

ORIGINAL RESEARCH

Awareness of Dental Students towards CBCT: A Cross Sectional Study

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ABSTRACT

Background: Due to its high resolution, low radiation dosage, and short screening time, cone beam computed tomography, an outstanding diagnostic 3D imaging modality that was recently developed for dento-maxillofacial imaging, is becoming more helpful. The purpose of this study was to analyse dentistry students' and general dental practitioners' awareness, knowledge, and attitudes concerning CBCT.

Materials and Methods: To measure their knowledge, awareness, and attitude regarding CBCT, 400 dental students and dental practitioners were given questionnaire. The replies of the participants were analysed using descriptive statistics, and the Chi-square test was employed to statistically analyse the variations in responses based on education level.

Results: The findings revealed that Post Graduate students were the most informed and aware of CBCT, followed by Interns, final BDS students, and General Practitioners.

Conclusion: The findings show that general practitioners are unaware of CBCT and have little expertise about it. As a result, it is suggested that more CDEs and workshops on diverse uses of CBCT be held in order to raise understanding and awareness among general practitioners.

Keywords: cone beam computed tomography; dental education; radiology; awareness; knowledge

INTRODUCTION

Cone-beam computed tomography is a three-dimensional imaging technology with specific benefits over multidetector computed tomography (MDCT), such as reduced radiation exposure, great spatial resolution, and quick scan durations.¹ In dentistry, CBCT has a wide range of uses. Dental implant treatment planning, identifying the proximity of mandibular third molars to the mandibular canal, orthodontic treatment planning, temporomandibular

joint examinations, and evaluating pathosis and dentoalveolar damage are just a few of the uses.² Several organisations have produced position papers and recommendations on the use of CBCT for various indications as they apply to different dental specialisations as a consequence of the rising demand for CBCT in dental offices.

There have been produced evidence-based recommendations for referral criteria, rationale, and optimization of maxillofacial CBCT users. CBCT is suggested when conventional radiographs are unable to address the clinical question for which CBCT imaging is required, according to these criteria.³⁻⁵ As a result, all CBCT requests must be tailored to each patient's needs and supported with risk vs benefit analyses. The interpretation of maxillofacial CBCT exams must be done by a qualified oral and maxillofacial radiologist (OMFR), according to the guidelines based on the frequency of incidental findings.⁶

Moreover, the information received by CBCT imaging also needs a high degree of skill in order to be properly interpreted. This means that an unskilled clinician's interpretation of CBCT pictures is likely to have a high mistake rate, resulting in a high percentage of missing or false positive diagnoses.⁷ As a result, the goal of this study was to analyse dental students' and general dentists' knowledge and opinions about CBCT.

MATERIALS AND METHODS

A validated questionnaire survey of 400 dental professionals (BDS final undergraduates, postgraduates, Interns and General practitioners) was conducted in Gwalior to assess their understanding of CBCT application. The study protocol was double-checked and approved. Participants were provided the survey form online link, which included a verified questionnaire, via email and social media platforms such as Facebook, WhatsApp, and others. The information gathered via electronic surveys was then coded. Participants gave their agreement in advance, and their identities were kept private. The findings were tallied when the entire questionnaire was obtained.

The data was collected and tabulated. It was then analysed using IBM SPSS software version 24 and divided into four categories: undergraduate dental students, postgraduate dentistry students, interns, and general practitioners, including specialists other than oral medicine and radiology specialists. For all questions, data was sorted in frequency (%) and a mean percentage was determined. To compare percentages in different variables, the Chi square and t-test were used.

RESULTS

A set of questions about CBCT Awareness, Knowledge, and Attitude were evaluated by category and gender. Figure 1 and Table 1,2, and 3.

I. QUESTIONS REGARDING AWARENESS

- 1) Have you heard about CBCT? YES NO
- 2) Have you advised your patients for CBCT imaging? YES NO
- 3) Do you think CBCT should be provided at dental institute? YES NO
- 4) Would you choose to use CBCT as an imaging modality in your clinical practice? YES NO
- 5) Would you choose to use CBCT in your future professional career? YES NO
- 6) What is the reason of not using CBCT? Lack of awareness Lack of availability
- 7) Do you require guidance from a Radiologist for radiological facility design and protection? YES NO

II. QUESTIONS REGARDING KNOWLEDGE:

- 8) Which technology do you prefer when you need 3-D Imaging of the head and neck region?
 Computerized Tomography Dental Volumetric Tomography/CBCT
- 9) What is the difference between CT and CBCT?
 Low radiation dose than CT Same radiation dose as of CT
- 10) How do you obtain knowledge about CBCT? Lectures CDE
- 11) Have you ever obtained knowledge of CBCT from your faculty? YES NO
- 12) Are you aware that focused FOV/small FOV should be advised in CBCT for endodontic purpose?
 YES NO
- 13) Are you aware of different sizes of FOV? YES NO

III. QUESTIONS REGARDING ATTITUDE

- 14) Are you satisfied with the use of CBCT? YES NO
- 15) Which session of BDS should include lecture on CBCT? Pre-clinical Clinical
- 16) Should there be guidelines formed for when or when not to take CBCT scan? YES NO
- 17) What is the reason of not using digital imaging/CBCT? Lack of awareness Lack of availability
- 18) Do you feel CDE/Workshop should be conducted to enhance your knowledge about digital imaging / CBCT?
 YES NO
- 19) Should patient be referred to an Oral radiologist who is trained to handle or have enough experience in handling CBCT machine? YES NO
- 20) Should an oral Radiologist take regular training/workshop/hands-on courses for evaluation of CBCT scan?
 YES NO

Figure 1: Questionnaire

Table 1: The Results of the Awareness Questions

Q no.	Category in frequency (%)				P value
	BDS	PG	Intern	Dental Practitioner	
1	24.03	25.51	25.42	25.04	0.006
2	14.93	32.33	32.12	20.62	0.001*
3	28.67	29.02	28.96	13.39	0.001*
4	25.05	25.33	24.88	24.74	0.007
5	25.11	25.30	24.97	24.62	0.006
6	28.96	33.88	21.12	16.04	0.001*
7	25.06	25.32	24.77	24.85	0.008
Average	24.54	28.10	26.03	21.33	

Table 2: The results of Questions Regarding knowledge

Q no.	Category in frequency (%)				P value
	BDS	PG	Intern	Dental Practitioner	
8	25.11	25.27	24.67	24.95	0.006
9	24.63	24.93	24.96	25.48	0.008
10	31.73	16.77	30.91	20.59	0.001*
11	30.15	28.27	24.01	17.57	0.001*
12	23.28	41.15	25.37	10.20	0.001*
13	23.17	41.10	25.28	10.45	0.001*
Average	26.34	29.58	25.87	18.21	

Table 3: The results of Questions Regarding attitude

Q no.	Category in frequency (%)				P value
	BDS	PG	Intern	Dental Practitioner	
14	21.33	32.36	31.72	14.59	0.001*
15	14.97	32.32	31.72	20.99	0.001*
16	14.37	33.36	31.57	20.70	0.001*
17	25.11	25.42	24.75	24.72	0.007
18	15.11	32.36	31.16	21.37	0.001*
19	24.97	25.23	24.97	24.83	0.006
20	25.07	25.15	23.52	26.26	0.008
Average	20.13	29.46	28.49	21.92	

There was a total of 20 surveys reviewed, with the majority of respondents being undergraduates (UGS), postgraduates (PGS), interns, and general practitioners.

The majority of participants were aware of CBCT, with no significant differences across (undergraduates) UGs (24.54%), PGS (28.10%), Interns (26.03%), and general practitioners (21.33%). PGs were the most worried (32.33%) of all participants when it came to recommending CBCT to patients. There was no significant difference in responses between students and dental professionals when it came to employing CBCT as an imaging modality in clinical practice and future professional career. While there was a substantial difference in not employing digital imaging amongst UGS, PGS, Interns, and general practitioners due to a lack of awareness and availability among them, PGs were found to be better knowledgeable about CBCT. While there was no significant difference in all groups' responses on the need for a radiologist's advice on radiological facility design and protection, there was a significant difference in the need for a radiologist's advice on radiological facility design and protection (Table 1).

There was no significant difference between students and general practitioners when it came to applying sophisticated technology in 3-D imaging of the head and neck area, according to questions on expertise in table 2. There was also no significant difference in CT and CBCT expertise between students and general practitioners. Furthermore, when it came to learning about CBCT through lectures and cde, there was a substantial difference between UGS, PGS, Interns, and general practitioners. General practitioners had not learned about CBCT from their professors, but students, particularly final BDS (30.15%), had sought assistance from their professors. The differences between their replies were statistically significant.

The majority of applicants, particularly PGs (41.10%), desired that the focused FOV/small FOV be indicated in CBCT for endodontic purposes, with the result being highly significant across all categories.

For attitude regarding CBCT, Table 3 demonstrates that there was a very significant difference in CBCT use among students and general practitioners, with PGs being more happy with CBCT use. UGs and general practitioners were not as worried as PGs regarding the application of CBCT recommendations.

PGs and interns are more likely than UGs and general practitioners to believe that a CDE/Workshop should be held to improve knowledge of digital imaging/CBCT. There were considerable discrepancies in their replies. While there was no significant difference between UGS, PGS, Interns, and general practitioners in terms of referring patients to an oral radiologist for CBCT, there was a significant difference between UGS, PGS, Interns, and general practitioners in terms of referring patients to an oral radiologist for CBCT. All groups agreed that an oral radiologist should attend frequent training/workshops/hands-on courses for CBCT scan assessment.

DISCUSSION

For diagnostic and treatment planning of patients attending a dental office for various dental operations, a variety of radiographic imaging modalities are available.⁸ A questionnaire was utilized to assess CBCT awareness among dental students and general dentistry practitioners in this study. It also examines dentists' knowledge and attitudes on CBCT, as well as their perspectives on the implications of expanded CBCT use in their offices.

Postgraduate students had the highest level of awareness, followed by Interns, Undergraduate students, and General Practitioners, according to the findings of this study (Table 1). This is in line with a research by Mahdizadeh et al (2012)⁹, who discovered that experts, especially aspiring specialists, are more knowledgeable about CBCT and frequently recommend it to patients. CBCT must be available at the dental institute, and all specialties must use it in their regular clinical practise. In this study, it was discovered that general practitioners are

unfamiliar with sophisticated technology, and that they should be educated on them. Implant planning is the sole use of CBCT that general practitioners are aware of. The majority of general practitioners believed that a lack of availability may be to blame.

There is an outstanding contrast about the information on CBCT got among Students, Interns and General Practitioner, in this review. The Post Graduate understudies, have more information on CBCT, trailed by UGs, Interns, and afterward followed by General Practitioner (Table 2). This perception is additionally in concordance with a review directed by Reddy et al(2012).¹⁰ Also PGs are more mindful about the Field of view(FOV), and their various sizes when contrasted with college Students, Interns and General professionals.

In the current review, the uplifting outlook for CBCT is reflected in post graduate understudies, trailed by Interns, General specialists and Under Graduate understudies (Table 3). This finding is in concordance with study led by Balabaskaran et al (2013).¹¹ Most of the Under Graduate understudies communicated that the information on CBCT ought to be given to them in the pre-clinical meeting for refreshing their insight.

The findings show that practising dentists are unaware of CBCT and that their knowledge of this potential new technique needs to be improved. Kamburoglu et al. observed similar findings in a research conducted in Turkey (2011).¹² As a result, Oral and Maxillofacial Radiologists should conduct CDEs on a regular basis to improve the understanding of other specialties and general practitioners.

CONCLUSION

The inclusion of CBCT training at the undergraduate and graduate levels will ensure that dental experts employ this method effectively. The need of the hour is for the dentistry community to be aware of CBCT and for it to be included in the curriculum. It is also suggested that OMR departments at various dental institutions engage actively and conduct specific qualifying programmes for dentists in order to develop their awareness, knowledge, and attitude toward various imaging modalities. For accurate diagnosis and improved patient care, general dental practitioners, as well as experts from other specialities, must obtain a deeper understanding of the indications and uses of digital imaging and CBCT.

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