

Study of Role of Information Technology in Research by Dentists in the Dental Colleges in Mumbai

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Abstract—Many developed countries have announced initiatives to modernize their health care systems with investments in health information technology (IT). The goal of these initiatives is to use technology to improve the health care system by reducing costs, increasing patient safety and improving quality of care. Improving health care is a common goal for these countries, but there are wide disparities in the success with which nations have pursued this goal.

This research aims at finding out the role of Information Technology in performing research by dentists at various levels.

Dentists are engaged in performing research but are not keen in using IT for the same because of several issues and time bound factors in the country with huge population and patients like India. These issues were addressed in the paper along with the recommendations are given to enhance the research culture amongst dentists by providing the guidelines may be introduced by several dental colleges or the government.

Index Terms— Dentist, Information Technology (IT).

1 INTRODUCTION

Information Technology (IT) refers to the computerized system that is used to create, acquire, process, store, retrieve, select, transform, disseminate and use vocal, pictorial, textual and numerical information. It is increasingly being used for educational development, including dentistry.

Advances in Information Technology year by year leads to new and beneficial applications of IT enabled application in dental education. There are lots of challenges and opportunities abound for improving support, clinical care, education, and research with IT.

Many dentists use electronic dental records, digital radiology and other IT tools daily. The use of Information Technology in Dental Research will benefits the dentists in-

1. Use information systems for managing dental data and supporting clinical decision making in the context of the dental care and office workflow
2. Apply principles of technology evaluation to identify and select appropriate information technology products and services to achieve specific goals
3. Plan, administer and manage information technology implementations in dentistry

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IT has moved on rapidly from a time when the desktop PC

was used solely for word-processing, toward networked systems with access to shared information databases and with the capacity to transmit data electronically anywhere in the world. Dentists are engaged in the research which determines the safety and effectiveness (efficacy) of medications, devices, diagnostic products and treatment regimens intended for human use. These may be used for prevention, treatment, diagnosis or for relieving symptoms of oral diseases.

Research embraces a continuum of studies involving interactions with patients, diagnostic clinical materials or data, or populations in a number of categories including: disease mechanisms; translational research; clinical knowledge, detection, diagnosis and natural history of disease; therapeutic interventions including clinical trials; prevention and health promotion; behavioral research.

With the overwhelming rapid development of Information technology in the past decade, modern dental research was becoming more dependent on informatics. However, it is important to distinguish informatics from IT. Informatics focuses on research and evaluation of computing applications, information models, and occasionally looks into how to set up, organize, and process digitization based on existed hardware and software. By contrast, IT primarily focuses on the development and implementation of computer technology and telecommunication. Although informatics and IT focus on different aspects of research, they have shared common interests, such as a joint program in which informaticians and IT engineers collaborate to customize a new three-dimensional (3D) virtual reality system for training preclinical dental students. Therefore, dental IT (d-IT) research could be considered as a subcategory of DI.

It is predictable that the use of Information Technology in dentistry will continue to grow beyond traditional practice man-

agement and clinical applications. Informatics will also play a role in communication among dentists and with their patients. Some dentists are already using the Internet for communication with colleagues and patients via E-mail and the World Wide Web as well as online chats and teleconferencing. The research paper focuses on the role and use of Information Technology by dentists in performing research.

2 AIMS AND OBJECTIVES

Study of the role of Information Technology by dentists in performing research. The aims and objectives of the research are:

1. To study the role of IT in performing research by dentists,
2. To study the support given by medical colleges or governments to promote research culture amongst dentists

3 REVIEW OF LITERATURE

The rapid expansion and exposure of information technology has affected modern life across a broad spectrum. Health and medical sector also get gear up with advances in modern technology and application of computers. Despite the significant conceptual breakthroughs of the 1960s, all medical informatics, including dental, have faced major impediments in the shape of systems performance and integration issues [1].

The term Dental informatics (DI) used in dentistry, which is described as “the application of computer and information science to improve dental practice, research, education and management”, is a relatively new discipline that has significant potential in supporting the research and education of dental science. [2, 3] DI can be considered as a sub-domain of medical informatics (MI), and thus the development of DI to a certain extent depends on MI. Despite the fact that DI and MI share common characteristics in medical research, it is worth having independent investigations focusing on DI itself.

Although informatics and IT focus on different aspects of research, they have shared common interests, such as a joint program in which informaticians and IT engineers collaborate to customize a new three-dimensional (3D) virtual reality system for training preclinical dental students. Therefore, dental IT (d-IT) research could be considered as a subcategory of DI.

Zimmerman JL discussed in 1986 about inclusion of computer courses in dental curriculum. It is difficult to retrace the exact time when DI was considered as a relatively independent research field. One of the earliest publications searched in Medline with keywords of “dental informatics” was “Computers in Dentistry” written by Zimmerman [4]. However, interests in DIT can be traced back even earlier to the 1960s. [5, 6] The introduction of computer-aided design and computer-aided manufacturing (CAD-CAM) in the 1980s changed the landscape of dentistry and became a milestone for dental computerization. [7, 8]

Ready access to information and beliefs about the value of such information dramatically affect the doctor-patient relationship. Some physicians and dentists are concerned about patients who present with information they have received from the Internet, while others embrace the role of the Internet with their patients and provide health information and links

to preferred sources of health information on their own Web sites.

With level access to information, patients are more actively participating in their health care. Access to information about the full range of treatment options is enabling patients to collaborate with their dentist in deciding on a course of treatment [9]. Internet-based applications used by a dental practice might include: email or secure messaging; a practice Web site or portal; online scheduling, pre-registration, and pre-visit preparation; patient access to personal dental records; and teledentistry. Email communication can prove to be an extremely important relationship builder [10]. Convenience, communication, personal knowledge, and trust can all be positively affected with the use of Internet-based applications [11]. Providing patients with direct access, via the Internet, to their own personal dental health records can enhance the dentist-patient relationship. Allowing patients direct access to their dental records reduces the asymmetry of power and knowledge and enables patients to feel more in control, which leads to more trust in the relationship. Studies have demonstrated that when patients are given access to their records, they find it easier to talk to their doctors [12], and the access facilitated “useful discussions” [13] Other studies have shown that patients who had access to their medical records expressed increased confidence and trust in their doctors (Baldry et al., 1986; Miller et al., 1987).

It has been observed that there is a large scope of Information Technology in enhancing the services provided to the patients in the profession of dentistry.

4 METHODOLOGY

The research survey was conducted at the various dental colleges across Mumbai city. The quantitative approach was implemented to understand the views of the dentists about the Information Technology and use of the same in research. Survey method was used to get data. Questionnaire and Face-to-face Interviews were conducted to get appropriate information from the respondents. The respondents were the dentists from various medical colleges across Mumbai, namely, MGM Dental College & Hospital, Nair Hospital Dental College, Terna Dental College and Dr. D. Y. Patil Dental College. The research focuses on the awareness and use of IT when performing Research by the dentists in various colleges.

Questionnaire and Face-to-face Interviews were conducted to get appropriate information from the respondents.

The study used Descriptive methodology which involved the survey of 117 dentists who were involved in research in their area

A well designed pretested questionnaire was administered amongst the respondents so as to gather knowledge. The Questionnaire had majorly objective responses. Only 117 respondents were able to submit information by answering the questionnaire.

4.1 Limitations of the Study

It was found that the dentists are not keen in doing research due to some issues which were addressed in this paper, the number of respondents were less. Also, the use of Information Technology was very limited by the respondents. Hence, it

was difficult to get the right number of respondent with relevant responses.

5 RESULT AND DISCUSSION

A study was conducted at various dental colleges across Mumbai City. A view of 117 doctors was taken to conduct the study of role and use of Information Technology in Research through questionnaire. A total of 29 Doctors from MGM Dental College & Hospital, 44 doctors from Nair Hospital Dental College, 15 Doctors from Terna Dental College & Hospital, and 29 Doctors Dr. D. Y. Patil Dental College was taken.

It was found from the study that, the doctors are not keen in doing the research because of the major issue, i.e. research funding. As shown in Fig. 1, it was found that only 14 % doctors received the research funding and only 22% research fundings from the private and government organizations was given for performing research.

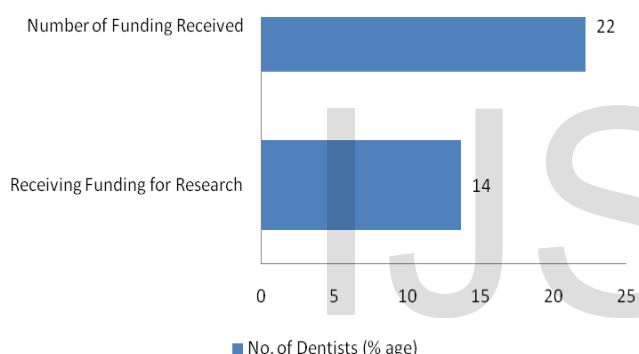


Fig. 1. Research Funds received and provided by Private and Government agencies

It has been observed from the study that most of the dentists are using IT for statistical analysis of data. Approximately 60% dentists are using IT for surfing information on internet, data entry, creating graphs, statistical analysis and approximately, 35% to 50% doctors are using IT for document management, image processing, recording findings etc. Very few dentists are using IT for pharmacovigilance research compliance, research budgeting etc.

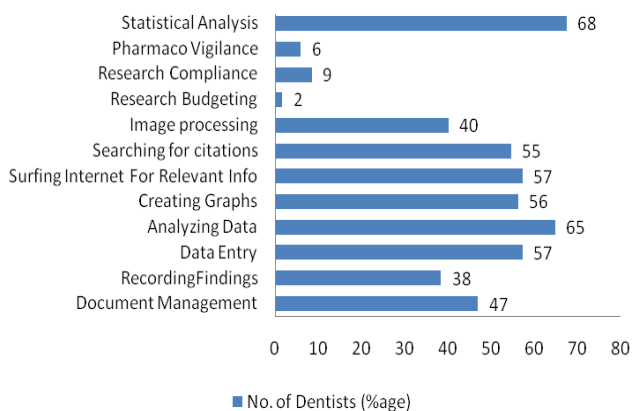


Fig. 2. Use of IT in various activities in performing research

It was found from the study that the infrastructural facilities required for Research & Development activities were not available for performing the research in majority of the medical colleges. Study states that, only 16 % doctors are getting the R&D facilities in their medical college.

As shown in Fig. 3, other factors lacking in performing research are,

1. Lack of provision of Research and Development lab facilities,
2. Low level of Computer literacy among investigators,
3. Non-familiarity with the user interface and difficulty in using the UI interface,
4. Delay in set-up of IT infrastructure,
5. Difficulty of Information System support to investigators,
6. Hardware and Software costs etc.
7. Regulatory authority position not being clarified.

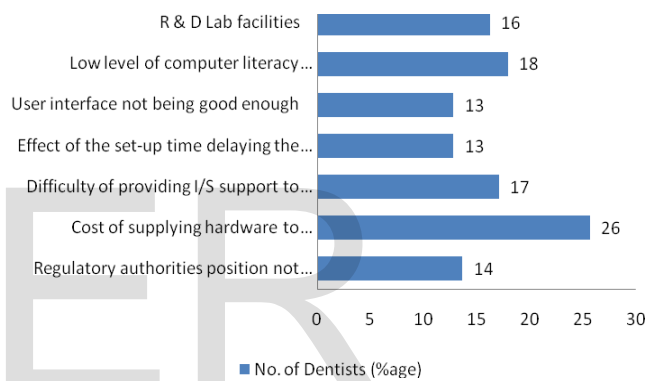


Fig. 3. Factors lagged in use of IT for Clinical research

As shown in Fig. 4, it was found that the very less number of dentists are using Clinical Information System because of concerns like security, confidentiality, privacy reliability of data etc.

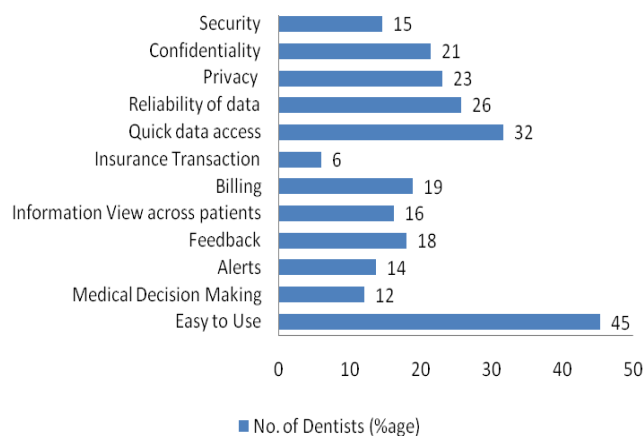


Fig. 4. Use of Clinical Information System

6 CONCLUSION AND SUGGESTIONS

The research finding indicates that the dentists are not majorly

involved in research because of the issues like, they are not receiving any research grants or funds from private or government agencies, lack of research & development facilities at medical colleges, lack of IT infrastructure and the concerns like security, privacy, confidentiality of data etc. Medical colleges must have to take steps in making doctors aware about the use of Information Technology in Research, Data Management, Cyber Security, etc so that they will perform the research effectively and efficiently. In order to increase the level of computer literacy and the usage of IT in Research it is suggested that positive steps need to be taken by all the dental colleges by providing facilities for performing the research.

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