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*Original article*

# Evaluation of Knowledge and Perception of Dentists regarding E-Health System

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## ABSTRACT

**Objective:** Across the world, utilization of electronic patient record systems constantly increasing in many health sectors. The development of new information technology and its implementation have beneficial effects on the healthcare system. However, there are some hurdles regarding this transition. The main objective of this study was to assess the knowledge and attitude of dentists towards teledentistry in Karachi.

**Materials and Methods:** Data for this cross-sectional study was collected through the self-designed questionnaire. The study sample (n=201) number of participants was selected, based on random sampling method, making sure the candidates fitted inclusion criteria. The inclusion criteria consisted of dental practitioner who were actively practicing and residing in different areas of Karachi. Numerous variables like demographic data, opinion and knowledge were included in the questionnaire to analyse respective effect on the knowledge of E-health systems. SPSS version 25 used to execute descriptive analysis on the following variables. To detect any relationship multiple regression tests used.

**Results:** Majority (66%) of the dentists agreed having the knowledge regarding E-health system which can be implemented in treatment planning and maintaining patient records. Implementation is difficult due to financial factors and lack of availability in dental practices. Predominantly, most participants (73%) favoured adopting electronic system over ageing paper-based record keeping.

**Conclusion:** Majority of dentists favoured switching to E-health experience but due to financial burden and lack of resources, implementation in dental practices in Karachi seems difficult. There is a small minority of participants lacking knowledge of systems leading to difficulties in operation during clinical practice. Teledentistry has great potential to benefit healthcare.

**Keywords:** Electronic Health Record, Implementation, Seminar,Teledentistry



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## INTRODUCTION

Healthcare organizations require a secure, reliable, and easily accessible system for sensitive and confidential patients' records. The clinical decisions and the provision of patient-centered programs rely on the timely accessibility of accurate information.[1,2] Since the 1980's, many idioms have been referring to the idea of a complete electronic patient record system – a way to store and manage patient health data and merge it into a system whereby it is easily accessible when needed. [3,4] Electronic Health Record (EHR) is often defined as a complete longitudinal history of an individual's health care across all settings and encounters as well as the data types and relationships that would enable it to be created, stored, and managed electronically.[5] By utilizing such electronic software for the management of patient's electronic health records, the clinical practice of dentistry can be streamlined saving cost and time.[6,7]

Electronic dental records are bodies of patient data arranged to present information to the provider, other authorized users, and in some cases the patient, and may include non-EHR data such as reference values for clinical laboratory tests.[8] EHR systems offer the potential to improve care quality and patient safety by enhancing both the quantity and quality of information available to providers for decision-making. [9,10]

There is a restricted understanding of the challenges associated with the balance of dental clinical workflow with the collection, review, and representation of clinical data in EHR. Regarding the acknowledgment that dentists' transition to EHR has been reduced due to diminishing incentives and technical assistance, the studies focusing on EHR in a dental clinic context are rare. The need for EHR and going digital is greatly required for dentists to practice safely and efficiently along with the security that the data storage is being backed up.[11]

This study is inclined to look for and point out the crucial success factors of an EHR system application in a dental clinic context, as authorized by clinicians.[12,13,7] The article closes with a summary of the study's contributions and research applications.[14,15]

## MATERIALS AND METHODS

This was a cross-sectional descriptive study design using a purposive sampling technique. It was carried out to evaluate knowledge of EHR amongst dental practitioners. A sample of 201 participants were selected in our study and the sample consisted of dental practitioner who were actively practicing and residing in different areas of Karachi. A questionnaire was developed using google forms software and participants were encouraged to fill it out. We used numerous social media platforms like Whats App, Facebook, and Instagram to circulate the web-link for the questionnaire. All participants consented to take part in this study and all the recorded responses were kept strictly anonymous. The ethics review committee of Altamash Institute of Dental Medicine has approved this study (AIDM/EC/09/2020/03). Inclusion Dental practitioners who were actively practicing and residing in different areas of Karachi. Exclusion Those people residing outside, or the age group that is not practicing dentistry. Predictor variable like demographic data, opinion and knowledge were included to analyse the respective effects they have on the knowledge of EHR.

## RESULTS

Using correlation method, we found out that there is a correlation coefficient of 0.915 between the questions asked about usefulness of EHR and that this system helps dentists to brief the treatment plan easily to the patient. By applying correlation method to the question related to having knowledge about EHR (Do you have knowledge about E-system) and attending any relevant seminar (Have you attended any seminar on E-system), a perfect negative correlation between the two was observed. This denotes that those people who know about this system might have never attended any seminar related to E-health. Proper attention needs to be given for marketing about the seminars of E-health and similar measures need to be introduced. These seminars allow the dentists to familiarize with the E health system for better understanding and implementation. Regarding the knowledge

about the EHR, nearly two thirds (66%) were knowledgeable about E-Health System whereas the rest were not familiar with it as denoted by figure 1.

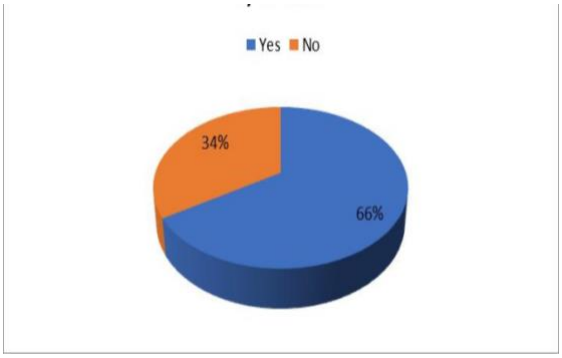


**Figure 1:** Distribution of knowledge about the E health system

Same statistical method was again applied to check the relationship between the people who have lack of computer knowledge also thinking that EHR is expensive. The result shows a correlation coefficient of 0.7 denoting the above mentioned statement. Furthermore, it is reflected that people who believed in the EHR superiority also believed in better explanation of the treatment plan to the patient whilst utilizing the EHR (Correlation coefficient of 0.65).

To further verify the above results, a regression model was applied to question seven and eight. In this process, the dependent variable (Due to think E-system is useful in treatment planing) and the independent variable (Do you think dentist will be able to brief treatment planing easily to patients by using E-system) were used for comparison. The results are shown below

**Table 1:** Comparison of E-system treatment planning variable

| Regression Statistics | |
|---|---|
| Multiple R | 0.956939863 |
| R Square | 0.915733901 |
| Adjusted R Square | 0.873600852 |
| Standard Error | 11.90881372 |
| Observations | 4 |

The R Square value 0.915 and adjusted R square value 0.87 shows that 87% variation is caused by the independent variable on dependent variable. This means that people who think E-system is useful also think that it will help in explaining the treatment plan in a better way table 1. Lastly, regression was applied to see if the variation in the value of the dependent variable (Do you think by conducting E-system we can easily access dental record at the time of need) correlated to the independent variable. The result is shown below table 2:

**Table 2:** Correlation of E-system for access of data record variable

| Regression statistics | |
|---|---|
| Multiple R | 0.999135315 |
| R Square | 0.998271378 |
| Adjusted R square | 0.997407067 |
| Standard error | 1.717965782 |
| Observations | 4 |

The adjusted R square value denotes a variance of 99% hence leading to the conclusion: people believe that using the Esystem is better than the paper-based system, for accessing patient records when needed as presented below in figure 2.

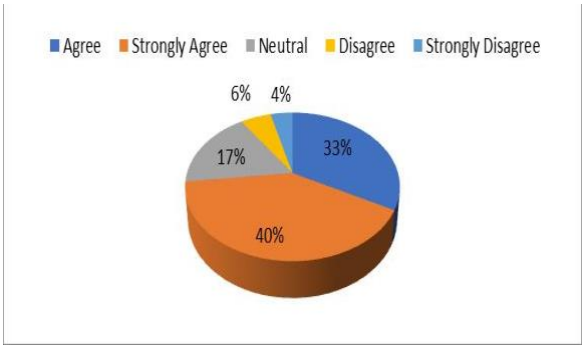


**Figure 2:** Distribution of responses about the E health system and manual recording

As per our findings, in this study 23% of the respondents agreed that they have attended seminar on EHR as shown in table 3. Significantly reduced participants were able to attend seminars about EHR as emphasized in this study, necessitating providers to conduct more EHR based seminars in an easy-to-understand format. Lastly, 23% of respondents reported that computer skills are necessary for implementation of EHR, however in Karachi several people are not trained to operate the software's. Moreover, 66% of the participants reported having knowledge about the dental databases and EHR software's in use as shown in table 4.

**Table 3:** Distribution of responses on attended seminars on E health system

| Response | n% |
|---|---|
| Yes | 47 (23%) |
| No | 154 (77%) |

**Table 4:** Knowledge of database dental software available in dentistry

| **Response** | **n%** |
|---|---|
| Yes | 133 (23%) |
| No | 68 (77%) |

# DISCUSSION

According to the ADA Primer on electronic health records, in 2006, 90% of dentists used some form of practice management software. That same year, 47% of new dentists and 42% of established dentists claimed their offices were at least somewhat paperless."[16] As new software's are developed, more and more practices are implementing the systems that are currently out there.[17,9,18] The ability of EHR is to utilize comprehensive clinical information in a highly constructive manner in order to allow analysis for quality assurance, identification of areas for improvement, design of decision support tools like allergy alerts, medication alerts, and other causes.[19,20,21] An EHR system can be a useful source for the dental auxiliaries to schedule patients appointment.[22] Moreover, the software can also be used to share relevant information of patients to another dentist, dental specialist, primary care physician in a safe and confidential manner.[23,24]

There are multiple software through which e-dental services can be applied such as: Open Dental and Health wire.[25] Open Dental, is a licensed Online Management Software. It is compatible with Microsoft Office. It can be used in making online appointments, obtaining patient records, rescheduling the appointments of patients and controlling the account of the patients like emails, payment plans, lab cases, charts, dental imaging, treatment plans, referrals, critical data backup, reports, track employees' hours and breaks and many more uses. Other software have similar functionality but due the financial constraints, majority of clinics use Health wire system. It is an easy-to-use software providing all the functionalities of its counterparts at a more budget friendly package. Another unique concept of Teledentistry can be deployed in numerous dental organizations to enable remote consultations. Teledentix software was widely used for consultations during COVID-19 pandemic. This software has gained popularity due to its cost effectiveness and its ability to provide remote consultations. EHR system is important for both the patient and the dentist and can be applicable in different fields of dentistry. It minimizes the time taken for multiple opinions by various specialists and is also more convenient for the patient and the doctor.[27] Prevention and early detection of any carious or a soft tissue lesion is also possible through EHR along with deployment of modern technology like computer aided diagnostic tools. [28,29] In Pakistan, a few EHR companies are working online. Therefore, the aim of the study is to seek knowledge of dentists about EHR system, and determine dentist's perceived barriers and its practicality in improving dental health in remote areas. Along with the advantages of E-health systems there are legitimate, ethical and financial application which need to be explored.[30,31]

# CONCLUSION

Majority of dentists are in favour of implementation of EHR in their practices to improve patient care. In this advanced day and age, using modern software's which enable provision of patient's standard of care and maintenance of confidentiality is vital and crucial. Reduced usage of EHR across the city should raise concerns to the quality of treatment that is being provided.

## Author Contribution

1. **S.H:** Writing -Original draft, data collection, conceptualization.
2. **A.S:** Writing - Original draft, conceptualization, data analysis.
3. **A.J:** Planned and designed the present work.
4. **A.J:** Data collection, conceptualization.
5. **A.H:** Writing -Original draft, data collection, conceptualization.
6. **N.A:** Reviewing - Final review of the manuscript and data collection
7. **S.A:** Final Review and Editing

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## Institutional ethical board approval

The ethics review committee of Altamash Institute of Dental Medicine has approved this study (AIDM/EC/09/2020/03)

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## Conflicts of Interest

The authors report no conflict of interest

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