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Recognition of Health and Non-Health Care Related College Students on the Safety Management of Dental Radiography

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Abstract

Background/Objectives: The aim of this paper is to provide basic data for preparing measures to improve the level of behavior for the dental radiation workers' safety management on the radiation usage.

Method/Statistical Analysis: The survey was conducted over a 15-day period from October 30, 2018 to November 13, 2018. A total of 300 copies of the questionnaire were distributed, of which 237 were collected, except 63, which were incompletely prepared. The questionnaire used for this study was modified and supplemented with reference to Park's questionnaire. The questionnaires used in the survey consisted total of 27 questions which were 5 general characteristics questions, 8 items related to radiation exposure knowledge.

Findings: The highest level of radiation exposure anxiety was 41 (65.1%) out of 123 health related students said 'do not fear', where 56 (58.9%) out of 114 non-health related students said 'normal' so that non-health related students had higher anxiety on radiation exposure and there was a significant difference. The questionnaire on radiation safety management was the highest among the total 123 health related students, with 71 (57.7%) said 'do not have it', 30 (24.4%) said 'do not know well', 22 (17.9%) said 'have it'. Among the 115 non-health related students, the highest was 57 (49.6%) with 'do not have it', 53 (46.1%) with 'do not know well', 5 (4.3%) with 'have it' so that safety management was not well managed in dental hospitals and there was a significant difference.

Improvements/Applications: Therefore, radiation workers need education and the importance of education related to radiation defense.

Keywords: *Recognition, Health, Non-health, dental radiography, safety management.*

Introduction

The average life span of humans was 67.2 years for males and 77.5 years for females as of the 1990s. However, in 2016, the average life expectancy of Koreans was 79.3 years and 85.4 years[1]. As life extends, interest in health has increased, and medical radiation has been used to protect health from diseases, and medical radiation equipment has also been advanced that is used for diagnosis, treatment and research[2]. In addition, radiography performed for the objective determination of the disease has become an important role for the accurate determination of the disease. As the demand for prosthetics and implants increases in the dental field, such radiography techniques rapidly increase in the proportion of intraoral radiography, panorama radiography, digital radiography, and etc., so that accurate diagnosis and treatment can be made using radiological equipment. As a result, the quality of medical care as well as the diagnosis using radiography are becoming more

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common[3-6]. Although, the Chernobyl nuclear accident in 1986, and the recent Fukushima nuclear accident in March 2011 have increased public awareness of radiation and fear of exposure. However, despite the increased anxiety about radiation exposure, most dental offices lack the manpower assigned to radiography, and there is a lack of awareness of radiation protection equipment and explanation of exposure during radiation treatment. Prior research papers on the degree of awareness of safety management of radiography include the patient's awareness[7] of dental digital radiography, the current status and use of dental radiation in Korea, and the knowledge[8], attitudesand behaviors[9] of radiation protection of dental workers has been reported. However, research on radiation safety management of university students is insufficient. Therefore, this study grasped the knowledge, attitude, and behavior of radiation safety management for health and non-health care, measured the degree of anxiety of radiation exposure, and analyzed the relationship between them. The aim of this paper is to provide basic data for preparing measures to improve the level of behavior for the dental radiation workers' safety management on the radiation usage.

Method

This study collected data by distributing a self-reported questionnaire to 300 university students in health and non-health related students who live in Busan. The survey was conducted over a 15-day period from October 30, 2018 to November 13, 2018. A total of 300 copies of the questionnaire were distributed, of which 237 were collected, except 63, which were incompletely prepared. The questionnaire used for this study was modified and supplemented with reference to Park's questionnaire[10]. The questionnaires used in the survey consisted total of 27 questions which were 5 general characteristics questions, 8 items related to radiation exposure knowledge, 4 items related to dental radiography experience, 2 items related to dental radiography awareness, four items related to dental radiography exposure anxiety, and 4 items on dental radiation safety.

Frequency and crossover analyzes were used to identify general characteristics of respondents. The significance level was $a<0.05$. For data analysis, SPSS 24.0 (IBM SPSS statistics) was used to analyze general characteristics and frequency of radiation therapy purposes. Recognition of radiographic needs was analyzed by chi-square test.

Results and Discussion

The gender distribution of 238 subjects was 55 males (23.2%) and 182 females (76.8%), with 53.6% more women. The most common age distribution was 214 (90.3%) for 20-24 years old, followed by 19 (8%) for 25-29 years old, 2 (0.8%) for 30-34 years old, and 2 (0.8%) over 35 years old in order. By marital status, 234 singles (98.7%) were the majority and 3 (1.3%) were married. According to the final education, 217 high school graduates (91.6%) were the most, 16 college graduates (6.8%), and 4 others (1.7%). By occupation, there were 122 health related students (51.5%) and 115 non-health related students (48.5%) [Table 1].

Among the 143, 41 patients (28.7%) were treated with dental caries, 38 patients (26.6%) for basic checkup, 38 patients (26.6%) for correction, and 24 patients (16.8%) for others, and 2 patients (1.4%) for implants[Table 2].

In the health field, 73 of the 123 students (59.3%) said 'do not know well about radiation awareness', which was the highest, followed by 35 students (28.5%) said 'know about radiation awareness', 9 students (7%) said 'do not know anything about radiation awareness', and 6 students (5%) said 'know about the radiation awareness very well'. In the non-health related students, 86 out of 115 (74.8%) said 'do not know well about radiation awareness', which was the highest, followed by 19 (16.5%) said 'do not know anything about radiation awareness', 9 (7.9%) said 'know about radiation awareness', and 1 (0.9%) said 'know about the radiation awareness very well' ($p<0.001$) [Table 3].

Table 1. General Characteristics of Subjects

		N(%)
Gender	Male	55(23.1)
	Female	183(76.9)
Age	20-24	215(90.3)
	25-29	19(8)
	30-34	2(0.8)
	Over 35	2(0.8)
Marital Status	Single	234(98.3)
	Married	4(1.7)
Final Education	High School Graduates	218(91.6)
	University Graduates	16(6.7)
	Others	4(1.7)
Occupation	Health Related	123(51.7)
	Non-health Related	115(48.3)
Total		**238(100)**

Table 2. Purpose of radiation therapy

Sort	N(%)
Basic Checkup	38(26.6)
Implants	2(1.4)
Dental Caries Treatment	41(28.7)
Correction	33(26.6)
Others	24(16.8)

Out of 123 in health related students, 109 (69.0%) said 'yes' 3 (50%) said 'no', and 11 (14.9%) said 'do not know', where out of 115 in non-health related students, 49 (31%) said 'yes', 3 (50%) said 'no', and 63 (85.1%) said 'do not know' (p<0.001). As a result of the knowledge of 'radioprotective substance', within the health related students, 58 (81.7%) said 'yes', 29 (56.9%) said 'no', and 36 (31%) said 'do not know' where with the non-health related students, 13 (18.3%) said 'yes', 22 (43.2%) said 'no', 80 (69%) said 'do not know' (p<0.001). On 'Natural radiation' knowledge degree within health related students, 99 (63.9%) said 'yes', 5 (62.5%) said 'no, 19 (25.3%) said 'do not know' where with the non-health related students out of 115, 56 (36.1%) said 'yes, 3 (37.5%) said 'no', and 56 (74.7%) said 'do not know' (p<0.001). The knowledge of radiation intensity in health related students, 80 (64%) said 'yes', 20 (58.8%) said 'no', and 23 (29.1%) said 'do not know', where in non-health related students, 49 (31%) said 'yes', 3 (50%) said 'no', and 63 (58.1%) said 'do not know' (p<0.001) [Table 4].

Table 3. Radiation Awareness of Subjects

Sort	Radiation Awareness					
	Know it Very Well	Know it Well	Do not Know	Do not Know Anything	Total	p-value
Health Related	6(85.7)	35(79.5)	73(45.9)	9(32.1)	123(51.7)	<0.001
Non-health Related	1(14.3)	9(20.5)	86(54.1)	19(67.9)	115(48.3)	
Total	7(100)	44(100)	159(100)	28(100)	238(100)	

Table 4. Radiation Exposure Knowledge

Sort		Radiation exposure knowledge				
		Yes	No	Do not know	Total	p-value*
Radiation sensitivity of the human body	Health related	109 (69)	3 (50)	11 (14.9)	123 (51.7)	<0.001
	Non-health related	49 (31)	3 (50)	63 (85.1)	115 (48.3)	
	Total	158 (100)	6 (100)	74 (100)	238 (100)	
Radiation protective material	Health related	58 (81.7)	29 (56.9)	36 (31)	123 (51.7)	<0.001
	Non-health related	13 (18.3)	22 (43.1)	80 (69)	115 (48.3)	
	Total	71 (100)	51 (100)	116 (100)	238 (100)	
Natural radiation	Health related	99 (63.9)	5 (62.5)	19 (25.3)	123 (51.7)	<0.001
	Non-health related	56 (36.1)	3 (37.5)	56 (74.7)	115 (48.3)	
	Total	155 (100)	8 (100)	75 (100)	238 (100)	
Radiation intensity	Health related	80 (64)	20 (58.8)	23 (29.1)	123 (51.7)	<0.001
	Non-health related	49 (31)	3 (50)	63 (85.1)	115 (48.3)	
	Total	129 (100)	23 (100)	86 (100)	238 (100)	

Table 5. Awareness of the Need for Dental Radiography

Sort	Radiography awareness						
	Very need	Need	Normal	Do not need	Do not need it at all	Total	p-value*
Health related	21(75.0)	52(65.8)	43(39.8)	6(37.5)	1(14.3)	123(51.7)	<0.001
Non-health related	7(25.0)	27(34.2)	65(60.2)	10(62.5)	6(85.7)	115(48.3)	
Total	28(100)	79(100)	108(100)	16(100)	7(100)	238(100)	

Table 6. Radiation Exposure Anxiety

Sort	Radiation exposure anxiety						
	Do fear very much	Do fear	Normal	Do not fear	Do not fear at all	Total	p-value
Health related	4(57.1)	21(61.8)	39(41.1)	41(65.1)	18(46.2)	123(51.7)	0.029
Non-health related	3(42.9)	13(38.2)	56(58.9)	22(34.9)	21(53.8)	115(48.3)	
Total	7(100)	34(100)	95(100)	63(100)	39(100)	238(100)	

Among the 123 health related students, the highest was 52 (65.8%) said 'need', followed by 43 (39.8%) said 'normal', 21 (75.0%) said 'very need', 6 (37.5%) said 'do not need', and 1 (14.3%) said 'do not need it at all' where among the 115 non-health related students, 65 (60.2%) for 'normal' which was the highest, followed by 27 (34.2%) said 'need', 10 (62.5%) said 'do not need', 7 (25%) said 'very need', and 6 (85.7%) said 'do not it at all' ($p<0.001$) [Table 5]. Among the 123 health related students, the highest was 41 (65.1%) said 'Do not fear', followed by 39 (41.1%) said 'normal', 21 (61.8%) said 'Do fear', 18 (46.2%%) said 'Do not fear at all, and 18 (46.2%) said 'do fear very much'. Whereas among the 115 non-health related students, 56 (58.9%) for 'normal' which was the highest, followed by 22 (34.9%) said 'do not fear', 22 (53.8%) said 'do not fear at all', 13 (38.2%) said 'do fear', and 3 (42.9%) said 'do fear very much' ($p = 0.029$) [Table 6].

Among the 123 health related students, the highest was 71 (57.7%) said 'do not have it', followed by 30 (24.4%) said 'do not know well', and 22 (17.9%) said 'Have it', where among the 115 non-health related students, 57 (49.6%) for 'do not have it' which was the highest, followed by 53 (46.1%) said 'do not know well', and 5 (4.3%) said 'have it' ($p = 0.001$).

Radiography has become an integral part of modern medicine for accurate diagnostic and therapeutic purposes. In addition, anyone who handles radiation is interested, but most people are not properly trained in radiation safety management because they have neglected their attention due to lack of knowledge or underestimation of self-confidence and risks in handling radiation.[9]

The purpose of this study is to investigate the exposure knowledge, experience, exposure anxiety, safety management, radiographic consciousness and awareness of radiation in health and non-health related students, and the main areas collected through surveys to compare the awareness of radiation safety management are as follows:

The radiation awareness of the study subjects was 52 (65.8%) of the health related students said 'know it well, and 65 (60,2%) of the non-health related students were 'normal' so that health related students is highly recognized about this matter. This is considered to be high because the health related students have more opportunities to access radiological expertise through lectures and exercises than non-health related students.

The anxiety about radiation exposure was 41 (65.1%) in the health related students and 56 (58.9%) in the non-health related students in which health related students' result was slightly higher. It is thought that this is because the knowledge of radiation in health related students is higher, so that effective dose will not reach the level that can cause disorder in human body.

There was a statistically significant difference in the awareness of radiation safety management among the 81 (81.4%) health related students and 100 (55.2%) non-health related students which shows non-health related students was significantly higher than the others. The majority of the respondents between these two groups answered 'Do not know well'. This is because non-health related students do not know radiation shielding well unless the dentist explains about it. The health related students are the future radiation workers, so the awareness of radiation defense is high, but it is not actually managed by dental hospitals. Therefore, we need to plan education or program on radiation defense to defend against radiation safety management.

In this study, there are limitations in the interpretation and utilization of results due to the following limitations. Since the survey target was selected from some universities located in Gyeongnam, Busan, it was difficult to represent the whole group. There is a limitation that uncertainties exist in the evaluation of the criteria. However, based on the contents of this paper, the training program for radiation defense in dental hospitals and the importance and necessity of radiation defense can be trained to raise the awareness of radiation safety management by radiation workers in the future. It may

be possible to provide a guideline for the preparation of such a plan.

Conclusion

In this study, questionnaires were distributed from October 30 to November 13, 2018 to grasp the knowledge, attitudes and behavior of radiation safety management in Busan, Gyeongsangnam-do, by measuring the degree of radiation anxiety and analyzing their relevance, the collected data were obtained using the SPSS 24.0 statistical program and the results are as follows:

1. The radiation awareness was highest among 123 health related students, with 52 (65.8%) said 'know it well' and the highest among the 115 non-health related students with 65 (60.2%) said 'normal' so that health related students showed higher radiation awareness and there was a significant difference ($p<0.001$).
2. In radiological consciousness, it was the highest among the 123 health related students with 52 (65.8%) said 'need', and the highest among non-health related students with 65 (60.2%) said 'normal' so that health related students showed higher radiographic consciousness and there was a significant difference ($p<0.001$).
3. The highest level of radiation exposure anxiety was 41 (65.1%) out of 123 health related students said 'do not fear', where 56 (58.9%) out of 114 non-health related students said 'normal' so that non-health related students had higher anxiety on radiation exposure and there was a significant difference ($p<0.029$).
4. The questionnaire on radiation safety management was the highest among the total 123 health related students, with 71 (57.7%) said 'do not have it', 30 (24.4%) said 'do not know well', 22 (17.9%) said 'have it'. Among the 115 non-health related students, the highest was 57 (49.6%) with 'do not have it', 53 (46.1%) with 'do not know well', 5 (4.3%) with 'have it' so that safety management was not well managed in dental hospitals and there was a significant difference. ($p<0.001$).
5. As a result of examining the radiation knowledge of the subjects, out of the total 123 health related students, 109 (69,0%) said 'yes', 3 (50%) said 'no', and 11 (14.9%) said 'do not know', where out of 115 non-health related students, 49 (31%) said 'yes', 3 (50%) said 'no', and 63 (85.1%) said 'do not know.

In this study, the non-health related students had lower radiation knowledge and higher exposure anxiety than health related students. Therefore, radiation workers are considered to be in need of education and the importance of education related to radiation defense.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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