# TELE-DENTISTRY A NEW HORIZON OF DENTISTRY  IN PAKISTAN

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**ABSTRACT**

 A new term e-dentistry or tele-dentistry is getting popularity these days in e-health which uses electronic processes and communication for the transfer of dental health resources and health-care by electronic means. Practice of e-dentistry is not adequate in Pakistan. **Objective**:The main objective of the study was to assess Knowledge and Attitude of Dentists towards Tele-Dentistry in Pakistan. **Place and duration of study**: this was conducted in Arm Forces Institute Of Dentistry Rawalpindi and Allied Hospital Faisalabad from January 2016 to September 2018.  **Methodology**: The data were collected through the self designed questionnaire. Study sample (n=155) included 92 males and 63 females. Mean age of male respondents was 29.57±5.3 years and the mean age of female respondents was 29.2±5.3 years. **Results**: According to the results of the study 37.4% respondents reported "yes" about knowledge about e-health. 23.9% reported "yes" about the knowledge of Open Dental or Free Dental software. 13.5% respondents had knowledge about the databases used now a days. 72.3% didn't mention any use of e-health. 30.3% respondents had attended seminar on e-health. No respondent had practiced tele-dental health. 38.1% respondents agreed for practicability of e-health. 39.35% respondents reported that tele-dentistry can be practiced in Pakistan. 21% respondents recommended some areas where tele-dentistry can be applied. **Conclusion**: There are still significant gaps in the facts between where e-health is used and where its use is supported by high-quality evidence. Tele-dentistry has a potential to benefit the Pakistan's healthcare system in terms of preventive care and disease treatment.

 **Key Words**: Communication, e-dental health, Healthcare, Tele-dentistry Knowledge, Practice.

**INTRODUCTION**

An innovation been made in the field of health for saving lives in the remote regions of any country. This innovation is the e-health. e-Health is the use of information and communication technologies (ICT) for health care. It is recognized as one of the most rapidly growing areas in health today. Being member of WHO, Pakistan had to develop strategy and plan for e-health but it is still considered a new concept here and situation of telemedicine and e-health policy is very alarming here in contrast of 55% of the member states of WHO.1 E-health is broadly used in many fields of health like Electronic health records Electronic medical records,2-4 Computerized Physician Order Entry (CPOE),5,6 e-Prescribing,7-9,2) clinical decision support,10 telemedicine,11 consumer health informatics,12 health knowledge management, Virtual healthcare teams, mHealth or m-Health,13 medical research using Grids and Healthcare Information Systems.14 Public health monitoring has become easy due to e-health. Educating health workforce, conducting research and treating patients are some examples of e-health to transfer health resources and health care by using Information and Communication Technology. IT, e-business and e-commerce play an important role to improve the public health services.15 There are many branches of health covered by e-health like e-medicine, e-pharmacy, e-health record keeping (Personally Controlled Electronic Health Record).16 E-health record provides a health summery to avoid mix-ups of the data of patients. A new term in dentistry is prevailing data by day which is called as Personally Controlled Electronic Health Record (PCEHR).17 According to Australian Dental Association it is not an electronic document but a "health record" and it should be called as "health summary" to avoid mix-ups.18 Electronic health records were first started in 1960s. It was mostly used by healthcare insurance agencies and companies. In 1990s American Dental Association in collaboration with many others introduced an electronic oral health record of the patients and formed a committee called Standards Committee for Dental

Informatics having mission to improve patient care and oral health by using Information Communication Technology. Revolution has occurred in the use of electronic records as well. As compared to 18% use of electronic health record (EHR) there is an increase of 78% of use of electronic health record by physicians according to a report of America.19 In May 2005 an eHealth strategy for WHO was developed by the Fifty-eighth World Health Assembly by adopting Resolution WHA58.28. In this resolution the member countries were urged to develop a plan for e-health services in their countries.4 In Pakistan some e-health programs are running but no dental programme is in process. So e-health is an important tool which can help the dentists to maintain dental records of the patients. e-health encompasses all the principles and policies their implementations and proves to be productive for the organization and the dentist. There are different softwares through which e-dental services can be applied; open dental is one of them. Open Dental, or Free Dental, is a licensed Online Management Software. It is compatible with Microsoft because it is written in the C# programming language. It can be used 1) in making online appointments,20 2) supporting complete patient records,21 3) scheduling the recalls of patients and controlling the account of the patients like payment plans, email, referrals, lab cases,22 4) treatment plan, charts, dental image making.22 Open dental is also used to create and send e-claims or paper claims, Billing automation, Audio and Visual office intercom, Critical data backup, Flexible user-defined queries and reports, Track employees' hours and breaks, Supporting daily, weekly and monthly task lists, Built-in accounting module, Secure remote access.23 In Pakistan a few e-health companies are working online. Dental e-health is a new concept in Pakistan and it needs to be explored by the dentists. Therefore the objectives of present study were to determine the knowledge of dentists about tele-dentistry, to determine dentist's perceived obstacles and its practicability in improving dental health in remote areas and to determine dentist's attitudes toward tele-dentistry.

## METHODOLOGY

It was a cross-sectional descriptive study design using purposive sampling. Targeted population was dentists of AFID and Allied Hospital Rawalpind(n=155). Dentists from both hospitals were approached for the purpose of data collection and one to one approach was used to fill questionnaire. 170 dentists working in both hospitals of Rawalpindi and Faisalabad were contacted. 15 dentists refused to participate in the study and 155 agreed. A self structured questionnaire was developed for pilot study and administered for pretesting to a sample of 32 dentists to gain feedback on the overall acceptability of the questionnaire in terms of length and language clarity. A final questionnaire was designed consisting of structured and non structured questions. The questionnaire was divided into three sections. First section consisted of demographic characters of the respondents, second consisted of knowledge about the e-dental health and third was to have views and opinions of dentists about practicability of e-dental health in Pakistan. Response rate was 91.17%. Coding of structured and non-structured questionnaires was done and data were analyzed by using SPSS version 20. Chi-square test was performed for finding out p-value of different variables used in the study.

## RESULTS

Out of 155 dentists 59.4% participants were males and 40.6% were females. Mean age of male participants was 29.57 years with the standard deviation of ±5.3.
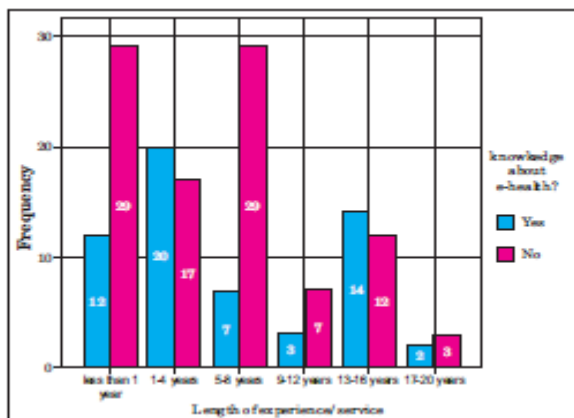
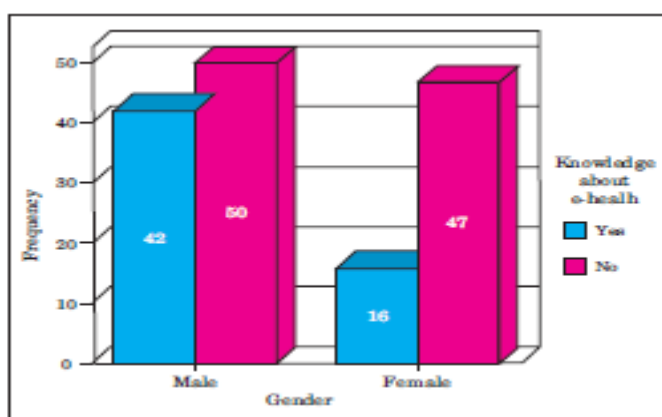Fig 1: Comparison of length of experience and knowledge of e-health



Fig 2: Gender wise knowledge about e-health

### TABLE 1: KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT EHEALTH

| Sr. No | Variables | Yes (%) | No (%) | P-value |
|---|---|---|---|---|
| 1 | Knowledge about e-health | 58 (37) | 97 (63) | 0.025 |
| 2 | Knowledge about Open-Dental software* | 37 (23.8) | 118 (76.2) | 0.036 |
| 3 | Knowledge about database dental software program used now a day | 21 (13.5) | 134 (86.4) | 0.041 |
| 4 | Attended any seminar on e-health or not | 47 (30.3) | 108 (69.7) | 0.039 |
| 5 | Opinion about practice of tele-dentistry for distant places | 59 (38.06) | 96 (61.94) | 0.015 |
| 6 | Practice of tele-dentistry | Nill | 155 (100) | —1 |
| 7 | Opinion about practice of tele-dentistry in Pakistan | 61 9(39.4) | 94 (60.4) | 0.001 |

### TABLE 2: OPINION ABOUT USES OF TELE-HEALTH (OUT OF 53*)

| Sr. No. | Uses of e-health | Frequency | (%) |
|---|---|---|---|
| 1 | Dental treatment plans | 11 | (20.7) |
| 2 | Supervising dentists for Prosthetic designs | 7 | (13.2) |
| 3 | Supervision of orthodontic services in the remote areas | 9 | (16.9) |
| 4 | Online appointments/consultation | 25 | (47.2) |
| 5 | Education of patients | 1 | (1.8) |
|  | Total | 53 | (100) |

*53 out of 155 respondents reported uses of e-health

#### TABLE 3: BARRIERS TO NON-PRACTICABILITY OF TELE-HEALTH IN PAKISTAN (OUT OF 94)

| Sr. No. | Barriers | Frequency | (%) |
|---------|----------|-----------|-----|
| 1 | Lack of computer skills among dentists | 27 | (28.7) |
| 2 | High cost to develop the system | 19 | (20.2) |
| 3 | Dentistry requires manual work and cannot be done online | 26 | (27.6) |
| 4 | Patient compliance and satisfaction need physical presence of dentists, not online consultation | 10 | (10.6) |
| 5 | It will b an extra burden for dentists | 12 | (12.7) |
|   | Total | 94 | (100) |

#### TABLE 4: OPINION ABOUT AREAS OF DENTISTRY USING E-HEALTH (OUT OF 34)

| Sr. No. | Comments about areas of e-health | Frequency |
|---------|----------------------------------|-----------|
| 1 | Basic health units /District and Tehsil headquarters | 12 |
| 2 | Telemedicine | 9 |
| 3 | Orthodontics | 7 |
| 4 | Operative dentistry | 5 |
| 5 | Community dentistry | 1 |
|   | Total | 34 |

SD and the mean age of female participants was 29.2 years with a standard deviation of ±5.3SD. 74.8% of the participants had BDS qualification and 25.2% had done specialization. All participants reported that they had not practiced e-dental health anywhere in Pakistan. An average of experience was found to be 6.01 years±7.75SD. Details of results can be seen in Fig 1-2 and in Tables 1-4.

### DISCUSSION

Government of Pakistan is utilizing Information Communication Technology for transformation of public health services at the door steps of common man. The main hub is in Holy Family Hospital and other four remote hospitals DHQ hospitals in Attock, DG Khan, Khushab and THQ hospital, Pindi Gheb are connected with the main HUB through satellite connectivity. In addition this centre is providing specialist consultations to 08 other sites in Punjab and rural Sindh. Rural telemedicine centres have enabled rural population to seek consultation, advice and treatment from specialist doctors in urban health centres, without having to travel hundreds of kilometres and spending their meagre financial resources on related transportation and accommodation. It is unfortunate, that there is no teledental or e-dental clinic in Rawalpindi and Faislabad. Berndt J et al used e-dentistry to provide interceptive orthodontic services to disadvantaged children.24 According to national e-Health implementation survey Finland, electronic patient records are being managed in the country at a very large coverage and filmless picture archiving and communication systems are being used in 94% hospitals of the country to provide primary health care.25 Study done by Ramesh Nagarajappa, et al support the results of this study.26 Eino Ignatius and others also reported similar results.27 In the present study 30.3% of the respondents had attended seminar on e-health. Seminars on e-health promotion should be conducted in the country to increase knowledge of the health professionals to explore new horizons. In 2011 e-health association of Pakistan (eHAP) conducted e-Health awareness and advocacy seminar, but probably after that no seminar has been conducted in the area of Rawalpindi and Faislabad. or conducted but not reported.28 10.6% of the respondents of the present study reported that patient compliance and satisfaction need physical presence of dental physician. Looms GA et al29 and Ajami S et al30 both explained similar reason of non-practicability of Electronic Medical Record (EMR). 28.7% of respondents reported that computer skill are required for operating e-dental software. These trainings are not available anywhere in Pakistan. A proper data exchange system is required for this purpose. Studies conducted by VH, Martínez-García AI and Meinert DB supported the results of this study.31-34 13.5% (n=21) reported "yes" about knowledge of database dental software used now a days. Only 9 out of 21 respondents answered about database software correctly. Teledentistry is a useful tool for both the patient and the dentist and can be applied in various sub-specialities of dentistry. It cuts down the time taken for multiple

opinions by various specialists and is also more economical for the patient and the doctor. Prevention and early detection of any carious lesion or a soft tissue lesion is also possible through teledentistry. In endodontics it can help in accurate diagnosis of periapical lesion and treatment planning of carious teeth. In oral medicine and radiology it helps in diagnosing and framing a treatment plan of difficult cases by easy access to various specialists through transfer of radiologic images. In maxillofacial surgery it may be helpful for appropriate treatment of complicated cases by analysis of advanced dental imaging techniques (like CBCT) which are often not available in one centre. Orthodontists can see routine cephalometric analysis and supervise treatment. Prosthodontists along with various computer aided diagnostic tools (like CAD, CAM) can design inlays, onlays and crown preparations.[35,36]

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