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Original Research Paper

Dental and Maxillofacial Radiology; Confidence and Experience among the Dental Interns of Riyadh city

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Introduction: Oral radiology is an essential part of dental education, so that, by completion, all dental students are believed to have established skills in understanding intraoral and extraoral radiographs. Materials and methods: This is a cross-sectional study conducted among the dental Interns of Riyadh, Saudi Arabia using an online survey. Online questionnaire was constructed consisting of questions related to personal, professional, and demographic data followed by questions including knowledge, confidence, and skills related to oral maxillofacial radiology. Results: 94.7% of participants had undertaken radiological science courses, 81.3% had lecture-based methods of teaching, 58.2% reported having education in cephalometric radiography, and 39.3% showed high confidence in the level of education they received. Conclusion: Training experience of dental interns regarding oral maxillofacial radiology seems to be adequate. However, their attitude and confidence level seems to be low.

Keywords: Maxillofacial radiology, Dental interns, Confidence.

INTRODUCTION

The history of the past 5 decades of technological variations and advancements for equipment and techniques in dental and maxillofacial radiology is connected from the insider viewpoint of an industrial physicist and technologist who has been influential in revolutionizing and developing medical equipment in various parts of the globe. The beginning and progress of all major categories of dental and maxillofacial radiographic gear have been established over the period of time and created an impact among dentists and maxillofacial radiologists. These include panoramic systems, both film-based and digital (including photo-stimulated phosphor plates); and cone beam CT (Molteni, 2021; Karjodkar, 2019).

Oral radiology is an essential part of dental education, so that, by completion, all dental students are believed to have established skills in understanding intraoral and extraoral radiographs. The development of proficiencies in radiologic interpretation involves a sound understanding of the fundamental sciences, particularly the pathophysiology of diseases. Planned education of dental students regarding oral maxillofacial radiology can assist in the development of their confidence as well as skills (Baghdady et al., 2013; Kumar & Gadbury-Amyot, 2012).

A study done among the new dental graduates in Iran showed that self-assessment outcomes of graduates are decent in terms of oral and maxillofacial radiology and about the practical proficiencies of this part. Education assessment in several areas of science especially medical science is essential and has exceptional sensitivity. Their findings further demonstrated that students had more satisfaction in the practical department of oral and maxillofacial radiology than in theoretical lessons (Far et al., 2015).

Another similar research done in the United Kingdom among the fresh graduates showed that most subjects were self-assured in their understanding and practice of the most common radiographic investigations (bitewing, periapical, panoramic) and CBCT, and less confident in undertaking lateral cephalometric and oblique lateral radiography. One noteworthy conclusion of the study was that the graduates felt confident concerning the indications for CBCT, in spite of not having many of these units presently used in general dental practice. Nevertheless, as this is expected to change in the future with the cost decreasing and the availability of CBCT units rising, their recognition and use in general dental practice are likely to increase (Drage, Atkin & Farnell, 2020).

Another study done in India indicated a lower level of knowledge when inquired about CBCT use in oral and maxillofacial surgery. From the research, it was apparent that dental practices are certainly influenced by high-end quality

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practice. More efforts for increasing knowledge about this imaging modality, through the addition of CBCT in the curriculum of BDS and via lectures/Continuing Dental Education, ought to be started to ensure improved knowledge among dentists (Rai et al., 2018). The necessity for additional training established from existing data suggests the need for continuous radiation education during the course of the career of dentists. The reality that some knowledge questions are mainly answered incorrectly by recently graduated dentists also underscores a necessity for more radiograph training as part of university curricula (Ihle et al., 2019; An, Lee & Lee, 2018).

NEED OF THE STUDY

Dentists should be aware of the maxillofacial radiological options available to improve the diagnosis and treatment prospects.

AIMS OF THE STUDY

- To determine the confidence and experience of dental interns towards oral and maxillofacial radiology.
- To determine the association of knowledge, confidence, and attitude with gender, GPA, and universities of interns.

MATERIALS AND METHODS

Study Design

This is a cross-sectional study conducted among the dental Interns of Riyadh, Saudi Arabia using an online survey.

Study Sample

509 dental interns were used in this study and were contacted using social media.

Study Instrument

Online questionnaire was constructed consisting of questions related to personal, professional, and demographic data followed by questions including knowledge, confidence, and skills related to oral maxillofacial radiology.

Instrument Validity and Reliability

A pilot study was conducted by sending the survey to 20 participants and the data was inserted in SPSS version 22 to determine the reliability by using Chronbach's coefficient alpha (value: 0.705). Validity of the questionnaire was tested by sending it to experienced researchers in REU, but no changes were made.

Statistical Analysis

Collected data was analyzed using SPSS version 22, where descriptive as well as inferential statistics were conducted. Comparisons between groups were made with the value of significance kept under 0.05 using the Chi-square test.

RESULTS

A total of 509 participants responded to the survey, which included 59.5% males and 40.5% females. According to GPA groupings, 7.3% had less than 2.5, 55.8% had 2.6 to 4, and 36.9% had more than 4 GPA. Moreover, the interns were also divided on the basis of their universities, 53.8% were from REU, 27.3% from KSU, and 18.9% from other universities (table 1). Table 2 shows the overall responses to the survey questions, which reveal that 94.7% of participants had undertaken radiological science course, 81.3% had lecture-based methods of teaching, 58.2% reported having education in cephalometric radiography, and 39.3% showed high confidence in the level of education they received.

Table 3 shows the comparison of survey responses on the basis of gender, which reveal that the majority of the questions had no statistically significant association with gender. However, statistically significant differences were achieved when inquired about bitewing radiography taught (p-value: .040) and panoramic radiography taught (p-value: .042).

Table 4 reveals the comparison of survey responses on the basis of interns' GPA, which showed statistically significant differences when inquired about radiographic interpretation course (p-value: .007), methods of teaching (p-value: .000), bitewing radiography taught (p-value: .000), occlusal radiography taught (p-value: .032), cephalometric radiography taught (p-value: .000), oblique lateral radiography (p-value: .005) and degree of confidence (p-value: .004). Finally, table 5 shows the survey responses comparison on the basis of universities, which revealed all questions showing statistically significant differences except two, including cephalometric radiography (p-value: .239) and oblique lateral radiography (p-value: .197).

DISCUSSION

This study aimed to assess the confidence and experience of dental interns towards oral maxillofacial radiology and compare them on the basis of gender, GPA, and universities. Clinical practice is essential not merely as a connection to dental education, but additionally as an approach that significantly improves dental students' capacity for clinical work and professional excellence. Feelings of readiness are vital in the successful shift from being a student to a practicing dentist.

To transfer from the preclinical to clinical year productively, dental students should create self-confidence in their abilities (Wu et al., 2016). A study conducted among Nepalese dental interns exhibited confidence levels in performing various dental procedures, one of them was oral maxillofacial radiography. It was noted from their findings that around 80% of the interns had a 'good' level of readiness when it comes to radiography (Dixit et al., 2020). As far as our study findings were concerned, when assessing the confidence level, it was noted that around 36% of dental interns fell into the category of 'reasonably confident', which is equivalent to 'good' in the above-mentioned study. There is a significant difference in the readiness of dental interns in the two compared studies.

A similar study conducted by Drage, Atkin & Farnell (2020) reported that 93.8% of participants had undertaken a radiographic interpretation course, 89.2% had received this information through lectures, 62.3% reported having received occlusal radiography, 33.1% had received cephalometric radiography education, 34.6% had received oblique lateral radiography training and 77.6% reported reasonable confidence in relation to training received regarding dental radiography and radiology.

Table 1 Demographics of the study participants

Demographics	Responses (%)
Gender	Males: 59.5% Females: 40.5%
GPA	<2.5: 7.3% 2.6 to 4: 55.8% >4:36.9%
University	REU: 53.8% KSU: 27.3% Others: 18.9%

Table 2 Survey questions with their responses

Survey Questions	Responses (%)
Have you undertaken radiological science course during undergraduate training?	Yes: 94.7% No: 5.3%
Have you undertaken practical radiography course during undergraduate training?	Yes: 93.9% No: 6.1%
Have you undertaken radiographic interpretation course during undergraduate training?	Yes: 92.5% No: 7.5%
If yes to any one of the above, what methods of delivery of teaching you had?	Lecture-based: 81.3% e-learning: 6.6% small group: 4.8% problem-based learning: 4.4% other: 2.8%
Periapical radiography taught?	Yes: 95.9% No: 4.1%
Bitewing radiography taught?	Yes: 92.5% No: 7.5%
Occlusal radiography taught?	Yes: 80.2% No: 19.8%
Panoramic radiography taught?	Yes: 85.5% No: 14.5%
Cephalometric radiography taught?	Yes: 58.2% No: 41.8%
Oblique lateral radiography taught?	Yes: 55% No: 45%
overall degree of confidence the training had given the dental interns in relation to dental radiography and radiology	Very confident: 39.3% Reasonably confident: 36.1% Don't know: 10% Little confident: 10.8% Very little confident: 3.7%

Table 3 Comparison of survey responses on the basis of gender

Survey Questions	Males	Females	p-value
Have you undertaken radiological science course during undergraduate training?	No statistically significant association		.231
Have you undertaken practical radiography course during undergraduate training?	No statistically significant association		.353
Have you undertaken radiographic interpretation course during undergraduate training?	No statistically significant association		.124
If yes to any one of the above, what methods of delivery of teaching you had?	No statistically significant association		.639
Periapical radiography taught?	No statistically significant association		.651
Bitewing radiography taught?	Yes: 94% No: 6%	Yes: 90% No: 10%	.040*
Occlusal radiography taught?	No statistically significant association		.213
Panoramic radiography taught?	Yes: 83% No: 17%	Yes: 89% No: 11%	.042
Cephalometric radiography taught?	No statistically significant association		.380
Oblique lateral radiography taught?	No statistically significant association		.131
overall degree of confidence the training had given the dental interns in relation to dental radiography and radiology	No statistically significant association		.269

Table 4 Comparison of survey responses on the basis of GPA

Survey Questions	< 2.5 GPA	2.5 – 4 GPA	>4 GPA	P-value
Have you undertaken radiological science course during undergraduate training?	No statistically significant association			.266
Have you undertaken practical radiography course during undergraduate training?	No statistically significant association			.229
Have you undertaken radiographic interpretation course during undergraduate training?	Yes: 81% No: 19%	Yes: 92% No: 8%	Yes: 96% No: 4%	.007*
If yes to any one of the above, what methods of delivery of teaching you had?	Lecture-based: 64% e-learning: 6% small group: 17% problem based learning: 8% other: 6%	Lecture-based: 86% e-learning: 3% small group: 4% problem based learning: 3% other: 3%	Lecture-based: 77% e-learning: 12% small group: 3% problem based learning: 6% other: 2%	.000*
Periapical radiography taught?	No statistically significant association			.888
Bitewing radiography taught?	Yes: 73% No: 27%	Yes: 94% No: 6%	Yes: 95% No: 5%	.000*
Occlusal radiography taught?	Yes: 78% No: 22%	Yes: 76% No: 24%	Yes: 86% No: 14%	.032*
Panoramic radiography taught?	No statistically significant association			.234
Cephalometric radiography taught?	Yes: 81% No: 19%	Yes: 50% No: 50%	Yes: 66% No: 34%	.000*
Oblique lateral radiography taught?	Yes: 65% No: 35%	Yes: 49% No: 51%	Yes: 63% No: 37%	.005*
overall degree of confidence the training had given the dental interns in relation to dental radiography and radiology	Very confident: 16% Reasonably confident: 38% Don't know: 19% Little confident: 19% Very little confident: 8%	Very confident: 36% Reasonably confident: 40% Don't know: 9% Little confident: 12% Very little confident: 3%	Very confident:48% Reasonably confident:30% Don't know: 10% Little confident: 7% Very little confident:4%	.004*

Table 5 Comparison of survey responses on the basis of GPA

Survey Questions	REU	KSU	Others	p-value
Have you undertaken radiological science course during undergraduate training?	Yes: 98% No: 2%	Yes: 99% No: 1%	Yes: 80% No: 20%	.000*
Have you undertaken practical radiography course during undergraduate training?	Yes: 98% No: 2%	Yes: 97% No: 3%	Yes: 78% No: 22%	.000*
Have you undertaken radiographic interpretation course during undergraduate training?	Yes: 99% No: 1%	Yes: 97% No: 3%	Yes: 69% No: 31%	.000*
If yes to any one of the above, what methods of delivery of teaching you had?	Lecture-based: 88% e-learning: 5% small group: 3% problem based learning: 3% other: 1%	Lecture-based: 83% e-learning: 7% small group: 6% problem based learning: 3% other: 1%	Lecture-based: 59% e-learning: 11% small group:14% problem based learning: 5% other: 10%	.000*
Periapical radiography taught?	Yes: 99% No: 1%	Yes: 99% No: 1%	Yes: 83% No: 17%	.000*
Bitewing radiography taught?	Yes: 65% No: 35%	Yes: 49% No: 51%	Yes: 68% No: 32%	.000*
Occlusal radiography taught?	Yes: 75% No: 25%	Yes: 91% No: 9%	Yes: 79% No: 21%	.001*
Panoramic radiography taught?	Yes: 82% No: 18%	Yes: 97% No: 3%	Yes: 77% No: 23%	.000*
Cephalometric radiography taught?	No statistically significant association			.239
Oblique lateral radiography taught?	No statistically significant association			.197
overall degree of confidence the training had given the dental interns in relation to dental radiography and radiology	Very confident: 43% Reasonably confident: 37% Don't know: 8% Little confident: 9% Very little confident: 3%	Very confident: 35% Reasonably confident: 37% Don't know: 7% Little confident: 14% Very little confident: 6%	Very confident: 35% Reasonably confident: 32% Don't know: 20% Little confident: 10% Very little confident: 2%	.009*

When these findings were compared with our results, it was noted that 92.5% had undertaken a radiographic interpretation course, which is similar to the compared study. 81.3% had received this information via lectures, which is lower than the above-mentioned study. 80.2% of interns had received training in occlusal radiography, which is significantly higher than the compared study. 58.2% had received education on cephalometric radiography 55% oblique lateral radiography, which is considerably higher. Finally, 36.1% reported to be reasonably confident, which is extremely lower than the compared study.

Limitations of this study include the fact that survey studies are sometimes associated with participants being uncomfortable in providing answers that present themselves in an unfavorable manner. Moreover, the study subjects may not be fully aware of their reasons for any given answer because of a lack of memory on the subject, or even boredom (Esposito, 2010).

CONCLUSIONS

- Training experience of dental interns regarding oral maxillofacial radiology seems to be adequate.
- However, their attitude and confidence level seems to be low.
- No difference among genders was seen.
- GPA and Universities show significant differences.

CONFLICT OF INTEREST

There is no conflict of interest among the authors.

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