



**Assessment of awareness, knowledge and attitude of dental professionals of Ludhiana towards the use of cbct- a questionnaire survey**

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**Abstract**

Cone beam computed tomography is an astounding diagnostic modality for the den to-maxillofacial region, developed by Dr Piero Mozzo and first came into dental practice in 2001 in the United States. Since then the use of this three-dimensional diagnostic tool has gained popularity among dentists because of its splendid characteristics namely low radiation exposure, advantages over conventional CT scan, higher image quality, better details and its benefits in each dental Speciality. This is a questionnaire-based survey that was conducted among the dental professionals of Ludhiana to evaluate their

awareness, knowledge and attitude towards the use of CBCT.

**Keywords:** CBCT, radiation, questionnaire survey, awareness, knowledge

**Introduction**

Cone beam computed Tomography (CBCT) is a diagnostic advancement widely used in the Dento maxillofacial region. The basic mode of action of CBCT systems is that they operate by concentrating a cone-shaped X-ray beam in a two-dimensional (2D) detector, which rotates 360 degrees or less around the patient's head to produce 2D images.

Following that, the cone-beam algorithm is applied to the data to generate three-dimensional (3D) images.<sup>[1]</sup> CBCT is preferred over conventional CT scan because of reduced radiation exposure, quick scan duration, occupies less pace, great spatial resolution, better image details. Because of all these factors.

CBCT is a more appropriate imaging modality for the Dento maxillofacial imaging. <sup>[1,2]</sup> Like a double-edged sword, CBCT has its shortcomings too-like poor contrast in soft tissues, beam hardening, dispersion from dental materials. CBCT has its applications in various dental specialties.<sup>[3]</sup>

### Methods and materials

A questionnaire survey of 25 multiple choice questions were given to 150 dental professionals- 4 questions regarding the general awareness of CBCT, 16 questions regarding the knowledge of CBCT and 5 questions regarding the attitude towards use of CBCT in dental practice. Out of the 150 dental professionals 61% males and 39% females.

The participating members had the following designations -34 were faculty members, 50 were senior private practitioners, 47 were general dentists and 19 were senior residents.

### Results

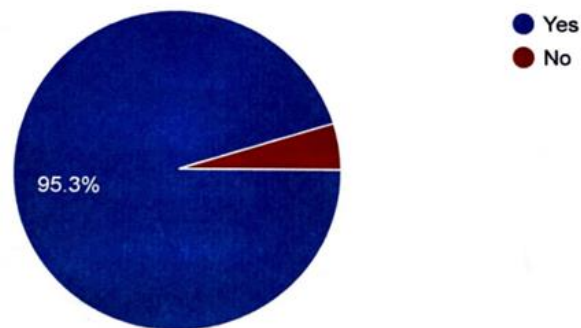
The results are summarizing the responses to each of the 25 questions in the survey and analyzing them using the SPSS software.

#### General awareness about cbct

#### Have you ever heard of CBCT in Dento-maxillofacial region?

Among 150 dental professionals, 95.3% are aware about the use of CBCT in Dento maxillofacial region and 4.7% are not.

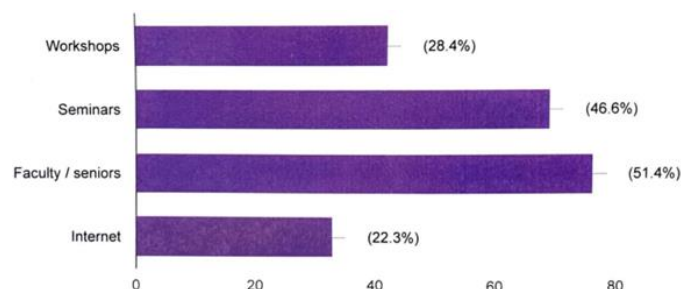
Graph 1:



#### If you have heard from where have you heard?

Among 150 dental professionals, 28.4% heard from workshops, 46.6% from seminars, 51.4% from faculty, seniors and 22.3% from internet.

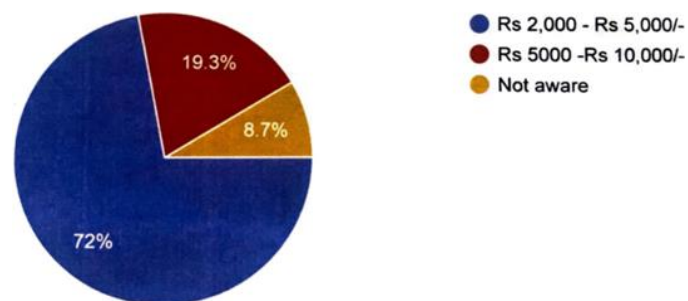
Graph 2:



#### Do you have any idea reading the price of CBCT for one quadrant?

Among 150 dental professionals, 72% feel the price the price is in the range Rs 2,000- Rs 5,000/- , 19.3% feel the price is in the range of Rs 5,000- Rs 10,000/- and 8.7% are not aware.

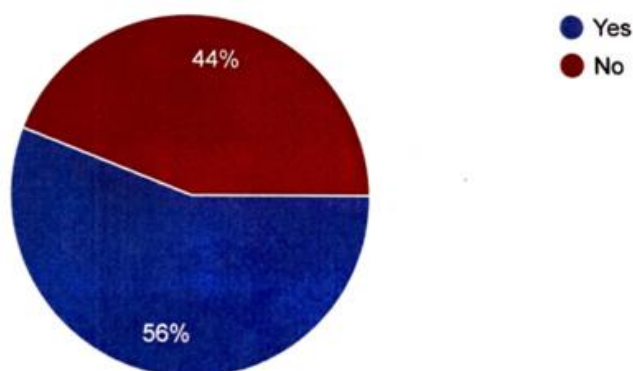
Graph 3:



#### Have you ever referred you patients for CBCT imaging?

Among 150 dental professionals 56% have referred their patients for CBCT and 44% have not.

Graph 4:

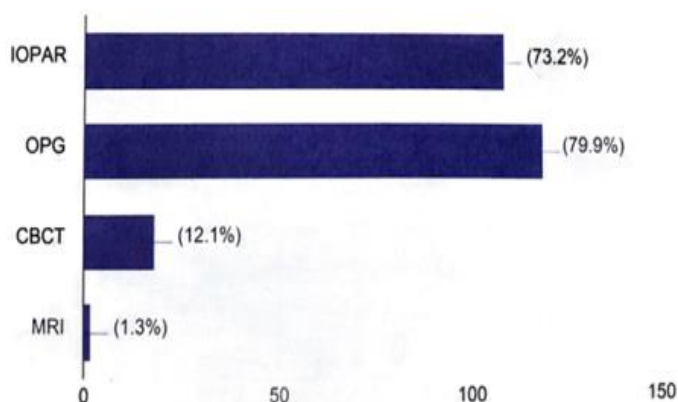


#### knowledge about cbct

According to you, which are the more frequently used imaging modalities in dentistry? (More than one option)

Among 150 dental professionals 73.2% felt IOPAR, 79.9% felt OPG, 12.1% felt CBCT and 1.3% felt MRI are the more frequently used imaging modalities.

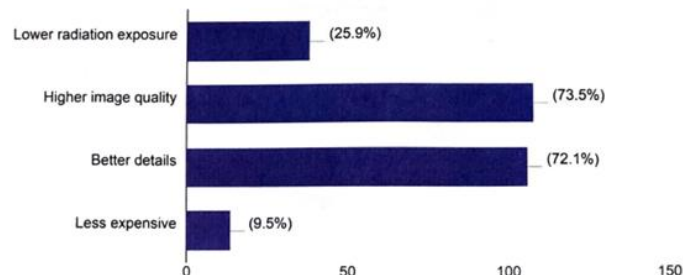
Graph 5:



In your opinion what are the advantages of CBCT over conventional CT scan? (More than one option)

Among 150 dental professionals 25.9% felt Lower radiation exposure, 73.5% felt higher image quality, 72.1% felt better details are advantages of CBCT over conventional CT scan. 9.5% felt that CBCT is less expensive compared to CT scan.

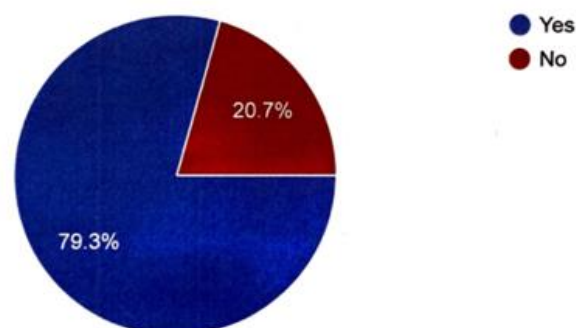
Graph 6:



Are you aware of basic principle and mode of action of CBCT?

79.3% are aware and 20.7% are not aware of the basic principle and mode of action of CBCT.

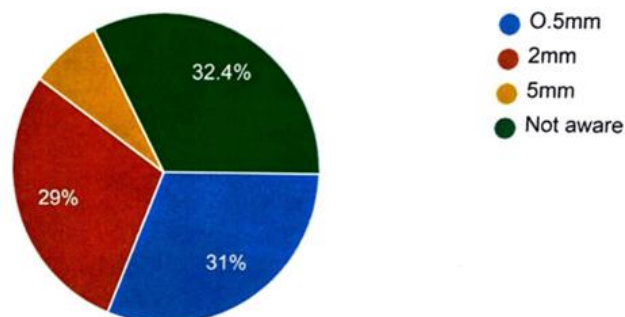
Graph 7:



What should be the minimum slice thickness for CBCT?

31% felt that the minimum slice thickness is 0.5mm, 29% felt that the minimum slice thickness is 2mm, 7.6% felt it is 5mm and 32.4% were not aware.

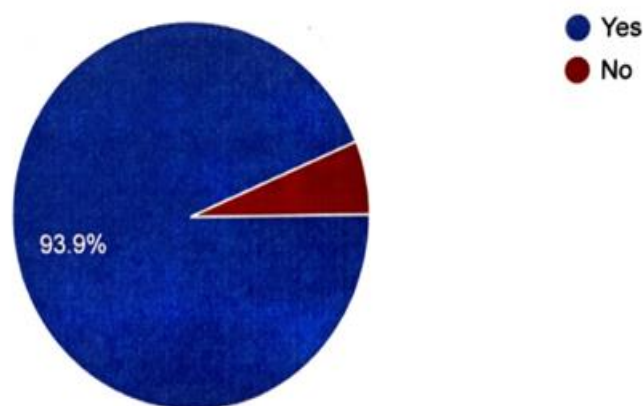
Graph 8:



Is CBCT useful in viewing TMJ (Temporo mandibular joint)?

93.9% feel that CBCT is useful in viewing TMJ and 6.1% feel that it is not useful for viewing TMJ.

Graph 9:

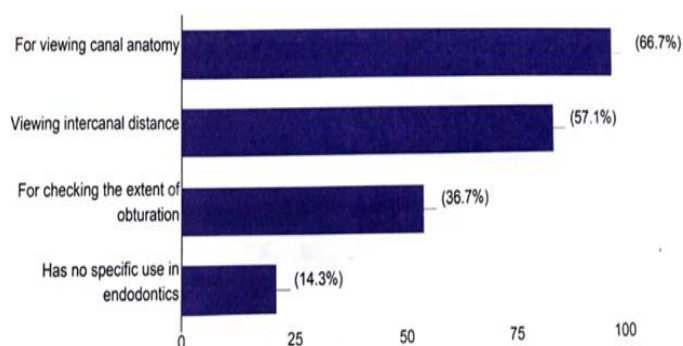


#### What is the use of CBCT in Endodontics? (More than one option)

66.7 % felt that CBCT is used for viewing canal anatomy, 57.1% felt that it is useful for viewing inter canal distance.

36.7% felt that it is useful for checking the extent of obturation and 14.3 % felt that it has no specific use in Endodontics.

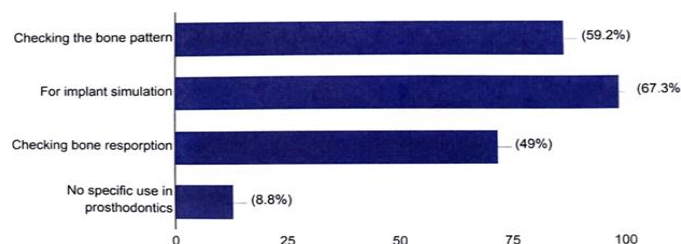
Graph 10:



#### What is the use of CBCT in Prosthodontics? (More than one option)

59.2% felt that CBCT is used for checking bone pattern, 67.3% felt that it is used for implant simulation, 49% felt that is used for checking bone resorption and 8.8% felt that it has no specific use in Prosthodontics.

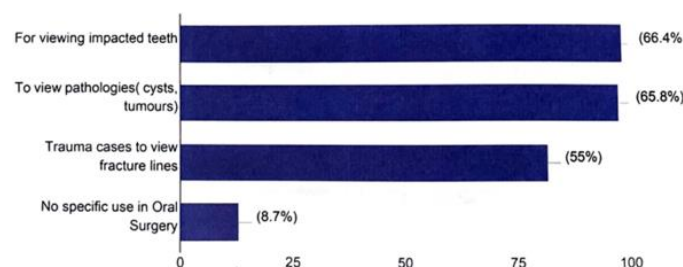
Graph 11:



#### What is the use of CBCT in Oral and Maxillo facial Surgery? (More than one option)

66.4% felt that CBCT is used for viewing impacted teeth, 65.8% felt that it is used for viewing pathologies (cysts, tumors) , 55% felt that it is used in trauma cases , to view fracture lines and 8.7% believed that there is no specific use in Oral Surgery.

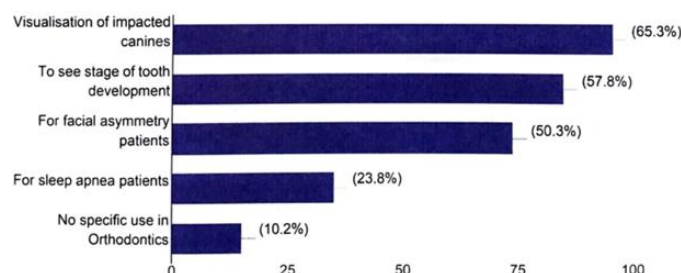
Graph 12:



#### What is the use of CBCT in Orthodontics? (More than one option)

65.3% felt that CBCT is used for visualization of impacted canines, 57.8% felt that it Is used to see the stage of tooth development, 50.3% felt that is used in facial asymmetry patients, 23.8% felt that it can be used for sleep apnea patients and 10.2% felt that there is no specific use in Orthodontics.

Graph 13:

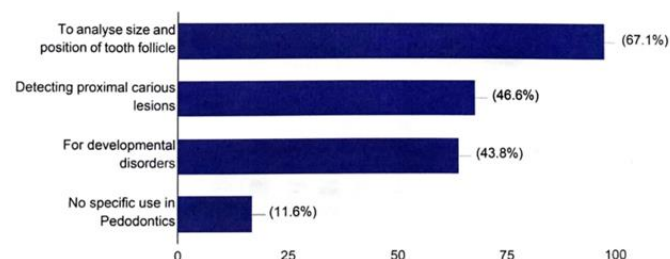


#### What is the use of CBCT in Pedodontics?



67.1% dental professionals felt that CBCT is used to analyze the size and position of tooth follicle, 46.6% felt that it is used for detecting proximal caries, 43.8% felt that it is used for detecting developmental disorders and 11.6 % felt that there is no specific use in Pedodontics.

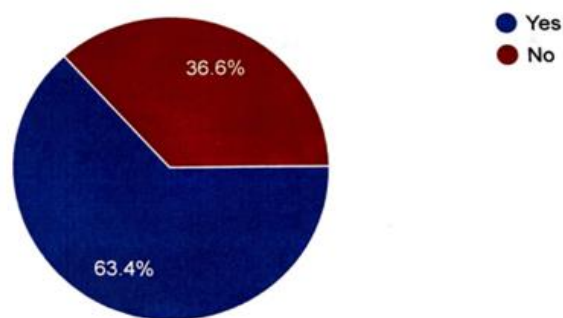
Graph 14:



### Can CBCT be used for Cancer Staging?

63.4% felt that CBCT can be used for cancer staging and 36.6% feel that it cannot be used.

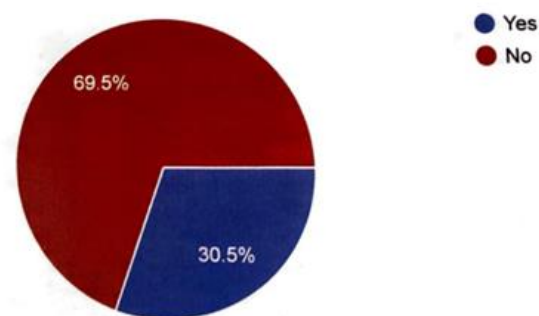
Graph 15:



### Can CBCT be used for the evaluation of any systemic disease?

69.5% felt that CBCT can be used for the evaluation for systemic disease, 30.5% felt that it cannot.

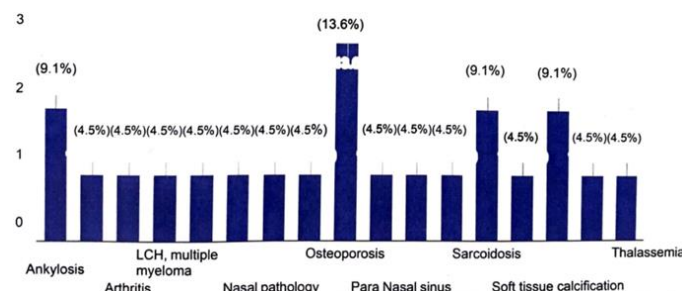
Graph 16:



If yes, then which disease?

9.1% felt that it can be used for evaluating Ankylosis, 4.5% felt that it can be used for arthritis, 4.5% felt that it can be used for diagnosing LCH and multiple myeloma, 4.5% felt that it is used for seeing nasal pathology, 13.6% felt that it is used for evaluating osteoporosis, 4.5% felt that it is used for evaluating paranasal sinus, 9.1% felt that it is used for evaluating sarcoidosis and soft tissue calcification and 4.5% felt that it can be used in Thalassemia patients

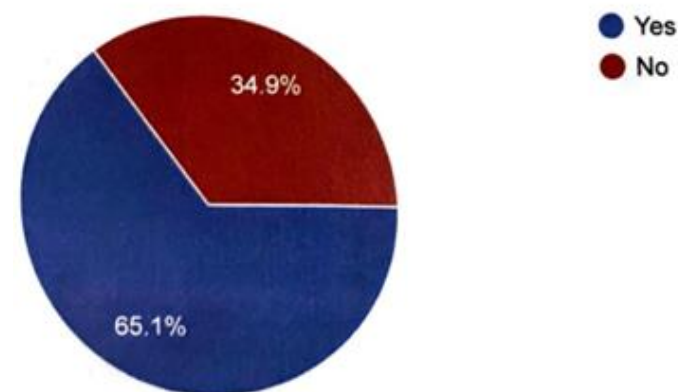
Graph 17:



### Are you aware of the concept of multi planar reconstruction?

65.1% were aware of this concept and 34.9% were not aware.

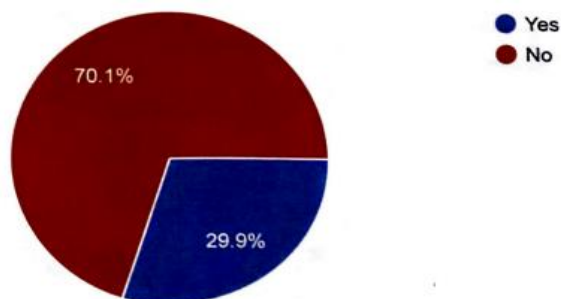
Graph 18:



Are you aware that for the use of CBCT radiologists have moved from ALARA (As Low as Reasonably Achievable) to ALADA (As Low as Diagnostically Acceptable)

70.1% were aware of ALADA principle and 29.9% were not aware of this.

Graph 19:

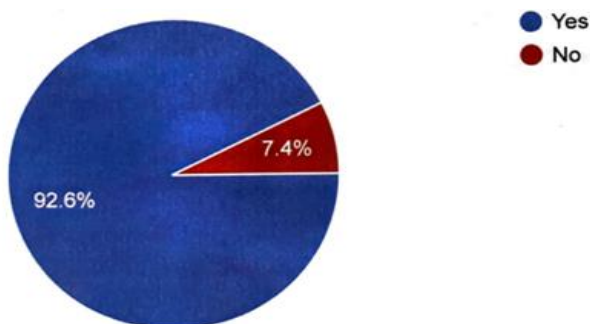


#### Attitude towards use of cbct in dental practice

**Do you feel the necessity of CBCT machine in a dental institute?**

92.6 % felt that CBCT is a necessity in a dental institute and 7.4% felt that it is not a necessity.

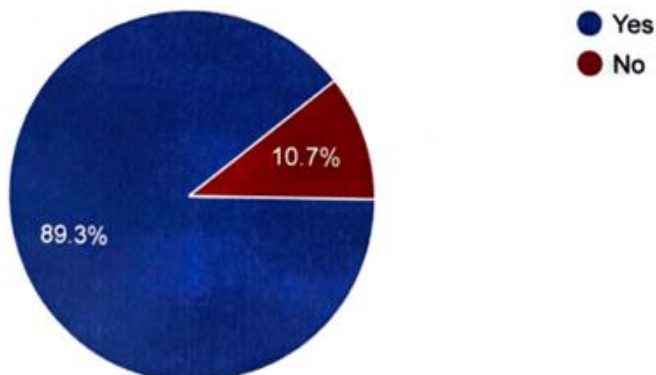
Graph 20:



**Do you feel, CBCT can prove to be an ultimate tool in the futuristic approach of dentistry?**

89.3 % felt that CBCT is the ultimate tool, and 10.7% is not that essential.

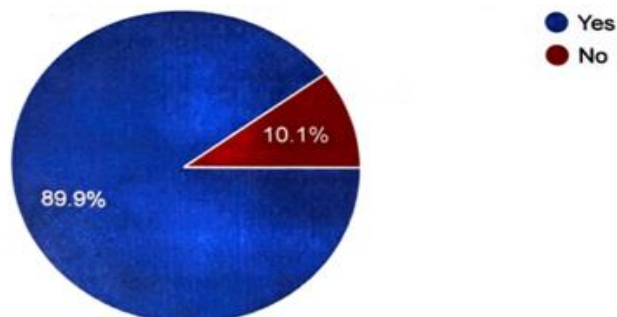
Graph 21:



**Do you feel CBCT is expensive?**

89.9% felt that CBCT is expensive and 10.1% felt that it is not expensive.

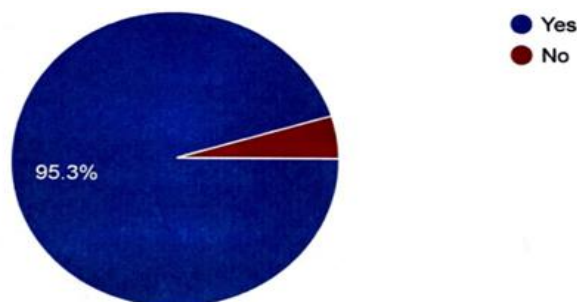
Graph 22:



**Do you feel proper radiation protection protocols for both dental professionals and patients should be followed during the use of CBCT machine?**

95.3% felt that proper radiation protection protocols should be followed and 4.7% Did not.

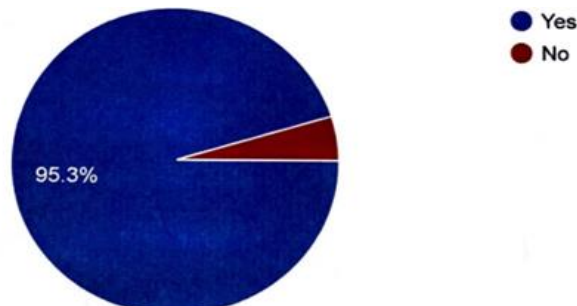
Graph 23:



**Do you feel there should be more awareness programmes regarding use of CBCT?**

95.3% felt that there should be more awareness programmes regarding use of CBCT and 4.7% did not feel the need for the same.

Graph 24:



## Discussion

CBCT is an advanced imaging modality that has high clinical applications in the Dento-maxillofacial region. Its usage is gaining more popularity because of its remarkable characteristics-this gives a 3D image of soft tissue structures, radiation exposure dose from CBCT is 10 times less than conventional CT scan, has great dimensional accuracy, minimal distortion and reduced radiation hazards, it provides sub-millimeter resolution of 2 line pair/mm, images of higher diagnostic quality.<sup>[4,5]</sup> CBCT uses a cone shaped beam and an area detector that captures a full volume of rotation where patient movement is not required.<sup>[6]</sup>

There have been studies assessing the knowledge of using digital imaging modalities among dental professionals and students. However, there is very little literature regarding the awareness of CBCT. This present study used a planned questionnaire to evaluate the awareness, knowledge and attitude among dental professionals. Among the 150 dental professionals who participated in this study, 95.3% were aware about the use of CBCT in Dento maxillofacial region and 4.7% were not. 56% had referred their patients for CBCT and 44% had not. 28.4% heard from workshops, 46.6% from seminars, 51.4% from faculty, seniors and 22.3% from internet. 72% felt the price was in the range Rs 2,000-Rs 5,000/-. 19.3% felt the price was in the range of Rs 5,000- Rs 10,000/- and 8.7% were not aware.

Most important application of CBCT in oral and maxillofacial surgery is to investigate the exact 3D location of jaw pathologies like benign or malignant tumors, inflammatory bone lesions, to assess impacted teeth, to investigate the exact location of supernumerary teeth and to assess their relation to vital structures.<sup>[7,8]</sup> In Endodontics, CBCT images can be used to differentiate

between apical granulomas and apical cysts by measuring the lesion density and differentiating the lesions of endodontic and non-endodontic origin, also used in inconspicuous cases of vertical root fractures. In orthodontics, the tool of choice for assessing facial growth, age, airway function and disturbances in tooth eruption, assessing the proximity of the tooth to vital structures that may interfere with orthodontic treatment.<sup>[9,10]</sup> CBCT even has its applications in implant dentistry, pedodontics and for viewing the TMJ.<sup>[11]</sup> It is also used in cancer staging and for the evaluation of systemic diseases.<sup>[11]</sup>

## Conclusion

CBCT is one of the most significant and recent imaging modalities in dental radiology. It has many advantages over conventional CT scan.<sup>[12]</sup> It hugely expands the fields for diagnosis and treatment possibilities for patients. This remarkable imaging modality should be widely adopted by dental professionals and thus there should be more awareness programmes and workshops about CBCT.<sup>[14,15]</sup>

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