

Knowledge, Attitude, and Perception of Dental Students Toward the Application of Artificial Intelligence in Dentistry – A Questionnaire Based Study

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Abstract

Background: Research on theories that aim to replicate how the human brain functions has been conducted for decades. The ongoing study has produced a significant advancement in artificial intelligence (AI). India being a developing country, technology has not yet reached its full potential. As a result, dental students are still learning about the principles and practical applications of AI in dentistry, which may have an effect on our ability to advance professionally. In order to assess dental students' knowledge, attitudes, and perceptions on the use of AI in dentistry, the current study was carried out. The purpose of the study is to know the knowledge, attitude, and perception of dental students toward the application of AI in dentistry. **Materials and Methods:** A cross-sectional questionnaire study was carried out among the dental undergraduate students of Tamil Nadu. A questionnaire containing 12 questions with multiple choices was designed and developed to collect the response through Google form. The collected data were entered, processed and analyzed by calculating the percentage response to each question. **Results:** In our study, the dental undergraduate students of Tamil Nadu are incredibly excited to use AI in diagnosis and treatment planning, and they desire to learn more about AI. **Conclusion:** The current study revealed that the majority of the students of Tamil Nadu are excited to learn about AI and apply them in diagnosis and decision making. Dental academic curriculums should include more lectures about this topic to enlighten the dental students on the uses of AI in their daily practice.

Keywords: Artificial intelligence, Attitudes, Awareness, Dental student, Knowledge.

INTRODUCTION

Millions of interlinked neurons that transmit signals throughout the body make a highly complex structure called the human brain. For ages, research has been done on the principles that try to mimic the functioning of the human brain. This perpetual research has led to an advanced breakthrough in what is known as artificial intelligence (AI).

AI reproduces human cognitive qualities such as rational thinking, learning and problem cracking. AI has brought a significant transformation in the world from a simple task such as parking vehicles, smart maps, self-driving to complex and challenging tasks in dentistry. AI application has high accuracy, sensitivity, specificity and precision in detecting caries, malocclusion, interpretation of radiographs, and diagnosis and treatment planning.^[1]

MATERIALS AND METHODS

A cross-sectional questionnaire study was randomly carried out among dental colleges in Tamil Nadu, India. The 3rd, 4th, and 5th-year dental undergraduates were approached.

This study was conducted after getting approval from the Institutional Ethics Committee. The questionnaire was prepared and validated by the expert faculty of the Department of Computer Science from various institutions.

Validation of the questionnaires was done (Table 1).

Method used = Lawshe method of content analysis.

Content validity was carried out by 3 jury members. Content analysis was performed using the Lawshe method, (Figure 1).

A web-based questionnaire was designed and developed to collect the response from 500 dental undergraduate students through Google form with the consent of the students.

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Table 2: A web-based questionnaire containing 12 questions was designed and developed to collect the response from dental undergraduate students through Google form with the consent of the students

S.N.	Questions	Yes (%)	No (%)	Don't know (%)
1	Are you familiar with the term artificial intelligence?			
2	Do you think that the concept of artificial intelligence can be applied in dentistry?			
3	Do you think AI can speed up processes in health care and reduce medical error?			
4	Do you agree with the fact that AI has neither emotional exhaustion nor physical limitation?			
5	Will you be interested in using a software/program that can be helpful during your diagnosis?			
6	Do you think that artificial intelligence can replace dentists/physicians?			
7	Do you think that artificial Intelligence should be a part of undergraduate training?			
8	Do you find the use of artificial intelligence in dentistry and medicine exciting?			
9	Do you agree that you may use AI while making dental diagnosis and treatment planning in the future?			
10	Do you think AI will help budding dentists in diagnosis and decision-making?			
11	Do you think AI could be a threat to the medical industry in the future?			
12	Do you think AI has a future in dentistry in India?			

Table 3: Results of the survey on dental undergraduate students' perspectives on artificial intelligence in dentistry are plotted in the table

S.N.	Questions	Yes (%)	No (%)	Don't know (%)
1	Are you familiar with the term Artificial Intelligence?	82	12.3	5.7
2	Do you think that the concept of Artificial intelligence can be applied in dentistry?	78.8	6	15.2
3	Do you think AI can speed up processes in health care and reduce medical error?	73.1	8.5	18.4
4	Do you agree with the fact that AI has neither emotional exhaustion nor physical limitation?	61.7	10.1	28.2
5	Will you be interested in using a software/program that can be helpful during your diagnosis?	83.2	6.4	10.4
6	Do you think that artificial intelligence can replace dentists/physicians?	19.6	60.1	20.3
7	Do you think that artificial intelligence should be a part of undergraduate training?	68.7	11.7	19.6
8	Do you find the use of artificial intelligence in dentistry and medicine exciting?	72.5	9.5	18
9	Do you agree that you may use AI while making dental diagnosis and treatment planning in the future?	77.8	5.1	17.1
10	Do you think AI will help budding dentists in diagnosis and decision-making?	73.7	9.2	17.1
11	Do you think AI could be a threat to the medical industry in the future?	39.6	26.6	33.9
12	Do you think AI has a future in dentistry in India?	69	8.9	22.2

students feel AI will help budding dentists in diagnosis and decision-making, and 69% of students believe that AI has a future in dentistry in India.

DISCUSSION

John McCarthy, the father of AI, describes AI as intelligent computer programs. In the current scenario, AI is being used in many fields, especially in the health-care system. Merely, a limited number of studies focused on knowledge, attitudes, and perceptions regarding the future of AI in dentistry among dental students.

In our study, 82% of students were familiar with the term AI, which was similar to the study conducted by Keser and Pekiner^[2] Sachdev *et al.*,^[3] Asmatahasin *et al.*,^[4] and Yüzbaşıoğlu.^[5] However only 50% of the students were aware of the concepts and application of AI in the study mentioned, which was in contrast to our study.

Female participants were predominant in our study, which was similar to the studies done by Keser and Pekiner^[2] Yüzbaşıoğlu^[5], and Asmatahasin *et al.*,^[4] in contrast, an equal

number of female and male students participated in studies reported by Ranjana *et al.*,^[6] Khanagar *et al.*^[7] and Seram *et al.*^[8] The distribution of students in the 3rd year, final year and interns were in concordance with Asmatahasin *et al.*^[4] study.

Around 50% and 26% of students think that AI would speed up the health-care system, reduce mistakes, and provide a vast quantity of high-quality data promptly without causing emotional or physical exhaustion in the survey conducted by Singh *et al.*^[9] and Keser and Pekiner^[2] Respectively, however, in contradictory in our study, 73.1% of students felt AI would speed up the process.

Like the study conducted by Keser and Pekiner^[2] Ranjana *et al.*,^[6] Sur *et al.*,^[10] Asmatahasin *et al.*,^[4] in our study also student felt that AI should be a part of the undergraduate curriculum and They were excited to use in diagnosis and treatment planning.

About 29.7% of students in the study by Singh *et al.*^[9] and 48% of students in the Ranjana *et al.*,^[6] survey believed that incorporation of AI would not lead to a reduction in the number of jobs for dentists, which was entirely in contrast to our study

where around 60% students firmly believe that AI can never replace dentist.

Dental undergraduate students of Tamil Nadu believe that AI will help budding dentists in diagnosis and decision-making, and AI has a promising future in dentistry which is analogous to the study done by Sur *et al.*^[10]

CONCLUSION

The current study revealed that the majority of the students of Tamil Nadu are excited to learn about AI and apply it in diagnosis and decision-making. The dental academic curriculum should include more lectures about this topic to enlighten dental students on the uses of AI in their daily practice.

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