



KNOWLEDGE ATTITUDE AND PRACTICE REGARDING USE OF CHATGPT AMONG DENTAL UNDERGRADUATE STUDENTS

Rahul Hegde	Director & Professor , D Y Patil Dental School, Pune
Anand Shigli	Dean & Professor , D Y Patil Dental School, Pune
Pritesh Gawali*	Associate Professor, D Y Patil Dental School, Pune *Corresponding Author
Pawan Herkar	Lecturer, D Y Patil Dental School, Pune
Anirban Chatterjee	Lecturer, D Y Patil Dental School, Pune

ABSTRACT

Aim- Artificial intelligence is a wide spectrum branch of computer science used to simulate human interactions and intelligence using machines. One profound and recent universal application of artificial intelligence is ChatGPT (Chat Generative Pre-Trained Transformer). Its role as a tool in dental studies holds limited exposure. This study assesses the knowledge, attitude, and practices of these technological advances, creating awareness and encouraging further studies and innovations to make these tools more accessible, available, and economical to be utilized in the Indian student population for better understanding of a topic. **Methods-** A descriptive cross-sectional questionnaire-based study was conducted among the undergraduate students at a private dental college in Pune. The self-administered questionnaire contained 11 close ended questions pertaining to KAP with a sample size of 104 under graduate (UG) students using "RoboAI" – an AI based ChatGPT application. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 17 software and a Chi-square test were applied. **Results-** A total of 104 undergraduate students participated in the study. Of these, about 63.8% students were familiar with the concept of ChatGPT. Also 50.9% students used ChatGPT in dental studies and 98.15% students wished to know more about ChatGPT versions on android and iOS **Conclusion-** Knowledge of advanced use of ChatGPT in dental studies is an adjunct tool to understand the subject matter in the science of dentistry. Its inclusion in the curriculum with adequate practical training shall ensure its use efficiently.

KEYWORDS : ChatGPT, Artificial Intelligence, Dental Students, Pediatric dentistry

INTRODUCTION

Advances in AI technology have sparked both excitement and apprehension in health care, particularly in the field of dentistry¹. The next decade will determine whether the high expectations for AI applications are realized, or if there will be another AI winter. This is especially true in health care, where there are concerns about data security and the use of computers to make key medical decisions. Despite these reservations, AI has the ability to transform health care and improve dental care. Dental research can help to ensure that AI is used to improve and make dental care more inexpensive for patients, providers, and society as a whole². The rise of artificial intelligence (AI) in dentistry is revolutionizing the industry, allowing for better precision, fewer errors, and improved outcomes.

In the dental clinic, AI can help with appointment scheduling, clinical diagnosis, and treatment planning, among other parameters.

ChatGPT, a revolutionary chatbot, was recently released and is already making waves³. Within a few days after its release, it had over a million users.

Chat generative pre-trained transformer (ChatGPT) is an AI-based computer program that has been trained on massive amounts of data to produce human-like responses to user prompts to improve the computational linguistics, communication competence, and responsiveness of these bots. Text-based interfaces are used to implement techniques such as machine learning and deep learning⁴. ChatGPT is a very large language model that employs deep learning AI techniques to provide human-like responses to natural language questions [5]. ChatGPT can deliver a variety of educational and healthcare services. For example, it might provide academic help and coaching to students by replying to enquiries and describing specifics to make complicated topics clear to them, and it has the ability to radically revolutionize how students study biomedical science

by acting as a teaching tool⁶. ChatGPT in dentistry and healthcare can provide a variety of services to healthcare personnel, including better diagnosis, decision support, digital data recording, image analysis, disease prevention, disease treatment, reducing the number of treatment errors, and enabling exploration and research⁷. ChatGPT is incredibly beneficial to patients since it can answer medical issues, particularly for patients undergoing a surgical procedure, as it can aid in educating the patient pre- and post-surgery and providing a reasonable expectation for the surgery's outcome.

To our best knowledge this is the first study of its kind, as a result, the current study sought to assess knowledge, attitude, and practices of dental students towards the use of ChatGPT in pediatric dentistry.

METHODOLOGY

Study Design

This was a cross-sectional questionnaire-based study carried out among dental undergraduate students to assess their knowledge, perception, and attitude on the basis of their level of education towards ChatGPT and its possible applications in the field of dentistry.

Study Population

Dental undergraduate students (Final year and Interns)

Inclusion and Exclusion Criteria

Participants pursuing under graduation who agreed to participate in this study were included. Undergraduates pursuing the first, second and third year of dental school were not included.

Sample Size Estimation

The sample size was estimated to be $n = 112$ (with 10% attrition) and using the formula, where $\alpha = 0.05$, $Z_{1-\alpha/2} = 1.96$.

Data Collection Instrument

After obtaining the Ethical clearance the participants were

asked to download a ChatGPT application (RoboAI, Webtech International L.P version 13) on their respective phones. Students were then instructed to assess database and ease of use of the application (RoboAI) by typing relevant questions pertaining to the topic of pediatric dentistry. Later, a self-administered structured questionnaire comprising 11 closed ended questions in English language were prepared and evaluated. The questionnaire was divided into three sections; knowledge (4 questions), attitude (3 questions), and practice (4 questions). Response was aimed to indicate their level of agreement based on a Likert scale (YES, NO, MAY BE)

Knowledge Based Questions

- 1) Are you familiar with the concept of ChatGPT?
- 2) Do you have any idea about how ChatGPT might be used in dentistry?
- 3) Do you currently use ChatGPT in your dental studies?
- 4) Do you think ChatGPT is essential in the field of pediatric dentistry?

Attitude Based Questions

- 1) Would you like to know more regarding different versions of ChatGPT on iOS and android platforms?
- 2) Did you encounter any challenges while using ChatGPT app?
- 3) Can ChatGPT be used as a tool to assist in diagnosis and treatment planning in pediatric dentistry?

Practice Base Questions

- 1) Is ChatGPT useful in providing current literature/evidence based literature pertaining to pediatric dentistry?
- 2) Have you been successful in receiving adequate knowledge regarding pediatric dentistry by using ChatGPT app?
- 3) Was it easy for you to use ChatGPT?
- 4) Would you like to use ChatGPT in future?

Pretest And Content Validation

The questionnaire was established referring from previous studies and pretested by circulating it to a sample of individuals who were not involved in the final research, and internal consistency was checked using Cronbach's alpha coefficient (α value = 0.85) and then disseminated.

Sampling And Data Collection Procedure

A simple random sampling was used, and ethical approval was acquired from the Institutional Research and Ethics Committee (Ref no 527). This research lasted three months, from April 2023 to June 2023 and was conducted following the Ethical Standards established by the Helsinki Declaration. The questionnaire was distributed in the form of Google forms® link format through social platforms like WhatsApp and Email. Participants were allowed to fill out the form only once with no time restriction and responses were gathered from participants after gaining their consent and willingness to participate in the study and explaining the aim and maintaining anonymity.

Statistical Evaluation

Non-probability, random sampling technique was employed that yielded information from 102 undergraduate students taken into this observational study having a cross-sectional design. Responses recorded among the selected population group were evaluated using SPSS software Version 22.0. Chi square test was done to check the association and a 'p' value was set at <0.05 as significant.

RESULTS

Response assessing the knowledge about ChatGPT and its possible applications.

67 participants (63.8%) were familiar with the term ChatGPT

($p < 0.05$ significant), while only 25 (23.80) were aware of its basic working concept with no statistically significant differences noted ($p > 0.05$). When the participants' knowledge was assessed on topics such as whether ChatGPT can aid in the formulation of diagnosis and treatment plans, as well as the evaluation of missed details by practitioners, highly significant differences ($p < 0.05$) were seen, with 84.8% ($n = 89$) students agreeing that it can be utilized for these reasons. Furthermore, only one-fourths of participants agreed that ChatGPT can be useful in providing current literature/evidence-based literature pertaining to pediatric dentistry ($n = 45$, 77.82 with no statistically significant differences ($p > 0.05$). Table 1 shows the response of participants regarding the questions assessing the knowledge of ChatGPT and its possible applications.

Response assessing the attitude about ChatGPT and its implementation.

Three questions assessing the participants attitudes revealed highly statistically significant differences ($p < 0.05$). When asked if the students would like to know more regarding different versions of ChatGPT on android and iOS majority of the participants answered affirmatively ($n = 103$, 98.1% agreement). Furthermore, many participants ($n = 98$, 93.3% agreement) stated that ChatGPT can be an essential tool in the field of dentistry. Similarly, 89 (84.8%) participants believed that they would like to use ChatGPT in future. Table 2 shows the response of participants regarding the questions assessing the attitude about ChatGPT and its implementation.

Responses assessing the practice towards ChatGPT and its probable utilization.

In terms of the practice of ChatGPT, very few students used the applications ($n = 40$, 37.7%). Majority of participants did not face any challenge while using the ChatGPT application ($n = 86$, 81.9%). In terms of gaining knowledge regarding topics in pediatric dentistry 41% ($n = 43$) participants were not sure about gaining updated knowledge while using the application ($p > 0.05$, not significant). 103 (98.1%) participants agreed to the ease of use of the application.

Table III shows the response of participants regarding the questions assessing the perception of ChatGPT and its probable utilization.

Overall knowledge, attitude, and perception of the participants

Knowledge of the participants was categorized into very poor, poor, good and excellent based on the percentile obtained from knowledge scores. Except for a few undergraduates (1.1%), nearly two-third of the participants had excellent knowledge about AI. Almost one-third of the participants had good knowledge and majority of the participants had excellent knowledge about AI and its possible applications as shown in Figure 1.

Attitude of the participants were categorized into positive and negative attitude. Only few participants (1.1%) had negative attitude towards AI among undergraduate students rest all the undergraduates had a positive attitude towards AI and its implementation as depicted in Figure 2.

Similarly, perception was classified as good or bad perception. Only 0.7% of the undergraduates had bad perception which is almost negligible. All the postgraduates and the faculties and private practitioners had a good perception about AI and its probable utilization as shown in Figure 3.

DISCUSSION

The development of ChatGPT, a sophisticated large language model (LLM), by Open AI has the potential to change several sectors, including dentistry and dental education. Its use in dentistry has the potential to improve communication between patients and dental professionals, streamline patient treatment, and promote the spread of dental information. ChatGPT and other LLM-based technologies may hold great promise for future medical, dental, pharmaceutical, and public health education, hence excellent knowledge of such platforms holds supreme importance particularly among undergraduate students⁽⁸⁾. Close to 63.8% of total undergraduate students in the present study were familiar with ChatGPT which was found significant regarding the awareness of such platform. However, to address any potential drawbacks of using LLMs like ChatGPT in the process of healthcare education, this should be led by evidence-based findings of additional studies.⁽⁹⁾

ChatGPT, an AI language model, may help medical researchers and scientists with writing, literature research, data summarization, structure, citation, and title suggestions, as well as by creating an initial paper draft. Nearly 84.8% of the total students in the present study agree with ChatGPT use being beneficial in diagnosis and treatment planning in the field of dentistry. Its widespread practice in dental curriculum has the potential to bring renaissance in academics. The text can still be developed further by humans; this is just the beginning. ChatGPT can help in locating scholarly publications, summarizing their conclusions, and identifying areas of doubt; nevertheless, the summary may not contain a critical evaluation of the variations between studies. The creation of graphs, tables, and other visual components to summarize data may be assisted by AI⁽¹⁰⁾. Around 42.9 % of total undergraduate students in the present study believed that ChatGPT is useful in providing current literature or evidence-based literature pertaining to pediatric dentistry. Currently ChatGPT applications are restricted to availability of evidence based literature till year 2020 and its further improvised versions can focus on delivering recent studies as well.

The key benefit of ChatGPT is that it can draw conclusions more quickly than people since it is faster at understanding information and connecting evidence from seemingly unrelated pieces of data than humans are. Almost all (98.1%) of the undergraduate students in the study would like to know more about other versions of ChatGPT available on android and IOS and close to 84.8% of total students would like to use ChatGPT in future as per this study. The use of this chatbot in scientific writing is conceivable. It can speed up and simplify academic writing by automating draft generation, summarizing material, and translating languages⁽¹⁰⁾.

In order to provide patients with individualized assistance and self-assessment tools and to help them better understand their oral health needs, ChatGPT can be implemented into the websites and applications of dental practices. Additionally, ChatGPT can be used by dental professionals to obtain the most recent studies and best practices, facilitating the use of evidence in decision-making and ongoing education. About 93.3% of the students in the present study think ChatGPT is an essential tool in dental studies. By producing simple explanations of complicated dental processes and treatment alternatives, the language model can also be used to enhance patient education. Additionally, ChatGPT and other AI-based training technologies can provide engaging environments that could improve the development of critical patient counseling abilities including facial expression and emotional expression.

Although ChatGPT cannot replace expert knowledge, its use in dentistry has the potential to improve patient satisfaction

and promote effective knowledge exchange among dental professionals⁽⁸⁾. In the present study, close to 37.7% of total undergraduate students uses ChatGPT in their dental studies. To maintain the confidentiality of patient information in this quickly changing digital environment, thorough consideration of privacy and security measures is important.

One significant limitation of Chatbots in healthcare education is the issue of breaching data privacy. Around 82% of total undergraduate students in the present study didn't face any difficulty in using the chatbot. Sensitive patient data is used in healthcare education, so ChatGPT and other AI-based technologies need to be rigorously regulated with complete data privacy protection in order to maintain patient confidentiality and avoid any negative consequences of data privacy breaches⁽⁷⁾.

Another drawback of ChatGPT was its tendency to provide biased, out-of-date, or erroneous content, which was mentioned across various healthcare educational fields in this study. The unintentional creation of insufficient, erroneous, or biased content in the context of healthcare education could degrade the standard of instruction and ultimately have a detrimental effect on the standard of healthcare⁽¹⁰⁾. The potential for ChatGPT to stifle the development of critical thinking and communication skills among healthcare students by inhibiting the engagement of students in critical evaluation of course material is an important constraint. Additionally, ChatGPT and other AI-based instructional technologies may hinder the development of interpersonal and communication skills, which are vital for health professionals⁽¹¹⁾. Around 50% of students were successful in receiving adequate knowledge regarding pediatric dentistry in the present study.

According to studies conducted in recent years, artificial intelligence is currently used mostly in dentistry to evaluate digital diagnostic techniques, particularly in radiography. However, as time goes on, its application is expected to become more widespread throughout the profession. This is how Schwendicke et al. conducted a study to establish the necessary coursework for both undergraduate and graduate studies, as well as to establish an acceptable number of goals that students should be able to achieve when studying oral and dental artificial intelligence.⁽¹²⁾

By increasing patient involvement, reducing the strain of healthcare providers, and disseminating up-to-date information, ChatGPT can have a substantial impact on clinical and translational medicine sectors. However, there are challenges and problems that need to be assessed and resolved through continual research and development in order to guarantee the secure and effective deployment of ChatGPT⁽¹³⁾. Writing clinical letters for patients using ChatGPT has been studied by Ali et al. A pilot study found that ChatGPT can produce clinic letters with high scores for correctness and at a reading level similar to letters written by people⁽¹⁴⁾. However, in order to prevent dangers like mistakes or misinterpretations that can endanger patients, the use of AI in healthcare communication needs to be regulated and closely watched.

It is critical to take into account any potential challenges and disadvantages of using ChatGPT, including ethical issues and harmful effects. Technology is developing quickly, and medical educators need to keep up with it in order to establish effective teaching strategies, curricula, and evaluation procedures.

Research requires writing, and while ChatGPT shouldn't be the main source of information, it can help immensely with language improvement and error detection. For people who are not native speakers of the language being used, this is

very advantageous. ChatGPT can be used to summarize important information from lengthy texts and translate text with personalized requests⁽¹⁵⁾ It is quite challenging to eliminate fraudulent or misleading information despite ChatGPT's ongoing updates and improvements.

Additionally, the social bias associated with ChatGPT and the fact that AI cannot yet be held accountable for its decisions make relying only on AI to solve environmental problems contentious. Therefore, extra caution must be used when AI is involved in decision-making processes connected to the welfare of the public irrespective of the ease of the use of chatbots like ChatGPT. In the present study nearly 98% of total students found it relatively easy to use ChatGPT.

Table 1: Knowledge Domain Regarding Use Of Chat GPT Among Dental Undergraduate Students

Knowledge	Yes N (%)	No N (%)	Not sure N (%)	Chi square test	P value
Familiar with the concept of Chat GPT	67 (63.8%)	38 (36.2%)	0 (0%)	Chi = 13.1	p= 0.012*
Idea about how ChatGPT might be used in dentistry	25 (23.8%)	36 (34.3%)	44 (41.9%)	Chi = 3.43	p= 0.412 (NS)
ChatGPT can be used as a tool to assist in diagnosis and treatment planning in pediatric dentistry	89 (84.8%)	16 (15.2%)	0 (0%)	Chi = 25.9	p < 0.001**
ChatGPT useful in providing current literature / evidence-based literature pertaining to pediatric dentistry	45 (42.9%)	32 (30.5%)	28 (26.7%)	Chi = 4.187	p = 0.211 (NS)

p>0.05 - no significant difference (NS)

*p < 0.05 – significant

**p < 0.001 – highly significant

Table 2: Attitude Domain Regarding Use Of Chat GPT Among Dental Undergraduate Students

ATTITUDE	Yes N (%)	No N (%)	Not sure N (%)	Chi square test	P value
Like to know more regarding different versions of ChatGPT on iOS and android platform	103 (98.1%)	2 (1.9%)	0 (0%)	Chi = 56.2	p < 0.001*
you would like to use ChatGPT in future	89 (84.8%)	4 (3.8%)	12 (11.4%)	Chi = 21.3	p < 0.001*
Think that ChatGPT is essential in the field of dentistry	98 (93.3%)	7 (6.7%)	0 (0%)	Chi = 35.1	p < 0.001*

p>0.05 - no significant difference (NS)

*p < 0.05 – significant

**p < 0.001 – highly significant

Table 3: Practice Domain Regarding Use Of Chat GPT Among Dental Undergraduate Students

PRACTICE	Yes N (%)	No N (%)	Not sure N (%)	Chi square test	P value
Currently use ChatGPT in your dental studies	40 (37.7%)	54 (50.9%)	12 (11.3%)	Chi = 9.23	p = 0.029*
Encounter any challenges while using ChatGPT app	19 (18.1%)	86 (81.9%)	0 (0%)	Chi = 19.5	p < 0.001**
You been successful in receiving adequate knowledge regarding knowledge in Pediatric Dentistry	53 (50.5%)	9 (8.6%)	43 (41%)	Chi = 4.187	p = 0.211 (NS)
Easy for you to use ChatGPT	103 (98.1%)	2 (1.9%)	0 (0%)	Chi = 59.12	p < 0.001**

p>0.05 - no significant difference (NS)

*p < 0.05 – significant

**p < 0.001 – highly significant

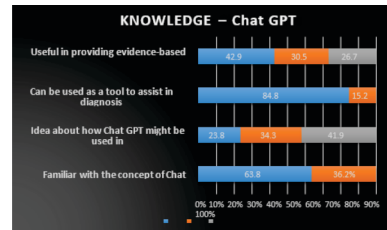


Figure 1

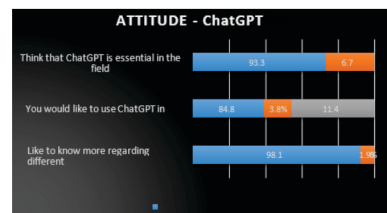


Figure 2

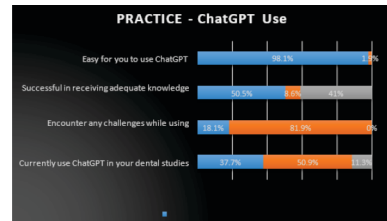


Figure 3

REFERENCES

- 1) Artificial Intelligence in Dentistry: Current Concepts and a Peep Into the Future. Alexander B, John S. Int J Adv Res. 2018;30:1105–1108.
- 2) Khanagar SB, Al-ehaideb A, Maganur PC, Vishwanathaiah S, Patil S, Baeshen HA, et al. Developments, application, and performance of artificial intelligence in dentistry—a systematic review. J Dent Sci. 2021; 16(1):508–22
- 3) Nayab Iqbal, Hassaan Ahmed, Kaukab Abid Azhar. Exploring Teachers' Attitudes towards Using Chat GPT. Global Journal of management and administrative sciences. 2022;3(4):97-111

- 4) Sarker, I.H. Deep Learning: A Comprehensive Overview on Techniques, Taxonomy, Applications and Research Directions. *SN COMPUT. SCI.* 2021;2: 420
- 5) Sabry Abdel-Messih M, Kamel Boulos MN. ChatGPT in clinical toxicology. *JMIR Med Educ.* 2023;9:0.
- 6) Abid Haleem, Mohd Jarvaid, Ravi Oratap Singh. An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *Bench Council Transactions on Benchmarks, Standards and Evaluations.* 2022;2(4).
- 7) Hind M Alhaidry, Bader Fatani, Jenan O Alrayes, Aljowhara M Almana, Nawaf K Alhaed. ChatGPT in Dentistry: A Comprehensive Review. *Cureus* 2023;15(4):e38317
- 8) Sallam M, Salim N, Barakat M. ChatGPT applications in medical, dental, pharmacy and public health education : A descriptive study highlighting the advantages and limitations. *Narra J.* April 2023; 3 (1): 1-14
- 9) Tiwari A, Kumar A, Jain S et al. Implications of ChatGPT in Public Health Dentistry: A Systematic Review. *Cureus* 15(6):e40367
- 10) Sallam M. ChatGPT utility in health care education, research, and practice: Systematic review on the promising perspectives and valid concerns. *Healthcare* 2023; 11(6):887.
- 11) De Angelis L, Baglivo F, Arzilli G, Privitera GP, Ferragina P, Tozzi AE, Rizzo C. ChatGPT and the rise of large language models: the new AI-driven infodemic threat in public health. *Front Public Health.* 2023 Apr 25;11
- 12) Lin Z. Why and how to embrace AI such as ChatGPT in your academic life. *PsyArXiv*; 2023. DOI: 10.31234/osf.io/sdx3j.
- 13) Nagarhalli TP, Vaze V, Rana N. A review of current trends in the development of chatbot systems. In: 2020 6th International conference on advanced computing and communication systems (ICACCS): 2020
- 14) Atlas S. ChatGPT for higher education and professional development: a guide to conversational AI. College of Business faculty at the University of Rhode Island 2023. 1-2023