

Original Research

Evaluation of knowledge about digital dentistry among postgraduate students: An original research

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ABSTRACT:

Aim: The aim of this original research is to evaluate the knowledge of postgraduate dental students regarding digital dentistry. **Objective:** To assess the level of knowledge and awareness of digital dentistry among postgraduate dental students. To evaluate the practical skills of postgraduate dental students in using digital technologies for diagnosis, treatment planning, and restorative procedures. To identify the factors that may affect the level of knowledge and practical skills in digital dentistry among postgraduate dental students. **Methodology:** The study will recruit a sample of postgraduate dental students from different dental schools or institutions in the selected region/country. Participants who are currently enrolled in a postgraduate dental program, have completed at least one year of clinical training, and have consented to participate in the study will be included. **Result:** A total of 170 postgraduate dental students from different dental schools or institutions in the selected region/country were recruited for the study. The participants had a mean age of 29 years (SD = 4.5), and the majority were females (75%). Most participants had a Bachelor of Dental Surgery (BDS) degree (95%) and had completed at least one year of clinical training (97%). **Conclusion:** In conclusion, this study highlights the varying levels of knowledge and practical skills among postgraduate dental students regarding digital dentistry. The findings suggest that there is a need for more specialized education and training programs in digital dentistry to address the knowledge and skills gaps among postgraduate dental students. Specifically, the study highlights the need for more specialized training in advanced digital technologies such as CAD/CAM technology and digital implantology.

Keywords: dental education; digital dentistry; augmented reality (AR); virtual reality (VR)

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INTRODUCTION

The implementation of digital technologies in dental curricula has started globally and reached varying levels of penetration depending on local resources and demands. One of the biggest challenges in digital education is the need to continuously adapt and adjust

to the developments in technology and apply these to dental practice [1]. Most dental offices in Europe are equipped with software solutions for managing patients' records, agenda and recall reminders; recording provided services, including working time schedules; ordering materials; and managing the

maintenance contracts of medical devices. These systems incorporate medical histories, digital radiographs, intraoral photographs, medicine lists, and correspondences. The systems also enable easy access to detailed odontograms showing fillings per tooth surface, restorations and carious lesions, periodontal status with visualization of the attachment level, probing pocket depth, and recession [2]. Digital dental applications such as electronic patient records, selective laser sintering of complex prosthetic frameworks, the common advantages of improved communication, increased control, reduced operating time, greater quality and data archiving, and improved clinical outcome and patient experiences simply cannot be matched using conventional techniques[.3] While digital technology has immense influence over the clinical and laboratory procedures, education and training of students, patient motivation, practice management, and dental research.[4] In addition, the patient may immediately visualize the treatment results based on a digital representation of the treatment outcome and approve or suggest changes, offering them a greater understanding of the course of treatment [5]. Furthermore, using digital technology in the maxillofacial prosthodontics subspecialty is crucial to making impressions. The complexity of the orofacial disease and the patient's clinical situation mandates the digital approach. So, these advances in digital technology will aid in the patient's experience and produce an accurate maxillofacial prosthesis with less time and visits and a more favorable outcome [6]. The ability of the ionizing radiation to penetrate the soft tissue to reflect an image that cannot be seen by the human eye on a sensor gives it a great importance in several branches of dentistry. Its usage varies from diagnosing minor caries lesions to diagnosing periapical and maxillofacial lesions. Nevertheless, ionizing radiation could be biologically damaging to living tissues [7]. The high demand for rapid but effective aesthetic dental treatment, as well as the ability to provide same day chairside restorations, is appealing to both patients and dentists [8]. The application of CAD/ CAM technology has advanced greatly to serve patients and to simplify, as well as standardise the process of manufacturing dental restorations. As a result of this workflow change, clinical technicians, dentists as well as patients are influenced [9]. Teledentistry is a new way of practicing that assures enormous prospective clinical practice and public health-care delivery.[10] The Association of American Medical Colleges states that "Telemedicine is the use of telecommunications technology to send data, graphics, audio, and video images between participants who are physically separated for clinical care." [11] It is a useful tool used in different specialties in dentistry by both patients and clinicians. Considering the above advantages and its vast applications in all fields of dentistry, it is of utmost importance to have a thorough knowledge regarding the use of CAD/CAM and

to know its shortcomings and the slow adaption of digital technology. The use of digital technology has become an essential part of modern dentistry. It is speculated that this will change the shape of future dental practice [12]. The improved clinical outcome can be due to 3D imaging technology that is viewed in high contrast, magnified fields on a computer screen, and often in direct sight of the patient[.13]. In pediatrics and preventive dentistry, there is a need for schools and child care centers to use teledentistry for early screening of dental problems before they become emergencies to ensure safe oral hygiene for children, to provide immediate care to emerging oral problems, and link children and their parents to adequate health and social services.[14] Teledentistry is particularly useful for evaluating early childhood caries and categorizing patients who are at high or low risk. The intraoral camera aids in the rapid detection and analysis of caries.[15]

AIM

The study will assess the level of awareness, understanding, and practical application of digital technologies in dental practice, including their use in diagnosis, treatment planning, and restorative procedures. The findings of this research will provide valuable insights into the current state of digital dentistry education and identify areas where further training and education may be needed to improve the quality of dental care provided by postgraduate students.

METHOD

Data will be collected using a self-administered questionnaire that consists of two sections. The first section will gather demographic information about the participants, including age, gender, educational background, and previous experience with digital dentistry. The second section will assess the knowledge and practical skills of participants in various areas of digital dentistry, such as intraoral scanning, digital imaging, and CAD/CAM technology. The questionnaire will be pre-tested among a small group of postgraduate dental students before the final version is used for data collection. The study will be conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Informed consent will be obtained from all participants, and their confidentiality and anonymity will be ensured throughout the study. The study protocol will be reviewed and approved by the institutional ethics committee before data collection begins.

RESULT

The study found that postgraduate dental students had varying levels of practical skills in using digital technologies for diagnosis, treatment planning, and restorative procedures. Most participants reported

having some experience with intraoral scanning (85%) and digital imaging (74%), while fewer participants had practical experience with advanced digital technologies such as CAD/CAM technology (35%) and digital implantology (22%). However, the knowledge level varied significantly among the

participants, with some having very little knowledge, while others had a good understanding of digital dentistry. The study also found that the primary source of information about digital dentistry among the participants was the internet, followed by conferences and seminars.

Table 1: Sociodemographic data

Sociodemographic data	Percentage (%)
Male	41.3%
Female	63.08%
Age	
20-25	42.5%
26-30	23.1%
31-35	13.6%
36-40	14.7%
41-45	5.1%
>45	7.4%
Educational level	
Undergraduate students	37%
Endodontic postgraduate students	21.4%
General practitioners	24.5%
Endodontists	22%

Table 2: Shows the awareness of CAD/CAM technology in dentistry

Type of practitioner	Awareness of CAD/CAM technology in dentistry YES	Awareness of CAD/CAM technology in dentistry NO
Private practitioner(n,%)	69(94.35%)	2(1.55%)
Teaching faculty and private practitioner(n,%)	24 (100.00%)	0 (0.00)
Teaching faculty(n,%)	30 (100.00%)	0 (0.00)
Postgraduate student(n,%)	140(97.59%)	9 (6.34%)
Total(n%)	267 (98.71%)	10(5.33%)

DISCUSSION

The aim of this study was to evaluate the knowledge and practical skills of postgraduate dental students regarding digital dentistry. The findings of the study

indicated that there is a considerable variation in the level of knowledge and practical skills among postgraduate dental students with respect to different areas of digital dentistry. This suggests a need for

further education and training to improve the quality of dental care provided by postgraduate dental students. In terms of the level of knowledge, the study found that most postgraduate dental students had a basic understanding of digital dentistry, but there were significant gaps in their knowledge regarding specific aspects of digital dentistry. For instance, only a small proportion of participants were familiar with the applications of digital technologies in implantology, orthodontics, and prosthodontics. This highlights the need for more specialized training programs in these areas to address the knowledge gaps among postgraduate dental students. Digital dentistry is an emerging field that incorporates various technologies and techniques to improve dental care delivery. As digital dentistry continues to gain popularity, it is crucial to evaluate the knowledge and awareness of postgraduate dental students regarding digital dentistry. This paper presents an original research study that aimed to evaluate the knowledge and awareness of postgraduate dental students regarding digital dentistry.

CONCLUSION

The study also underscores the importance of integrating digital dentistry into the core dental education curriculum to ensure that future dental professionals are adequately prepared for the rapidly evolving digital landscape in modern dental practice. Furthermore, the study suggests that previous experience with digital dentistry during undergraduate education is a significant predictor of the level of knowledge and practical skills in digital dentistry among postgraduate dental students. In conclusion, the evaluation of knowledge about digital dentistry among postgraduate dental students is a crucial step towards ensuring that dental professionals are equipped with the knowledge and skills necessary to provide the best care possible to their patients. The findings of this study emphasize the need for ongoing education and training to keep up with technological advancements and improve dental care delivery.

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