A Survey on the Use of Information Technology amongst Dentists in Islamabad

Sheze Haroon Qazi1 and Haroon Shahid Qazi2
1 Lecturer, Islamabad Medical and Dental College, Islamabad
2 Professor and Head, Department of Orthodontics, Islamabad Medical and Dental College, Islamabad (Bahria University, Islamabad)

Abstract

Objective: To get a better understanding of the baseline computer skills of the target group, see how dental informatics is helping health professionals and how far behind Pakistan is from the rest of the world in this field.

Introduction: We use the term information technology or IT to refer to an entire industry. In actuality, information technology is the use of computers and software to manage information. In some companies, this is referred to as Management Information Services (MIS) or simply as Information Services (IS). The term Dental informatics is defined as the application of computer and information sciences to improve dental practice, research, education and management.

Methodology: A questionnaire based survey was conducted consisting of 19 questions relating to dental informatics and randomly distributed amongst dentists of Islamabad and Rawalpindi.

Results: Results showed that computer usage and access was only limited to storing patient information or email. Practice management systems were a very uncommon feature, in fact nonexistent in dental practices. Only a handful of the target group dentist had ever taken a computer course however the general attitude of young Pakistani dentists towards the adoption of dental informatics in their practice, institutes or hospitals was very positive.

Conclusions: A lot of issues have to be addressed before an integrated system can be implemented in to every practice and hospital in our country. Dentists' attitudes are a decisive factor to implementing dental computerization for an ever growing need for advancement in dentistry. The government should try and implement a dental health information system country wide and train dentists in this field of dental education.

Keywords: Dental informatics, Pakistani dentists, computer usage, health information system

Introduction

Dentists have been using technology to supplement their practice for years. Radiography is the most common tool used by dentists to supplement areas of human inadequacy. Lately the computers are being used to enhance the dental practice and provide patient care more efficiently.1 Initially the computers were introduced into dental practices to make paperwork and billing procedures more efficient. However, this limited use of computers overlooked less obvious educational applications that can have an added benefit of helping dentists to widen their horizon and become more effective providers of high quality healthcare delivery.2 Dentistry will have to move ahead and shed past concepts in order to reform its basic structure of education. The past has been tailored according to diverse agendas, time and time reflecting the conceptual understanding of a certain era and given the natural reticence for change, many ideas tend to prolong after the philosophies that spawned them have evaporated.3

Dental concepts need to be redefined in order to become organized and appropriate for computer applications. Therefore it is essential that educators give urgent attention to redefining dental concepts in a way that will benefit all. Computer systems today provide chair side check-out, charting capabilities, treatment planning options, educational modules, photographic and radiographic image storage, and total office organization modules to streamline every aspect of dental health care. Today’s systems can soon become the backbone of an office and everyone, including the dentist, who must become intimately involved with the computer to gain the maximum benefits.4

The term information technology refers to an entire industry. In real, information technology is the use of computers and software to manage information. In some areas, this is referred to as Management Information Services (MIS) or simply as Information Services (IS). The information technology department of any institute or company executes tasks like storing, utilizing, retrieving and implementing data. Today information management is a very important aspect of the health care system. Nowadays a lot of research is being focused on this area to provide better and efficient health care. Cognitively medical informatics concerns itself with information processing, and communication tasks of
medical practice, education, and research, including the information science and the technology to support these tasks. It is basically interdisciplinary field, with a highly applied aim, and it also addresses a number of fundamental research problems as well as planning and policy issues. After years of research on information systems to support the infrastructure of medicine, finally a new generation of systems and tools emerged that aimed at doctors and other health care managers and professionals - to support education, decision making, communication, and may other aspects of professional activity. Large scale investments are being made by health care institutions on information systems that will affect every aspect of their organization's function and medical informatics will emerge as a distinct academic entity.5

This study was aimed to assess if the dentists in Pakistan even begun to use computers at their practices and hospitals and how far behind are we in the field of dental informatics from the rest of the world.

Material and Methods

The study involved a survey of randomly selected dental professionals working in different hospitals of Rawalpindi and Islamabad. Some participants were from tertiary care hospitals where health management information system (HMIS) has been implemented since more than a decade, while others were from hospitals where paper based records are still being used. A questionnaire was used to conduct the survey. The questionnaire was randomly distributed to 150 dental professionals working in various dental departments. To assess the baseline information, communication technology skills and its use by dental professionals the survey questionnaire was self designed and modified, with the purpose of developing a questionnaire that can effectively provide insight into the use of computers by dental professionals in Islamabad. A survey containing 19 main questions was created with subsections in some questions. The questionnaire was divided into two main categories as demographic details and computer experience. The length of survey was such that a user could complete it
in single sitting. Questions used were short and easy to understand. The survey was kept anonymous in order to make it more transparent so that users can share their real opinion of their skills and their training needs. The survey data was entered into a database for further analysis. SPSS 12.0 was used for this purpose. The data was used to generate frequencies, percentages, and graphs.

Results

The total number of respondents was 110, out of which 63 (57.3%) were females and 47 (42.7%) males. The mean age of the respondents was 26.8 years with a range of 22 years to 42 years. Dentists who responded included 81 (73.6%) general dentists / practitioners and 29 (26.4%) specialists. The survey showed that 8.6% of the respondents had their own private practice, 14.8% worked for a private clinic/hospital, 61.7% worked for an institute and only 14.8% worked for some government hospital or establishment. The result of the survey showed that 67.3% of the respondents had no network connecting all the computers at their practice while 32.7% did have a network connecting all the computers at their practice. It was noted that 85.5% of the dentists did not use any practice management system, only 14.5% were using a practice management system at work. Thus majority of the practices in Islamabad were not using a customized computerized system to manage their work. Majority of the dentists started using a computer in the year 2008-2009 (25%). Only 22.1% started using a computer at their practice in 2007 while the frequency of computer usage kept declining with each receding year (Figure 1). Those who are using computers at their practices most frequently use it to store patient information (33.7%). While 19.6% use it for scheduling appointments, 12.6% for treatment planning, 11.1% use it for diagnosis and 23.1% use it for other purposes which were not specified (Figure 2).

The frequency of internet usage at home was the highest (Figure 3). 47.9% used their office premises to access patient related information while 40.2% accessed patient related information at the chair side and only 12% accessed this information at home. Fifty percent use the computer for patient education. Eighty seven percent thought that computer usage has become critical in dental practice. The most significant barrier of computer usage was the lack of computer education, untrained staff and low financial support (Figure 4). Majority of the dentists had internet connection at their workplace (78.2%), the most common being the DSL (50.9%) and 68.2% of them use the internet for clinical purpose. Most (90.9%) of them thought that a computer at the chair side is an additional advantage. Ninety two percent said they would be willing to adopt a health information system at their practice; however 50% were insecure about its security and 86% were ready to share patient information on a secure system.

Discussion

In the early 1960s when even 'computer science' was new, the phrase 'medical computer science' was used to refer to the subdivision of computer science that applies the methods of the larger field to medical topics. The term 'Biomedical Computing' has also been used for a number of years. 'Medical informatics' originated in Europe with a broader scope than 'medical computing'. Medical Informatics was defined as the 'rapidly developing scientific field that deals with the storage, retrieval and optimal use of biomedical information, data, and knowledge for problem solving and decision making'. The computer-based patient record (CPR) has been defined as essential technology for healthcare. CPR use in primary care remains varied even among economically affluent countries. A common EMR (architecture and implementation) that will fit all environments in developing countries is hard to achieve because of the paucity of experience in similar CPR systems, huge variations in requirements, priorities and local constraints. In developing countries information systems are mainly used to report aggregate statistics about morbidity, mortality and notify diseases for national agencies. A few medium developing countries may use clinical systems that support direct patient care.

Dental informatics is a comparatively new field that has significant potential for supporting clinical care. Most dentists are unaware of what dental informatics is, what its goals are, what it has achieved and how they one can get involved in it. The purpose of our survey was to see how far are Pakistani dentists from the rest of the world in the field of dental informatics. Are they aware what can be achieved through it and are there any who are applying this branch of information technology at their practices. The results showed that the average age of the dentists that we surveyed was almost 27 years ranging between 22-42 years. The primary reason for this was that we targeted hospitals and institutes where we could access large number of dentists in one visit. Thus the questionnaire was distributed amongst house officers, fresh graduates and general dentists. The only keen respondents as it turns out were the younger generation, probably they are the ones who are more literate about dental informatics. In Pakistan as well as the rest of the world computer technology has significantly taken over all fields of life. In 1982, females comprised less than 3% of all dentists. By 1997, the percentage rose to 13%. It is expected that this will rise to 25% within the next 10 years. In 2002, 40% of dental school students were female as compared to 1982 when it was only 24%. With this kind of scenario it’s expected that the male to female dentist ratio in the coming years will be 60:40. As we can see the relative proportion of women in dentistry has increased from less than 3 percent of practicing dentists in 1970 to more than 14 percent in 2002. By 2020, women are projected to make up about 30 percent of active dental practitioners. The American Dental
Association’s Future of Dentistry report concluded that the major demographic shift in the number of female dentists will affect dental workforce trends in the United States throughout the first decades of this century.  

If we look worldwide the gender ratio is quite surprising. India has a comparatively low female to male ratio in the general population as compared to the Western countries and also a few Southeast Asian countries. We can see the same trend shift in Pakistan where a few years ago only a handful of female dentists were there and now concurring with our results the ratio of female dentists being higher than males. The results showed 57.3% female dentists answered the questionnaire as compared to 42.7% male dentists. Specialists in Pakistan are much lower in number than general practitioners. The reasons being limited number of postgraduate courses being offered locally. Apart from these dentists who do specialize from abroad have no incentive to come back to Pakistan due to job saturations and low income offering, leaving behind a large pool of general dentists as compared to specialist? Adding on are the strict PMDC (Pakistan Medical and Dental Council) rules for registering as a specialist. Results of this study illustrated that only a handful of specialists were involved in the survey as compared to general practitioners and out of those very few owned a private practice probably owing to financial  

Computers are an increasingly common feature of healthcare systems throughout the world. In addition to clinical care, computerization in clinical practice can also improve both front- and back-room administrative efficiency. In regards to dentistry, computer applications offer benefits in patient registration, admission, computer-based Patient Records (CPR), recalls and regular follow-ups, and knowledge-based clinical decision support systems.  

Computer use may be on the rise among dentists. Statistics published by the American Dental Association reveal that dentists of all ages use computers in their practices, but the highest usage, 80%, is among dentists aged 35 to 39. Between 1991 and 1994, computer use by all dentists rose from 46% to 61%. Currently, computers in dentist’ offices are used primarily by secretaries and receptionists for business management purposes. Dental applications for the dentist to use during patient examinations are being developed. Such computer use should improve primary dental patient care.  

Inspite of globalization of technology, few reports reveal the status of dental computerization in Pakistan. It is significant for dentists, informaticians, and dental IT investors to have a general picture of the progress of dental computerization in Pakistan. Most of the dentists as our survey showed started using the computer between 2007-2009. As compared to the west where the use of computers in dental education and practice goes back to the mid 1960's when they were used for specific and small tasks in the administration of dental schools and large dental practices. Initially the educational use of computers was in the marking and collating of multiple choice examinations in some universities. The widespread availability of both the Apple and PC computers in the early 1980's changed the emphasis and role of the computer and hence the relationship dentists had with them. The dentists became empowered at the expense of the so called computer expert. The theory that dentists, in all disguises, are "gadget mad" and were a natural group to become computer enthusiasts will be explored. This has caused dentistry being in the forefront in the development of computer usage in educational institutes and dental clinics. 

We found that a majority of respondents had computers in their offices, while a minority used chair-side computers. Data are similar to Schleyer's report for the United States. Pakistan although an undeveloped country, has an equal opportunity to progress dental informatics as does the west. Pakistan's great population seems to create a larger market for dental IT investors. Patient related information is largely accessed at chair side or in the office premises. Though our study showed that almost all dentists had an internet connection at their practices but only a few had a network connecting the computers. Apart from this hardly anyone used or knew about a practice management system. They accessed patient’s related information from home or office and the main purpose for internet use was email. The other purpose of using a computer was storing patient related information. This shows that dentists in Pakistan though having full potential are not utilizing it to the fullest. But the encouraging part is that the general attitude towards computerized dentistry is positive. Our survey revealed that most dentists agreed that computers were critical to further development of dentistry. And most were willing to adopt a national health information system and exchange patient related clinical information. This survey reveals that computerization is more likely to be adopted by Government Hospitals, probably because of financial support from government, than by private clinics. Additionally, few respondents adopt CPR or use the internet for clinical service. Thus Pakistanis may implement dental computerization in ways that differ from the west. Further research concerning this topic must take many factors into consideration, including politics, economics, culture, and patients' education levels. In Pakistan, government hospitals receive a much higher number of patient visits than private clinics. It is urgent for them to adopt information technology to assist and streamline administrative affairs. The competitive advantage of a private practitioner lies in service delivery. Investment in technology to assist in clinical service delivery offers a great return. Differences detected between two types of practices on certain issues inform us that we must have diverse thinking in developing and applying information technology under different dental clinical environments. With the increasing use of computer technology in dentistry, it will be imperative to add dental informatics as a subject in the undergraduate curriculum.
Conclusions

The concept of a computerized dental practice is not an all or nothing proposition. Presently the dental practices are in a transition between paper based storage of information and implementation of electronically storing data. On the other hand, one can observe the fast movement towards implementing computers at chair side and the surfacing of systems that serve clinical needs more comprehensively than previously. We found that Pakistani dentists' attitudes were generally positive. The negative impacts of computer use may be amplified by some nonusers, but proper instruction in computer use will reduce resistance to this inevitable and essential change.

References
8. Carlisle LD. The Gender Shift, the demographics of women in dentistry. What impact will it have? ADA, Survey Center. 2004.