

Level of Knowledge on Radiation Protection in Roentgen Photo-taking among Clinical Dental Students

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Received; August 15, 2022, Revised, September 15, 2022, Accepted, October 18, 2022

ABSTRACT. Radiography in dentistry is a device that is often used. The images produced from radiographs are significant for dentists, especially to see any abnormalities that are not visible or unclear on clinical examination so that they can assist in making a diagnosis, determining treatment plans, and assessing treatment success. Besides having benefits, radiography can also cause damage to normal human cells or tissues. The danger caused by this radiation can be overcome by radiation protection. This study aimed to determine the knowledge of clinical clerkship students regarding radiation protection when taking dental x-rays at the Dental and Oral Hospital of Universitas Syiah Kuala (RSGM). This type of research is descriptive, with a total of 305 subjects. The data was collected through the distribution of questionnaires. The results showed that there were 44 (14.4%) students who had a high level of knowledge, 159 (52.1%) moderate, and 102 (33.4%) low. It was concluded that most young dentists at RSGM had an intermediate level of knowledge about radiation protection when taking x-rays.

KEYWORDS: Radiography, radiation protection, level of knowledge, Clinical Clerkship Students

INTRODUCTION

Utilization of X-rays (roentgen) in the field of medicine is one way to improve health. This application has various uses, from diagnostic tools to therapy (radiotherapy).¹ Radiotherapy is an example of treatment using X-rays widely used to treat cancer. X-ray radiotherapy is used to treat oral cavity cancer and surrounding areas such as the tongue, the soft palate, and the lips.²

Diagnostic radiology (radiography) applications widely used include X-ray photos that function for imaging body organs. Radiography in dentistry is a device that is often used. According to (cit. Goaz et al., 1992), the picture produced by radiography is significant for dentists, especially to see any abnormalities that are not visible or less obvious on clinical examination so that they can assist in making a diagnosis, determining a planned treatment and assess the success of the treatment that has been carried out on patients.³

Besides having benefits that can be used in diagnosis and therapy, X-ray radiation can also cause damage to normal human cells or tissues due to atomic interactions at the cellular level. X-ray

radiation can cause erythema, atrophy, ulceration, sterility, cancer, and genetic disorders.⁴ The danger from this radiation can be overcome by doing radiation protection.⁵ Radiation protection is an effort to protect someone from receiving or being exposed to radiation in the smallest possible dose.

All individuals who interact in an X-ray exposure environment need proper and continuous protection, such as the use of film badges, Thermo luminescence dosimeters, taking radiographs as far as possible from the X-ray source, using radiation protection devices such as lead (Pb) aprons, Pb gloves, Pb goggles, Pb thyroid protectors, radiation measuring instruments and shorten radiation time. Operators must have a thorough knowledge of radiation hazards and protection protocols.^{7,8}

Mojiri and Moghimbeigi (2011) stated that although most operators know that it is mandatory to use a film badge and routine inspections every six months, there are still operators who do not use radiation protection when taking x-rays and do not carry out routine check-ups every six months.⁸ Research by Yucel et al. (2009) in Turkey stated that

How to cite this article: TARIGAN MT and ABIDIN T. Potential of chitosan oligosaccharide gel as a cavity cleanser against adhesive restoration adhesive on the cavity wall. JDS. 2022; 7(2): 113-117

knowledge about X-ray radiation among medical students and doctors who requested radiological procedure treatment was very lacking.⁶ Shahab et al. (2010) also published that learning and behavior related to the application of oral radiology safety standards in most students and dentists did not meet expectations. Most dentists do not understand technological advances and still perform procedures that cause radiation overexposure to themselves and their patients.⁹ Scientific publication by JKM Apps (2010) at the Ghent University School of Dentistry explained that students' knowledge of dento-maxillofacial radiology was very lacking. Both in terms of radiation use and protection.¹⁰ Suwargiani (2007) demonstrated that in Indonesia, the

knowledge and awareness of clinical clerkship students regarding the principles and techniques of radiation protection when taking pictures and the dangers that may arise from taking dental radiographs, in general, can be categorized as good.

Based on these conditions, the authors feel the need. They are interested in researching the level of knowledge of clinical clerkship students regarding radiation protection when taking X-rays at the RSGM, where later, those who act as operators must understand the importance of radiation protection very well so that operators and the patient can avoid the dangers of excessive radiation.

MATERIALS AND METHODS

Types of research

This type of research is descriptive research with a cross-sectional approach. Descriptive research is a method carried out with the main objective of making an objective picture or description of a situation. This study will describe the knowledge of clinical clerkship students about radiation protection measures when taking x-rays at RSGM Unsyiah Banda Aceh.

Inclusion Criteria

1. Clinical clerkship student at RSGM Universitas Syiah Kuala Banda Aceh, Indonesia
2. Willing to be a respondent.
3. Cooperative

Population and Research Subjects

The population in this study were all clinical clerkship students at RSGM RSGM Universitas Syiah Kuala Banda Aceh, totaling 332 students. Subjects are part of the population taken from the whole being studied and are considered to represent the 332 population. The subjects in this study were all clinical clerkship students at RSGM. The subject-taking method is done in total sampling with a non-probability approach. Taking subjects with a non-probability sampling technique is taking subjects based on calculated possibilities.

Data Collection Procedures

The researcher visited the research subjects according to the inclusion criteria, then asked about the subject's willingness to fill out an informed consent form. Researchers will distribute questionnaires after the subject agrees. Subjects were given approximately 10 minutes to fill out a questionnaire that had been designed. After

completion, the researcher collected questionnaires for data analysis.

Trials of Research Instruments

The validity test aims to determine the extent to which a measure or value indicates the level of validity of a measuring instrument by measuring the correlation between variables and the total score of variables which can be seen according to the corrected item-total correlation (r), provided that if the value of r count $>$ value of r table, then declared valid and vice versa.

The reliability test aimed to determine the extent of the reliability of a measuring instrument. The calculation of the reliability test for the agency for each variable can be seen from Cronbach's alpha coefficient.

Research Data Analysis

The data analysis in this study was descriptive and univariate to describe the knowledge of clinical clerkship students at the Faculty of Dentistry Universitas Syiah Kuala Banda Aceh about radiation protection when taking x-rays using SPSS (Statistic Package for Social Science (SPSS) 15.0). The data will be displayed in a frequency distribution table with a percentage.

Univariate analysis, namely analysis to see an overview of the frequency distribution of each variable, and all data were analyzed with the help of a computer and concluded descriptively. Furthermore, the variables are categorized in the following criteria: 12

- a. Good, if $x > 75\%$ is obtained
- b. Enough, if $75\% \leq x \leq 56\%$ is obtained
- c. Less, if $x \leq 55\%$ is obtained

Furthermore, the data that has been entered into the frequency distribution table is determined by the percentage of gain for each category using the formula, namely:

Information: p = percentage, fi = observed frequency, n = the number of respondents who are subjects.

RESULTS

This research was conducted at RSGM Universitas Syiah Kuala Banda Aceh on 22-24 September 2014. The study subjects were all young dentists who attended the hospital, as many as 305 people out of 332 total young dentists. Twenty-seven young dentists did not become research respondents because they were currently in the public health stage clerkship at the public health center. The research was conducted on the knowledge of young dentists about radiation protection in taking x-rays at

RSGM. The data collection technique was carried out by distributing questionnaires. Young dentists were asked to agree to participate in this study by filling out the distributed questionnaires. Univariate analysis was used to see the frequency distribution of knowledge of young dentists about radiation protection when taking x-rays at RSGM.

Table 1 shows that most of the research subjects were female, with a total of 231 people (37.4%), and subjects male sex, as many as 74 people (24.7%).

Table 1. Demographic data of research subjects based on gender

Sex	Amount (%)
Male	74 (24,7%)
Female	231 (75,3%)
Total	305 (100%)

Table 2 shows that most young dentists at RSGM know about radiation protection in taking x-rays in the moderate category, namely 159 (52.1%).

A total of 44 (14.4%) young dentists knew the high category, and 102 (33.4%) young dentists knew the low category.

Table 2. Level of knowledge of young dentists about radiation protection when taking x-rays at RSGM Unsyiah

Level of knowledge	Amount (%)
Hight	44 (14,4%)
Medium	159 (52,1%)
Low	102 (33,4%)
Total	305 (100%)

Table 3 shows that young male dentists at RSGM are more likely to have a percentage of knowledge about radiation protection when taking x-rays in the

high category, namely 41.9%. Young female dentists at RSGM have a portion of knowledge in the high category, namely 30.7%.

Table 3. Level of knowledge of young dentists about radiation protection in taking x-rays at RSGM Unsyiah by gender

Knowledge	Female	Male	Amount (%)
Tinggi	71 (30,7%)	31 (41,9%)	102 (33,4%)
Sedang	121 (52,4%)	38 (51,4%)	159 (52,1%)
Rendah	39 (16,9%)	5 (6,80%)	44 (14,4%)
Total	231 (100%)	74 (100%)	332 (100%)

DISCUSSION

Using ionizing radiation such as x-rays is one of the most important diagnostic aids in the medical world. The benefits obtained from ionization energy are enormous. However, there are still potential risks that cannot be ignored because the radiation harms body tissues. It makes radiation protection measures necessary for all individuals involved, especially health workers who work with radiation¹¹.

Every worker must monitor how much radiation dose he has received and protect himself from radiation adequately. They must also receive education and training on good self-protection measures. The level of knowledge and awareness about radiation greatly influences the behavior of operators in protecting themselves, so an overview of radiation protection knowledge for operators needs to be known¹².

Table 2 shows that most young dentists know radiation protection in the moderate category, 159 (52.1%). These results follow previous research by Shahab et al. (2012), which states that the knowledge of most doctors about radiation protection is not very good⁹. Research Yucel et al. (2009) also explained that most respondents in their study did not have good knowledge about radiation protection⁶. Yurk et al. (2014) added in their research that most of the research subjects had poor knowledge about radiation protection¹³. Sadigh et al. (2014) also presented the same results where most residents who studied had limited knowledge about radiation protection¹⁴.

This result is inversely proportional to the research of Mojiri and Moghimbeigi (2011), which stated that the majority of research respondents had good knowledge about radiation protection⁸. It is probably related to the experience of the radiographers, most of whom have worked long enough and have experience in the field of radiology.

The results of this study indicate that most respondents know radiation protection in the moderate category related to the information received by the operator. Mubeen et al. (2008) stated that inadequate information about something would lead to destructive behavior. Good education and education must be given to operators to protect themselves adequately. The addition of materials on radiation into the

education curriculum is needed so that the operator's understanding of the dangers of radiation becomes better¹⁵.

In addition to information, knowledge about radiation protection by operators is also related to the length of education undertaken. Research by Rabhat et al. (2011) stated that the longer the education period, the better the radiation protection knowledge and behavior¹. The level of knowledge of clerkship students about radiation protection is best obtained from final-year students, followed by students at the lower level. It is related to work experience. Shah et al. (2007) stated that work experience is related to knowledge and adherence to taking radiation protection measures when taking x-rays¹⁶.

Table 3 shows that the percentage level of knowledge of young male dentists in the category is 41.9% compared to young female dentists, namely 30.7%. This result follows the study of Hagi and Khafaji (2011), which stated that 57% of male respondents had a good level of radiation protection knowledge compared to 42% of female respondents. Research conducted before and after that also showed the same results where the comparison was 51% versus 43%¹⁷. Research Sadigh et al. (2014) also showed the same results, where the knowledge of male respondents was higher than that of female respondents¹⁴. It is thought to be related to psychology. Female respondents often do not concentrate on their ability to take good photos and protect against radiation, causing them to often not take action properly due to fear and nervousness.

Green in Notoatmodjo (2003) states that there is a link between knowledge and behavior. The knowledge that is not good will make someone tend to do an action that is not good too. In this study, the understanding of female respondents was lower than that of male respondents, so women tended not to take radiation protection measures properly¹⁸.

The data collection process in this study was carried out by distributing self-administered questionnaires, thereby increasing bias. Filling out the questionnaires carried out by the respondents without being interviewed by the researchers made the respondents tend to fill out the questionnaires unobjectively.

CONCLUSION

Based on the research that has been done, it can be concluded that the majority of young dentists at RSGM Universitas Syiah Kuala Banda Aceh know radiation protection in taking x-rays in the medium category, namely 159 people (52.1%).

Young dentists at RSGM who knew about radiation protection in the high class were 44 people (14.4%), young dentists at RSGM who knew about radiation protection in the low category were 102 people (33.4%)

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