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Evaluation of Knowledge and Perspective of Endodontic Residents and General Dentist Towards the Endodontic Application of CBCT in Saudi Arabia

Areen Aljuhani[1]*, Smita Dutta[1], Ayman Mandorah[2]

[1]College of Dentistry, Qassim University, Saudi Arabia

[2]Faculty of Dentistry, Taif University, Saudi Arabia

ABSTRACT

Objective: This study is aiming to evaluate the knowledge, skills, and the awareness of CBCT importance in endodontic treatment and diagnosis among the Endodontic residents and General Dentists in Saudi Arabia.

Methodology: This is a cross-sectional survey carried out among Saudi General Dentists and Endodontic residents. The questionnaire was administered to 99 participants. This survey consists fourteen closed-ended questions formulated and validated by the Endodontics Committee in Qassim University.

Results: On analyzing the response to the questionnaire it was found that 39 General Dentist chose limited FOV and 11 for full FOV, while all Endodontic residents chose limited FOV. About 10 participants rate the accuracy and specificity of CBCT verses digital radiography as equally accurate and specific, and 80 rate as thrice accurate and specific. Around 81 participants think that the true size, location be appreciated with CBCT, 5 participants thinks no, while 13 participants says I don't know.

Conclusion: This study reveals that information and applicability of CBCT in varied clinical dental specifications is furnished by few dental colleges. However, to churn the maximum benefit of the CBCT, its uses, advantages, contraindications, and interpretation. More efforts and ideas need to be incorporated in teaching curriculum that fall well within the limits of the institute.

Keywords: Cone beam computed tomography, Interpretation, Endodontic residents, Questionnaire survey, Root canal treatment, Endodontic diagnosis

INTRODUCTION

Cone Beam Computed Tomography (CBCT) is not a long past invented diagnostic imaging modality which produces accurate three-dimensional (3D) image construction [1,2]. CBCT 3-D anatomic representation has overcome the limitation of two-dimensional (2D) radiographs such as overlapping of osseous structures [1,2,3] Low-definition imaging of anatomic structure being assessed which may impair the accuracy of diagnosis [3].

CBCT applications in dentistry have eased the image interpretation thus improving the diagnosis and treatment planning in most dentistry fields such as the dental implant, location and the number of root canals, teeth impaction, orthognathic surgeries tumors.

The American Association of Endodontics, along with the American Academy of Oral and Maxillofacial Radiology has provided evidence-based guidelines regarding the applications of CBCT in endodontics, As CBCT can provide a small field of view image with low dose and high resolution to be applicable in endodontic diagnosis, treatment planning, and after treatment assessment.

It provides information about the pulp chamber size, morphology of the tooth, location and number of canals, degree of calcification, direction and curvature, fractures, and iatrogenic defects. [4-8]

CBCT imaging should be carried out by an appropriately qualified and well-trained dentist. Therefore, dentists should make a wise decision in the prescription of CBCT examinations by consulting recommendations from CBCT evidence-based guidelines [4,5,9,10].

Literature search shows no published paper of knowledge and skills on CBCT interpretation in endodontic treatment procedures in Saudi Arabia; therefore, this study is aiming to compare the knowledge, skills, and the awareness of CBCT importance in endodontic treatment and diagnosis among the Endodontic residents and General Dentists in Saudi Arabia [11,12].

MATERIALS AND METHODS

This is a cross-sectional study, questionnaire-based survey conducted among Saudi General Dentists and Endodontic residents. The questionnaire was administered to 99 participants of two groups:50 General dentists and 49 Endodontic residents. Participants were offered to fill the questionnaires online using a version designed to be accessible on mobile phones and computers. participation in this survey was voluntary. Therefore , consent was assumed by the voluntary choice of participating, and this study was approved by the ethical approval committee (Ethics committee of Qassim University). This survey consists fourteen closed-ended questions were formulated and validated by the Endodontics Committee In Qassim University. The questionnaire collected data regarding the participant's gender, specialty, educational level, and Data that evaluate knowledge and skills of CBCT interpretation in endodontic treatment procedures.

Statistical analysis

The collected data was analyzed with IBM, SPSS statistics software 23.0 Version. To describe the data, descriptive statistics like frequency analysis, and percentage analysis were used.

RESULTS

About 150 applicants were invited to participate in this study but we received responses from only 99 applicants, out of which 50 (50.5%) were general dentists and 49 (49.5%) were endodontic residents. Among the total, 50 (51%) were males and 48 (49%) were females. 1 (1%) choose OPG as the choice of method for endodontic diagnosis, 16 (16.2%) chooses conventional methods for diagnosis, 63 (63.6%) chooses digital methods of diagnosis and 19 (19.2%) chooses CBCT as the choice of endodontic diagnosis.

Around 48 (48.5%) participants of the survey had undergone training and 51 (51.5%) had not undergone any training nor did they attend any workshops. 8 (8.1%) would advise CBCT imaging for endodontic procedures whereas 63 (63.6%) would do it frequently and 28 (28.3%) would never advice.

65 (65.7%) of the participants have access to CBCT at workplace on-site, whereas 34 (34.3%) do not have it. About 26 (26.3%) have access to CBCT at workplace off-site and 73 (73.7%) do not have access. A maximum of 82 (82.8%) did not choose CBCT for its cost, 13 (13.1%) don't choose because of the radiation exposure and 4 (4%) don't choose because of lack of installation space.

The field of view (FOV) for CBCT in case of General Dentist is 39 for limited FOV and 11 for full FOV and in case of Endodontic resident is 49 for limited FOV and 0 for full FOV as shown below along with the graphical representation (Table 1 and Figure 1).

About 74 number of participants of this survey chooses CBCT for surgical re-treatment, followed by 53 in case of missing canals, 50 for internal and external resorption, 48 for dental trauma, 34 for calcified cases and differential diagnosis and

Table 1: Skills *CBCT fields of view (FOV).

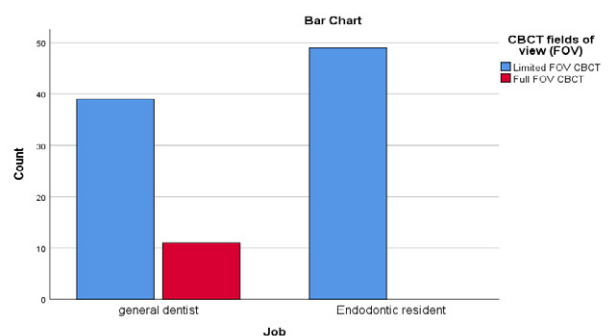|	Count	CBCT fields of view (FOV)		Total
		Limited FOV CBCT	Full FOV CBCT	
Skill	General dentist	39	11	50
	Endodontic resident	49	0	49
	Total	88	11	99

Figure 1: Skills * CBCT fields of view (FOV).

16 in case of non-surgical treatments (Figure 2).

About 10 participants rate the accuracy and specificity of cone beam computed tomography verses digital radiography as equally accurate and specific, 80 participants rate the accuracy and specificity of cone beam computed tomography verses digital radiography as thrice accurate and specific and 2 participants rate the accuracy and specificity of cone beam computed tomography verses digital radiography (Table 2 and Figure 3).

Around 81 participants think that the true size, location, and extent of a periapical lesion be appreciated with cone beam computed tomography, 5 participants think no, while 13 participants say I don't know (Table 3 and Figure 4).

77 participants think that Cone beam computed tomography detect radio lucent lesions before lingual and buccal plates are de-mineralized, followed by 21 who opted for I do not know and 1 opts for no (Table 4).
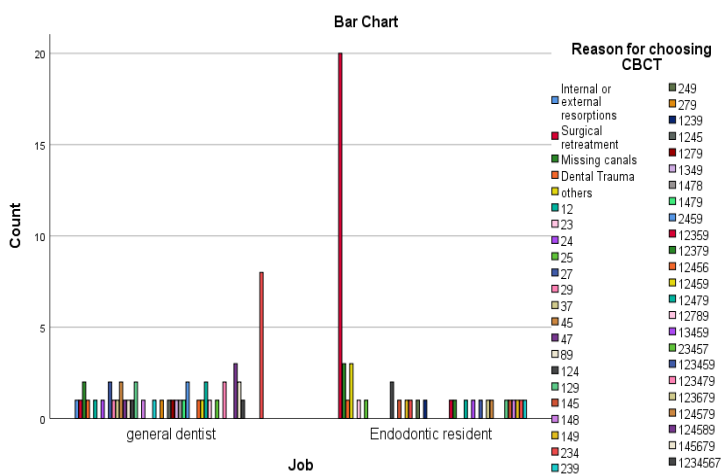

Figure 2: Bar chart.

Table 2: Accuracy and specificity of CBCT.

Count		Accuracy and specificity of CBCT				Total
		Equally accurate and specific	Thrice accurate and specific	Less accurate and specific	I don't Know	
Job	General dentist	5	36	2	7	50
	Endodontic resident	5	44	0	0	49
	Total	10	80	2	7	99
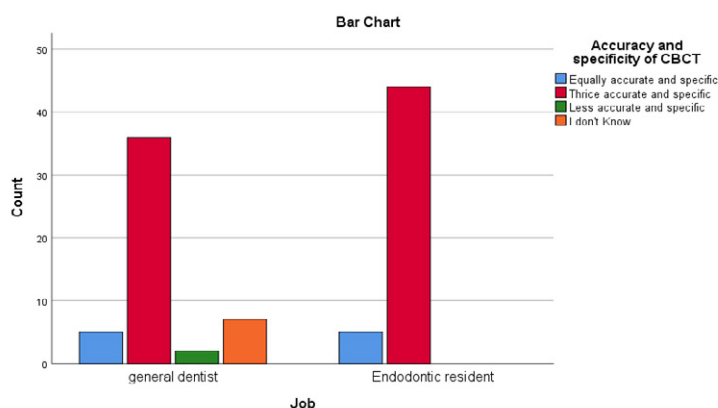
Figure 3: Accuracy and specificity of CBCT.

Table 3: Periapical lesion.

Count		periapical lesion			Total
		yes	no	I dont know	
Job	General dentist	34	3	13	50
	Endodontic resident	47	2	0	49
	Total	81	5	13	99

Table 4: Radioluscent lesion.

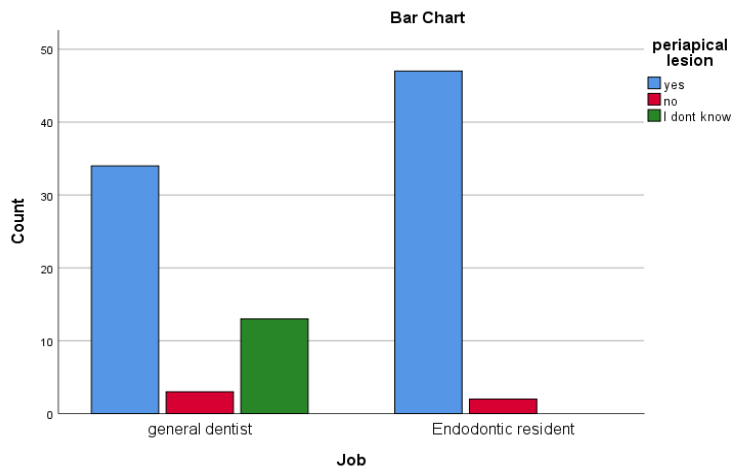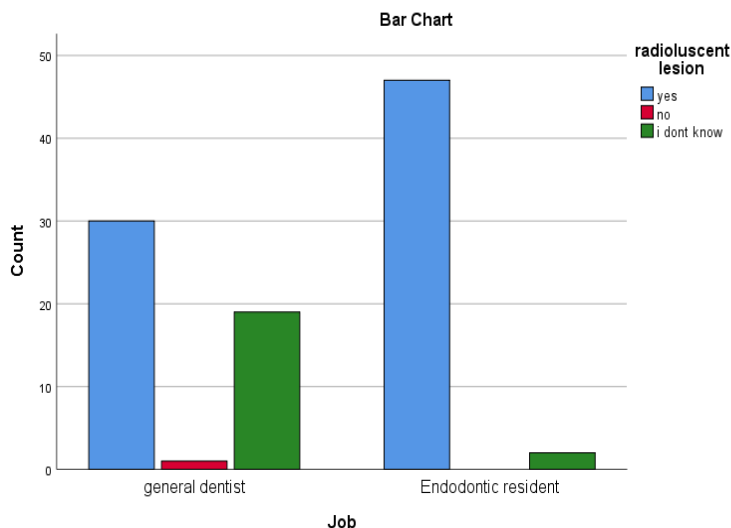| Count		Radioluscent lesion			Total
		Yes	No	I don't know	
Job	General dentist	30	1	19	50
	Endodontic resident	47	0	2	49
	Total	77	1	21	99

Figure 4: Periapical lesion.

Figure 5: Bar chart.

86 participants agree CBCT is an indispensable diagnostic modality in for modern endodontic practice, 4 disagrees and 9 opts I don't know (Figure 5).

DISCUSSION

For Diagnosis, planning, execution, and evaluation of success of endodontic treatment, radiology is essential [13]. The radical change for dental and maxillofacial radiology is represented by Cone Beam Computed Tomography (CBCT). The use of CBCT has many clinical applications in the diagnosis of denture [11]. A detailed three-dimensional teeth evaluation, maxillofacial skeletal structure and relation between the anatomical structures can be obtained via the CBCT. It is an extremely helpful tool in case of imaging the third molar extraction, sinus pathology, to detect vertical root fracture, maxillofacial surgery, evaluation of tumors, orthodontic cases, forensic dentistry and temporomandibular joint disorders [14].

SEDENTEXCT, a multinational project supported by EURATOM published the guidelines on the use of CBCT [15]. Recent research showed that there was less awareness about the clinical applications about the CBCT among the practitioners. Aditya et al. found in their study that CBCT is still not very frequently used by dental specialists due to less availability of the technique, high cost, or inability of case selection for CBCT imaging by the dentists [16]. The CBCT is less commonly used by the dental specialists to diagnose due to its cost, lack of installation space, resolution limitations and radiation exposure. In the past years very, limited literature is available about the awareness of the radiographic imaging in dentistry [17].

In the year 2008, the first CBCT was installed in the Kingdom of Saudi Arabia. The source of knowledge about the CBCT was available via., the postgraduate studies in Saudi Arabia [18]. In recent times the use of CBCT in radiographic imaging in dentistry field is gaining importance in Saudi Arabia as well. However, a clear literature stating about the knowledge and awareness about CBCT among the dental practitioners in Saudi Arabia is not available until now [19]. Thus, this subject gained our interest to study and survey the dental practitioners about the knowledge and awareness about CBCT in Saudi Arabia.

About 74 participants of this survey answered that they chose CBCT for surgical re-treatments. Only 48 participants had got trained for the use of CBCT. Yalcinkaya SE et al reported in his study 100% awareness among the participants about CBCT [13]. Ghoncheh et al. reported 72.2% using CBCT to evaluate the implants [20]. Lavanya et al reported that about 68.2% were partially aware of the technologies used in CBCT [21]. A study in Turkey [22] reported that there was less knowledge about the CBCT among their dental students and a study in South India [23] reported the same.

According to this study, only 19 (19.2%) of the dental practitioners chooses CBCT as the choice of endodontic diagnosis. About 9,000 members of the American Association of Oral and Maxillofacial Surgery (AAOMS) uses CBCT since 2007 [24]. In this study about 80 participants rate the accuracy and specificity of cone beam computed tomography verses digital radiography as thrice accurate and specific. The field of view (FOV) for CBCT in case of General Dentist is 39 for limited FOV whereas in case of Endodontic resident is 49 for limited FOV. Ghanbarnezhad et al. reported to measure doses of NewTom VGi , by changing field of view (FOV) size from 8×8 cm2 (height × diameter) to 6×6 cm2 [25]. 34 General Dentists and 47 endodontic residents thinks that the true size, location and extent of a periapical lesion be appreciated with cone beam computed tomography. 30 General dentists and 47 endodontic residents thinks that Cone beam computed tomography detect radio lucent lesions before lingual and buccal plates are de-mineralized.

However, with this survey it gave a hint that the endodontic residents had more knowledge about the CBCT when compared to the general dentists.

Rai S et al reported that Dentists including specialists from other specialities must gain more knowledge about indications and contraindications of digital imaging and CBCT for accurate diagnosis and better management of patients [26-28].

CONCLUSION

This research showed that specialized training influenced the result outcome as endodontic residents had more awareness about the CBCT when compared to the general dentists.

Although dental colleges in Saudi Arabia gives knowledge about the use of the CBCT in varied clinical applications in dentistry. The emerging need of acquiring skill, knowledge and useage of CBCt through various programs, workshops and firsthand experience need to be considered promptly. Also, proper teachings need to be given on the interpretation of data retrieved from CBCT.

CONFLICTS OF INTEREST

None.

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