proficiency of EMR

	1	2	3	4	5	Mean	SD
Word processor, data base systems, spreadsheets etc.	6.3%	16.3%	30.0%	30.0%	17.5%	2.64	1.139
Internet use, for example search engines (Explorer, google, Yahoo, Mozilla, etc.)	3.8%	11.3%	42.5%	25.0%	17.5%	2.59	1.027
Emailing, such as, Outlook, Gmail and Yahoo.	13.8%	23.8%	13.8%	21.3%	27.5%	2.75	1.436
Average						**2.66**	**1.200**

The results present participants' level of familiarity with and proficiency in various computer-related skills. The findings revealed that a significant proportion of participants reported familiarity with word processing, database systems, spreadsheets, and similar tools, indicating familiarity and expressing strong proficiency. This suggests that the participants possessed a moderate level of familiarity and proficiency in using these computer tools.

The average mean rating indicates a moderate level of familiarity and proficiency across these computer-related skills. These findings highlight the need for targeted training and support programs to enhance participants' computer skills and proficiency.

EMR's Usability

The study sought to assess the usability of the Electronic Medical Record (EMR) system in terms of day-to-day system operation. The results indicate a range of perceptions among the participants as shown in Figure 3.
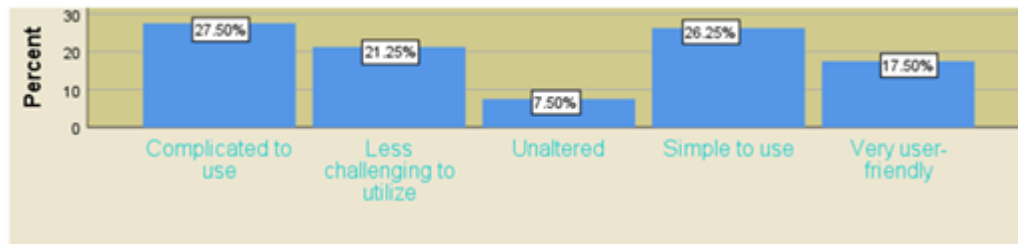

Figure 3: EMR's Usability

These findings reflect the varied experiences and perspectives of the participants regarding the usability of the EMR system. While some participants found the system complicated or challenging to use, others perceived it as simple, user-friendly, or relatively less challenging. These results emphasize the importance of addressing usability concerns to enhance the user experience and ensure that the EMR system effectively supports healthcare professionals in their day-to-day tasks. Improving the usability of the system can lead to increased efficiency, effectiveness and satisfaction among users, ultimately benefiting patient care and healthcare delivery.

Staff ICT Knowledge and Skills Affect Hospital's Acceptance of EMR

These findings underscore the significance of addressing factors such as fear of technology, information gaps, computer proficiency, and underuse to promote successful adoption and utilization of EMR systems in healthcare settings. By addressing these perceptions and providing appropriate training and support, healthcare institutions can enhance the acceptance and effective use of EMR systems among their staff as shown in Table 7.

Table 7: Staff ICT Knowledge and Skills Affect Hospital's Acceptance of EMR

	1	2	3	4	5	Mean	SD
Medical professionals struggle to implement EMR systems because of their fear of technology.	1.3%	7.5%	25.0%	30.0%	36.3%	2.07	1.016
Health experts would rather have someone else perform computer-related tasks on their behalf than use computers themselves.	0.0%	5.0%	37.5%	51.2%	6.3%	2.41	.688
Lack of information about EMR affects its adoption and use	1.3%	21.3%	23.8%	17.5%	36.3%	2.34	1.211
The general level of computer proficiency among us has an impact on how we use the EMR in our hospital.	3.8%	20.3%	17.7%	21.5%	36.7%	2.33	1.268
The use and adoption of EMR technology are hampered by its underuse.	25.0%	5.0%	13.8%	25.0%	31.3%	2.67	1.573
Average						**2.364**	**1.1512**

Staff's Computer Literacy

These findings emphasize the need for continuous training and support to enhance computer literacy skills among staff and ensure that the hospital's technical team remains equipped to operate IT systems effectively. By investing in training programs and providing adequate resources, healthcare institutions can strive to bridge any gaps in computer literacy and technical expertise, thereby enhancing the overall utilization of IT systems for improved healthcare delivery as shown in Table 8.

Table 8: Staff's Computer Literacy

	Very High	High	Fair	High	Very High	Mean	SD
Computer literacy	15.0%	13.8%	30.0%	21.3%	20.0%	3.18	1.320
Hospital's technical team proficiency at operating IT systems	6.3%	8.8%	36.3%	26.3%	22.5%	3.50	1.125
Average						**3.34**	**1.2225**

Adoption Level of EMR in Public Hospitals in Banadir Mogadishu

The study explored perceptional degree of implementing EMR systems at public hospitals in Banadir, Mogadishu. The aforementioned scores provide insights into the perspectives and agreement among participants about the incorporation and efficacy of EMR systems within the healthcare domain.The influence of EMR systems on patient data management and patient treatment that EMR systems have significantly improved the healthcare delivery process. Participants' responses suggest a generally positive outlook on EMR adoption, albeit with nuances reflecting differing levels of agreement on specific aspects as shown in Table 9.

Table 9: Adoption Level of EMR in Public Hospitals in Banadir Mogadishu

Statement	SD	D	N	A	SA	Mean	SD
EMR systems are extensively used and incorporated into several divisions inside governmental hospitals	5%	10%	20%	40%	25%	3.72	1.17
The healthcare personnel employed in the public hospitals exhibit the requisite competencies for proficiently utilizing EMR systems.	10%	15%	20%	35%	20%	3.45	0.98
The training and education programs offered to healthcare professionals in public hospitals have shown efficacy in equipping them with the necessary skills for utilizing EMR systems.	5%	10%	15%	40%	30%	3.85	1.26
The implementation of EMR systems at public hospitals has resulted in notable improvements in the efficiency and accuracy of patient data management.	10%	15%	20%	35%	20%	3.45	0.98
The implementation of EMR systems has had a beneficial effect on the standard of patient treatment in public hospitals	5%	10%	15%	40%	30%	3.85	1.26
In general, use of EMR systems has significantly improved healthcare delivery process in public hospitals	5%	10%	20%	35%	30%	3.92	1.13

Technological Factors

Proficiency in Basic Computer Skills

The study focused on three key aspects: proficiency in basic computer skills, prior exposure to Electronic Medical Records (EMRs), and software training provided by the hospital. The results indicated that majority

of participants had basic computer skills. These findings highlight the participants' computer skills, exposure to EMRs, and the provision of software training, which are crucial factors in determining their readiness for EMR utilization in clinical management as shown below Table 10.

Table 10: Proficiency in Basic Computer Skills

Variable	Categories	Frequency	Total
Do you have basic computer skills?	Yes	66	82.5%
	No	14	17.5%
	Total	80	100%
Have you ever been in touch with any Electronic Medical record?	Yes	65	81.3%
	No	15	18.8%
	Total	80	100%
Has your hospital ever trained you on any type of software?	Yes	60	75%
	No	20	25%
	Total	**80**	**100%**

Frequency of their Software Usage

This section explores the frequency of software usage among the respondents, shedding light on the extent to which they actively utilize software systems in their daily tasks. The analysis provides valuable insights into the regularity and consistency of software usage, which can indicate the level of integration and reliance on technology in their clinical management practices., majority of the respondents frequently used the software and very few used it rarely as shown in Figure 4.
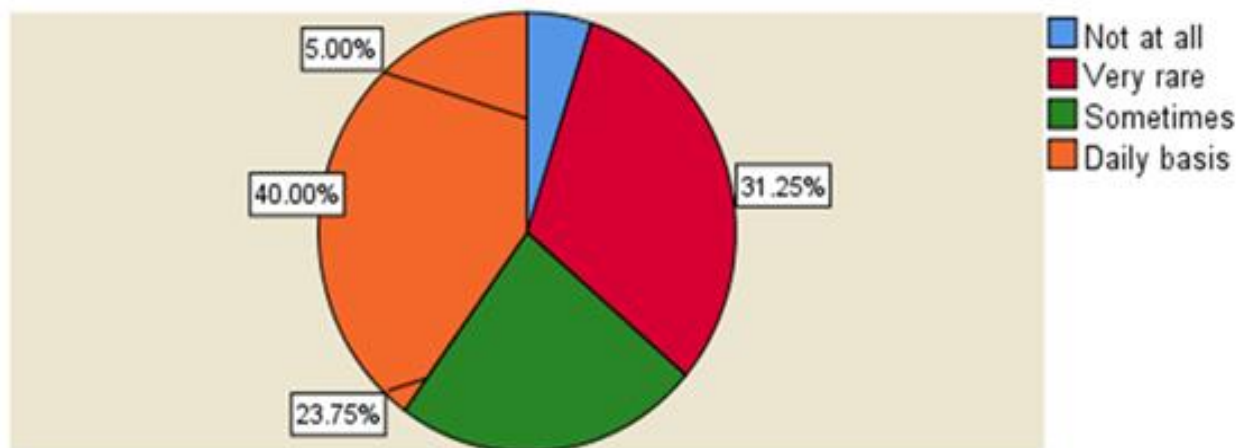

Figure 4: Frequency of their Software Usage

Software Practice

Frequency of EMR Software Practice

The results revealed that majority of respondents indicated that they frequently utilize reports retrieval software as their primary software. This suggests that accessing and retrieving reports is an essential aspect

of their clinical management tasks. Another significant proportion of respondents reported using data entry software more often, highlighting the importance of data input and recording in their daily practice. The findings provide insights into the software practices of respondents and emphasize the significance of reports retrieval and data entry software in their clinical management workflows as shown in Table 11.

Table 11: Frequency of EMR Software Practice

Variables	Categories	Frequency	Percentage
software practice more often	Data entry software	31	38.8%
	Reports retrieval software	44	55.0%
	Any other specify	5	6.3%
	Total	**80**	**100%**

Number of Internet Service Providers (ISPs) Usage

The study sought to assess the Number of Internet Service Providers (ISPs) usage. The results revealed that two thirds of them reported the number of service provider usage to be two followed by close to-one third who reported it to be one. The results were presented below in Table 12.

Table 12: Number of Internet Service Providers (ISPs)

Variable	Categories	Frequency	Percentage
Technological factor	One	30	37.5%
	Two	31	38.8%
	Three	17	21.3%
	Four and above	2	2.5%
	Total	**80**	**100.0**

WAN and LAN Operations

The table displays the responses of the respondents regarding WAN and LAN operations inside and outside the institution. The results reveal that a significant number of respondents (38.8%) considered the operations to be reliable followed closely by 33.8% who reported them to be somewhat reliable as shown in Table 13.

Table 13: WAN and LAN Operations

Variables	Categories	Frequency	Percentage
WAN and LAN Operations: Inside and Outside the Institution	Not reliable	8	10%
	Somehow reliable	27	33.8%
	Reliable	31	38.8%
	Very much reliable	14	17.5%
	Total	**80**	**100%**

Technological Elements

This study provides valuable insights into the participants' perceptions regarding various technological factors related to the implementation of Electronic Medical Record (EMR) systems as shown in Table 14.

Table 14: Technological Elements

	1	2	3	4	5	Mean	SD
Acceptance in healthcare facilities is hampered by a lack of EMR software programs.	7.5%	11.3%	23.8%	32.5%	25.0%	2.44	1.200
Concerns about security and privacy under the law impact how EMR is implemented.	5.0%	8.8%	42.5%		13.8%	2.61	1.000
Lack of Internet bandwidth is a significant obstacle to the introduction of EMR.	0.0%	28.7%	27.5%	16.3%	27.5%	2.57	1.178
The implementation of EMR is affected by the many participants' poor communication.	15.0%	7.5%	16.3%	22.5%	38.8%	2.38	1.444
The main problems with implementation EMR at our facility are security-related matters, such as confidentiality, integrity, and availability.	17.5%	1.3%	21.3%	28.7%	31.3%	2.45	1.404
Average						**2.49**	**1.2452**

These findings highlight the importance of addressing issues such as software availability, security concerns, internet bandwidth limitations and communication challenges to ensure the successful implementation and utilization of EMR systems in healthcare facilities. By understanding and addressing these technological factors, healthcare institutions can work towards overcoming barriers and enhancing the effectiveness and efficiency of EMR systems in supporting patient care.

Technological Factors Associated with EMR Adoption

This study examines the relationship between technological factors and the adoption of Electronic Medical Record systems in public hospitals. Information is provided on IT training, frequency of software usage, qualification and type of software used. The results revealed that IT training alone does not show a significant association with the adoption of EMR systems ($p = 0.001$) and a low Cramer's V coefficient of 0.092. This suggests that simply providing IT training to staff may not significantly impact on the adoption of EMR systems in public hospitals as shown in Table 15.

Table 15: Technological Factors Associated with Adoption of EMR

		Yes	No	Total	Ch-square	Df	p-value	Cramer's V
IT training	Yes	5	15	20	.684[a]	1	0.001	.092
	No	10	50	60				
Total		**15**	**65**	**80**				
Frequency of Using of the software	Not at all	2	2	4	14.483[a]	4	0.001	.284
	Very rare	6	19	25				
	Sometimes	7	12	19				
	Daily basis	0	32	32				
	Total	15	65	80				
Qualification	Clinical Officer	3	16	19	4.612[a]	3	0.002	.425
	Nurse	9	22	31				
	HRIO	3	18	21				
	Laboratory technician	0	5	5				
	Pharmaceutical officer	0	4	4				
	Total	**15**	**65**	**80**				

	Data entry software	7	24	31	1.462^a	2	0.001	.135
Type of Software	Reports retrieval software	8	36	44				
	Any other specify	0	5	5				
	Total	**15**	**65**	**80**				

However, the frequency of software usage is found to have a significant association with the adoption of EMR systems. The χ^2 test shows a highly significant p-value (p = 0.001), and Cramer's V coefficient indicating moderate association (0.284). This suggests that the frequency of software usage plays a role in adoption of EMR systems, with higher usage frequency associated with greater adoption rates. Qualification was identified as another factor significantly influencing the adoption of EMR systems (p=0.002), with a moderate Cramer's V coefficient (0.425). This implies that individuals with different qualifications, such as Clinical Officers, Nurses, HRIOs, Laboratory Technicians, and Pharmaceutical Officers, show varying levels of adoption of EMR systems.

Further, the type of software used had a significant association with EMR system adoption (p=0.001), and Cramer's V coefficient indicating a small association (0.135). This indicates that the specific type of software utilized, such as data entry software or reports retrieval software, impacts the adoption of EMR systems. A higher frequency of software usage is associated with greater adoption rates, align with this previous research. It emphasizes the importance of regular and consistent software usage to ensure successful integration and EMR systems use.

Health System Factors

The results provided insights into the implementation of an Electronic Medical Record system. Majority of respondents reported using a combination of paper and electronic systems in some locations, indicating a transitional phase. A significant proportion reported achieving complete implementation across all staff members and office locations while a smaller group reported no implementation of any medical record system. These findings highlight the varying stages of EMR implementation and the need for further efforts to promote and facilitate adoption in healthcare institutions. The results were presented in Table 16 .

Table 16: Implementation of an Electronic Medical Record System

Variables	**Categories**	**Frequency**	**Percentage**
An existing implemented EMR system in place	Complete implementation across all staff members and office locations	23	28.7%
	Sometimes paper some electronic	49	61.3%
	Not implementation at all	8	10%
	Total	**80**	**100%**

Use of EMR

The descriptive findings from the study provide insights into the participants' perceptions regarding the use of Electronic Medical Record (EMR) systems. The results indicate that a substantial number of participants expressed positive views towards the use of EMR systems. The average mean ratings for all questions indicate a moderate level of agreement among participants regarding the benefits and impact of using EMR systems. This finding provides valuable insights into participants' perspectives and attitudes towards EMR systems, which inform strategies for implementation and training to maximize the potential benefits of these systems in healthcare institutions as shown in Table 17.

Table 17: Use of EMR

	1	2	3	4	5	Mean	SD
Installation of an EMR system at the facility boosts productivity	3.8%	1.3%	17.5%	42.5%	35.0%	1.96	.961
Using the EMR helps completion of chores more quickly	0.0%	3.8%	31.3%	45.0%	20.0%	2.19	.797
EMR system makes work easier.	5.0%	1.3%	33.8%	32.5%	27.5%	2.24	1.034
Using an EMR system is time and effort saver	2.5%	8.8%	22.5%	22..5%	43.8%	2.04	1.119
Using EMR speeds up work	5.0%	12.5%	20.0%	26.3%	36.3%	2.24	1.214
Use of an EMR system improves performance	13.8%	28.7%	21.3%	18.8%	17.5%	3.03	1.321
Average						**2.2833**	**1.0743**

Health System Factors associated with Adoption of EMR

The findings reveal that the implementation of EMR systems has a significant association with the adoption of EMR systems (p=0.013). This suggests that public hospitals with complete or partial implementation of EMR systems are more likely to have a higher adoption rate compared to those with no implementation. This implies that public hospitals with a higher frequency of software usage are more likely to have a greater adoption rate of EMR systems. The participants rated the frequency of their software usage ranging from Very High to Very Low as shown in Table 18.

Table 18: Health System Factors associated with Adoption of EMR

		Yes	No	Total	Ch-square	Df	p-value	Cramer's V
EMR system	Complete implementation across all staff members and office locations	0	23	23	8.615[a]	2	**0.013**	**.328**
	Sometimes paper sometimes electronic	14	35	49				
	No implementation at all	1	7	8				
Total		**15**	**65**	**80**				
Frequency of using the software	Very High	2	3	5	9.315[a]	4	0.001	.341
	High	1	6	7				
	Average	2	27	29				
	Low	3	18	21				
	Very low	7	11	18				
	Total	**15**	**65**	**80**				

χ^2/**statistical outputs**

DISCUSSION

Socio-Demographic Characteristics and EMR Adoption

This study aimed to explore how socio-demographic factors such as gender, age, qualification, and education level influence the adoption of Electronic Medical Record (EMR) systems in public hospitals within the Benaadir region of Somalia.

Gender did not significantly influence EMR adoption, with both male and female participants exhibiting similar usage patterns. which also reported no substantial gender-based differences in EMR adoption rates.

In the Somali context, this may reflect the relatively balanced gender ratio (98.76 men to 100 women in 2020), although broader cultural and occupational norms still skew certain professions—such as nursing—towards females.

Age showed a significant association with EMR adoption, with younger participants more likely to adopt EMR systems. This supports the idea that younger professionals may be more technologically literate or adaptable [29,28]. In Somalia's healthcare environment, where exposure to digital systems remains limited for older professionals, these findings suggest a generational divide in EMR readiness, which can inform targeted training initiatives.

In terms of qualification, the study did not find a statistically significant relationship with EMR adoption. Clinical Officers, Nurses, HRIOs, Laboratory Technicians, and Pharmaceutical Officers reported similar adoption rates. This suggests that, in Somalia's public healthcare setting, job title alone may not predict EMR engagement.

Education level, however, was significantly associated with EMR adoption. Participants with higher educational attainment were more likely to use EMRs effectively. In a developing health system like Somalia's, this underscores the need to invest in capacity-building among less-educated staff to ensure equitable EMR implementation.

From a theoretical perspective, these findings support Rogers' Diffusion of Innovations theory, particularly the attribute of "compatibility." Age and education likely influence how compatible individuals perceive EMRs to be with their existing knowledge and work habits, thereby impacting adoption.

Adoption Level of EMR in Public Hospitals

The results revealed that most healthcare professionals are in a transitional phase, using both paper and electronic systems. Despite infrastructure and resource limitations, there was a generally positive attitude towards EMR implementation in Benaadir's public hospitals. Respondents agreed on the benefits of EMRs for data management and patient care, as well as the adequacy of existing training programs.

However, discrepancies in perceptions of training effectiveness and the EMR system's impact on care delivery highlight implementation challenges. These variations may stem from unequal exposure to EMR training or system accessibility, reflecting institutional disparities across hospitals.

These mixed findings align with Rogers' concept of "trialability"—the degree to which an innovation can be tested on a limited basis. The coexistence of digital and paper systems suggests ongoing experimentation with EMRs, a typical trait of early adoption stages in low-resource settings like Somalia.

Technological Factors and EMR Adoption

The analysis showed that IT training alone did not significantly impact EMR adoption, but frequency of software use did. Staff who used EMR systems more frequently demonstrated higher adoption levels, underscoring the importance of practice and familiarity over one-time training.

Professional qualification also emerged as a significant factor in this section, with highly qualified individuals demonstrating greater EMR utilization. This aligns with [23], suggesting that advanced knowledge and digital readiness may contribute to higher adoption levels.

According to Rogers' theory, these findings relate to the "complexity" attribute—more user-friendly and familiar software reduces perceived difficulty and increases likelihood of adoption. Thus, frequent software use, higher qualifications, and intuitive system design all contribute to greater uptake of EMR systems.

Health System Factors and EMR Adoption in Public Hospitals

Health system factors such as the status of EMR implementation and software usage frequency showed significant influence on adoption levels. Hospitals with complete or partial implementation had higher adoption rates than those with none supporting the idea that institutional readiness facilitates individual adoption.

Similarly, frequent use of EMR software contributed to increased adoption, in line with literature suggesting that habitual usage helps embed EMRs into routine workflows, thereby improving patient outcomes.

However, a noteworthy portion of participants described the EMR system as "complicated to use." This indicates usability issues that could hinder adoption and reduce the efficiency gains promised by EMRs. Addressing this complexity through customized user interfaces, ongoing training, and localized system development may improve uptake in Somali hospitals.

From Rogers' perspective, these issues pertain to the innovation's "relative advantage" and "observability." If EMR systems are seen as too complex or provide unclear benefits, adoption will stagnate.

In the Somali context, where digital infrastructure is still maturing, these findings suggest a need for system-wide investment in EMR infrastructure, policy support, and training. Aligning technology with the skill levels and preferences of Somali healthcare professionals is essential to realizing the full benefits of EMRs.

CONCLUSION

Overall, the study confirms that age, education level, frequency of software usage, professional qualification, and software type significantly influence EMR adoption. Conversely, gender and job qualification titles were not significant determinants. These insights, framed within Rogers' Diffusion of Innovations theory, highlight that individual attributes, system design, and organizational readiness are key to successful EMR integration.For Somalia's public healthcare system, where technological transformation is both a necessity and a challenge. These findings offer practical guidance for phased, inclusive, and sustainable EMR implementation strategies.

RECOMMENDATIONS

To improve EMR adoption, the study recommends that stakeholders develop tailored training programs that consider the unique characteristics of healthcare providers, including their age, professional qualifications, and educational backgrounds. Such customized training, adjusted in content and delivery methods, would better equip staff for EMR use, aligning with findings that adoption is influenced by these demographic factors [29]. A structured framework for ongoing evaluation and feedback on EMR use should also be established to enhance usability and user confidence. Continuous assessments can ensure that training remains effective and that software challenges are addressed proactively.

Furthermore, fostering a culture of innovation within healthcare institutions is essential. Providing opportunities for healthcare workers to share success stories and EMR-related experiences can promote wider acceptance and highlight the positive impacts of EMRs on healthcare delivery. Technological adjustments such as regular updates and compatibility checks should also be made to ensure systems meet users' evolving needs. Addressing these elements can facilitate smoother integration of EMR systems and improve overall healthcare outcomes.

From a policy perspective, inclusive training programs must be supported and adequately funded, ensuring accessibility for all staff regardless of age or educational background. Policies should also encourage frequent software usage by introducing incentives for consistent and proficient users. Moreover, routine evaluations of EMR software functionality and user-friendliness must be institutionalized to ensure optimal

utility [23]. Policymakers should prioritize full EMR implementation across all public hospitals, especially those still in partial transition, through strategic plans, resource allocation, and technical support. Doing so would contribute to consistent and comprehensive EMR usage, driving more effective patient data management and service delivery.

Suggestions for Future Research

Future research should focus on conducting longitudinal studies to explore the long-term impact of EMR system adoption on healthcare outcomes in Benaadir, Somalia. Such studies would offer insight into the sustainability of current adoption strategies and the enduring benefits or challenges of EMR usage in the Somali healthcare context. Additionally, there is a need for economic evaluations to assess the cost-effectiveness of EMR implementation in public hospitals. These analyses will help guide resource allocation and policy decisions and support strategic investment in health information systems tailored to developing healthcare settings.

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