

A cross-sectional study on the awareness of CBCT among undergraduate dental students of Central India

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Abstract

Background: Cone Beam Computed Tomography (CBCT) is an advanced imaging device that allows in diagnosing hard tissue lesions of oral and maxillofacial location.

Aim: To assess the knowledge and focus on various application elements of CBCT and also to set up the importance of dental student's attitudes closer to new technologies utilized in dental practice among undergraduate college students of Rishiraj College of Dental Sciences and Research Centre, Bhopal.

Strategies: Self-administered E-questionnaire inclusive of 12 questions distributed amongst 213 dental students of Rishiraj College of Dental Sciences and Research Centre.

Results: It was observed through the survey that there were varied responses from the students of B.D.S 1st, 2nd, 3rd, 4th year and Interns, but most of students were quite aware about CBCT.

Keywords: Cone Beam Computed Tomography; Undergraduates; E- questionnaire; Knowledge

1. Introduction

Among all the three-dimensional imaging technologies, CBCT is considered a safer option having higher resolution and decreased time duration.^[4,7,9,12] CBCT improves in fields such as magnification, image distortion and image superimposition which were limitations of two-dimensional imaging.^[3,4,5] Cone Beam Computed Tomography has revolution in the field of Dental and Maxillofacial Imaging.^[7,8] CBCT was first introduced in 1982 for angiographic purpose by Robles R.A. Mozzo et al and Arai et al independently introduced CBCT for Dental and Maxillofacial applications.^[6,12,14] It is easily available in urban and suburban setups because of which diagnosis, evaluation of severity of disease, treatment planning, administration and follow up have become easy.^[1,7,8,9] Revolution is evident in Dental and Maxillofacial imaging by Cone Beam Computed Tomography. Through the use of CBCT imaging, practitioners can focus on the dentoalveolar arch while also view the entire craniofacial region.^[2,10,12,15] Given the increasing presence of CBCT in dental practices, it is essential for dental students to acquire both theoretical and practical knowledge because it helps in the evaluation of impacted teeth, bone for infection detection, endodontics, impacted teeth, temporomandibular joint disorders, orthodontic treatment planning, assessment of jaws for implant placement, periodontal diseases, cysts and tumors.^[11,16,17,18]

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2. Materials and Methods

An E-questionnaire survey of 12 questions was conducted among the undergraduate students of Rishiraj College of Dental Sciences and Research Centre, Bhopal to assess their knowledge and awareness regarding Cone Beam Computed Tomography usage in dentistry. The tabulation of results was done after obtaining it, later subjected to statistical analysis from which graphs were made.

3. Results

Out of 213 participants, there were 36 (16.9%) first-year students, 31 (14.6%) second-year students, 63 (29.6%) third-year students, 52 (24.4%) fourth-year students and 31 (14.6%) interns of dental program of Rishiraj College of dental sciences & Research Centre.

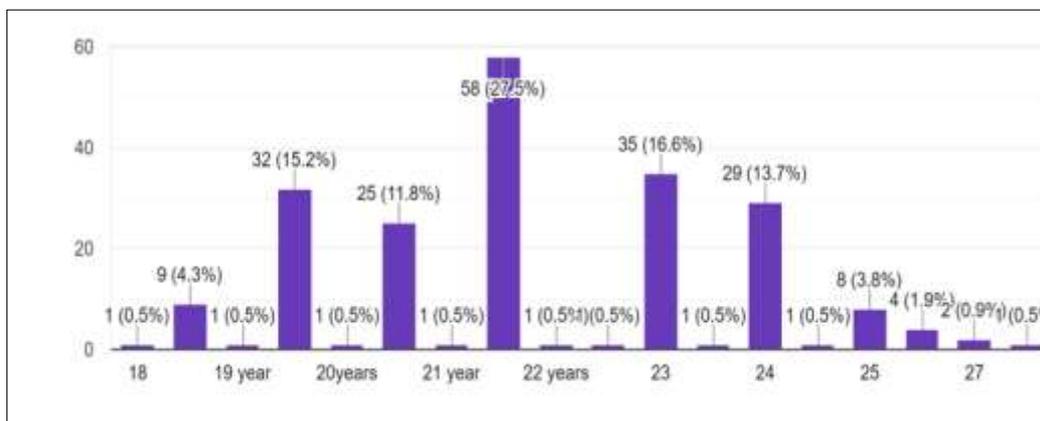


Figure 1 Representing Age wise distribution of students of Central India

There were 148 (69.4%) females and 65 (30.5%) male students. In general, participant's knowledge and their overall satisfaction with the use of CBCT and CT were compared in relation to their basic education status.

3.1. Questions

A) Of all the 213 dental students enrolled in the present study, 66.8% students were aware of different 3D imaging options.

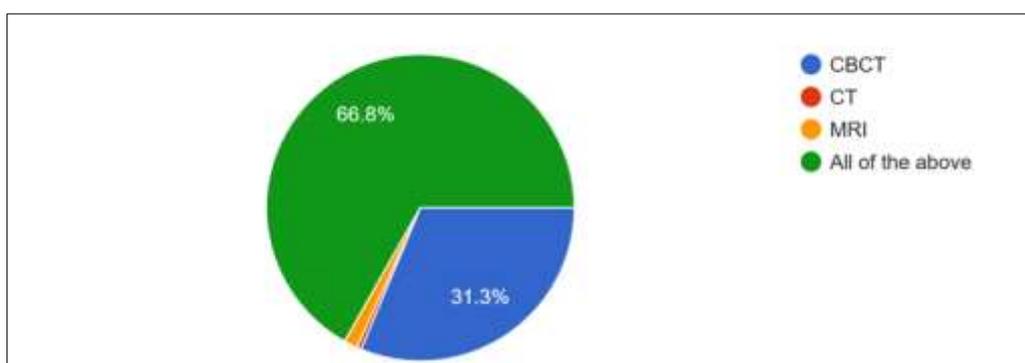


Figure 2 Pie Chart representing awareness of students about 3D imaging options.

B) Majority of the dental students (84.9%) were familiar with the term CBCT out of which 79.7% were aware that CBCT stands for Cone Beam Computed tomography.

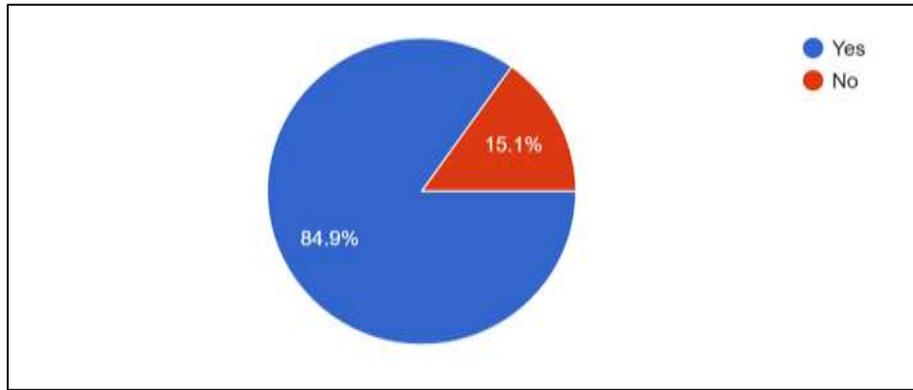


Figure 3 Pie Chart representing awareness of students about CBCT.

C) 81% dental students were aware of the applications of CBCT of which 92.9% students think that CBCT report is essential for implant placement and 94.3% say that CBCT is helpful in Endodontics.

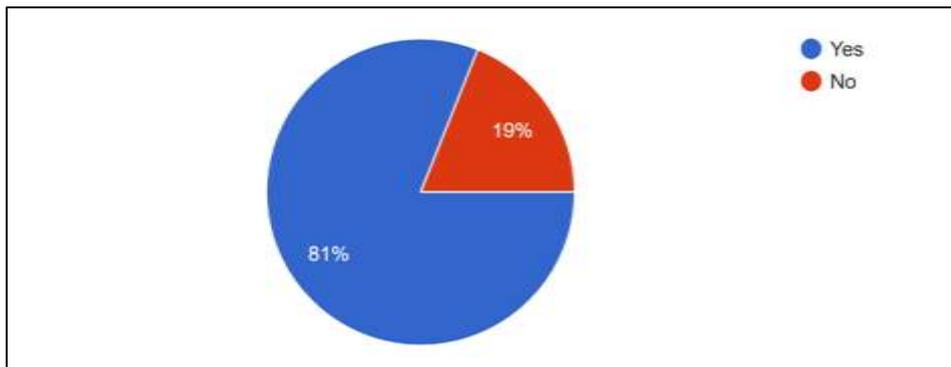


Figure 4 Pie Chart representing awareness of students about the applications of CBCT.

D) 92.9% students think that CBCT report is essential for implant placement.

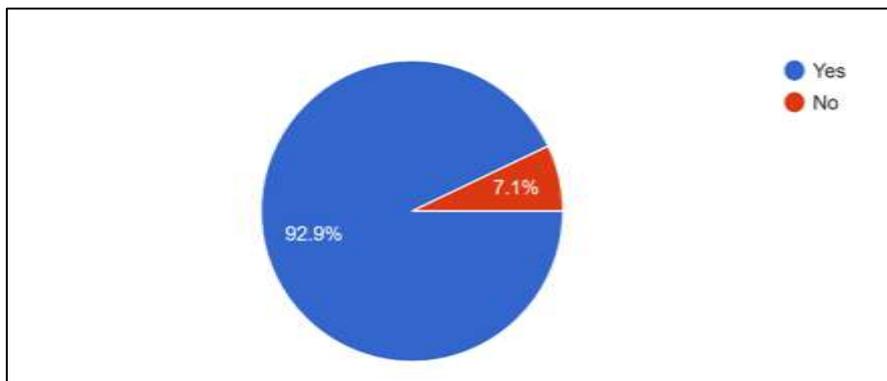


Figure 5 Pie Chart representing awareness of students about the need of CBCT for implant placement.

E) 79.7% were aware that CBCT stands for Cone Beam Computed tomography.

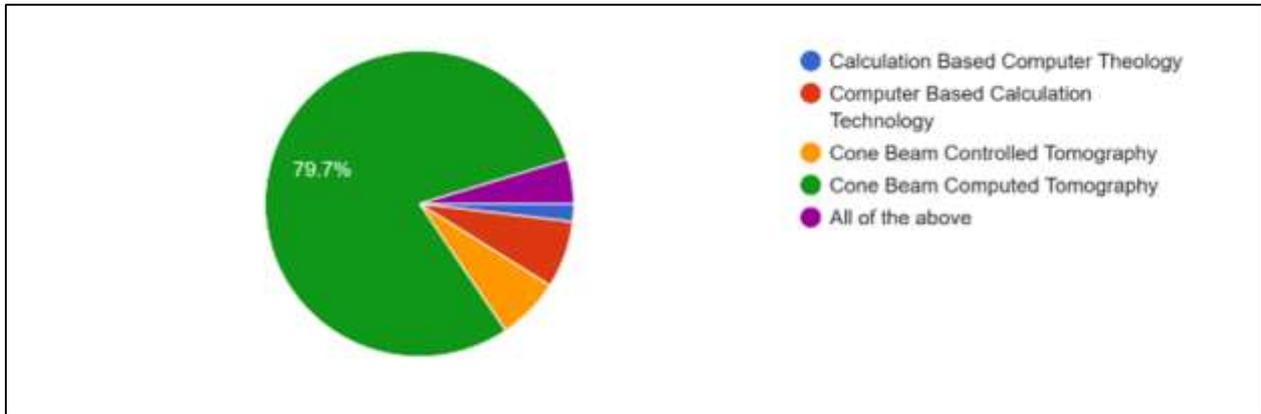


Figure 6 Pie Chart representing the awareness of students about the expansion of CBCT.

F) 91.5% students think CBCT is safe option regarding radiation in dental setup and 94.8% students say that CBCT is better than CT in dentistry.

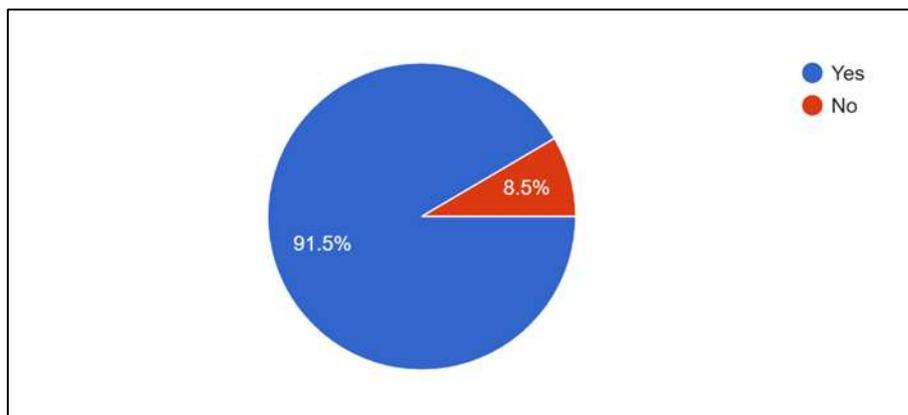


Figure 7 Pie Chart representing the awareness among students regarding radiation in dental setup.

G) 98.1% students feel the need of CBCT in college.

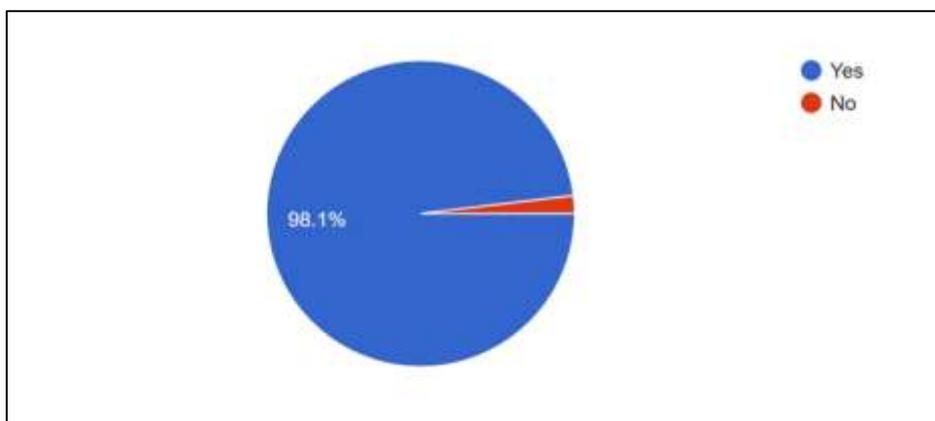


Figure 8 Pie Chart representing the awareness of the students about the need of CBCT in college.

H) 98.6% thinks that CBCT is helpful in academic research.

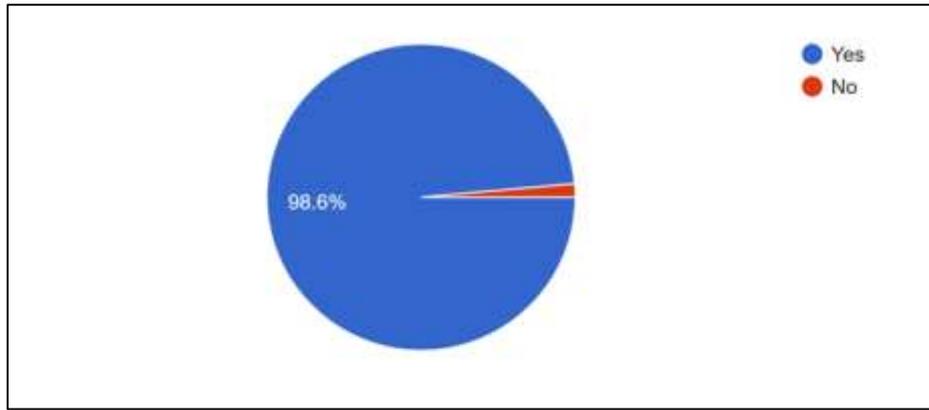


Figure 9 Pie Chart representing the awareness of students about the essentiality of CBCT in academic research.

I) 95.3% want to have a course on CBCT in college.

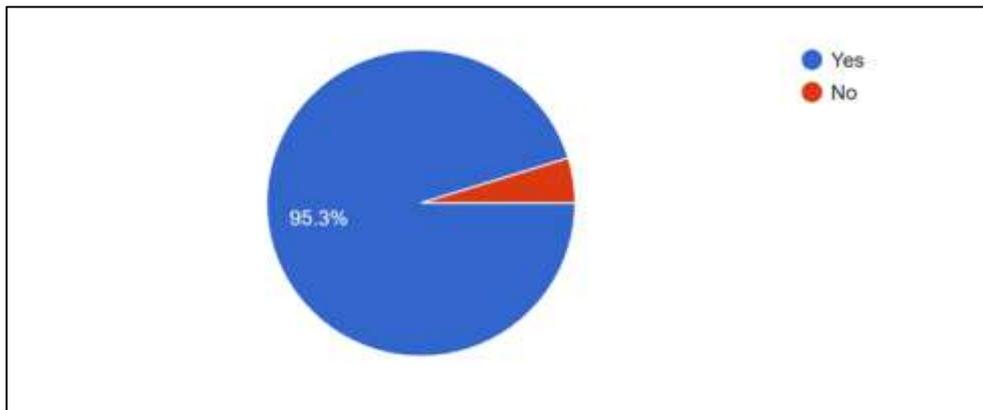


Figure 10 Pie Chart representing the will of the students to conduct CBCT course in the college.

J) 94.8% students say that CBCT is better than CT in dentistry.

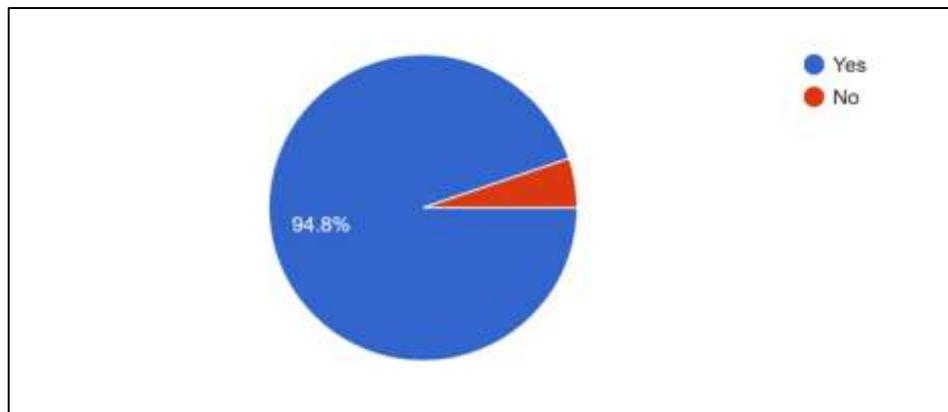


Figure 11 Pie Chart representing awareness of students regarding the selection of better radiological technique between CBCT and CT.

K) 204 (96.7%) students think that CBCT has revolutionized the field of dentistry.

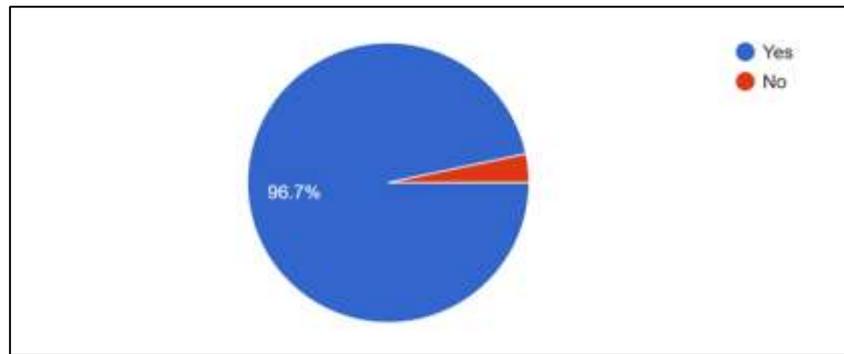


Figure 12 Pie Chart representing the awareness of students regarding CBCT and its revolution in the field of Dentistry.

L) 94.3% say that CBCT is helpful in Endodontics.

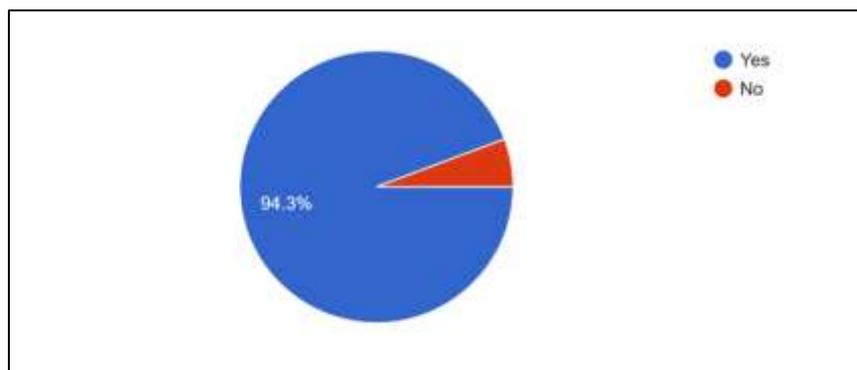


Figure 13 Pie Chart representing the awareness of students about essentiality of CBCT in Endodontics.

4. Discussion

Cone Beam Computed Tomography (CBCT) imaging represents the most important technological progress in maxillofacial imaging since the advent of orthopantomography.^[2,14] Initially, CBCT was utilized by cardiothoracic surgeons for angiographic applications, but they eventually discontinued its use with the emergence of multidetector CT. The technology was then adopted by dentists for imaging the maxillofacial region in the late 1990s. It became commercially available at the turn of this century for maxillofacial diagnosis. CBCT units utilize a cone-shaped beam of divergent X-rays emitted from the X-ray source.^[5,10,13] Unlike CT machines that have a linear array detector, CBCT employs a flat 2D panel. This design enables the coverage of a volume of tissue in a single rotation around the head and neck region.^[15] Consequently, this technique allows for the construction of a 3D image volume from a 2D dataset.

Table 1 The response of the study subjects towards CBCT imaging.

Questions	Our Results			Results by Reddy Lavanya et al ^[14]		
	YES	NO	TOTAL	YES	NO	TOTAL
Need of CBCT machine in their workplace	202	11	213	81	7	88
Response of individuals on usage of CBCT in Dental Practice	205	8	213	40	48	88
Response of individuals about their willingness to attend CBCT program in future.	202	11	213	88	0	88

Table 2 The response of the study subjects towards CBCT imaging.

Questions	Our Results			Results by Dr. Surya Gunasekaran et al ^{6]}			
	YES	NO	TOTAL	YES	NO	DON'T KNOW	TOTAL
Awareness of CBCT used for Oro maxillofacial region	204	9	213	168	31	0	199
Essentiality of having CBCT in dental institution.	202	11	213	153	7	21	181
Willingness to participate in CBCT course	202	11	213	162	19	0	187

5. Conclusions

This study was conducted in a Dental College without CBCT facilities. While there is a notable awareness of CBCT usage among students, but some level of lack of understanding is still evident. However, a positive aspect is their willingness to participate in the programs for learning the science involved in Cone Beam Computed Tomography. Therefore, it is essential to enhance awareness about CBCT's applications through CDE programs, webinars, and online platforms.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest to declare. All co-authors have seen and agree with the contents of the manuscript and I declare that to the best of my knowledge and belief neither I nor a related person have any financial interests or hold any position /office which might conflict, or be perceived in conflict. I declare my interests below for consideration.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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Authors short biography

Abin Raji is currently doing Internship in Rishiraj College of Dental Sciences and Research Centre. Abin is dedicated to advancing methods of radiological investigations of pathologies of oral cavity across Central India.

