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Radiation Safety Knowledge of Medical Center Radiological Technologists in Taiwan

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INTRODUCTION

In World War II, America used the atomic bomb in Hiroshima and Nagasaki. It's the first time people felt the destruction from radiation. But the radiation is not only used in war, also used in medicine, biotechnology, …, etc. In fact, radiation has existed several million years in environment that we lived.

In medicine, radiation is usually used to diagnosis and therapy. In recent, Taiwan government built the National Multipurpose Medical Cyclotron/PET Center for clinical research. From the diagnostic X-ray or therapeutic X-ray to the annihilation gamma ray applied in PET, medical radiation producing units has great difference. According to the new concept of the radiation protection, our domestic radiation safety laws were modified. The medical exposure practice is effected the radiation dose by radiological technologists. In general, radiological technologists take the responsibility for the reduction of medical doses. The study is focused on whether the domestic radiological technologists have enough radiation safety knowledge without continued education and to know what the important reason affect on the cognition.

MATERIALS and METHODS

The radiological technology board examination was picked up, and then was made the questionnaire for this study. The content validity and reliability had been built in pilot study. Final questionnaire included five social variables and twenty questions about radiation safety knowledge. The population is the radiological technologists who work at department of diagnostic radiology, radiation oncology, and nuclear medicine in domestic medical centers. Five medical centers were sampled in the main study by SPSS 8.01. Statistics is then used to know the relationship between the radiation safety knowledge and the factors including gender, age, education level, working places, and career period.

RESULTS

Four months was spent to finish the field survey. Based on statistics, three medical centers located in north Taiwan and two medical centers located in south Taiwan are equal to the probability in population. The average of correct percentage is 65.83%. Table 1 and Table 2 will show the social variables distribution and frequency.

No significant difference was shown between radiation safety knowledge and gender or working places. Of all the responders, the radiation safety knowledge of the college level for radiological technologists is significant better than the junior college level ones. ($p<0.001$) As the growth of the age and the career period, the radiation safety knowledge also gets significant worse. ($p<0.05$) Table 3 shows the relationship between radiation safety knowledge and the social variables.

Table 1 The Social Variables Distribution (N=144)

Variables	Categories	Cases	%
Gender	Male	84	58.3
	Female	60	41.7
Education Level	Junior College	112	77.8
	College	32	22.2
Working Place	Diagnostic Radiology	74	51.4
	Radiation Oncology	50	34.7
	Nuclear Medicine	20	13.9

Table 2 The Categories of Age and Career Period Distribution (N=144)

Variables	Categories	Cases	%
Age	1.21-25 (y/o)	21	14.6
	2.26-30 (y/o)	55	38.2
	3.31-35 (y/o)	32	22.2
	4.36-40 (y/o)	18	12.5
	5.Above 41 (y/o)	18	12.5
Career Period	1.0.1-5.0 (years)	52	36.1
	2.5.1-10.0 (years)	44	30.6
	3.10.1-15.0 (years)	24	16.7
	4.Above 15.1 (years)	24	16.7

Average Age = 31.56 (Years Old) Standard Deviation = 6.35 (Years Old)
Average Career Period = 8.594 (Years) Standard Deviation = 6.182 (Years)

Table 3 The Relationship Between Average of Correct Percentage and Social Variables

Variables	Mean	SD	Case	F (T) value	Sig.
Gender				0.683	0.496
Male	66.49	13.70	84		
Female	64.92	13.48	60		
Education Level				-3.457	0.001
Junior College	64.20	14.18	112		
College	71.56	9.37	32		
Working Place				1.803	0.169
Diagnostic Radiology	63.92	13.88	74		
Radiation Oncology	67.10	13.63	50		
Nuclear Medicine	69.75	11.64	20		
Age				2.956	0.022
21-25 (y/o)	72.38	14.54	21		
26-30 (y/o)	66.82	13.14	55		
31-35 (y/o)	66.09	15.01	32		
36-40 (y/o)	60.56	11.23	18		
Above 41 (y/o)	60.00	9.85	18		
Career Period				3.909	0.010
0.1-5.0 (years)	69.81	14.21	52		
5.1-10.0 (years)	65.91	13.26	44		
10.1-15.0 (years)	63.96	14.14	24		
Above 15.1 (years)	58.96	9.09	24		

CONCLUSION

Since 1978, the radiological technologists board examination was held in our country. New radiation protection concept is recommended by new ICRP publications with time. Younger radiological technologists have better radiation safety knowledge than older ones. It’s meant to adequate continued training is necessary to radiological technologists. Adequate continued training course shall be defined in the statutory instrument.

The formal education course of radiological technologists will be modified in future. The radiation safety concept of junior college course focus on the practicing and the college course focus on theory are not suited the trend. Practicing and theory get complement each other. For the purpose of reducing population doses from medical exposure, the radiation safety knowledge for radiological technologists is an important factor. From this study, the adequate formal and continued training course of radiation safety has equal necessary for domestically

radiological technologists.

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