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Research Article

KNOWLEDGE, ATTITUDE AND PERCEPTION OF DENTAL SURGEONS, POST GRADUATES AND UNDER GRADUATES ON RADIOGRAPHIC PROTECTION – A QUESTIONNAIRE BASED CROSS SECTIONAL STUDY

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A R T I C L E I N F O

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A B S T R A C T

Background: Radiation hazards are harmful and it becomes precarious when there is a professional negligence or ignorance. **Objectives:** To assess the knowledge, attitude and perception of dental surgeons, post graduates and under graduates on radiographic protection. **Materials and Metodology:** The study participants comprised of 450 dental surgeons, post graduates and under graduates. The information was collected from each participant through structured questionnaires (16 in number) containing answers in the form of multiple choices. **Statistical Analysis:** Chi square test was used to evaluate statistical significance. **Results:** out of 450 participants 180 were under graduates, 160 were post graduates and 110 were dental surgeons. **Conclusion:** The knowledge, attitude and perception level in context to radiation protection protocol was noted to be higher in dental surgeons, then with post graduates and least with under graduates.

INTRODUCTION

Radiation known to be transmission of energy through space and matter has become a part of modern living, reaching every segment of our society. All individuals are exposed to ionizing radiation, both from natural and artificial radiation sources. With the advent of modern radiographic imaging modalities, it has added a new dimension to the branch of radiology and continue doing so in future.[1] X ray was invented in the year 1895 by Wilhelm Roentgen in Germany which will eventually prove to be a pathbreaking event in history of radiology especially in relation to dental discipline.[2]

X rays are ionizing radiation, even though they provide useful information and aid in diagnosis, they have the potential to cause harmful effects both deterministic and stochastic in nature. High-dose ionizing radiation (x-ray) causes both deterministic and stochastic effects whereas low dose of radiation leads to mainly stochastic effects. The inevitable fact is that ionizing radiation causing biological harmful effects, by the production of free radicals thus affecting the cell directly or indirectly, leading to DNA damage, including single or double- strand breaks, and or DNA cross-links. They are detrimental to cells of the human body and are adequately powerful and lead to cancer, leukemia and even genetic damage.[3]

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In the era of modern dentistry where radiology plays a important role in diagnostic purpose as well indicated as a part for post –operative procedures it becomes very pertinent to analyze the attitude and the knowledge of radiation exposures and their protection among the present practitioners and the future dentists so that radiation hazards owing to stochastic effects can be reduced. Though the exposure is minimal still it is very important to reduce the radiation to avoid the accumulated dose to the dentist and patients in their lifetime.[4,5] Radiation protection considered to be science and art of protecting people and the environment from the harmful effects of ionizing radiation. It is also described as all activities directed towards minimizing radiation exposure of patients and personnel during x-ray exposure.[6]

In literature owing to previously conducted studies insufficient documentation was observed about knowledge, attitude and perception of radiation protection protocol among dentists. Therefore the present study aims at understanding and analyzing the present scenario with respect to radiation protection among the people associated with field of dentistry.

MATERIALS AND METHODOLOGY

The study comprised of 450 under graduates, post graduates and dental surgeons from D.J. College of Dental Sciences and Research, Modinagar. Prior permission was taken from the institutional ethical committee, explained the importance of the study to the participants and included on voluntary basis. Among 450 participants 180 were under graduates, 160 were post graduates and 110 were dental surgeons. We observed 100% response rate. There was a female predominance

(67.8%) among the participants Among under graduates, final BDS and interns were included in the study. A questionnaire (16 questions) related to radiation protocol in the form of multiple choices was given to each participant and the response sheets will be collected in person.

Questionnaire for assessment was procured from Prabhat *ET al* [9] with minimal changes. Among the 16 questions 13 were close-ended and 3 were leading questions. The response from the participants will be evaluated with SPSS (Statistical package for social sciences, software Version 23.0 by IBM). Pearson chi-square test and Fisher's exact test was done to evaluate the statistical significance.

RESULTS

When we compared the (Table 2) knowledge of the participants towards radiation hazards and radiation protection, we observed that most of the participants were of aware of NCRP/ICRP guidelines, but at the same time AERB recommendations were not known to the most of the participants. Most of them believed that digital radiography require less exposure, but this KAP value was less in under graduates.

It was seen that all participants were aware of the ALARA principle following which proper exposure parameters with radiation protection guidelines with reference to the distance n from the source and shielding from the ionizing radiation was followed. Most of the participants were using film holders for intra oral imaging in conventional techniques and many of them were asking the patients to hold the film while making exposure. Interestingly most of the participants were aware the usefulness of lead apron but many preferred to position distance rule over lead apron owing to it's weight. All the post graduates and dental surgeon were aware the use of collimators and the function of filtration and clearly indication the use of rectangular collimator to be very specific. The results clearly indicates the inclination towards digital radiography when compared to conventional radiography.

Table 1 Distribution according to gender

Gender	Under graduates	Post graduates	Dental surgeons	overall		Chi square	p-value
	N	N	N	N	%		
Male	21	65	59	145	32.2	63.094	0.001 significant
Female	159	95	51	305	67.8		
Total	180	160	110	450	100.0		

Table 2 Table showing the Questions given to the participant and their responses group wise

Questions	Response	Under graduates N (180) (%)	Post graduates N (160) (%)	Dental surgeons N (110) (%)	Chi square	p-value
1. Dental X rays are harmful?	Yes	152 (84.4 %)	134 (83.8%)	104 (94.5%)	12	0.018 Significant
	No	18 (10%)	22 (13.8%)	3 (2.7%)		
	Don't know	10 (5.6%)	4 (2.5%)	3 (2.7%)		
2 Are you aware of NCRP /ICRP recommendations?	Yes	103 (57.2%)	80 (50%)	47 (42.7%)	5.864	0.053 not significant
	No	77 (42.8%)	80 (50%)	63 (57.3%)		
3 Are you aware of usefulness radiography?	Yes	151 (83.9%)	160 (100%)	110 (100%)	46.496	0.001 Significant
	No	29 (16.1%)	0 (%)	0 (%)		
4 Does rectangular collimator reducing	Yes	114 (63.3%)	160 (100%)	110 (100%)	118.08	0.001 Significant
	No	66 (36.7%)	0 (%)	0 (%)		
5. Does Long Focal spot film distance (FSFD) reduce the tissue	Yes	126 (70%)	120 (75%)	79 (71.8%)	57.965	0.001 Significant
	No	54 (30%)	40 (25%)	31 (28.2%)		
6. Are you aware of deterministic	Yes	137 (76.1%)	152 (95%)	104 (94.5%)	34.166	0.001 Significant
	No	43 (23.9%)	8 (5%)	6 (5.5%)		
7. Are you aware of ALARA principle?	Yes	180(100%)	160(100%)	110(100%)	-	-
	No	0	0	0		
8. Does digital radiography require less exposure	Yes	102(56.7%)	160(100%)	110(100%)	142	0.001 Significant
	No	40(22.2%)	0(%)	0(%)		
	Don't know	38(21.1%)	0(%)	0(%)		
9. Do you prefer to hold the films with your hand during exposure?	Yes	0	0	0	-	-
	No	180 (0%)	160 (0%)	110 (0%)		
10. Will you ask the patient to hold the film with their hand during exposure?	Yes	180 (0%)	160 (0%)	110 (0%)	-	-
	No	0	0	0		
11. Dental radiographs absolutely contra indicated in pregnant patients?	Yes	84 (46.7%)	43 (26.9%)	29 (26.4%)	20	0.001 Significant
	No	50 (27.8%)	56 (35%)	42 (38.2%)		
	Don't know	46 (25.6%)	61 (38.1%)	39 (35.5%)		
12 Do you prefer to regularly use lead aprons?	Yes	91 (50.6%)	85 (53.1%)	26 (23.6%)	26.807	0.001 Significant
	No	89 (49.4%)	75 (46.9%)	84 (76.4%)		
13 Are you aware of AERB guidelines for radiation exposure room shielding?	Yes	40 (22.2%)	79(49.4%)	49 (44.5%)	29.931	0.001 Significant
	No	140 (77.8%)	81 (50.6%)	61 (55.5%)		
14	Above the lead apron	75 (41.7%)	71 (44.4%)	41 (37.3%)	4.0	0.436 not significant
	Below the lead apron	50 (27.8%)	34 (21.3%)	26 (23.6%)		
	Doesn't matter	55 (30.6%)	55 (34.4%)	43 (39.1%)		
15 Indicate why you are not using lead apron regularly?	Non-availability of	25 (13.9%)	21 (13.1%)	29 (26.4%)		0.001
	Due to weight of apron	26(14.4%)	23 (14.4%)	18 (16.4%)	31.0	Significant
	Common apron for all	50 (27.8%)	72 (45%)	20 (18.2%)		
	Will follow position distance rule	79 (43.9%)	44 (27.5%)	43 (39.1%)		
16 The ideal position distance rule while performing exposure?	4 F & 90-1350	19 (10.6%)	23 (14.4%)	15 (13.6%)	8.0	0.390 not significant
	4 F & 60 – 900	34 (18.9%)	31 (19.4%)	18 (16.4%)		
	6 F & 90-1350	104 (57.8%)	76 (47.5%)	53 (48.2%)		
	6 F & 60 – 900	23 (12.8%)	30 (18.8%)	24 (21.8%)		

DISCUSSION

With gradually proving it's importance in the field of dentistry practitioners and the those undergoing training process who are exposed to radiation it is quintessential that they must become familiar with it's magnitude and the possible risk that such exposure entails, and the also consequently the methods for exposure and resulting dose reduction. This information also provides the necessary background for explaining to the concerned patients regarding the benefits and possible hazards involved with the use of x rays.[7]

In order to achieve these goals, a thorough knowledge about biological hazards of X- ray, is a must, in order to do proper radiation protection protocols. In the light of above context, present study was conducted to achieve with aim of having a better life of everyone associated with field of dentistry.

On evaluating results of the study, it was observed that most of the participants were aware that the radiation used in dentistry was harmful and certain protocols should be taken while in use. These results were in accordance with the

previous studies done by Swapna *et al*, [4] Khan M *et al*, [8] Prabhat *et al*, [9] Eman, *et al*, [10] conducted a study on dental students at Taibah University, Madinah, showed that 66.7% of the clinical group who answered yes that X-ray was harmful and in a similar study conducted by Basheer *et al* [11] 63.5% answered yes.

When compared the knowledge of the participants towards radiation hazards and radiation protection, we observed most of the participants were of aware of NCRP/ICRP guidelines, but at the same time AERB recommendations were not known to the most of the participants mostly the under graduates which is understandable as they are more towards performing the procedure not being aware of the guidelines. Most of them believed that digital radiography require less exposure, but this KAP value was less in under graduates.

When the participants were questioned about their awareness of deterministic and stochastic effects of radiation, response was positive with 87% answered, which contemplates a study conducted by Khan *et al*[8], where the same question was forwarded and about 45-55% of them were unaware of the probability of occurrence of radiation biological damage, either by under or over estimation of radiation biological hazard effects. In a study conducted by Rela R [12] only60% of the participants were aware of radiation hazards. In a study by Basheer *ET al* [11] 51.5% and a study by Arnout *ET al* [10] 70% of the under graduates have the awareness about radiation biological damage.

When enquired about the attitude of participants towards taking radiograph to pregnant patients, overall 32.9% of participants were not in agree with contraindication of taking radiographs in pregnant patients. In a study by Parvez *ET al* [13] difference in attitude can be assessed with less than average response from undergraduates and a significant positive response from graduates in agreeing that dental radiography is not completely contraindicated in pregnant patients but to be advised with extreme caution and special precautions. A similar outcome was revealed in a study conducted on Egyptian students [10] In a study by Basheer *ET al* [11] 36.8%, Swapna *ET al* [4] 42% answered that it was absolutely contra indicated to make dental radiograph to pregnant. The present study highlights the differences of knowledge, attitude and perception of various aspects of radiation protection protocol among the Dental surgeons, Post Graduates and Under Graduates. Though exposure to radiation in dentistry is minimal, it is very important to follow the guidelines to minimize the radiation exposure and it's related hazards.

CONCLUSION

From the response obtained through our study, we observed that knowledge, attitude and perception levels for radiation protection protocol was high among dental surgeons and least with the Under Graduates. The level of awareness were freckled (more with dental surgeons, followed by post and under graduates) it was due to less exposure to clinical practice among post and under graduates. The main principle of radiation protection protocols is to practice appropriate measures that will control unnecessary exposure to patients and dental professionals. Studies, seminars, CDE programs and workshops should be planned at regular intervals at institutional and national level for strict adherence of regulation protocol.

Further studies with equal sample size and equal distribution of male and female participants should be done.

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