Review Article

Dental Students' Knowledge and Attitude towards Cone Beam Computed Tomography in Riyadh Colleges of Dentistry and Pharmacy

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Literature Review

Radiology involves the use of radiations to produce an image of the inner parts of the body. It is the oldest and most commonly utilized form of medical imaging. The field of radiology has been constantly changing and evolving eventually helping health professionals. Although cone-beam computed tomography (CBCT) is just 15 years old, it has improved the practice of dentistry (Vogl, Reith & Rummery, 2016; Hol et al, 2015).

Digital radiology has become an important tool in the diagnosis of dental related problems and disease. Although the use of CBTC has been there for a long time, still many general practitioners are not aware of its benefits and uses. Cone-beam computed tomography images have advantages in disease detection for selected patients (Tetradis, Anstey & Radford, 2010).

The CBCT radiographic images are used for the patients, who need dental implants or orthodontic surgery or have impacted dentition. Dentists should be able to evaluate the entire patient's data and the CBCT scan, therefore it requires good knowledge of the head and neck anatomy, oral pathology and advanced training in oral radiology (Han et al, 2011). Another important utilization of CBCT is the imaging in endodontic treatment where the accuracy of tooth anatomy is required. Furthermore, CBCT is effective in lower radiation dose as compared with conventional computed tomography (Durack & Patel, 2012).

Patel et al (2007) investigated the advantages of CBCT and concluded that the use of these scanners may result in accurate diagnosis of root fractures, which may not be accessed using convention radiographs in some cases (Patel et al, 2007). Moreover, CBCT is useful in the determination and diagnosis of cysts and tumors among patients (Quereshy, Savell & Palomo, 2008).

It usually displays a large area than that of conventional radiography, shows abnormalities that are outside the direct field of experience of the dentist. It is the responsibility of dental educators to incorporate the most updated information on this technology into their curricula promptly so that the next generation of oral health providers and educators will be competent in utilizing this technology for the best interest of patients (Adibi et al, 2012). There is evidence to argue that CBCT will be essential in reducing the cost of CT scans in the future. Hence, providing ideal results in maxillofacial imaging (Sukovic, 2003).

A study conducted in Turkey assessed the knowledge of dental students regarding the utilization and benefits of CBCT. It was revealed that there is a need for further education to be provided to these students (Kamburoglu, Kursun & Akarslan, 2011). The use of CBCT has been compared with other radiology options in Dentistry. Success in orthodontics treatment assessment was achieved using CBCT as compared with Orthopentamography (Drieseidler et al, 2009).

Aims of the Study

- To evaluate dental students' knowledge in Riyadh colleges about CBCT.
- Comparing male and female students, interns and postgraduate.

Materials and Methods

This is a cross-sectional study, which recruited 185 participants, comprising of undergraduate dental students (level 11 & 12), dental interns, and postgraduate dentistry students. They were assigned into 4 groups and were compared for each item (question) of the survey. The survey was constructed online using google forms. It was sent to the study participants through emails.

Measuring Instrument

The survey included questions related to demographics and knowledge about cone beam computed tomography. Each question was answered using a categorical response. A Chi-square test was

performed to compare the study groups. We utilized the Statistical Package for Social Sciences (SPSS) version 19.

Sample size

We consulted the statistician, and according to him, we should go for a pilot study, as there is a chance of receiving less response from the participants. Eventually, this was the case in our study.

Registration no. FPR/2018/19

Results

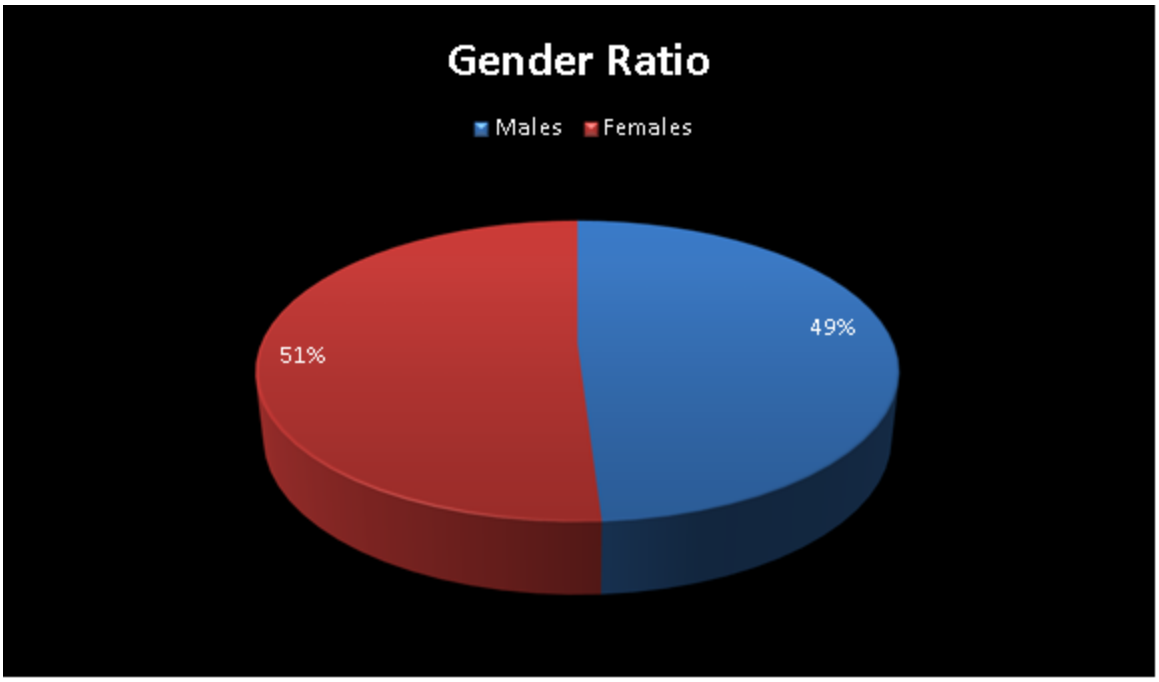

Figure 1: Gender ratio in this study

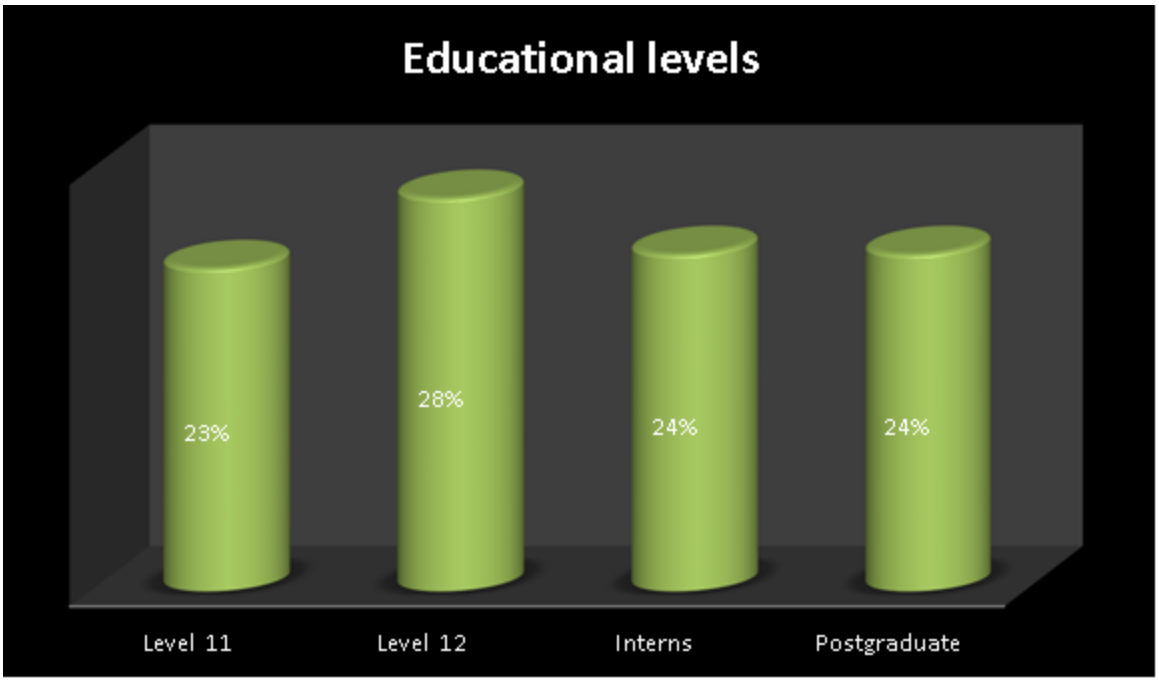

Figure 2: Students from difference educational levels participating in this study

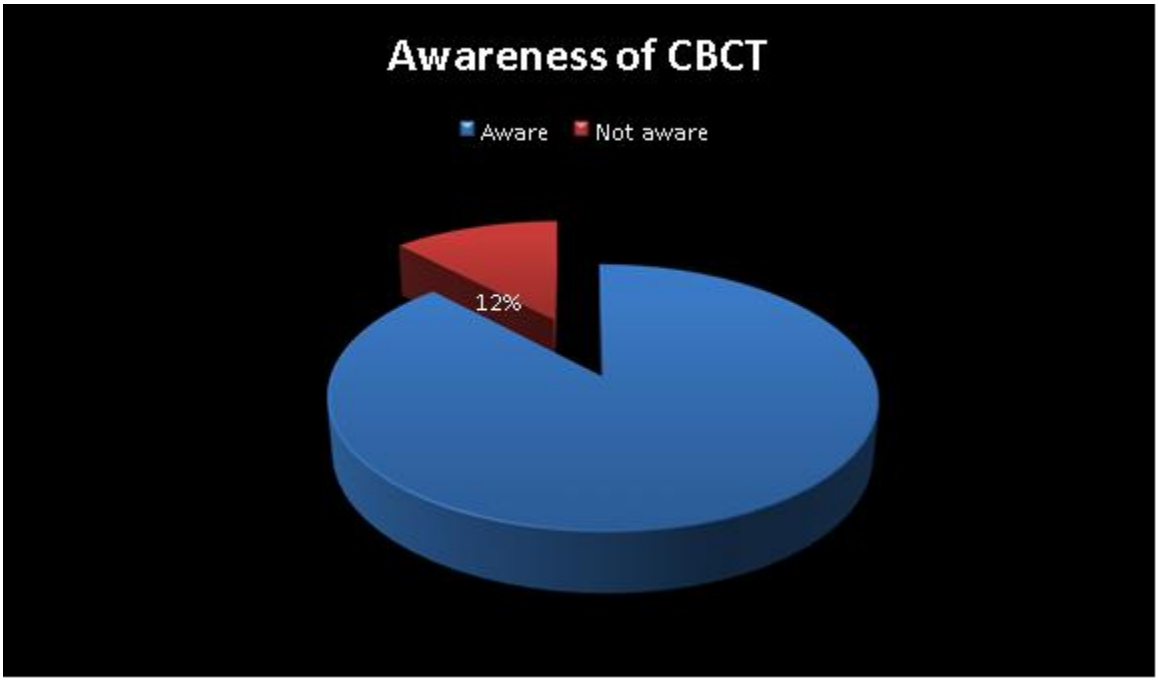

Figure 3: Awareness of CBCT among the study participants

Item	Males	Females	p-value
Source of CBCT information?	Lectures: 64% Seminars: 20% Internet: 11% Others: 5%	Lectures: 65% Seminars: 13% Internet: 16% Others: 6%	0.550
Advantage of CBCT over Medical CT?	Lower radiation dose: 36% Shorter scanning time: 7% Less expensive: 12% Easier to maintain: 6% Image processing is easier: 15% Data reconstruction is easy: 14% Don't know: 11%	Lower radiation dose: 31% Shorter scanning time: 8% Less expensive: 2% Easier to maintain: 7% Image processing is easier: 25% Data reconstruction is easy: 13% Don't know: 13%	0.245
Extent of CBCT use in dental practice in near future?	All areas of dentistry: 31% Selected dental use: 42% Will not be commonly used: 18% Not sure: 9%	All areas of dentistry: 36% Selected dental use: 41% Will not be commonly used: 17% Not sure: 6%	0.790
Faculty provides adequate information about CBCT?	Yes: 66% No: 15% Can't say: 19%	Yes: 68% No: 20% Can't say: 12%	0.440
Level of dental education (phase) CBCT should be	Preclinical: 35% Clinical: 40%	Preclinical:16% Clinical: 55% Doctoral: 24%	0.033

taught?	Doctoral: 20% No need: 5%	No need: 5%	
CBCT unit should be available at your facility?	Yes: 81% No: 11% Not sure: 8%	Yes: 81% No: 10% No idea: 9%	0.937
Would you use CBCT in future?	Yes: 84% No: 6% Not sure: 10%	Yes: 74% No: 12% Not sure: 14%	0.269
Which specialties you can use CBCT?	Implants: 44% Impacted teeth extraction: 8% Patients with tumors: 12% Orthodontics: 2% All of the above:32% Other: 0% No need: 2%	Implants: 42% Impacted teeth extraction: 8% Patients with tumors: 12% Orthodontics: 12% All of the above:30% Other: 2% No need: 3%	0.884

Table 1: Gender comparisons of the questions from survey.

Item	Level 11	Level 12	Interns	Postgraduate	p-value
Source of CBCT Information?	Lectures: 69% Seminars: 17% Internet: 6% Others: 8%	Lectures: 63% Seminars: 16% Internet: 14% Others: 6%	Lectures:69% Seminars:15% Internet:13% Others: 3%	Lectures: 57% Seminars:19% Internet: 19% Others: 5%	0.855

Advantage of CBCT over Medical CT?	Lower radiation dose: 59% Shorter scanning time: 3% Less expensive: 3% Easier to maintain: 3% Image processing is easier: 3% Easy data reconstruction : 11% Don't know: 19%	Lower radiation dose: 22% Shorter scanning time: 8% Less expensive: 2% Easier to maintain: 6% Image processing is easier: 35% Easy data reconstruction : 8% Don't know: 18%	Lower radiation dose: 43% Shorter scanning time: 10% Less expensive: 5% Easier to maintain: 10% Image processing is easier: 13% Easy data reconstruction : 13% Don't know:8%	Lower radiation dose: 14% Shorter scanning time: 9% Less expensive:19% Easier to maintain: 7% Image processing is easier: 26% Easy data reconstruction: 23% Don't know:2%	0.000
Extent of CBCT use in dental practice in near future?	All areas of dentistry: 11% Selected dental use: 68% Will not be commonly used: 8% Not sure: 14%	All areas of dentistry: 35% Selected dental use: 35% Will not be commonly used: 20% Not sure: 10%	All areas of dentistry: 26% Selected dental use:54% Will not be commonly used: 18% Not sure: 2%	All areas of dentistry: 58% Selected dental use:16% Will not be commonly used: 21% Not sure: 4%	0.000
Faculty provides adequate information about CBCT?	Yes: 46% No: 24% Can't say: 30%	Yes: 59% No: 16% Can't say: 24%	Yes: 71% No: 29% Can't say: 0%	Yes: 91% No: 2% Can't say: 7%	0.000
Level of dental education (phase) CBCT should be taught?	Preclinical: 38% Clinical: 35% Doctoral: 22% No need: 4%	Preclinical:18% Clinical: 49% Doctoral: 27% No need: 6%	Preclinical:21% Clinical: 62% Doctoral: 15% No need: 3%	Preclinical:28% Clinical: 44% Doctoral: 23% No need: 5%	0.489
CBCT unit should be available at your facility?	Yes: 78% No: 11% Not sure: 11%	Yes: 63% No: 18% No idea: 19%	Yes: 90% No: 7% No idea: 3%	Yes: 96% No: 2% No idea: 2%	0.005

Would you use CBCT in future?	Yes: 76% No: 8% Not sure: 16%	Yes: 69% No: 20% Not sure: 10%	Yes: 75% No: 5% Not sure: 20%	Yes: 95% No: 0% Not sure: 5%	0.005
Which specialties you can use CBCT?	Implants: 59% Impacted teeth extraction: 14% Patients with tumors: 5% Orthodontics:5% All of the above:19% Other: 2% No need: 2%	Implants: 31% Impacted teeth extraction: 14% Patients with tumors: 22% Orthodontics:2% All of the above:22% Other: 2% No need: 7%	Implants: 53% Impacted teeth extraction: 3% Patients with tumors: 5% Orthodontics:3% All of the above:38% Other: % No need: 0%	Implants: 33% Impacted teeth extraction: 7% Patients with tumors: 10% Orthodontics:2% All of the above:45% Other: 0% No need: 3%	0.049

Table 2: Comparisons made on the basis of levels of dentistry

It can be noted from the figures that 51% females took part in this study. 23% of students were from level 11, 28% from level 12, 24% from internship and 24% from post graduate. It can be noted that 88% of the participants were aware of CBCT.

Discussion

This study is a pilot study and it's aimed to assess the knowledge and awareness of dental students about the use and benefits of Cone-beam computed tomography. We compared the males with females; furthermore, the comparisons were made among the different levels of dentistry both undergraduate as well as postgraduate.

It was noticed that the majority of male and female students had received information about CBCT through faculty lectures. However, the comparison between these two groups was not statistically significant. On the other hand, 35% of male students believed that CBCT should be taught in preclinical courses, whereas 55% of the females were interested in studying CBCT in clinical courses. This comparison between males and females was found to be statistically significant.

When we compared the different levels of dentistry, a few significant comparisons were revealed. One of the major advantages of CBCT over conventional CT scans is the use of low radiation doses. This information was hugely appreciated by level 11 students as compared with other study groups. This comparison was statistically significant. It can be argued that level 11 students being the junior-most and having recently studied about radiology in undergraduate courses may have an impact on these significantly better results as far as CBCT knowledge is concerned.

Literature review suggests a wide range of CBCT use in many fields of dentistry. Postgraduate dental students revealed in the majority that they believed in the overall use of CBCT in all areas of dentistry as compared with the other study groups.

When inquired about the use of CBCT in future clinical practice, 95% of the postgraduate students showed interest in this issue. This number was more than the other study groups. Both of the above-mentioned comparisons were found to be statistically significant.

A similar study was done among the Turkish dental students by Kamburoglu, Kursun & Akarslan (2011), which revealed that 63% of the dental students had heard about CBCT, whereas our study demonstrated 88% of students being aware. 69% of Turkish dental students believed that CBCT should be taught in clinical courses. This number was low (males 40% and females 55%) in our study. A similar finding was disclosed when asked about the future use of CBCT, which came out to be 84% among Turkish students and 80% among our study participants.

Unfortunately, no more study was done to assess the knowledge of dental students. we will continue this research during our internship and we intend to expand our scope of this study with a bigger sample size.

Conclusions

- Level 11 dental students showed better awareness regarding the technical aspects of CBCT.
- The eagerness of students in using CBCT increased with the increase in levels of dentistry (i.e. from level 11 to post graduate).
- CBCT should be taught in clinical programs and students must be provided with adequate knowledge about its use.
- CBCT can be used in almost all dental specialties.

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