



## Reshaping Dentistry with the Help of Dental Informatics

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**Received Date: May 26, 2022**

**Published Date: June 01, 2022**

### **Abstract**

**Introduction:** *In the early half of the 1970s, the phrase "Medical Informatics" was coined in France and simultaneously made its way into English literature. The term "dental informatics" first appeared in a MEDLINE-indexed paper in 1986. Since 1997, funding has been available in the subject of dental informatics, and the number of formally qualified dental informaticians has been steadily increasing since then. Dental informatics is a relatively new topic that is still in its development. It has huge potential in terms of improving patient care in clinical settings. It comprises a variety of clinical applications and techniques, such as oral disease diagnoses, prescriptions, indications and contraindications for specific drugs in patients with various conditions, and much more.*

**Purpose of the study:** *The purpose of this study was to examine the potential outcomes of dental informatics in clinical setups and to determine the barriers to the adoption of technology.*

**Methodology:** *This study had been conducted by a literature review of scholarly articles, peer-reviewed articles, journals, and case studies. The study us Methodology: This study had been conducted by a literature review of scholarly articles, peer-reviewed articles, journals, and case studies. The study used ten articles for the relevant information, which was then reviewed reduced to seven articles.*

**Results:** The results from this study illustrated that the dental informatics would result in increased quality and accessibility to oral care. However, the lack of proper knowledge in oral physicians regarding dental informatics were identified as possible barriers.

**Discussion:** Information retrieval is the art and science of searching for documents, relevant information, and metadata in standalone databases or hypertext networked databases such as the Internet as well as text, sound, and images. When necessary, data is uploaded into an expert laboratory information system, the test results can be automatically interpreted for lung function tests, the PUFF system for liver function tests, the LFT (liver function test) system, and many more. Clinical decision support systems (CDSS) are available to improve the patient's safety and prognosis.

**Conclusion:** Computer technology has already transformed civilization. The pressing question is how much it will change the dental field. Making the idea of putting informatics theories and concepts into practice a reality necessitates a significant amount of effort and resources. Many of the ventures on this path are likely to fail. Only then will we achieve the promise of informatics. Dentistry, on the other hand, should learn as much from its errors as it does from its accomplishments.

**Keywords:** 'Dental informatics' AND 'Digitalization in Dentistry' AND 'e-Health Technologies for Oral Health' AND 'Data Management in Dentistry' AND 'AI in Dentistry'

## Introduction

Oral health information systems must be able to track patterns and trends in oral disease throughout time, as well as collect data about them. WHO launched an online oral health database in 1996, with help from the WHO Collaborating Centre for Oral Health at Malmö University in Sweden and the University of Niigata in Japan. We can avoid potentially fatal medical errors, cut expenses, and improve treatment by digitizing health records. As a result, it makes it easier to find essential patient data and aids clinical decision making. Dentists must stay up with such advancements in order to make perfect decisions. It is becoming increasingly difficult for health practitioners to practice modern medicine without the correct mix of information technologies. Dentists must stay up with such advancements in order to make perfect decisions. It is becoming increasingly difficult for health practitioners to practice modern medicine without the correct mix of information technologies. The purpose of this study was to examine the potential impact of the dental informatics in health care and to determine current benefits and barriers for the adoption.

## Methodology

The primary working hypothesis derived out this research was that the implementation of dental informatics would result in increased quality and accessibility to oral health care to patients throughout the world. However, the lack proper knowledge particularly in oral physicians could be affected negatively.

The methodology used to derive this hypothesis was a literature review of scholarly articles, peer-reviewed articles, journals, and case studies. The research study began with the identification of the advantages of dental informatics and possible barriers to the implementation. This systematic review was conducted in a phased manner and included the establishment of an overall strategy, determination of the inclusion and exclusion criteria, and literature and case study classification and analysis.

## Results

In the traditional method of record keeping, 11% of laboratory tests are repeated due to misplaced results, 30% of treatment orders are not documented, paperwork consumes 35 percent of physicians' and nurses' time, approximately 20-30% of national healthcare expenditures are spent on administrative paperwork, and approximately 50% of paper-based medical records go missing or contain incomplete data. According to a survey of American dentists, barely 25 to 30 percent of dentists use chair-side computers, even though nearly all dentists have computers in their offices. In their offices, almost 90% of dentists have computers. Only a small percentage of those who use computers at the chairside do so to their full capacity, such as by creating and keeping paperless patient charts or evaluating clinical and therapeutic patient outcomes.

DESCRIBES, COMPARE2, and PAIRS etc. are programs designed for use in descriptive epidemiology in health care practice and research. "SOFPRO" is an automated tool for collecting, organizing, retrieving, managing, and analysing OSF patient data. It can be useful tool for educating or quickly testing new concepts that are being evaluated for more in-depth clinical study on OSF. Large international epidemiological research on OSF can be made possible by making this application available on the internet.

The front-end use of health data in clinical decision making includes the use of supportive diagnostic tools for patient-centered treatment planning, as well as back-end algorithms that analyze the standardized acquired data to guide population-based research initiatives. The ability to deliver value-based dental care and take advantage of AI's enormous potential requires the interoperability of health data with readily available digital health technology.

Dental informatics is a new area with a lot of obstacles to overcome. The hypothetical patient-care situation, as well as the specific informatics-related applications, highlight the major issues that dental informatics faces today. We can begin to create solutions to these difficulties if we can agree on a set of challenges facing the field.

## **Discussion**

Data science can help healthcare systems process, manage, analyze, and integrate massive amounts of fragmented, structured, and unstructured data. To obtain true findings, this data requires effective management and analysis. The clinical case records store the incidence and outcome of disease in a person's body as a hereditary in the family, and the physicians plays an integral role in this scenario. With the introduction of electronic systems and their capacity, digitizing medical exams, dental records, health records, and investigations is a common procedure today. In 2003, the Institute of Medicine, a division in the National Academies of Sciences and Engineering coined the term "Electronic Health Records" for representing an electronic platform that saves the records of the patients. Electronic health records (EHRs) are computer-assisted medical records of patients' physical and mental health, as well as important reports, that are kept in an electronic system and used to record, send, receive, store, retrieve, and connect health personnel and patients with medical services.

Data Science can provide real-time predictive analytics that can be utilized to get insights into a range of disease processes and provide patient-centric treatment. It will aid in the enhancement of researchers' abilities in the fields of science, epidemiological studies, tailored medicine, and soon. Predictive accuracy, on the other hand, is strongly reliant on effective data integration from several sources in order to be generalized. By combining biomedical and health data, modern health organizations can change medical care and individualized medicine. By creating new avenues in comprehensive medical care, data science can efficiently handle, analyze, and understand huge data.

Dental informatics abilities numerous starting with bring together a large group of DI researchers from around the world in one united platform, allowing them to develop a shared goal and work cooperatively. Communities of Practice, such as the DIOC, are becoming increasingly important in emerging disciplines because they enable the construction of expert-based knowledge networks, which accelerates the discipline's growth and development.

## Conclusion

The most utilized applications were digital radiography/analysis and dental office administrative management. Web-based learning tools, computer-based evaluations, and virtual technology for teaching clinical skills were all used in Saudi dental education. Saudi Arabia has yet to reach patient education software, electronic dental/oral health records, and the potential of dental research output from electronic databases. Electronic dental records can be mined to report on the prevalence of non-communicable medical problems among patients getting dental care, in addition to their vital use in dental education and patient management. The utility of EDR for disease surveillance and research applications will be greatly enhanced if the information entered is complete and accurate.

SOFPRO was found to be a user-friendly automated tool for easy data collection, retrieval, management and analysis of OSF patients. AI has the potential to change healthcare and, with it, dentistry AI could help fix the flaws in traditional dental care that have been widely criticized. Dentistry, and specifically dental research, has a role to play in ensuring that AI improves dental treatment while lowering costs, benefiting patients, providers, and society. Dentists have a range of oral cancer information needs at the point of service. Developers of dental technology or clinical decision support systems should think about incorporating high-quality, up to date clinical data into comprehensive and easily accessible EDRs in the future, as well as supporting dentists' resource usage patterns revealed in the study.

With the advancement of technology in dentistry, it is now possible to complete a full digital case and properly address issues such as vertical dimension loss. More clinical investigations are needed, however, to acquire consistent outcomes when comparing the digital workflow to the traditional procedure in cases of loss of vertical dimension. Data Science can provide real-time predictive analytics that can be utilized to get insights into a range of disease processes and provide patient-centric treatment. It will aid in the enhancement of researchers' abilities in the fields of science, epidemiological studies, tailored medicine, and so on. Predictive accuracy, on the other hand, is strongly reliant on effective data integration from several sources in order to be generalized. By combining biomedical and health data, modern health organizations can change medical care and individualized medicine.

By forging new avenues in comprehensive medical care, data science can efficiently handle, analyze, and understand huge data.

Health service research, epidemiological studies, and skill mix research all benefit from electronic dental records. To guarantee that the data provided is accurate, valid, and generalizable, researchers should collaborate closely with doctors, managers, and software developers. Researchers must use severe validation and data cleaning procedures after data extraction to ensure that the extracted electronic data is accurate.

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