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Comparative Analysis of Barriers And Challenges In Adoption Of Electronic Health Record System In Government And Private Hospitals Of Islamabad

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Abstract

Objective: The purpose of this study was to identify the barriers and challenges in the adoption of the Electronic Health Record system in hospitals of Islamabad and to compare the barriers and challenges faced in adopting and running the electronic health record system in government and private hospitals of Islamabad.

Method: This multicentric cross-sectional study was carried out among 210 respondents in four government and four private hospitals in Islamabad from June 2022 to November 2022. Out of 210, 160 respondents filled the questionnaire A structured questionnaire was distributed to the management, health professionals, and staff using the EHR system by simple random sampling. The data were analysed using SPSS version 26. An independent sample t-test was applied for a comparative analysis of challenges and barriers in government and private hospitals.

Results: The response rate for the electronic health record system survey was 160 (76%). Of those responding, 85.75% and 72% reported using the EHR system regarding patient care in government and private hospitals, respectively. Around 42.5% and 83.75% of government and private hospitals have fully functional EHR systems, and 72% of government and 90% of private responses reported the use of computers as a major mode of patients' data entry. A significant difference was found between government and private hospitals regarding social and legal barriers and lack of knowledge of the EHR system (p-value <0.05). Implementation of single modules and multi modules was a big challenge for the government and private hospitals, respectively (p-value <0.05).

Conclusion: Government and private hospitals equally face the challenges and barriers to the implementation of the EHR system, with social and legal barriers being more prevalent in government hospitals and barriers and implementation of single modules and multimodule were a big challenge for the government and private hospitals

Keywords: Electronic health record, challenges, barriers.

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1. Introduction

The electronic health record (EHR) system is the computerization of patient and public health information. Globally, the tendency to use computerised medical information systems is comparatively high in many developed countries. According to the 2021 survey, the use of EHR systems by medical practitioners in Sweden, Denmark and Germany was 100% and in the USA was 96%, whereas in Japan and Korea, the use of EHR systems was around 45% and 85% respectively.[1,2] With the evolution of the pandemic statistics show that in the UK in 2022 adoption rate of the EHR system has increased from 6,6% to 81.2%.[3]

With the help of the EHR system, physicians can easily find the medical information and history of a particular patient, permitting them to identify the patient who is due for their next visit for checkups, review any required laboratory tests or radiological reports, and provide diagnosis and advice on treatment. EHR systems are expected to have more advantages than the old paper-based record systems. That's why physicians and hospitals are implementing EHR systems, though adoption speed is slow.[4,5] EHR systems have flexibility and modifiable qualities, so when new EHR software is to be developed, the needs and requirements of EHR system users should be considered.[6] To ensure that the health care systems in developing nations are of higher quality, more of these systems are being adopted. Various barriers were identified in past regarding the adoption of the EHR system. The cost of implementing the EHR system is high, but it can play a role in decreasing the overall

running cost, improving the quality of health support provided to the patient, and facilitating patient contact with healthcare facilities. So, the overall working of the hospital can be improved, and incorrect information entry and human error can be minimized. But despite known advantages and returns, adoption in developing countries is still a hard task.[7]

The implementation of the EHR system faces multiple challenges and barriers. The reluctance of practising physicians to switch from paper to electronic record keeping, whether it be due to a lack of adequate computer expertise or the added tedium of data entry interfering with their clinical workload, has been observed in healthcare institutes.[8] The fact that adapting to the EHR system is a steep learning curve with many complex features and add-ons doesn't make things easier either.[9] Mastering these features and being able to navigate the system efficiently requires multiple hours of training, which may prove challenging for the overworked technical and clinical staff.[10] This may also add to the psychological pressure experienced by healthcare professionals to seamlessly adapt to an entirely new system of documentation and record keeping.[11] Furthermore, the sensitive issue of patient confidentiality also needs to be considered when using such widely shared and integrated digital data and records.[12] The medicolegal implications of using data from the EHR system, from the ethical standpoint of patient consent, public versus private data, reporting, and/or hesitation bias on the part of the patient, all need to be carefully considered before implementing the EHR system.[13]

Pakistan is the fifth-most populous nation in the world and has the potential to have one of the world's strongest economies. It is unquestionably necessary to develop and put into place a national EHR in modern healthcare systems to improve patient safety and documentation quality. In Pakistan, many barriers and challenges are faced by health professionals in finding expert developers of EHR software, hiring trained staff, and training health personnel. Widespread application efforts can be considered for improvement and the holding of seminars to encourage the use of the EHR system.[14] By implementing the EHR system, we can reduce the extended stay of patients in hospitals through speedy work and the random availability of all reports to physicians. We can minimise the nurse's work on the paper registers and patient charts by entering work time. Patients' data can be properly stored, and confidentiality can be maintained. All these advantages broadly decrease the financial burden on Pakistan's total health budget and encourage professionals to shift towards EHR system usage, providing excellent health care. The current study is one of the first to identify the barriers and challenges to adopting the EHR system, specifically from the perspective of Pakistani healthcare workers, and to compare the challenges and barriers in government and private hospitals in Islamabad.

2. Materials & Methods

This multicentric cross-sectional study was conducted from June 2022 to November 2022. Eight leading government and private hospitals in Islamabad were selected based on their use of the EHR system. A total of 210 health providers were randomly selected, working in different departments of the hospitals. Eligible participants were different health personnel, such as physicians, nurses, laboratory technicians, administrative staff, and pharmacists. The anonymity and confidentiality of the participants were guaranteed. Healthcare professionals, including doctors and nurses, hospital management, and IT staff with more than 6 months of job experience, were eligible for inclusion and had signed the study's informed consent form. We excluded very small (<4 doctors) and very large units (>40 doctors) and those that had recently implemented an electronic medical records system (<6 months before).

All participants provided electronic consent before participation. A questionnaire was subsequently distributed to all participants through convenience sampling.[15] The questionnaire with a Cronbach alpha coefficient of 0.75 has two sections: the first section of the questionnaire comprises demographic data of the participants, their experience in running the EHR system, and its application. The second section is related to the analysis of barriers and challenges encountered in using EHR software.

From 210 distributed questionnaires, 160 respondents completed the survey, 20 from each hospital, giving an effective response rate of 76%. All questionnaires were manually checked for completeness before entry into Microsoft Excel. Descriptive statistics were performed to describe the characteristics of physicians' and nurses' attitudes towards EHR characteristics. IBM SPSS Statistics for Windows version 26 (IBM Corp., Armonk,

NY, USA) was used. The frequency and percentage were used to determine the demographic profile of the participants using the EHR system and the barriers and challenges to its use. An independent sample t-test was used for a comparative analysis of challenges and barriers in government and private hospitals.

3. Results

The demographic and job characteristics of the study population are shown in Table 1. Out of 160 participants, 61.25% and 60.62% of respondents were medical officers, followed by registrars (21.25%), pharmacists (10%), nurses (5%), and administrators (2.50% vs. 3.13%), respectively. According to the respondents' responses, it was observed that less than 1 year of working experience in a hospital with the EHR system was 50% and 18.75% and 1 year to 5 years of experience was 32% and 55% in government and private hospitals, respectively. Private hospitals have a more fully functional EHR system than government hospitals (83.75% and 42.55%).

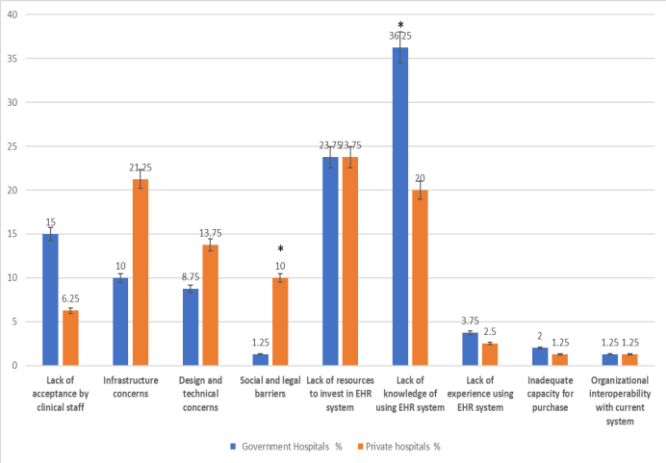
The majority of hospitals kept these medical records electronically, and the majority (72.50%) reported having computers available at the registration desks, according to the results analysis.

Figure 1 shows all of the EHR system implementation barriers in eight government and private hospitals. The most significant barrier affecting 36.25% of respondents from government hospitals and 20% of respondents from private hospitals was the lack of supporting staff with sufficient experience and knowledge of the EHR system (Table 2).

Similarly, less than a quarter of the participants (23.75%) in both private and public hospitals thought that the economic burden of purchasing an EHR system was a barrier to implementing it in the hospitals. Likewise, the lack of availability of EHR software at a reasonable price was another significant barrier for private hospitals (21.25%), as compared to government hospitals (10%). Similarly, regarding the technical issues and software design of the EHR system, private hospitals showed more difficulties (13.75%) than government hospitals (8.75%). An independent sample t-test was applied to check the difference in responses regarding barriers between government and private hospitals, which showed social and legal barriers were high in private hospitals as compared to government hospitals ($p < 0.05$), whereas lack of knowledge of using the EHR system was a significant barrier in government hospitals as compared to private hospitals ($p < 0.05$).

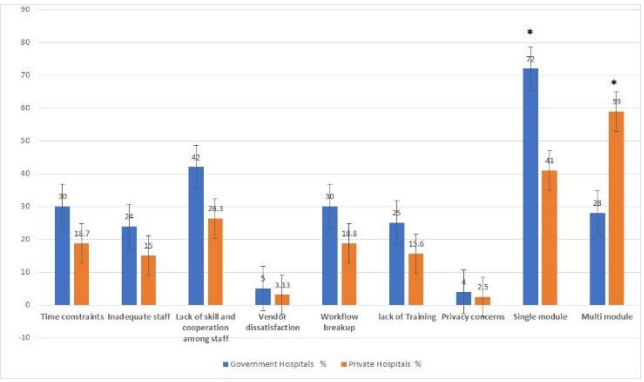
Table 1: Descriptive statistics regarding the participants and software usage (N=160)

Variables	Government Hospitals %	Private Hospitals %
Gender		
Female	42.50	33.75
Male	57.50	66.25
Designation of Respondents		
Medical doctors	61.25	60
Registrars	21.25	21.24
Pharmacy	10	10
Administrator	2.50	3.75
Nurses	5	5
Experience of Hospitals with EHR system		
< 1year	50.00	18.75
1-5 years	32.50	55.00
5-10 years	8.75	18.75
>10 years	8.75	7.50
Percentage of computers integrated with EHR system		
Integrated	58.75	66.25
Not integrated	41.25	33.75
Functionality of EHR system		
Fully Functional	42.50	83.75
Not Fully Functional	57.50	16.25
Staff training in EHR system		
Trained	18.75	58.75
Not Fully trained	81.25	41.25
Response about the utility of EHR system regarding patient care		
Yes	85.00	72.50
No	15.00	27.50
Place of patient Data entry using the EHR system		
Registration counters	72.50	72.50
Nurses	12.50	12.50
Doctors	15.00	15.00
Mode of patient Data entry		
Hard files	26.25	6.25
Computer	72.50	90.00
Any other system modality	1.25	3.75
Reporting Frequency using EHR software		
Daily basis	65.00	72.50
Weekly basis	12.50	23.75
Monthly basis	11.25	3.75
Annual Basis	11.25	0.0
Mode of sending patient data		
Telephonically	3.75	12.50
Via Email	11.25	66.25
Paper-based system	85.00	21.25
The authority receiving the reports		
Departmental Head	42.50	48.75
MS/Director	20.00	22.50
Data Section	37.50	28.75



P< 0.05 is significant, and P< 0.000** is highly significant.*

Figure 1: EHR system implementation barriers in hospitals in Islamabad.



P< 0.05 is significant and P< 0.000** is highly significant.*

Figure 2: Challenges after EHR System Implementation in Hospitals of Islamabad

As far as challenges are concerned, respondents believed that lack of skills and cooperation was more prominent among government (42%), as compared to private hospital staff (26.3%). Workflow disruption, considering all unfortunate happenings like electricity failure, financial instability, and internet challenges, is more prominent in government hospitals (30%) as compared to private hospitals (18.8%). However, only 25% of the participants from the government and 15.6% from the private sector thought that lack of training was a potential challenge after implementing the EHR system. Lack of time availability for skill development was rated as the third most common cause attributing to reluctance in the usage of the EHR system for 30% of respondents working in government hospitals as compared to 18.8% of respondents in private hospitals (Figure 2). Privacy concerns were recorded at 4% in the government and 2.5% in private hospitals. Significant differences were found regarding the implementation of single modules: 72% in government and 41% in private, with $p < 0.05$ significant, and multi modules: 28% in government and 59% in private, with $p < 0.05$ significant.

4. Discussion

Digital technology advancements have made electronic health record systems the primary method for gathering health and medical data, which can improve patient safety and enhance the quality of hospital care.[16] The goal of this study is to identify the obstacles and difficulties hospitals and healthcare workers have when implementing an EHR system in hospitals of Islamabad and also to provide a comparison of challenges and barriers faced by government and private hospitals in Islamabad.

The statistical analysis showed that the majority of our participants (58.75% and 66.2% of government and private hospitals) have expanded their use of the EHR system to improve the standard of care. This has been backed up and is in line with the findings of Mohammed et al.,[17] who found that 80% of healthcare workers had timely access to the EHR system. The statistics show that hospitals in Pakistan are hopeful about taking decisive action to establish an EHR system and are properly taking into account the significance of doing so. However, several unrelated constraints, such as extended wait times for government permissions and finances, may prevent you from fully achieving your desired goal. According to current research, only 42.50% of governments and 83.5% of private companies have fully functional EHR systems.

In developing nations like Pakistan, the effectiveness of EHR software usage is the key issue. According to our findings, only about 25% of government healthcare professionals and 15.6% of private healthcare professionals have the necessary training and education to operate EHR software efficiently. Longer wait times, more irate patients, and lower staff output may result from this. Organisations in the healthcare industry should develop training policies and techniques for effective implementation of the EHR system. Staff employees must be properly trained to use the EHR system. The biggest obstacle to the implementation of an EHR system, according to 36.25% of respondents from government hospitals and 20% from private hospitals in

our study, is a lack of available, well-trained IT employees, as well as inadequate skills and knowledge regarding EHR systems. The outcomes are consistent with earlier research by Abbas AF et al.,[4] that the majority of Pakistani medical professionals are unaware of e-health technology and the potential advantages it offers.

The initial cost necessary to implement an EHR system might be a considerable obstacle for some hospitals, especially those that are already under financial pressure. The second most frequent impediment to the successful deployment of EHR systems in Pakistan, according to 23.75% of both government and private institutions, was the initial cost to purchase and subsequent maintenance of the software. To get beyond the cost barrier associated with setting up the hardware and software of the new system, government funding programmes are necessary. The essential technology infrastructure, including computers, servers, and internet connectivity, should be purchased by hospitals.[18] Contrary to the present study, Anwar et al., show that social and legal barriers were higher in government than in private hospitals.[19]

About infrastructure concerns, 21.25% of respondents from private and 10% from public hospitals thought that a lack of infrastructure, such as computers, servers, and internet connectivity, was a barrier to the adoption and usage of EHR systems. Similar conclusions from a previous study also emphasised that a lack of computers, particularly laptops, at various healthcare levels is considered a major hindrance to the adoption of health information systems in Pakistan.[20] The removal of the barrier preventing the integration of the EHR system with the public and private hospitals in Pakistan may be achieved through the government's provision of high-speed internet at affordable prices.

Although many healthcare providers use the EHR system, doctors are essential to its adoption and utilisation in hospitals. The use of EHR systems by physicians, however, is not always simple and can encounter several challenges.[21] Giving physicians rewards or recognition can encourage them to use the system. While 32.5% of respondents from government hospitals and 23.75% from private hospitals said that they were unfamiliar with EHR systems. Doctors may struggle to use the system because they are unfamiliar with it, which might result in mistakes and frustration.[22] Mehmood et al., [23] claims that thorough training and continuous support can assist doctors in gradually becoming more familiar with the EHR system and how it functions.

With the implementation of the EHR system, we need more trained staff for the smooth and efficient running of this system. Lack of skills and cooperation among staff was reported by 42% and 26.3% of respondents in government and private hospitals, respectively. This problem can be solved by employing techniques including offering sufficient training and assistance, making sure EHR systems are user-friendly and interoperable, and streamlining data entry procedures. Additionally, it might increase doctors' technical proficiency and readiness to use HER.[24] Workflow breakdowns, considering all unfortunate happenings like electricity failure, financial instability, and internet challenges, are a major problem in government hospitals (30%) compared to private hospitals (18.8%). A key lesson from this experience was that cooperation during the early phases of the shift became a hindrance rather than helpful for minimizing early resistance.[25]

Moreover, 36.5% of physicians who were working in government hospitals reported that their lack of familiarity with the EHR system had a major impact on the implementation process, compared to 20% of physicians working in private hospitals. Even though electronic health records can improve users' work efficiency, the differences in experience, understanding, and skills can lead to dissatisfaction among health professionals, who are unable to realise their full potential to use the EHR systems.[26]

Regarding challenges after EHR system implementation, the majority of participants (35% of government hospitals and 46.25% of private hospitals) reported that they were unable to use this system properly due to a lack of skills and cooperation; however, only a few respondents thought that lack of training (25% of government hospitals and 15.6% of private hospitals) and interference of the EHR system with their workflow (30% of government hospitals and 18.8% of private hospitals) may cause annoyance and burnout. To ensure that the EHR system suits the needs and preferences of the physicians, hospitals might involve them in the selection and modification of the system. In a different survey, doctors felt that using an EHR system had significantly increased their administrative labour.[27] 72% of participants from government hospitals and 41% from non-government hospitals were eager to work on a single-module EHR system in the initial phase. This will not only ensure

quick learning of the EHR system by the staff but will also develop an interest in working on this new system without any embarrassment of not being experienced and, most importantly, fewer chances of errors. The choice to install a single module or a full-fledged EHR system should be based on the particular requirements of the hospital and its patients and should incorporate input from all stakeholders, including doctors.[28]

The value of EHR systems has recently been properly recognized in all sectors to enhance patient care as well as management, as evidenced by the results. Few governments and the majority of private hospitals have started the process of implementing EHR systems, but it still needs to go a long way to realise its full potential through effective strategic planning, infrastructure development, and experienced human resources, including IT and training experts. The government can take the lead in identifying and bridging the gaps in resources and competencies to achieve the required results.

There were a few limitations in this research study that prevented the researchers from delving deeper. The first constraint was the necessity for more healthcare professionals, such as laboratory workers and administrative staff like clerks who use the EHR system, to be included in future studies. Another drawback was the small sample size, which was a result of the few replies from some of the medical professionals who were too busy to complete the online link survey. Thirdly, because this research is qualitative, it generates theories that need to be investigated further.

5. Conclusion

This study highlights the barriers and challenges faced by both public hospital administrators and vendors in implementing digital health systems in developing countries such as Pakistan. It also gives a comparison of the analysis and barriers to the adoption of the EHR system in government and private hospitals. A fully functional EHR system is more common in private hospitals than in government ones. More or less, government and private hospitals are faced with the same challenges and barriers as far as the implementation of EHR systems is concerned. EHR systems are a critical component of modern healthcare delivery, and their adoption has the potential to improve patient outcomes and reduce healthcare costs. Identifying usability barriers can help healthcare organisations develop more user-friendly systems, develop strategies to minimise workflow disruptions, and ensure that physicians can use EHRs efficiently and effectively. However, additional studies on clinical usability and the workflow fit of EHR systems are required to ensure efficient system implementation.

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Contributions:

G.J - Conception of study
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G.J, M.A, A.A, A.F.A - Critical Review
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