



Knowledge, Attitude and Practice Regarding Computed Tomography and Cone Beam Computed Tomography among Dental Students at Dow University of Health Sciences.

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Abstract

The study was conducted to gauge the knowledge of dental students regarding computed tomography and cone beam computed tomography at Dow University of Health Sciences. The research included 600 participants, among which were dental undergraduates, house officers and postgraduate trainees. This study was cross-sectional as well as a KAP survey. Participants were assessed about their knowledge, attitude and practice for computed and cone beam computed tomography through a self-administered survey form upon which the study was based. The response rate was immense and there was a voluntary participation. The product of questionnaires was evaluated by SPSS-16.

Results were measured by descriptive analyses and cross tabulations. Almost 21.7% and 18.0 % of those were familiar with the usage of both CT and CBCT scan respectively. Furthermore, majority of the participants acquire the knowledge of tomographies from textbooks and not the clinical practice whereas 56.8% and 62.5% of the dental students agreed that CT and CBCT Scan is an imperative diagnostic tool for every dental institute respectively. Unfortunately 56.0% participants haven't experienced the need of advising tomographies during their clinical span. And majority of the students focused on the need to improvise the teachings and demonstration of scanning procedures in pre-clinical and clinical stages of the dental education. It was concluded that there is a utmost need of CBCT units in hospital setup to enhance students' knowledge and providing better diagnosis and treatment plan.

Keywords: Computed tomography; Radiography; Diagnostic modalities; Dental students

Introduction

Radiographs are always an essential tool in diagnostic assessment of the dental patients suspected of having dental or maxillofacial diseases [1]. The more the deep diagnosis, the more patients can be diagnosed for malignancies at early stages leading to save many innocent lives. Intra oral periapical radiographs are the primary tool for spotting dental radiolucencies and radio-opacities around dental soft and hard tissue but these radiographs are not wide enough to detect between the mega destruction and micro-invasion of bacteria or virus around the dental hard and soft tissues which is why there is always a need to distinguish among cysts, tumours, abscesses, inflammation etc. Hence computed tomographies are the best tool for determining such diseases in dentistry. Studies have shown that not enough periapical lesions could be spotted on periapical radiographs due

to which more roots (periapical pathosis) need to be assessed through computed tomographies [2].

Patel et al. [2] discovered the implication of assessing dental radiolucencies with tomographies by assessing the failure rate when teeth with pre-operative periapical radiolucencies were only assessed periapical radiographs at 1 year. Moreover, the low cost and easily accessible nature of panoramic radiography has made dental practitioners to confine their diagnosis only up to the result of panoramic radiographs disregarding the minor tissue changes which could be possibly detected through computed tomography. Researchers have investigated the use of digital radiological imaging in various countries. In 2000, it was estimated that 5% of dental practitioners in North America used digital radiography in their practice 6. In studies conducted in

Norway, the usage rate was estimated to be 11-14% and in the Netherlands it was estimated as 12% [3-5].

CT was developed by Sir Godfrey Hounsfield in 1967, and there has been a gradual evolution to what is currently in use today [6]. According to the shape of beams produced it is of 2 types fan-beam and cone-beam scanners. A cone-beam scanner operates by focusing a cone-shaped X-ray beam and the reciprocating detector, which rotates 360° or less around the patient's head to produce a series of 2D images of projected data. Reconstruction algorithms are then applied to this set of data allowing the operator to generate accurate three-dimensional (3D) images of bone and soft-tissue surfaces [7]. Both fan-beam and cone-beam 3D images can be reconstructed in axial, coronal and sagittal planes [6].

Thus a principle difference between CT and CBCT is the method by which data are gathered – while CT acquires image data using rows of detectors, CBCT exposes the whole section of the patient over one detector these data are then used to generate individual slice images [8]. However, its main disadvantage, especially with larger FOVs, is a limitation in image quality related to noise and contrast resolution because of the detection of large amounts of scattered radiation [9].

Cone beam computed tomography (CBCT) scanners for the oral and maxillofacial region were pioneered in late 1990s independently by Arai et al. [10] in Japan and Mozzo et al. [11] in Italy. Therefore, CBCT is a new technology that has been recently useful for maxillofacial imaging [12].

When compared with Computed Tomography scanners, CBCT unit cost less and require less space. They have rapid scan time and they reduce the radiation doses [13-15]. Also, the beams are confined to head and neck only, and have interactive display modes that offer maxillofacial imaging making them well suitable for use in dental practices [16,17]. Chau et al. [18] compared typical patient radiation doses delivered in implant imaging with spiral CT, computed spiral tomography and CBCT in their study. They reported that CBCT delivers the lowest radiation dose to the organs, whereas spiral multi slice CT delivers the highest dose. Lower dosage of X-rays and the ability to take different images from a certain structure and also the possibility of reconstructing sagittal and coronal views, all make CBCT a convenient technology [19-21].

CBCT is important in detection process and plays an important role in the management and outcome assessment [22]. Recent advances in cone beam computed tomography in dentistry have identified the importance of providing outcomes related to the appropriate use of this innovative technology to practitioners, educators, and investigators [23]. The researchers suggest that efforts should be made to improve student's theoretical and also practical knowledge regarding CBCT through various educational programs [7,22].

Considering the growing availability and need of tomographies in dental practices and the importance of dentist's attitudes towards new technologies, [24] this study gauged the knowledge and attitudes regarding CBCT and CT among undergraduates, interns and postgraduate dental students.

Methodology

The research comprised 600 participants working or studying in Dow international dental college and dr. ishrat-ul-ebad khan institute of oral health sciences. Among 600 participants, 328 participants were enrolled in undergraduate program of dentistry, 108 participants were enrolled as house officers and 164 participants were carrying out with their post graduate studies. The study was based on self-administered questionnaire which was given to the participants directly, in which participants were assessed about their knowledge, attitude and practise regarding computed and cone beam computed tomography. Hence, study conducted was cross-sectional and there was a KAP survey within the study.

The questionnaire contained demographic question, knowledge related to CT and CBCT scan in comparison with CDR, whole knowledge of CT and CBCT and attitude and practise towards CT and CBCT scan in diagnosis and treatment planning.

The product of questionnaires was analysed by SPSS-16. Descriptive analyses along with cross tabulations were used to gauge results.

The response rate was comprehensive and voluntary participation was appreciated.

Results

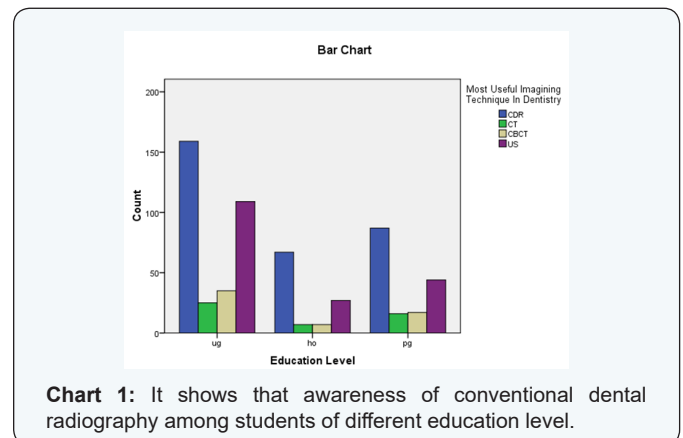


Chart 1: It shows that awareness of conventional dental radiography among students of different education level.

Chart 1 shows that among students of different education level, 48.5 % undergraduate students, 62.0 % house officers and 52.2 % postgraduate students aware of the fact that conventional dental radiography is most useful imaging technique in dentistry.

Chart 2 depicts familiarity level of different tomographies in dentistry. It is found that 18 % undergraduate students, 18.5 % house officers and 17.7% postgraduate students are familiar with the usage of cone beam computed tomography in field of

dentistry.

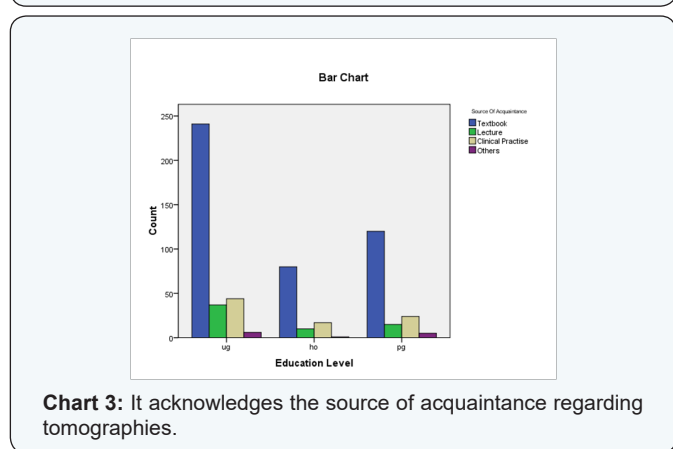
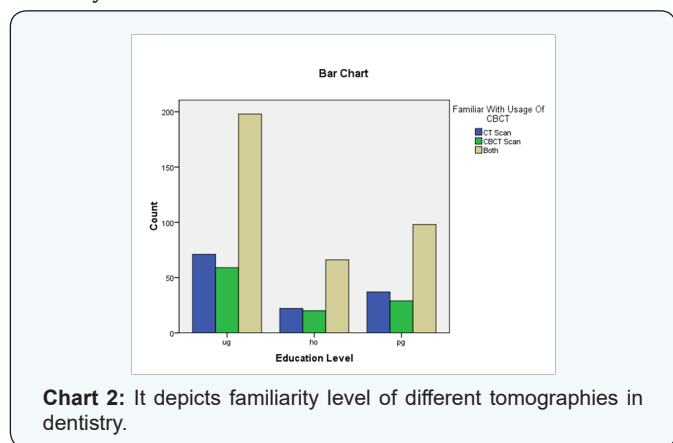


Chart 3 acknowledges the source of acquaintance regarding tomographies. The chart shows that textbooks were the main source for majority of the participants for acquiring knowledge regarding CT and CBCT scan.

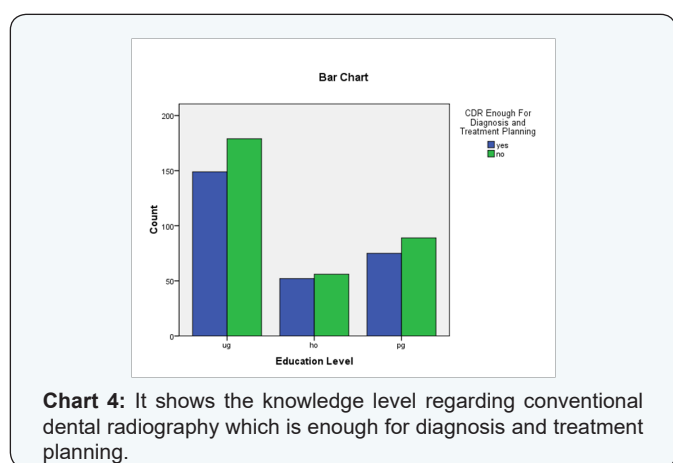


Chart 4 shows the knowledge level regarding conventional dental radiography which is enough for diagnosis and treatment planning. 45.4 % undergraduate students, 48.1 % house officers and 46.0 % post graduate students affirms that conventional dental radiography is sufficient enough for diagnosis and treatment planning.

Table 1: Demographic specifics.

Variable	Description	Frequency N	
		N	%
Age Group	19-30 years	529	80.7
	31-40 years	71	19.3
Gender	Male	216	36
	Female	384	64
Level of Education	Under-graduate	328	54.7
	House officers	108	18.0
	Post-graduate	164	27.3
Span of Clinical Experience	1 – 3 yrs	435	72.5
	3 – 5 yrs	46	7.7
	> 5 yrs	119	19.8

Table 1 shows the demographics of the study population. The undergraduate students greatly outnumbered house officers and post graduate students. As the study involved greater number of undergraduate students, the clinical exposure is found to be less than 3 years in this study whereas post graduate students have greater clinical exposure that is more 5 years.

Table 2.1 shows the participants' Knowledge Of Computed Tomography Scans in Comparison With Conventional Dental Radiography. It explains that n=181, 55.2% undergraduates , n=60, 55.6% House officers and n=95, 57.9% post graduates consider that the CT Scan is higher in quality in comparison to conventional dental radiography. While 36.3% of the participants are unaware of the imagining quality of CT scan w.r.t Conventional dental radiography. Moreover it shows that n=147, 44.8% undergraduates, n=52, 48.1% House officer and n=80, 48.8% post graduates opines that the CT Scan gives better imagining details in comparison to conventional dental radiography. 29.3% and 28.0 % of the participants are unaware of the Radiation dose & cost of CT scan respectively in comparison to Conventional dental radiography.

Table 2.2 shows the participants' Knowledge Of Cone beam Computed Tomography Scans in Comparison With Conventional Dental Radiography. It explains that n=197, 60.1% undergraduates , n=61, 56.5% House officers and n=103, 62.8% post graduates consider that the CBCT Scan is higher in quality in comparison to conventional dental radiography. While 32.2% of the participants are unaware of the imagining quality of CBCT scan w.r.t Conventional dental radiography. Moreover it shows that n=210, 64.0% undergraduates ; n=70, 64.8% House officers and n=104, 63.4% post graduates opines that the CBCT Scan gives better imagining details in comparison to conventional dental radiography. 26% of the participants are unaware of the Radiation dose & cost of CBCT scan in comparison to conventional dental radiography.

Table 2.1: It shows knowledge of computed tomography scans in comparison with conventional dental radiography.

			EDUCATION LEVEL			TOTAL
			UG	HO	PG	
Imaging Quality of CT in comparison with CDR	High	Count	181	60	95	336
		% within Education Level	55.2%	55.6%	57.9%	56.0%
		% of Total	30.2%	10.0%	15.8%	56.0%
	Low	Count	24	10	12	46
		% within Education Level	7.3%	9.3%	7.3%	7.7%
		% of Total	4.0%	1.7%	2.0%	7.7%
	Don't Know	Count	123	38	57	218
		% within Education Level	37.5%	35.2%	34.8%	36.3%
		% of Total	20.5%	6.3%	9.5%	36.3%
Radiation Dose of CT in comparison with CDR	High	Count	161	57	80	298
		% within Education Level	49.1%	52.8%	48.8%	49.7%
		% of Total	26.8%	9.5%	13.3%	49.7%
	Low	Count	70	17	39	126
		% within Education Level	21.3%	15.7%	23.8%	21.0%
		% of Total	11.7%	2.8%	6.5%	21.0%
	Don't Know	Count	97	34	45	176
		% within Education Level	29.6%	31.5%	27.4%	29.3%
		% of Total	16.2%	5.7%	7.5%	29.3%
Imaging Details of CT in comparison with CDR	Better	Count	147	52	80	279
		% within Education Level	44.8%	48.1%	48.8%	46.5%
		% of Total	24.5%	8.7%	13.3%	46.5%
	Worst	Count	68	22	30	120
		% within Education Level	20.7%	20.4%	18.3%	20.0%
		% of Total	11.3%	3.7%	5.0%	20.0%
	Dont Know	Count	113	34	54	201
		% within Education Level	34.5%	31.5%	32.9%	33.5%
		% of Total	18.8%	5.7%	9.0%	33.5%
Cost of CT in comparison with CDR	High	Count	180	67	101	348
		% within Education Level	54.9%	62.0%	61.6%	58.0%
		% of Total	30.0%	11.2%	16.8%	58.0%
	Low	Count	50	13	21	84
		% within Education Level	15.2%	12.0%	12.8%	14.0%
		% of Total	8.3%	2.2%	3.5%	14.0%
	Dont Know	Count	98	28	42	168
		% within Education Level	29.9%	25.9%	25.6%	28.0%
		% of Total	16.3%	4.7%	7.0%	28.0%

Table 2.2: It shows knowledge of cone beam computed tomography scans in comparison with conventional dental radiography.

			EDUCATION LEVEL			TOTAL
			UG	HO	PG	
Imaging Quality of CT in comparison with CDR	High	Count	181	60	95	336
		% within Education Level	55.2%	55.6%	57.9%	56.0%
		% of Total	30.2%	10.0%	15.8%	56.0%
	Low	Count	24	10	12	46
		% within Education Level	7.3%	9.3%	7.3%	7.7%
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Table 3.1 is a knowledge based comparison between CT and CBCT Scan of following variables imagining quality, radiation dose and imagining details; n=149, 45.4% undergraduates, n=57, 52.8% House officers and n=82, 50.0% post graduates considers that the CT Scan is higher in quality in comparison to CBCT Scan. n=208, 63.4% undergraduates, n=77, 71.3% House officers and n=111, 67.7% post graduates considers that the CBCT Scan is higher in quality in comparison to CT scan whereas 36% and 28% of the participants are unaware of the imagining quality of CT and CBCT Scan respectively. n=161, 49.1% undergraduates,

n=61, 56.5% House officers and n=90, 54.9% post graduates considers that the radiation dose of CT Scan is higher than CBCT Scan. n=163, 49.7% undergraduates, n=51, 47.2% House officers and n=74, 45.1% post graduates considers that the radiation dose of CBCT Scan is higher than CT scan whereas 32% and 26% of the participants are unaware of the radiation dose of CT and CBCT Scan respectively. Moreover 38% and 32% of the participants are unaware of the imagining details of CT and CBCT Scan respectively.

Table 3.1: It shows knowledge based comparison between CT and CBCT Scan of following variables imagining quality, radiation dose and imagining details.

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		% of Total	16.3%	4.7%	7.0%	28.0%

Table 3.2 Shows that 44.0% and 42.0% of the participants thought that CT and CBCT Scan are uncommon due to high cost respectively. While according to 30% and 12% of the participants CT and CBCT Scan is commonly used in dentistry. Moreover n=68, 20.7% undergraduates, n=27, 25% House officers and n=37, 22.6% post graduates considers that the

CT scan is used for oral and maxillofacial surgeries only. n=48, 14.6% undergraduates, n=20, 18.5% House officers and n=28, 17.1% post graduates considers that the CBCT Scan is used for oral and maxillofacial surgeries only. While 49.5% and 50% of the participants opines that CT and CBCT Scan is used in all fields of dentistry respectively.

Table 3.2: It shows that 44.0% and 42.0% of the participants thought that CT and CBCT Scan are uncommon due to high cost respectively.

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Table 3.3 shows that n=174, 53% undergraduates, n=52, 48.1% House officers and n=74, 45.1 % post graduates considers that there are multiple medical conditions that restrain the referral for CT scan. n=176, 53.7 undergraduates, n=56, 51.9% House officers and n=80, 48.8% post graduates considers that

there are multiple medical conditions that restrain the referral for CBCT Scan. While according to 42% and 64% of the participants CT and CBCT Scan is high in cost and difficult to access for the patient respectively.

Table 3.3: It shows that n=174, 53% undergraduates, n=52, 48.1% House officers and n=74, 45.1 % post graduates considers that there are multiple medical conditions that restrain the referral for CT scan.

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		% within Education Level	29.9%	25.9%	25.6%	28.0%
		% of Total	16.3%	4.7%	7.0%	28.0%

Table 4.1 Shows the attitude of dental students towards CT and CBCT Scan assessed by following variables; n=187, 57.0% undergraduates , n=60, 55.6% House officers and n=94, 57.3 % post graduates consider CT Scan as an important Diagnostic Tool For every dental Institute. n=213, 64.9% undergraduates, n=62, 57.4% House officers and n=100, 61.0% post graduates consider CBCT Scan as an important Diagnostic Tool For every

dental Institute. Infact 78.5% and 81.8% of the dental students thinks that knowledge regarding CT and CBCT Scan should be improvised respectively. It is high in cost and difficult to access for patient respectively. While according to 62.3% and 62.5% of the participants CT and CBCT scan supersede the conventional techniques respectively.

Table 4.1: It shows the attitude of dental students towards CT and CBCT Scan assessed by following variables; n=187, 57.0% undergraduates , n=60, 55.6% House officers and n=94, 57.3 % post graduates consider CT Scan as an important Diagnostic Tool For every dental Institute.

			EDUCATION LEVEL			TOTAL
			UG	HO	PG	
Imaging Quality of CT in comparison with CDR	High	Count	181	60	95	336
		% within Education Level	55.2%	55.6%	57.9%	56.0%
		% of Total	30.2%	10.0%	15.8%	56.0%
	Low	Count	24	10	12	46
		% within Education Level	7.3%	9.3%	7.3%	7.7%
		% of Total	4.0%	1.7%	2.0%	7.7%
	Don't Know	Count	123	38	57	218
		% within Education Level	37.5%	35.2%	34.8%	36.3%
		% of Total	20.5%	6.3%	9.5%	36.3%
Radiation Dose of CT in comparison with CDR	High	Count	161	57	80	298
		% within Education Level	49.1%	52.8%	48.8%	49.7%
		% of Total	26.8%	9.5%	13.3%	49.7%
	Low	Count	70	17	39	126
		% within Education Level	21.3%	15.7%	23.8%	21.0%
		% of Total	11.7%	2.8%	6.5%	21.0%
	Don't Know	Count	97	34	45	176
		% within Education Level	29.6%	31.5%	27.4%	29.3%
		% of Total	16.2%	5.7%	7.5%	29.3%
Imaging Details of CT in comparison with CDR	Better	Count	147	52	80	279
		% within Education Level	44.8%	48.1%	48.8%	46.5%
		% of Total	24.5%	8.7%	13.3%	46.5%
	Worst	Count	68	22	30	120
		% within Education Level	20.7%	20.4%	18.3%	20.0%
		% of Total	11.3%	3.7%	5.0%	20.0%
	Don't Know	Count	113	34	54	201
		% within Education Level	34.5%	31.5%	32.9%	33.5%
		% of Total	18.8%	5.7%	9.0%	33.5%

Cost of CT in comparison with CDR	High	Count	180	67	101	348
		% within Education Level	54.9%	62.0%	61.6%	58.0%
		% of Total	30.0%	11.2%	16.8%	58.0%
	Low	Count	50	13	21	84
		% within Education Level	15.2%	12.0%	12.8%	14.0%
		% of Total	8.3%	2.2%	3.5%	14.0%
	Don't Know	Count	98	28	42	168
		% within Education Level	29.9%	25.9%	25.6%	28.0%
		% of Total	16.3%	4.7%	7.0%	28.0%

Table 4.2 Shows the attitude of dental students towards CT and CBCT Scan assessed by following variables; n=77, 23.5% undergraduates, n=29, 26.9% House officers and n=40, 24.4% post graduates consider that the teachings of CT Scan should be focused in Pre-Clinical stage of Dental education. n=60, 18.3% undergraduates, n=17, 17.6% House officers and n=29, 17.7% post graduates consider that the teachings of CBCT Scan should

be focused in Pre-Clinical stage of Dental education. While 56% and 54% of the dental students thought that demonstration and apprehension of the imaging techniques should be executed at clinical stage of dental education respectively. According to 48% and 52% of the participants consider that CT and CBCT Scan is the boon in dentistry along with conventional Dental radiography respectively.

Table 4.2: It shows the attitude of dental students towards CT and CBCT Scan assessed by following variables ; n=77, 23.5% undergraduates, n=29, 26.9% House officers and n=40, 24.4% post graduates consider that the teachings of CT Scan should be focused in Pre-Clinical stage of Dental education.

		EDUCATION LEVEL			TOTAL	
		UG	HO	PG		
Focus Of Teaching the Imaging Modality of CT At	Pre-clinical	Count	77	29	40	146
		the Imaging	23.5%	26.9%	24.4%	24.3%
		Modality of CT At	12.8%	4.8%	6.7%	24.3%
	Clinical	Count	156	60	88	304
		% within Education Level	47.6%	55.6%	53.7%	50.7%
		% of Total	26.0%	10.0%	14.7%	50.7%
	Post-graduation	Count	95	19	36	150
		% within Education Level	29.0%	17.6%	22.0%	25.0%
		% of Total	15.8%	3.2%	6.0%	25.0%
Focus Of Teaching the Imaging Modality of CBCT At	Pre-clinical	Count	35	10	15	60
		% within Education Level	10.7%	9.3%	9.1%	10.0%
		% of Total	5.8%	1.7%	2.5%	10.0%
	Clinical	Count	182	67	99	348
		% within Education Level	55.5%	62.0%	60.4%	58.0%
		% of Total	30.3%	11.2%	16.5%	58.0%
	Post-graduation	Count	111	31	50	192
		% within Education Level	33.8%	28.7%	30.5%	32.0%
		% of Total	18.5%	5.2%	8.3%	32.0%
Demonstration Of Scanning Procedures of CT Executed At	Pre-clinical	Count	60	19	29	108
		% within Education Level	18.3%	17.6%	17.7%	18.0%
		% of Total	10.0%	3.2%	4.8%	18.0%
	Clinical	Count	180	64	92	336
		% within Education Level	54.9%	59.3%	56.1%	56.0%
		% of Total	30.0%	10.7%	15.3%	56.0%
	Post-graduation	Count	88	25	43	156

Demonstration Of Scanning Procedures of CBCT Executed At	Pre-clinical	% within Education Level	26.8%	23.1%	26.2%	26.0%
		% of Total	14.7%	4.2%	7.2%	26.0%
		Count	65	21	34	120
		% within Education Level	19.8%	19.4%	20.7%	20.0%
		% of Total	10.8%	3.5%	5.7%	20.0%
		Count	176	61	87	324
	Clinical	% within Education Level	53.7%	56.5%	53.0%	54.0%
		% of Total	29.3%	10.2%	14.5%	54.0%
		Count	87	26	43	156
	Post-graduation	% within Education Level	26.5%	24.1%	26.2%	26.0%
% of Total		14.5%	4.3%	7.2%	26.0%	
Count		156	54	78	288	
Boon For Dentistry	CT Scan & CDR	% within Education Level	47.6%	50.0%	47.6%	48.0%
		% of Total	26.0%	9.0%	13.0%	48.0%
		Count	172	54	86	312
		% within Education Level	52.4%	50.0%	52.4%	52.0%
		% of Total	28.7%	9.0%	14.3%	52.0%
		Count	156	54	78	288

Table 5.1 is the evaluation of practices regarding CT and CBCT Scan among Dental students; n=48, 14.6% undergraduates, n=20, 18.5% House officers and n=28, 17.1% post graduates have enough knowledge regarding SOP of CT Scan. n=74, 22.6% undergraduates, n=21, 19.4% House officers and n=37, 22.6% post graduates have enough knowledge regarding SOP of CBCT

Scan. While 64% of the participating dental students have no competency to handle the trouble shoots during the CT and CBCT Scan. In fact 44% and 43.7% of the dental students have no knowledge provided regarding handling of CT and CBCT Scan procedures respectively.

Table 5.1: It is the evaluation of practices regarding CT and CBCT Scan among Dental students; n=48, 14.6% undergraduates, n=20, 18.5% House officers and n=28, 17.1% post graduates have enough knowledge regarding SOP of CT Scan. n=74, 22.6% undergraduates, n=21, 19.4% House officers and n=37, 22.6% post graduates have enough knowledge regarding SOP of CBCT Scan.

		EDUCATION LEVEL			TOTAL	
		UG	HO	PG		
Focus Of Teaching the Imaging Modality of CT At	Pre-clinical	Count	77	29	40	146
		% within Education Level	23.5%	26.9%	24.4%	24.3%
		% of Total	12.8%	4.8%	6.7%	24.3%
	Clinical	Count	156	60	88	304
		% within Education Level	47.6%	55.6%	53.7%	50.7%
		% of Total	26.0%	10.0%	14.7%	50.7%
	Post-graduation	Count	95	19	36	150
		% within Education Level	29.0%	17.6%	22.0%	25.0%
		% of Total	15.8%	3.2%	6.0%	25.0%
Focus Of Teaching the Imaging Modality of CBCT At	Pre-clinical	Count	35	10	15	60
		% within Education Level	10.7%	9.3%	9.1%	10.0%
		% of Total	5.8%	1.7%	2.5%	10.0%
	Clinical	Count	182	67	99	348
		% within Education Level	55.5%	62.0%	60.4%	58.0%
		% of Total	30.3%	11.2%	16.5%	58.0%
	Post-graduation	Count	111	31	50	192
		% within Education Level	33.8%	28.7%	30.5%	32.0%
		% of Total	18.5%	5.2%	8.3%	32.0%

	Pre-clinical	Count	60	19	29	108
		% within Education Level	18.3%	17.6%	17.7%	18.0%
		% of Total	10.0%	3.2%	4.8%	18.0%
Demonstration Of Scanning Procedures of CT Executed At	Clinical	Count	180	64	92	336
		% within Education Level	54.9%	59.3%	56.1%	56.0%
		% of Total	30.0%	10.7%	15.3%	56.0%
	Post-graduation	Count	88	25	43	156
		% within Education Level	26.8%	23.1%	26.2%	26.0%
		% of Total	14.7%	4.2%	7.2%	26.0%
Demonstration Of Scanning Procedures of CBCT Executed At	Pre-clinical	Count	65	21	34	120
		% within Education Level	19.8%	19.4%	20.7%	20.0%
		% of Total	10.8%	3.5%	5.7%	20.0%
	Clinical	Count	176	61	87	324
		% within Education Level	53.7%	56.5%	53.0%	54.0%
		% of Total	29.3%	10.2%	14.5%	54.0%
	Post-graduation	Count	87	26	43	156
		% within Education Level	26.5%	24.1%	26.2%	26.0%
		% of Total	14.5%	4.3%	7.2%	26.0%
Boon For Dentistry	CT Scan & CDR	Count	156	54	78	288
		% within Education Level	47.6%	50.0%	47.6%	48.0%
		% of Total	26.0%	9.0%	13.0%	48.0%
	CBCT Scan & CDR	Count	172	54	86	312
		% within Education Level	52.4%	50.0%	52.4%	52.0%
		% of Total	28.7%	9.0%	14.3%	52.0%

Table 5.2 shows that; n=78, 23.8% undergraduates, n=33, 30.6% House officers and n=40, 24.4% post graduates are familiar with the pros and cons of CT scan. n=73, 22.3% undergraduates, n=27, 25.0% House officers and n=38, 23.2% post graduates are familiar with the pros and cons of CBCT Scan. While 20% of the

participating dental students have experienced advising the CT Scan. 24 % of the participating dental students have experienced advising the CBCT Scan 56 % of the participating dental students have no experience of advising any of the two tomographies.

Table 5.2: It shows that; n=78, 23.8% undergraduates, n=33, 30.6% House officers and n=40, 24.4% post graduates are familiar with the pros and cons of CT scan. n=73, 22.3% undergraduates, n=27, 25.0% House officers and n=38, 23.2% post graduates are familiar with the pros and cons of CBCT Scan.

			EDUCATION LEVEL			TOTAL
			UG	HO	PG	
Focus Of Teaching the Imaging Modality of CT At	Pre-clinical	Count	77	29	40	146
		% within Education Level	23.5%	26.9%	24.4%	24.3%
		% of Total	12.8%	4.8%	6.7%	24.3%
	Clinical	Count	156	60	88	304
		% within Education Level	47.6%	55.6%	53.7%	50.7%
		% of Total	26.0%	10.0%	14.7%	50.7%
	Post-graduation	Count	95	19	36	150
		% within Education Level	29.0%	17.6%	22.0%	25.0%
		% of Total	15.8%	3.2%	6.0%	25.0%

	Pre-clinical	Count	35	10	15	60
		% within Education Level	10.7%	9.3%	9.1%	10.0%
		% of Total	5.8%	1.7%	2.5%	10.0%
Focus Of Teaching the Imaging Modality of CBCT At	Clinical	Count	182	67	99	348
		% within Education Level	55.5%	62.0%	60.4%	58.0%
		% of Total	30.3%	11.2%	16.5%	58.0%
	Post-graduation	Count	111	31	50	192
		% within Education Level	33.8%	28.7%	30.5%	32.0%
		% of Total	18.5%	5.2%	8.3%	32.0%
Demonstration Of Scanning	Pre-clinical	Count	60	19	29	108
		% within Education Level	18.3%	17.6%	17.7%	18.0%
		% of Total	10.0%	3.2%	4.8%	18.0%
	Clinical	Count	180	64	92	336
		% within Education Level	54.9%	59.3%	56.1%	56.0%
		% of Total	30.0%	10.7%	15.3%	56.0%
	Post-graduation	Count	88	25	43	156
		% within Education Level	26.8%	23.1%	26.2%	26.0%
		% of Total	14.7%	4.2%	7.2%	26.0%
Demonstration Of Scanning Procedures of CBCT Executed At	Pre-clinical	Count	65	21	34	120
		% within Education Level	19.8%	19.4%	20.7%	20.0%
		% of Total	10.8%	3.5%	5.7%	20.0%
	Clinical	Count	176	61	87	324
		% within Education Level	53.7%	56.5%	53.0%	54.0%
		% of Total	29.3%	10.2%	14.5%	54.0%
	Post-graduation	Count	87	26	43	156
		% within Education Level	26.5%	24.1%	26.2%	26.0%
		% of Total	14.5%	4.3%	7.2%	26.0%
Boon For Dentistry	CT Scan & CDR	Count	156	54	78	288
		% within Education Level	47.6%	50.0%	47.6%	48.0%
		% of Total	26.0%	9.0%	13.0%	48.0%
	CBCT Scan & CDR	Count	172	54	86	312
		% within Education Level	52.4%	50.0%	52.4%	52.0%
		% of Total	28.7%	9.0%	14.3%	52.0%

Discussion

Cone beam computed tomography has been an essential tool for diagnosis and treatment planning in field of dentistry [23,24,29]. It can be quickly taken into concern for different implementations in restorative dentistry such as in diagnosing bony lesion, root canal therapy; coronal micro leakage can be

spotted with the usage of CBCT [26]. It does play a vital role in finding facial anatomical structures for surgical purposes along with its utmost important role in orthodontics where it is frequently used for analysing occlusion and also its role in implant placement could not be subsided by any other imaging technique [9,26,27].

Thus, the study discovers that conventional dental radiography will remain the mainstay in diagnosing and treatment planning [28]. But many studies have evidenced the fact that conventional dental radiography is not sufficient for the diagnosis and treatment planning as a whole [23]. Therefore, the students should be familiar with usage of CT and CBCT. The students should get aware of the knowledge of CT and CBCT in comparison with conventional dental radiography.

Shetty et al. [29] evidence the importance of CBCT in dentistry and proved that the imaging quality and details of tomographies is better than intra oral periapical or orthopantomogram whereas due to cost effectiveness of conventional dental radiography, the use of CT and CBCT scan has been subsided. Pecker et al. [30] and Ishak [31] highlighted the significance of CBCT in the field of surgical exodontia.

The study assessed the knowledge level regarding indications of computed and cone beam computed tomography. The cross tabulations showed that 49.5% and 50% participants were aware of the indications of CT and CBCT respectively. Kamburog et al. [32-34] also assed the level of knowledge about CBCT indications and it was a similar finding.

According to this study, dentists preferred CBCT in different fields of dentistry. Among different fields in dentistry, (n= 300, 50%) participants suggested to use CBCT for crack tooth diagnosis, implant dentistry, orthodontic assessment, maxillofacial surgery and for evaluation of oral and pathologic lesions. Researches show that CBT is used in the treatment of dental implants, particularly in linear dimension, three dimensional structures of alveolar ridge, design for surgical guide and vicinity to vital anatomical structures [35].

CBCT is used in Implantology as well in a wide variety of assessments before the treatment, such as anatomical distinction, and evaluations associated with complications following surgery with an emphasis on the damage to neurovascular structure [36]. A study showed the essentiality of tomographies in diagnosing vertical root fractures [37]. Balabaskaran [38] found that some dentists are not aware of cone beam computed tomography used for maxillofacial region.

This study found that 52% of participants were aware of the high radiation dose of CT whereas 48% participants thought that CBCT also delivers high radiation dose. In a study, Chau et al. compared radiation doses of CT and CBCT and evidenced that CBCT delivers less radiations than CT [18].

Researches that are published demonstrate that CBCT is essential in detection process and plays a significant role in the management and outcome evaluation [23].

45.1% of dentists believe that the diagnostic value of intraoral radiographs is better in the diagnosis of inflammatory lesions than CBCT and panoramic. Although periapical are preferred to panoramic radiographs, but research has shown that the

limitations of periapical radiographs may hinder the detection of periapical lesions and more roots need to be assessed, and secondly, more periapical lesions need to be detected with CBCT [2].

Patel et al. [39] shows a 14 times increase in failure rate when teeth with no pre-operative periapical radiolucencies were assessed with CBCT compared with peri apical radiographs at 1year.

The study of CT and CBCT are new advances in radiology in hospital setup and therefore, there is great lack of theoretical as well as practical lessons according to this research. Considering the fact that there is a great lack of CBCT units in the hospital setup, therefore CBCT education is chiefly restricted to textbooks. Our study highlights the difficulties of acquiring knowledge about a system without practical experience. The lack of a CBCT units at all three institutions seems to have played a significant role in student's unfamiliarity with this technology. As student responses, theoretical education must be supplemented by routine practice with CBCT.

Thus, study focused that there should be lectures, seminars, conferences and education programs regarding the importance of CT and CBCT for patient care and applying conservative dental procedures. The more the disease is viewed radiographically with good imaging details, the more the conservative dentistry grows leading to best patient care within short time. The curriculum of basic dental qualification program should set including brief knowledge about radiology by which treatment plan could not be established. The students should made friendly with different imaging techniques during their undergraduate level so that they may come up with better diagnosis and treatment plan for a patient.

Conclusion

The KAP survey showed that knowledge level among under graduates, house officers and post graduates regarding CBCT and CT was not satisfactory therefore participants insisted to improvise knowledge for CBCT and CT. Moreover, they also focused upon adding the learning about imaging modalities and demonstration of scanning procedures in the dental curriculum. Hence, it is concluded that this technology should also be used in hospital setups as frequently as panoramic radiographs.

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