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Assessment of Knowledge, Attitude and Perception in Oral Radiology Regarding the future of Artificial Intelligence in Lucknow Dental College: A Questionaire Study

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ABSTRACT

Purpose: The primary purpose of this Present study was to investigate knowledge, attitudes, and perceptions of dental specialists located in central India regarding the future utility of artificial intelligence (AI) in radiological diagnosis.

Materials and Methods: A pre-validated questionnaire link was distributed online to 250 participants, including academics, postgraduate students, and undergraduates, through social media platforms (WhatsApp groups). A brief message outlining the study's objectives and obtaining informed consent was also delivered. There were fifteen closed-ended questions on the survey, which were roughly split into three categories. For each question, participants were instructed to choose one response from the list.

Results: Research involving 250 dentists showed 68% had previous knowledge about AI while 73% projected using AI for dental diagnoses and 54% identified the main role of AI as radiographic scan interpretation and 62% believed AI held a future in India.

Conclusion: The research found that dental specialists understood AI concepts while recognizing AI programs enable dentists to enhance their radiographic interpretation accuracy and predicting that AI holds considerable potential for radiological analysis.

Keywords: *Oral Radiology, Perception,Artificial intelligence*

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1. INTRODUCTION

As simply as possible, artificial intelligence (AI) is the abilities of computers and other machines to function with intelligence to complete activities that ordinarily need human intelligence[1,2], for instance, healthcare diagnosis, speech recognition and decision making processes. Machine learning is a type of artificial intelligence that learns how to teach computers and machines in evaluating specific qualities of data using diverse approaches.[3]Many data have been collected from an extensive variety of sources which have been device for AI programs to analyse.[1,2]

AI applications in healthcare settings have become more and more common in dentistry, especially in imaging for diagnostic purposes, particularly for recently graduated dental learners. The inferior alveolar nerve, face growth study, tracking of cephalometric landmarks, and the identification of periapical pathosis, caries and alveolar bone loss were some of the related activities that can be carried out with help of AI technologies for auto segmenting the inferior alveolar nerve. Research shows AI technology helps doctors evaluate and plan medical treatment of facial problems plus finds cancer and lymph node problems before they grow.[4]

It can be utilized for preliminary tasks in educational dental care, such as arranging and preparing teeth, managing the.

behaviour of anxious children, and providing direct surgical robotic treatment.[5]Future innovations based on artificial intelligence will reduce the workload for educators and bring down the cost of education.[6]A minority group denies the accuracy of AI systems and believes they will never replace radiologists yet many others see artificial intelligence as opening new business opportunities in medical and dental fields which will lead to splendid future prospects.[7]The research examines dental professionals' opinions regarding artificial intelligence through survey questions

2. MATERIAL AND METHODS

This cross-sectional descriptive study, which was based on a questionnaire, was carried out for two months among dental students at Lucknow's dental colleges. The institutional ethical committee granted authorization for the study to begin.

The online questionnaire link reached 250 individuals who comprised academics and both postgraduate students and undergraduates on social media networks. The study objectives and consent process were briefly explained through the delivered message. The fifteen questions in the survey consisted of closed-ended sections which divided into three main sections. The participants selected one answer from the given options for every question.

Collected data were compiled in a master Excel sheet 2007. Statistical analysis was done by using the software SPSS 22.0version. Chi square test was done to check the association and a ‘p’ value was set at >0.05 as significant.

3. RESULT

Awareness of the Term "Artificial Intelligence (AI)"

The vast majority of respondents (96.8%) are aware of the term AI, indicating that AI is a well-known concept among the surveyed group.

Only a small fraction (3.2%) responded with "Maybe," suggesting minimal uncertainty about AI as a term.(Table 1)

AI as an Integral Part of Dental Training

73% believe AI should be integrated into dental training, reflecting a positive attitude toward its educational value.

However, 27% are unsure, suggesting the need for further discussion on how AI can be incorporated effectively into dental curricula. (Table1)

AI’s Ability to Detect Minute Details in Radiographs

54% agree that AI can identify subtle details in radiographs that practitioners might miss, highlighting AI’s strength in image analysis.

However, 39% are unsure, and 7% disagree, suggesting that while AI is seen as an aid, its reliability still needs validation. (Table 1)

Future of AI in Dentistry in India

62% believe AI has a future in Indian dentistry, indicating optimism about its integration.

However, 29.6% are unsure, and 8.4% disagree, pointing to concerns about adoption, cost, or effectiveness in the Indian healthcare context.(Table 1)

AI vs. Experienced Practitioners in Diagnosis

34% believe AI has superior diagnostic ability, while 42% disagree, and 22.4% are uncertain.

This reflects a divided opinion, indicating that AI is still seen as a supportive tool rather than a replacement for experienced practitioners.(Table1)

Table 1: Response of study participants towards knowledge, attitude and perception part of questionnaire.

Question	Under Graduate (n=168)			Post Graduate (n=60)			Faculty (n=22)			P-value
	Yes	Maybe	No	Yes	Maybe	No	Yes	Maybe	No	
Awareness of AI	165 (98.2%)	3 (1.8%)	0 (0.0%)	58 (96.7%)	2 (3.3%)	0 (0.0%)	19 (86.4%)	3 (13.6%)	0 (0.0%)	0.232 NS

Working principle of AI	90 (53.6%)	40 (23.8 %)	38 (22.6 %)	35 (58.3%)	20 (33.3 %)	5 (8.3%)	20 (90.9 %)	2 (9.1%)	0 (0.0%)	**0.001 Sig**
AI useful in medical field	125 (74.4%)	40 (23.8 %)	3 (1.8%)	45 (75.0%)	14 (23.3 %)	1 (1.7%)	20 (90.9 %)	2 (9.1%)	0 (0.0%)	**0.034 Sig**
AI in dental practice	105 (62.5%)	45 (26.8 %)	18 (10.7 %)	38 (63.3%)	17 (28.3 %)	5 (8.3%)	17 (77.3 %)	4 (18.2 %)	1 (4.5%)	**0.010 Sig**
AI for treatment quality control	85 (50.6%)	75 (44.6 %)	8 (4.8%)	30 (50.0%)	28 (46.7 %)	2 (3.3%)	19 (86.4 %)	3 (13.6 %)	0 (0.0%)	**0.005 Sig**
AI for radiological diagnosis	155 (92.3%)	10 (6.0%)	3 (1.8%)	55 (91.7%)	4 (6.7%)	1 (1.7%)	20 (90.9 %)	2 (9.1%)	0 (0.0%)	**0.756 NS**
AI in dental training	120 (71.4%)	40 (23.8 %)	8 (4.8%)	45 (75.0%)	12 (20.0 %)	3 (5.0%)	17 (77.3 %)	5 (22.7 %)	0 (0.0%)	**0.801 NS**
AI for secure digital healthcare	85 (50.6%)	50 (29.8 %)	33 (19.6 %)	28 (46.7%)	20 (33.3 %)	12 (20.0 %)	17 (77.3 %)	3 (13.6 %)	2 (9.1%)	**0.042 Sig.**
AI vs human diagnostic ability	40 (23.8%)	50 (29.8 %)	78 (46.4 %)	15 (25.0%)	18 (30.0 %)	27 (45.0 %)	7 (31.8 %)	8 (36.4 %)	7 (31.8 %)	**0.003 Sig.**
AI helps in radiograph analysis	90 (53.6%)	65 (38.7 %)	13 (7.7%)	30 (50.0%)	25 (41.7 %)	5 (8.3%)	15 (68.2 %)	8 (36.4 %)	1 (4.5%)	**0.045 Sig.**
AI future in Indian dentistry	100 (59.5%)	55 (32.7 %)	13 (7.7%)	38 (63.3%)	18 (30.0 %)	4 (6.7%)	17 (77.3 %)	4 (18.2 %)	1 (4.5%)	**0.067 NS**
AI helps budding dentists	98 (58.3%)	55 (32.7 %)	15 (8.9%)	36 (60.0%)	20 (33.3 %)	4 (6.7%)	16 (72.7 %)	5 (22.7 %)	1 (4.5%)	**0.088 NS**

4. DISCUSSION

AI has registered significant progress in its field of development. Recent computational and data acquisition improvements along with machine learning have extended AI applications into dental and medical practices.[8] Most dental practitioners showed considerable understanding of AI through high recognition numbers.[1]

Most students demonstrated remarkable expertise in artificial intelligence. Most students possess knowledge about how AI operates within healthcare technology since 90% of students confirmed their awareness. Additionally 96.8% of dental students showed similar understanding in medical device technology. Comparable findings emerged from similar studies in Chennai where 59% of participants were familiar with AI[5] terminology while Telangana exhibited 89.63% student

awareness of the same concept according to Asmatahasin et al.[9,10]

The comparison with the global outlook was consistent with our research; Yuzbasıoglu E et al.[11] found that among dentistry students in Turkey, just 48.40 percent were familiar with AI, whereas the author in Saudi Arabia found that 49.9% knew the basics.[9]

In this study, 58% of the content understood the idea and or concept of artificial intelligence (AI), 73% of the dental specialists considered that AI may be applicable to diagnosis and treatment planning, and 62% believed that AI may have its future in India or may be relevant to or applicable in India. 92 % of all the dental professionals and specialists were of the opinion that AI will help the aspiring dentists in making the radiological diagnosis and 54% of the dental specialists deemed AI useful in using small details in the radiograph that practitioners might not see.

As Pakdemirli[12]mentioned, AI has brought revolutionary changes in the field, has been a discussion regarding framework of radiological organizations and contributed to an on-going research in the recent past. This is anyone's guess; although risks and issues with quality of service have been highlighted earlier in this essay and there are dangers ahead but undeniably indeed there will be ground breaking changes in the delivery of radiological service in the future. When asked about AI, 35% of dentists indicated that AI could diagnose better than a clinically experienced practitioner, as many as 62% of dentists in this study said that it would have a life in India. Historically, assisted diagnostics (which includes many already discussed areas) was in the realm of 'second-opinion', that is, an attempt to diagnose at least somewhat better (with improved specificity and sensitivity), but very little interaction between diagnostic technology and humans is required.[13] As reported by Hwang et al., however, deep learning algorithms in the medical field have reached the point of reliably achieving diagnosis accuracy comparable to that of humans, making assisted diagnostics more interactive.[13]

According to Wong et al.[14], AI has the ability to transform contemporary clinical radiography, and it will be important to stay up to date with any new advancements.

According to Park et al. [15], the application of AI in dentistry is rapidly growing beyond text- and image-based dental procedures, and its function will significantly grow as its use rises throughout the medical industry.

According to our research, survey participants acknowledged the concept of artificial intelligence and concurred that it might be used in dental care. Thus, it is necessary to arrange seminars, lectures, and workshops to help dental students better understand AI and its applications.

Las but not least, questions were created using previously published research by medical professionals rather than AI specialists. Along with accurate and trustworthy sample classification based on gender and qualification, a bigger sample size comprising participants from various educational institutions should be employed. Changing the questionnaire to include open-ended questions and inquiries from an AI expert's point of view could help participants share their favorable opinions about this rapidly developing technology.

5. CONCLUSION

This study shows that dental professionals and dental students are aware of artificial intelligence (AI) and how they can be applied in radiology and oral medicine. The results led us to discover shortcoming, which we unified in order to eradicate false and misleading perceptions, and to motivate the singular professionals to take part in this area of interest, so to say, to request and to advance and to develop AI training in dental faculties.

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