BMC Medical Informatics and Decision Making

RESEARCH

Open Access

Insights into healthcare workers' perceptions of electronic medical record system utilization: a cross-sectional study in Mafeteng district, Lesotho

Tebeli E. Sekoai[1*], Astrid Turner[1] and Janine Mitchell[1]

Abstract

Background Electronic medical record (EMR) systems have significantly transformed how healthcare data is created, managed, and utilized, offering improved legibility, accessibility, and support for clinical decision-making compared to paper records. In Lesotho, the system was implemented to enhance patient care, track patients, and generate reports for evidence-based programming. It is imperative to understand how healthcare workers (HCWs) perceive the system as frontline end-users; thus, the aim of the study was to explore HCWs' perceptions of the system, focusing on perceived usefulness (PU) and perceived ease of use (PEU) and factors influencing acceptance and utilization in Mafeteng district.

Methods A descriptive cross-sectional study design was conducted; 145 healthcare workers from 17 health facilities were invited to participate. The Technology Acceptance Model was incorporated into a self-administered questionnaire. The analysis employed descriptive statistics and the constructs of PU and PEU using Stata/BE 18.0. Multiple regression examined HCWs' perceptions, while verbatim text from participants clarified quantitative findings.

Results The study had a 49% response rate ($n=71$). Most participants were female (70.42%; $n=50$), with registered nurse midwives as the most common profession (45.07%; $n=32$). A large proportion reported 'good' or 'very good' computer skills (43.66%; $n=31$). For PU, 87.32% found the EMR system useful, 83.1% agreed it improves job performance, and 83.1% said it saves time. For PEU, 85.91% found the system easy to use, 81.69% could recover from errors, and 85% could remember task procedures. Network connectivity and electricity supply were cited as barriers to the effective use of the EMR system in health facilities, resulting in interruptions in service delivery. The characteristics of sex and profession had no significant impact on PU and PEU, while both qualification ($p=0.035$) and computer skills ($p=0.007$) were significant, indicating a positive association with greater PEU of the EMR system.

Conclusion HCWs in the Mafeteng District exhibited positive attitudes toward the EMR system, recognising its usefulness, ease of use, and efficiency. Sustaining computer literacy and addressing infrastructural challenges could

*Correspondence:
Tebeli E. Sekoai
sekoaitebeli@gmail.com

Full list of author information is available at the end of the article

further enhance the successful implementation and adoption of the system, ultimately improving patient care outcomes.

Keywords Acceptance, Ease-of-use, EMR system, Healthcare workers, Perceptions, Technology acceptance model, Usefulness

Background

Since February 2015, the US President's Emergency Plan for AIDS Relief (PEPFAR) has supported Lesotho's Ministry of Health (MOH) in transforming the country's Health Management Information System (HMIS) by introducing the District Health Information Software 2 (DHIS2) for data capture, storage, and program queries, which has drastically enhanced the quality of HIV care and treatment data [1]. However, discrepancies persisted between the program data in DHIS2, and survey data from the Lesotho Population-based HIV Impact Assessment (LePHIA), a household-based national survey conducted between November 2016 and May 2017 to provide a detailed status of the HIV epidemic in the country [2]. For example, while the LePHIA survey estimated that 235,135 people living with HIV were on antiretroviral therapy (ART) drugs, the DHIS2 reported only 149,951 [2].

Recognizing the significant gap identified, the Ministry of Health (MOH) took proactive steps to address it by using electronic medical records (EMR). Their approach involved adopting, developing, and deploying an open-source client-level electronic register (eRegister) tailored for HIV, Tuberculosis (TB), and Maternal and Child Health (MCH) services. This strategic shift was based on the recommendations from a thorough assessment conducted in 2017, which highlighted the inadequacies of the hospital-based EMR system previously introduced across 16 public health hospitals in Lesotho's 10 districts back in 2013 [1].

The evaluation highlighted numerous challenges encountered during the initial implementation of the hospital-based EMR system. These included the Ministry not receiving crucial monthly outpatient department (OPD) reports from the 16 hospitals, discontinuation of EMR implementation in several health facilities, and instances of substandard implementation where EMR systems remained in use but were not optimally utilized [3].

Building upon lessons learned from this pilot, the eRegister emerged as a promising solution, serving as a clinical decision-support tool to enhance patient care and as a dynamic monitoring and evaluation instrument to address underreporting. Notably, the eRegister's integration with the national DHIS2 facilitated more robust data collection and analysis. Given its demonstrated efficacy, the MOH devised a three-phased implementation plan to systematically roll out the eRegister across relevant healthcare settings [3], as illustrated in Fig. 1 below.

The MOH implemented the EMR system in 2018, to collect and use high-quality patient-level data, to uniquely distinguish and track patients through the 95-95-95 targets, and to automatically generate facility-level routine and key operational reports in support of data usage and evidence-based programming [1]. An EMR is a computerized system for keeping track of patient health information that offers ways to gather, store, and display patient data to provide HCWs with accurate and up-to-date information about the patient's medical records to support patient care and enhance the quality of healthcare [4–6].

The implementation of EMR benefits healthcare workers (HCWs), patients, and healthcare sector management in different ways. However, HCWs are in the best position to report what encourages or limits its usage as they are the first-hand users of the system [7, 8]. The use of EMR improves healthcare quality, productivity, and efficiency while also leading to better public health outcomes [9] and aligning with the Sustainable Development Goal (SDG) 3 of good health and well-being [10]. The benefits of EMR include enhanced data quality as well as improved and prompt access to records for all healthcare service providers [3, 11–13].

Moreover, EMR provides patients with easy access to their medical health records which promotes better health outcomes due to improved self-care, informed decision-making, enhanced medical compliance, and stronger trust and communication between patients and HCWs [14–18]. Some of the benefits relate to time management and cost savings due to reduced duplication of tests and sharing of patient records among HCWs [19, 20], as well as reduced healthcare costs, storage facilities, and overall healthcare services such as medical transcriptions and reporting [21, 22].

The challenges of EMR implementation include standardized communication between patients and physicians which results in a more formal relationship [4, 5, 13]. The system is believed to significantly change the workflow of HCWs, hence complicating workloads and reducing productivity [23, 24]. In addition, the limited adoption and use of EMR systems in developing countries are related to HCWs' attitudes, awareness levels, fulfilment with the system or workflow [25], lack of proper management, resistance from users, poor commitment from staff, and lack of computer skills [6, 26, 27]. A lack

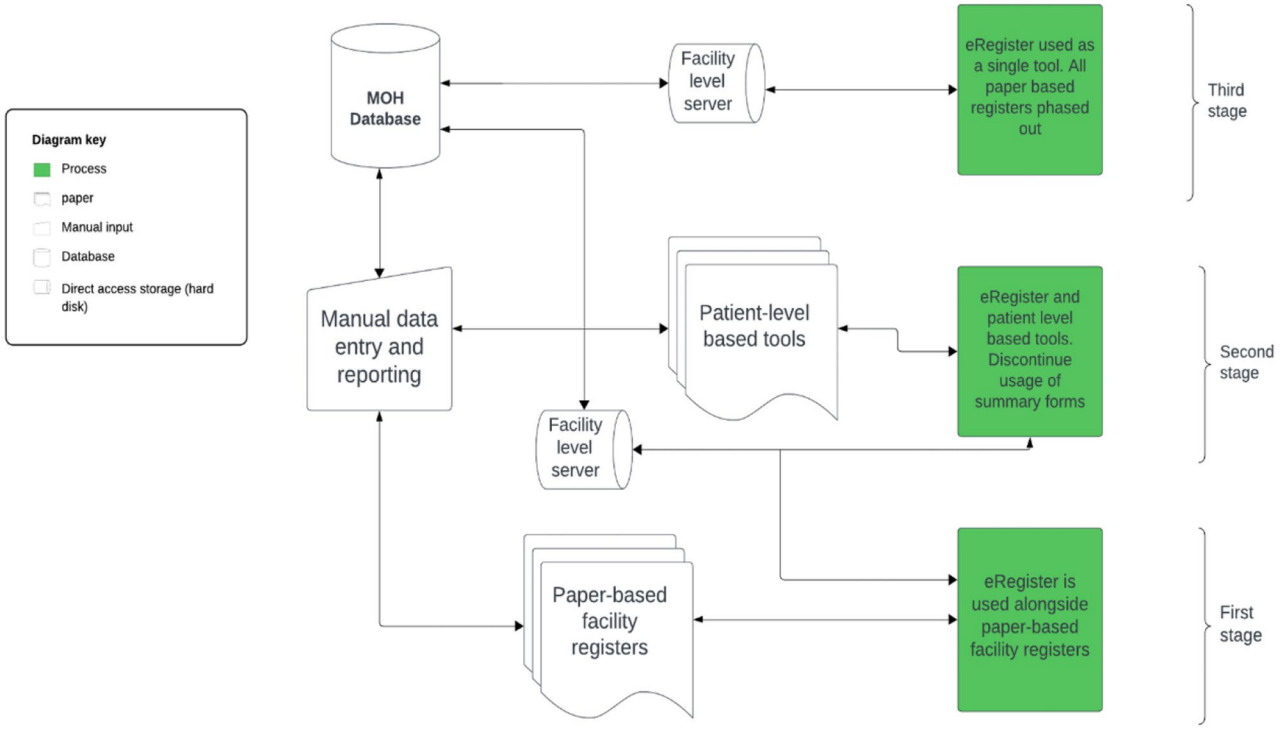

Fig. 1 Stages of the register implementation [Created by the researcher]

of training also contributes to the high rate of EMR rejection by the HCWs as studies postulate that sufficient training related to EMR implementation is associated with improved well-being of HCWs and appears to be extremely crucial [4, 28].

There are no studies available related to the views of the frontline end-users of the system since the EMR implementation of the system in Lesotho. It is imperative to understand HCWs' perceptions of the usage of the system, and their willingness to utilize it, as they influence the effectiveness of its implementation. Therefore, this study aimed to examine HCWs' perceptions of the EMR system in the Mafeteng district in Lesotho.

Ethical clearance for the study was obtained from the University of Pretoria Faculty of Health Sciences Research Ethics Committee (reference number 492/2023) and the Ministry of Health (MOH) National Research Ethics Committee of Lesotho (ID237-2023). Permission to collect data was obtained from the District Health Management Team of Mafeteng. Participants were duly informed that participation in the study was voluntary. A signed informed consent form was required to proceed.

Methods

Study design and setting

A descriptive cross-sectional study was conducted at 17 government and Christian Health Association of Lesotho (CHAL) healthcare facilities in the Mafeteng district. The health facilities included one district referral hospital and 16 clinics.

Study population and sample

One hundred forty-five HCWs who were involved in the utilization of the EMR system in the Mafeteng district were invited to participate in the study. These HCWs included registered nurse midwives, nurse assistants, HTS counselors, and data clerks. Purposive non-random sampling was used to select participants from the study population, focusing on HCWs actively utilizing the EMR system to ensure inclusion of individuals with relevant experience and insights into its use and challenges. The questionnaire was distributed to the respondents via a link to a web-based questionnaire (Google form) during site visits, and those who did not utilize the system were excluded from the study.

Data collection

A structured questionnaire was developed, guided by one from Tubaishat [29] which determined the factors associated with HCWs' perceptions of the EMR system. For this study, modifications were made by adding an open-ended section to each question, allowing respondents to elaborate on their choice of response. The original questionnaire developed by Davis consists of 28 items that assess both PU and PEU. The reliability of PU and PEU was found to be 0.97 and 0.91 respectively, while their validity was reported significant at a level of 0.05, with

PU being consistently significant and PEU significant 95.6% of the time [29].

There are a few theoretical frameworks that dominate studies of health information technology (HIT) implementation. The Unified Theory of Acceptance and Use of Technology (UTAUT), for example, integrates several models by identifying four key constructs, performance expectancy, effort expectancy, social influence and facilitating conditions to explain user intentions to use technology and subsequent usage behaviour [30]. The model is advantageous because it is considered comprehensive and considers social influence, but is however complex and requires extensive data collection. The Consolidated Framework for Implementation Research (CFIR), on the other hand, provides a comprehensive structure for the comprehension of the factors that influence the implementation of interventions, which includes five major domains; intervention characteristics, outer setting, inner setting, characteristics of individuals, and process, which assists in identifying barriers and facilitators to implementation [30]. CFIR is comprehensive and flexible but can be complex and require thorough comprehension.

This study however adopted the Technology Acceptance Model (TAM), a theoretical framework that explains how users come to accept and use a technology, which centers on PU and PEU as the main influencers of individuals' acceptance and intention to utilize a system [31]. Perceived usefulness is defined as the extent to which an individual believes that using technology will enhance their job performance while PEU is characterized by the extent to which an individual perceives technology as easy to learn, use, and integrate in their workflow [32]. The model proposes that these perceptions influence users' attitudes toward the usage of technology, hence affecting their intentions to adopt and intention to utilize it.

The questionnaire for this study, which adopted TAM, was pretested with ten respondents from health facilities outside the sites of interest, to ensure reliability, accuracy, and consistency.

Table 1 Demographic characteristics of respondents

Characteristics		*N* (%)
Sex	Male	21 (29.58)
	Female	50 (70.42)
Profession	Registered nurse midwife	32 (45.07)
	Nurse assistant	5 (7.04)
	HTS counsellor	18 (25.35)
	Data clerk	16 (22.54)
Qualification	COSC/LGCSE	12 (16.90)
	Diploma	24 (33.80)
	Bachelor's Degree	31 (43.66)
	Honors/Postgraduate Diploma	4 (5.63)
Computer skills	Poor	4 (5.63)
	Good	36 (50.70)
	Very Good	31 (43.66)

Data analysis

Stata/BE 18.0 was used to analyze the data after it was entered into EpiData software. Descriptive statistics was conducted to calculate the frequencies of the demographic characteristics of the sample and the PU and PEU of the EMR. Multiple regression analysis was conducted to identify the outcomes of the healthcare workers' perceptions. Additional text by participants was extracted to clarify quantitative results.

Results

Descriptive analysis of participants' demographic characteristics

There was a response rate of 49% (n = 71). Table 1 below demonstrates the demographic characteristics of the respondents. Among the professions represented, registered nurse midwives constituted the largest group (45.07%), while nurse assistants made up a smaller proportion (7.04%). Regarding educational qualifications, 12 respondents (16.90%) held the Cambridge Overseas School Certificate (COSC) / Lesotho General Certificate of Secondary Education (LGCSE) qualification, while the majority of the respondents were Bachelor's degree holders (43.66%). Notably, many participants (94.36%) reported having 'good' and 'very good' computer skills, implying that they were proficient in common computer applications and tools such as Microsoft Word, Excel, and PowerPoint.

Perceived usefulness

According to Tables 2 and 52.11% of the HCWs strongly agreed, while 35.21% agreed that the EMR system is useful in their job. The respondents stated that the system makes patients' record keeping and retrieving of information very easy. One respondent mentioned that the system enables the immediate appointment of patients' next visit dates and thus minimizes the risk of missed appointments. Approximately 38.03% of the HCWs agreed while 32.39% strongly agreed that their jobs would be difficult without the EMR system, and the majority (83.1%) agreed or strongly agreed that the system improves their job performance. The respondents stated that compiling reports has become easier with the use of the system, hence making their jobs less difficult. They also indicated that the system has made patient monitoring and management easier since access to patients' records is effortless.

A significant number of the HCWs (78.87%) agreed or strongly agreed that the EMR system saves them time and enables them to accomplish more tasks than would otherwise be possible, as postulated by 71.84% of the respondents. A large proportion of the HCWs (84.51%)

Table 2 PU items

PU items	Rating Scale				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My job would be difficult to perform without EMRs	2.82	7.04	19.72	38.03	32.39
2. Using EMRs improves my job performance	1.41	4.23	11.27	36.62	46.48
3. EMRs save me time and enable me to accomplish tasks more quickly	2.82	5.63	12.68	25.35	53.52
4. Using EMRs allows me to accomplish more work than would otherwise be possible	2.82	4.23	21.13	30.99	40.85
5. Using EMRs enhances my effectiveness on the job	0	7.04	12.68	32.39	47.89
6. Using EMRs improves the quality of work I do	0	4.23	11.27	35.21	49.3
7. Using EMRs increases my productivity	5.63	4.23	14.08	35.21	40.85
8. Overall, I find the EMR system useful in my job	0	2.82	9.86	35.21	52.11

Table 3 PEU items

PEU items	Rating Scale				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I often become confused and make frequent errors when I use the EMR system	39.44	45.07	9.86	1.41	4.23
2. Interacting with the EMR system is often frustrating and requires me to consult the manual more often	47.89	33.8	9.86	5.63	2.82
3. Interacting with the EMR system requires a lot of mental effort	40.85	25.35	18.31	14.08	1.41
4. I find it easy to recover from errors encountered while using the EMR system	4.23	5.63	8.45	32.39	49.3
5. The EMR system often behaves in unexpected ways	5.63	38.03	23.94	26.76	5.63
6. I find it cumbersome (difficult) to use the EMR system	50.7	35.21	4.23	2.82	7.04
7. It is easy for me to remember how to perform tasks using the EMR system	1.41	7.04	5.63	39.44	46.48
8. Overall, I find the EMR system easy to use	5.63	2.82	5.63	26.76	59.15

believe that the system improves the quality of work they do and 76.06% trust that it increases their productivity. They mentioned that reports from the EMR system meet most of the data quality dimensions such as timeliness, and they also have an opportunity to make informed decisions concerning patients' health needs. However, approximately 9.82% of the HCWs are neutral about the usefulness of the system, as they believe that they have been performing tasks very well without it, and some believe that it has added more workload.

Perceived ease of use

As shown in Table 3, a vast majority of the HCWs (59.15% and 26.76%) found the EMR system easy to use. This is supported by the respondents' opinions that the language of the system is very easy and straightforward and that they receive supportive supervision from the implementers where they obtain clarity on several issues related to the system. The majority of the HCWs (47.89%) strongly disagreed, while 33.8% disagreed that interacting with the system is often frustrating and requires frequent consultations with the manual. A total of 40.85% of the HCWs strongly disagreed, while 25.35% disagreed that interacting with the system requires a lot of mental effort. In addition, 85.91% strongly disagreed or disagreed that they find the system cumbersome to use. Several respondents highlighted that they received adequate training which enabled them to navigate the system effectively, as one noted, "The training was sufficient to help me use the system without relying on the manual." The other respondents echoed this statement, emphasizing that the hands-on approach to the training sessions facilitated ease-of-use.

A notable number of the HCWs (81.69%) agreed or strongly agreed that they find it easy to recover from errors encountered while using the system, while 85.92% find it easy to remember how to perform tasks using the EMR system. This pertains to the fact that the system highlights errors immediately and autocorrects some of the errors. The respondents also pointed out that the system allows editing of information at any point and that errors are usually highlighted by a star, and hence are easy to recognize and recover. The HCWs highlighted frequent challenges related to network connectivity and electricity availability, which impact the functionality of the EMR system. Many noted issues such as slow or unstable internet, with comments such as, "The network is sometimes not stable," and, "The system is sometimes very slow." Others mentioned more severe interruptions, stating, "The system can go down for hours," or, "When there is no electricity, it cannot be used." A smaller portion of the HCWs (8.45%), however, do not find the EMR

Table 4 Linear regression for PU

Predictor variable	Coefficient	Standard error	*p*-value	95% confidence interval
Constant	1.808	0.699	0.012	0.413 to 3.203
Sex	0.029	0.19	0.879	-0.350 to 0.408
Profession	-0.028	0.073	0.701	-0.173 to 0.117
Qualification	0.182	0.105	0.088	-0.028 to 0.391
Computer skills	0.641	0.167	0	0.308 to 0.975

Observations = 71 R-squared = 0.3155 Adj R-squared = 0.2740 F-statistic = 7.60 Prob > F = 0.0000

Table 5 Linear regression for PEU

Predictor variable	Coefficient	Standard error	*p*-value	95% confidence interval
Constant	1.06	1.003	0.294	-0.941 to 3.062
Sex	0.016	0.272	0.953	-0.527 to 0.560
Profession	0.054	0.104	0.606	-0.154 to 0.262
Qualification	0.324	0.15	0.035	0.024 to 0.624
Computer skills	0.672	0.24	0.007	0.198 to 1.151

Observations = 71 R-squared = 0.2802 Adj R-squared = 0.2366 F-statistic = 6.42 Prob > F = 0.0002

system easy to use, mainly because of their poor computer skills, while others believe that paper-based registers are much easier to use.

Multiple linear regression

Tables 4 and 5 present the results of a multiple linear regression analysis conducted to explore the relationships between the demographic characteristics of HCWs and their perceptions of the EMR system.

The F-test indicates that at least one predictor variable significantly relates to PU, with the model explaining 31.55% of its variance. P-values for sex (0.879), profession (0.701), and qualification (0.088) show they are not significant at the 0.05 level and have no impact on PU for EMR. In contrast, computer skills showed a highly significant relationship (p-value = 0.000), indicating that better computer skills are strongly associated with greater PU.

Table 5 shows that the model is statistically significant, explaining 28.02% of the variance in PEU. Sex ($p = 0.953$) and profession ($p = 0.606$) had no significant impact on PEU. However, qualification ($p = 0.035$) and computer skills ($p = 0.007$) were significant, indicating a positive association with greater PEU of the EMR system.

Discussion

In general, the majority of the HCWs who participated in this study perceive the EMR system as both useful (87.32%) and easy-to-use (85.91%), which highlights the positive acceptance of the technology. This study revealed that demographic factors such as qualifications and computer literacy have a significant impact on the HCWs' perceptions of the EMR system. A study by Tubaishat [28] also revealed that computer skills impact nurses' PU and PEU of the EMR system. The implementation of EMR is aimed at solving existing inconsistencies within data management and patient care within the healthcare system, and feedback from the respondents revealed that EMR is capable of enhancing patient data management and enabling quick access to patient files [7].

The study identified several interesting issues regarding the perceptions of the HCWs in the district. The positive reception of the HCWs means that the system's implementation has the potential to be sustainable and thus positively impact patient care and management. It is also worth noting a high percentage of HCWs agreed that EMR improves their job performance and enhances the quality of their work. The findings that higher qualifications and better computer skills are associated with greater PU and ease of use of the EMR system are particularly interesting, as they highlight specific areas where targeted training and support could increase the adoption rate. Furthermore, the study identified network connectivity and electricity supply as some of the significant barriers to effective usage of the EMR system in health facilities, which result in service delivery interruptions. The participants mentioned that the system is prone to technical issues and often experiences downtime, particularly due to power outages and network problems, and some suggested that the system might be susceptible to malware attacks, highlighting the need for robust antivirus protection.

The key strengths of the study relate to the fact that the findings are highly relevant to healthcare administrators and policymakers in Lesotho, as they identify the factors that influence the successful implementation and utilization of the EMR system. Nonetheless, there are notable limitations exhibited by this study. The researcher was required to leave the questionnaires at facilities during working hours, thus being unable to encourage participation, possibly contributing to the low response rate. Future researchers are advised to negotiate this with healthcare facilities and explore strategies such as reminders (e.g. flyers in facilities) and/or non-monetary incentives (e.g. certificates of participation) that may improve participation and engagement. Additionally, utilizing multiple survey methods, such as online surveys, face-to-face or virtual interviews, and paper-based surveys, can accommodate different participants' preferences and potentially improve response rates.

Budget constraints restricted the study to a single district, thereby limiting the generalizability of its findings to the broader country context. Expanding the research across the country to different facility settings will expand the generalizability of the study findings. Future researchers are advised to delve deeper into HCWs' perceptions of EMR systems through qualitative research, comparative studies

across different districts, as well as considering longitudinal study designs to track changes in perceptions. Repeated cross-sectional study designs may also be an alternative with a changing workforce. To mitigate the possibility of the Hawthorne effect, researchers should prioritize confidentiality and anonymity during data collection.

Finally, TAM was adopted for this study because of its relevance to technology acceptance, alignment with the study's objectives and ability to provide a solid framework for understanding and predicting participants' behaviour towards EMR. However, it overlooks other critical factors that may influence EMR implementation, such as system quality, organizational culture, and individual social norms that should be considered in future research studies. Measurement of how EMR improves the productivity and efficiency of the health workforce is another potential area of research.

Recommendations

Based on the study's findings related to HCWs' perceptions and challenges regarding EMR system implementation, we recommend that the MOH consider the following specific actions. Firstly, there is a need for enhanced training programs aimed at improving the HCWs' computer literacy, which is specifically tailored to the usage of the EMR system. To foster continued career development, the introduction of mentorship programs and peer learning opportunities around computer literacy could be prioritized. The implementation of comprehensive training programs on EMR has the potential to enhance the capabilities, skills, and knowledge of the HCWs, hence advancing the goal of SDG 4, which focuses on quality education [31].

Secondly, investment in robust infrastructure, reliable network connections, and uninterrupted electricity supply may ensure consistency in the usage of the system. The installation of high-speed internet connections and reliable power sources such as backup solar power systems and generators will align with SDG 9, which centers on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation [31].

In addition, to ensure comprehensive patient data management, ensuring interoperability of the EMR system and DHIS2 would be critical for seamless data exchange and communication. Interoperability allows sharing of patients across different healthcare system settings, hence improving productivity and efficiency. The EMR system stores highly confidential and sensitive patient information, which must be protected against unauthorized access at all times. Thus, it is crucial to implement robust access control mechanisms to ensure that access is limited to authorized HCWs.

It is also imperative to introduce regular feedback mechanisms in the system so that issues are identified and solutions are provided on time. There is also a need for continuous research and evaluations to assess the long-term impact of the system and the HCWs' satisfaction as well as to monitor implementations of the recommendations, for improved patient care and more effective healthcare data management.

Conclusion

While the majority of the HCWs in the district are satisfied with the EMR system, computer literacy and infrastructural challenges should be addressed to enhance the successful implementation and adoption of the system, ultimately improving patient care outcomes.

Abbreviations

ART	Antiretroviral therapy
CHAL	Christian Health Association of Lesotho
CFIR	Consolidated Framework for Implementation Research
COSC	Cambridge Overseas School Certificate
DHIS2	District Health Information Software 2
EMR	Electronic Medical Record
eRegister	Electronic Register
HCWs	Healthcare workers
HIT	Health Information Technology
HMIS	Health Management Information System
HTS	HIV Testing Services
LePHIA	Lesotho Population-based HIV Impact Assessment
LGCSE	Lesotho General Certificate of Secondary School
MCH	Maternal Child Health
MOH	Ministry of Health
OPD	Out-patient Department
PEPFAR	President's Emergency Plan for AIDS Relief
PEU	Perceived Ease-of-Use
PU	Perceived Usefulness
SDG	Sustainable Development Goal
SI	Strategic Information
TAM	Technology Acceptance Model
TB	Tuberculosis
UTAUT	Unified Theory of Acceptance and Use of Technology

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12911-025-02858-3.

Supplementary Material 1

Acknowledgements

The authors would like to give special thanks to the Ministry of Health in Lesotho for granting access for data collection in the health facilities as well as to the participants who gave off their time for the study.

Author contributions

TES developed the original draft of the manuscript, conducted data collection and analysis, and participated in writing up and shaping the manuscript. ACT and JM provided supervision and constructive feedback during the development and write up of the manuscript. The final manuscript was read and approved by all the authors.

Funding

Not applicable.

Data availability

The dataset supporting this study's findings has been deposited in the University of Pretoria research repository, with the following DOI for access: https://doi.org/10.25403/UPresearchdata.27078121.v1.

Declarations

Ethics approval and consent to participate

This study was approved by the University of Pretoria Faculty of Health Sciences Research Ethics Committee (reference number 492/2023). The Ministry of Health (MOH) National Research Ethics Committee of Lesotho (ID237-2023) also approved the study and permission to collect data was obtained from the District Health Management Team of Mafeteng. All methods in this study were carried out according to relevant guidelines and regulations, including compliance to ethical norms and principles of research adopted by the University of Pretoria Faculty of Health Sciences Research Ethics Committee and the MOH National Research Ethics Committee of Lesotho. Participants were duly informed that the study was voluntary and were asked to sign the informed consent form.

Consent for publication

Participants were duly informed that the study findings may be published but that measures would be taken to anonymize their role.

Competing interests

The authors declare no competing interests.

Author details

[1]School of Health Systems and Public Health, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa

Received: 25 September 2024 / Accepted: 3 January 2025
Published online: 12 May 2025

References

1. Lesotho Ministry of Health. Standard operating procedure for transition to the eRegister Live DHIS2 reporting. February 2020.
2. Lesotho Population-based HIV Impact. Assessment 2016–2017. https://phia.icap.columbia.edu/wp-content/uploads/2020/02/LePHIA_FinalReport_Web.pdf. Accessed 07 April 2023.
3. Jimma BL, Enyew DB. Barriers to the acceptance of electronic medical records from the perspective of physicians and nurses: a scoping review. Inf Med Unlocked. 2022;31(100991). https://doi.org/10.1016/j.imu.2022.100991.
4. Boonstra A, Vos J, Rosenberg L. The effect of electronic health records on the medical professional identity of physicians: a systematic literature review. Procedia Comput Sci. 2022;196:272–9. https://doi.org/10.1016/j.procs.2021.12.014.
5. Oumer A, Muhye A, Dagne I, Ishak N, Ale A, Bekel A. Utilization, determinants and prospects of electronic medical records in Ethiopia. Biomed Res Int. 2021; 2021(2230618); https://doi.org/10.1155/2021/2230618
6. Government of the Kingdom of Lesotho Ministry of Health. Electronic medical record (EMR) assessment: Final report. 18 October 2017.
7. Nguni PN, Were MC, Babic A. Users' perception of factors contributing to electronic medical records systems use: a focus group discussion study in healthcare facilities setting in Kenya. BMC Med Inf Dec Mak. 2021;21(362). https://doi.org/10.1186/s12911-021-01737-x.
8. Attafuah PYA, Abor PA, Abbuosi AA, Nketiah-Amponsah E, Tenza IS. Satisfied or not satisfied? Electronic health records system implementation in Ghana: Health leaders' perspective. BMC Med Inf Dec Mak. 2022;22(249). https://doi.org/10.1186/s12911-022-01998-0.
9. Lin H-L, Wu D-C, Cheng S-M, Chen C-J, Wang M-C, Cheng C-A. Association between electronic medical records and healthcare quality. Med. 2020;99(e21182):31. https://doi.org/10.1097/MD.0000000000021182.
10. Adetoyi OE, Raji OA. Electronic health record design for inclusion in sub-saharan Africa medical record informatics. Sci Afr. 2020;7(00304). https://doi.org/10.1016/j.sciaf.2020.e00304.
11. Hamade N, Terry A, Malvankar-Mehta M. Interventions to improve the use of EMR in primary health care: a systematic review and meta-analysis. BMJ Health Care Inf. 2019;26(e000023). https://doi.org/10.1136/bmjhci-2019-000023.
12. Honavar SG. Electronic medical records – the good, the bad, and the ugly. Indian J Ophthalmol Case Rep. 2020;68(3):p417–8. https://doi.org/10.4103/ijo.IJO_278_20.
13. Tapuria A, Porat T, Kalra D, Dsouza G, Xiaohui S, Curcin V. Impact of patient access to their electronic health record: systematic review. Inf Health Soc Care. 2021;46(2):194–206. https://doi.org/10.1080/17538157.2021.1879810.
14. Janett SR, Yeracaris PP. Electronic medical records in the American health system: challenges and lessons learned. Scie G. 2020;25(4):1293–304. https://doi.org/10.1590/1413-81232020254.28922019.
15. Wali RM, Alqathtani RM, Alharazi SK, Bukhari SA, Quqandi SM. Patient satisfaction with the implementation of electronic medical records in the Western Region, Saudi Arabia, 2018. BMC Fam Pract. 2020;21(37). https://doi.org/10.1186/s12875-020-1099-0.
16. Sieck CJ, Pearl N, Bright TJ, Yen P-Y. A qualitative study of physician perspective on adaptation to electronic health records. BMC Med Inf Dec Mak. 2020;20(25). https://doi.org/10.1186/s12911-020-1030-6.
17. Rahal RM, Mercer J, Kuziemsky C, Yaya S. Factors affecting the mature use of electronic medical records by primary care physicians: a systematic review. BMC Med Inf Dec Mak. 2021;21(67). https://doi.org/10.1186/s12911-021-01434-9.
18. Jabour AM. The impact of electronic health records on the duration of patients' visits: time and motion study. JMIR Med Inf. 2020;8(2):e16502. https://doi.org/10.2196/16502.
19. Quinn M, Forman J, Harrod M, Winter S, Fowler KE, Krein SL, et al. Electronic health records, communication, and data sharing: challenges and opportunities for improving the diagnostic process. Diagnosis. 2019;6(3):241–8. https://doi.org/10.1515/dx-2018-0036.
20. Yi M. Major issues in adoption of electronic medical records. Journ Digit Inf Man. 2018;16(4). https://doi.org/10.6025/jdim/2018/16/4/180-191.
21. Khalifa M. Perceived benefits of implementing and using hospital information systems and electronic medical records. Inf Emp Health Transform. 2017;238:165–8. https://doi.org/10.3233/978-1-61499-781-8-165.
22. Johnson WG, Gee PM, Kelly LA, Buttler RJ. The effect of electronic medical records on nurses' job satisfaction: a multi-year analysis. Urban Stud Pub Admin. 2021;4(3). https://doi.org/10.22158/uspa.v4n3p1.
23. Khairat S, Xi L, Liu S, Shrestha S, Austin C. Understanding the association between electronic health record satisfaction and the well-being of nurses: Survey study. JMIR Nurs. 2020;3(1):e13996. https://doi.org/10.2196/13996.
24. Berihun B, Atnafu DD, Sitotaw G. Willingness to use electronic medical record (EMR) system in healthcare facilities of Bahir Dar City, Northwest Ethiopia. Biomed Res Int. 2020. https://doi.org/10.1155/2020/3827328.
25. Or C, Tong E, Tan J, Chan A. Exploring factors affecting voluntary adoption of electronic medical records among physicians and clinical assistants of small or solo private general practice clinics. Journ Med Sys. 2018;42(121). https://doi.org/10.1007/s10916-018-0971-0.
26. Joukes E, de Keizer NF, de Bruijne MC, Abu-Hanna A, Cornet R. Impact of electronic versus paper-based recording before HER implementation on health care professionals' perceptions of HER use, data quality, and data reuse. Appl Clin Inf. 2019;10(2):199–209. https://doi.org/10.1055/s-0039-1681054.
27. Heponiemi T, Gluschkoff K, Vehko T, Kaihlanen A, Saranto K, Nissinen S, Nadav J, Kujala S. Electronic health record implementations and insufficient training endanger nurses' well-being: cross-sectional survey study. J Med Internet Res. 2021;23(12):e27096. https://doi.org/10.2196/27096.
28. Tubaishat A. Perceived usefulness and perceived ease of use of electronic health records among nurses: application of the Technology Acceptance Model. Inf Health Soc Care. 2017;43(4):379–89. https://doi.org/10.1080/17538157.2017.1363761.
29. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quart. 1989;13(3):319–40. https://doi.org/10.2307/249008.
30. Handayani PW, Hidayanto AN, Pinem AA, Hapsari IC, Sandhyaduhita PI, Budi I. Acceptance model of hospital information system. 2017; 99:11–28 https://doi.org/10.1016/j.ijmedinf.2016.12.004
31. United Nations Development Programme. The SDGs in action. https://www.undp.org/sustainable-development-goals. Accessed 26 July 2024.
32. Rouleau G, Ramamoorthi K, Boxall C, Liu RH, Maloney S, Zelmer J et al. Mapping theories, models, and frameworks to evaluate digital health interventions: scoping review. 2024; 26:e51098; https://doi.org/10.2196/51098

Publisher's note