



# Knowledge of the senior high-school students in Sukarami subdistrict of Palembang about dental radiographic examination

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## ABSTRACT

**Objectives:** The study on knowing lay-persons' radiographic examination is still rare. It actually can provide the description of how well they understand it in dentistry, especially in dentistry's radiography. This research is aimed to find out the senior high school students' level of knowledge about dental radiographic examination.

**Materials and Methods:** This research used a descriptive survey method with a cross-sectional design. The population was the grade XII students of SMA 13, Palembang, and 174 of them were used

as the samples, taken by using purposive sampling technique and was in accordance with the inclusion and exclusion criteria, using Google form questionnaire, and analyzing descriptively.

**Results:** The result showed that 23 respondents (13.22%) had good knowledge, 108 respondents (62.07%) had moderate knowledge, and 43 respondents (24.71%) had poor knowledge.

**Conclusion:** The students' level of knowledge at SMA 13 Palembang high school about dental radiographic examination was moderate.

**Keywords:** Radiography, dentistry, knowledge, students

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## INTRODUCTION

The data of Riskesdas in the period of 2018 revealed that there was the increase in the percentage of young respondents at the age of 10-14 who had the problems with their teeth and mouths.<sup>1</sup> Dental treatment sometimes requires radiographic examination. Dental radiographic examination is part of supporting examination which helps in diagnosis, treatment planning, or assessment of the result from previous treatment. The use of radiographic examinations can increase the success of patient dental treatment<sup>2</sup>

Patients are sometimes still afraid when radiographic examinations are carried out. Studies had been conducted to assess the level of patient knowledge of radiographic examinations. Raidha F, et. al., 59.75% of the students of SMA had moderate knowledge of dentistry's radiography. Their average poor knowledge was in radiation protection (only 39.42%).<sup>3</sup> Chew SY, et. al., 90.1% of the patients who were being treated in radiographic imaging got explanation about the need for radiography. Patients got an explanation about the risks of radiation only 26.5%.<sup>4</sup> Purnal K, et. al. point out that of the 200 patients who visited the Dentistry Clinic of the University of Malaysia, most of them did not understand the reason why X-ray had to be done and what about

its benefit.<sup>5</sup>

Previous research states that medical radiation knowledge is still limited by patients, and the perception given can be related to age and education level.<sup>6,7</sup> Lack of knowledge about radiographic examination can cause misperception that this examination is dangerous and having no significant use. Incorrect perceptions can lead to the failure of radiographic examinations.<sup>3</sup>

Therefore the objective of the research was to find out the senior high school student's level of knowledge about dental radiographic examination. Through the description of the level of knowledge, dentists and radiographers are expected to have good communication before taking X-rays, so that radiographic examinations can be successfully carried out.

## MATERIALS AND METHODS

This research used descriptive survey method with cross-sectional design. The population was the grade XII IPA (Natural Science) high-school students of Sekolah Menengah Atas (SMA) 13, Palembang, and 174 of them were used as the samples. The sample was taken by using purposive sampling

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technique.

Knowledge measurement is done by using Google form-based online questionnaire, consisting of questions about socio-demography and 14 multiple choice questions. Of the 14 multiple choice questions, 12 of them were assessed. Every right answer was scored 1 while every wrong answer was scored 0. Maximum value was 12 points. They were then classified to become three categories: 1) Good if the right answers were between 76% and 100%, 2) Moderate if the right answers were 56% and 75%, and 3) Poor if the right answers were < 56% of the total of 12 questions.<sup>8</sup> This research had been approved by the Research Ethics Committee of the University of Sumatera Utara, Number: 1224/KEP/USU/2021.

## RESULTS

In this study, the age and gender characteristics of the respondents aged 17 years are the largest age category, namely 79.9%. Respondents aged 16 years were 10.9%, 18 years old were 8.6%, and 15 years old were only 0.6%. Respondents who were female were 64.4% while 35.6% were male.

There are 12 questions in Table 1, the 3 questions with the highest correct answers are about pictures about the types of dental x-rays, types of dental radiographic examination (dental x-ray), one of the uses of dental radiographic examination (dental x-ray). The 3 questions with the highest number of wrong answers were

regarding wrong statements about dental radiography, action to reduce excessive exposure as the protection of radiation for patients, what condition of dental x-ray which can cause danger to the body.

Figure 1 shows that 14.4% of respondents have had dental radiographic examinations. As many as 85.6% of respondents have never had a dental radiographic examination. Data from Figure 2 shows that 25.3% of the respondents received information about dental radiography from the dentist's explanation. As many as 64.4% of respondents read from social media or the internet and 10.3% of respondents read from school textbooks, magazines or newspapers. Figure 3 shows that 43 respondents (24.71%) have a low level of knowledge, 108 respondents (62.07%) have a sufficient level of knowledge, and 23 respondents (13.22%) have a good level of knowledge regarding radiographic examinations of dentistry.

## DISCUSSION

The data from Table 1 are the questions about radiographic examination (X-ray) in dentistry, pictures about the types of dental X-rays, and types of dental radiographic examination (dental X-ray) are answered correctly by the respondents (70,7%, 99,4%, and 84,5% respectively). The research conducted by Raidha F, et. al. pointed out that 97.6% of the respondents knew about the X-rays in dentistry, and 96.4% of them knew the dental X-

**Table 1.** Knowledge of dental radiographic examination

Questions	Answers			
	Right		Wrong	
	n	%	n	%
There is radiographic examination in dentistry	123	70.7	51	29.3
Pictures about the types of dental X-rays	173	99.4	1	0.6
Types of dental radiographic examination (dental X-ray)	147	84.5	27	15.5
Purpose of radiographic examination in dentistry practices	115	66.1	59	33.9
One of the uses of dental radiographic examination (dental X-ray)	146	83.9	28	16.1
Wrong statement about dental radiography	67	38.5	107	61.5
Protective effort toward X-ray radiation in order to give protection to dentists and operators (radiographers), the people/environment and patients	83	47.7	91	52.3
Action to reduce excessive exposure as the protection of radiation for patients	67	38.5	107	61.5
Dental radiographic examination (dental X-ray) cannot stand by itself in detecting patients' illnesses	128	73.6	46	26.4
What condition of dental X-ray which can cause danger for the body.	68	39.1	106	60.9
Organs which can cause the risk of making dental radiography.	142	81.6	32	18.4
Long-term effect which can occur, due to exposure to needless and excessive radiation in the body	77	44.3	97	55.7

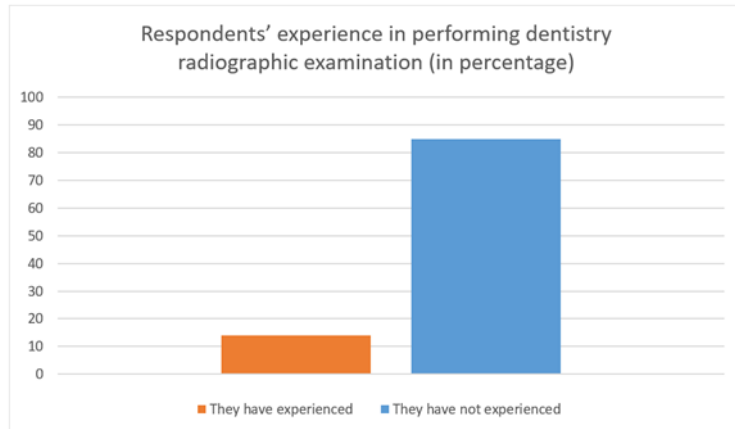


Figure 1. Respondents' experience in performing dentistry radiographic examination

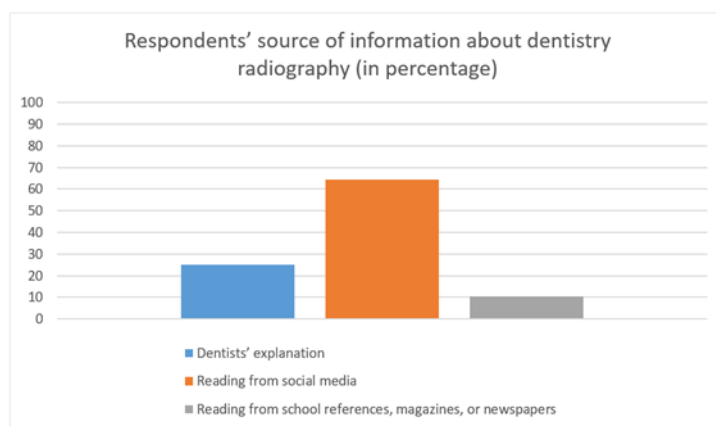


Figure 2. Respondents' source of information about dentistry radiographic examination

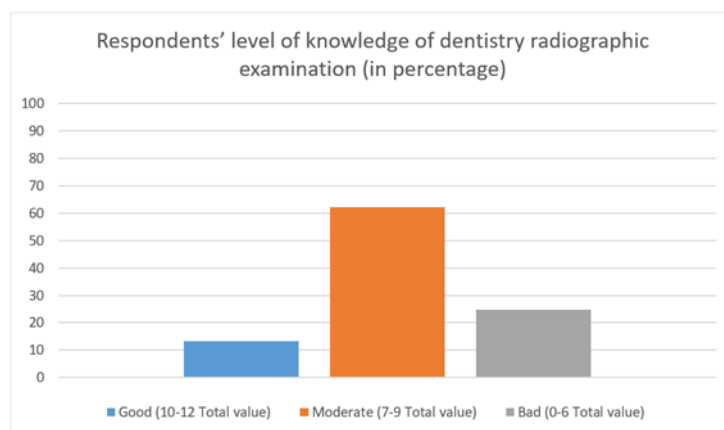


Figure 3. Respondents' level of knowledge of dentistry radiographic examination

rays. The result of this research was categorized as good and was in accordance with the research conducted by Raidha F, et. al on the students of SMAN 1, Cipatat.<sup>5</sup>

The respondents' right answers of these questions could be caused by their good basic knowledge. There were learning materials about the structure and the function of tissue arrangement cells in digestive system. One of the discussions in it included the materials on devices,

digestive organs which one of them was teeth. Respondents could differentiate pictures of dental X-rays probably because they had obtained knowledge of the shape of teeth in general. Respondents' good knowledge was probably because they had had basic knowledge of X-ray and its application in human life in general.<sup>9,10</sup>

Questions about the purpose of radiographic examination in the dentistry practice were answered correctly by 66.1% of the respondents.

This research was different from the result of the research conducted by Raudha F, et. al which indicated good result. 84.2% of the respondents knew the function of dental X-ray to determine treatment planning.<sup>5</sup> Description of the result of dental radiographic examination became very important for dentists, especially for finding out the invisible or unclear abnormality in clinical examination. Dental radiographic examination is very helpful for dentists, especially to uphold diagnosis in determining treatment planning and evaluating it.<sup>11</sup>

Questions about one of the uses of dental radiographic examination (dental X-ray) were answered correctly by 83.9% of the respondents. They knew that dentistry radiographic examination could find out and detect dental caries. The research conducted by Raudha F, et.al (2018) also had the same result, 82.9% of the respondents knew that one of the functions of dental X-ray was to find out the cavity area.<sup>5</sup> There are many diseases and conditions which have no clinical symptom which are usually found through dental radiographic supporting examination. Radiographic examination has the capacity to project the invisible area clinically.<sup>12,13</sup> Questions about wrong statements about dental radiography were answered correctly by 38.5% of the respondents. It seemed that they still had poor knowledge about the use of dental radiographic examination. The research conducted by Al Faleh W, Mubayrik AB, and Al Dosary, S. showed that 42% of the respondents in their research considered that radiography was not important in diagnosing oral disease.<sup>14</sup> The research conducted by Chris, et. al. revealed that the patients did not know exactly the X-ray.<sup>15</sup> Dental radiographic examination has contributed to assessing the growth and the development of teeth and jaws of children and adolescents and detecting various abnormalities and pathological condition in the oromaxillofacial which cannot be seen clinically. Some of the examples are detecting invisible caries lesion, periodontal disease, detecting the possibility of dental impaction, by the potential dentigerous cysts in the related teeth, showing non-eruption teeth, periapical disease, and helping upholding diagnosis of various kinds of cyst and benign and malignant tumors.<sup>16</sup>

Questions about the objective of protection against X-ray radiation to protect patients, radiographers, dentists, and the people/environment were answered correctly by 47.7% of the respondents. It was categorized as poor result. The research conducted by Yunus and Sirajuddin on D3 students of Poltekkes Makassar, showed that the respondents' knowledge of protection against X - X-ray radiation was poor.<sup>11</sup> They considered that the protection against the X-ray radiation was done only toward patients. Implementation of the optimization of protection and safety from radiation should be done so that not only patients but also the personnel in charge of radiation in the radiology installation as well as the people surrounding the installation have to be protected so

that they will be exposed to radiation as low as possible.<sup>17</sup>

Questions about action to reduce excessive exposure to protect against radiation in patients by wearing radiation protecting clothes (apron) and thyroid collars were answered correctly by 38.5% of the respondents. It was in accordance with the research conducted by Raudha F, et. al which showed that the respondents' knowledge was still very poor about protection against radiation. Many of them considered that radiation caused by radiographic examination was insignificant so that the protection against radiation was not needed during the examination.<sup>5</sup> Exposure to radiation in dental radiography should be minimized if it is possible even though the dosage of radiation in dental radiographic examination is low. Lead apron and thyroid collars are patients' protecting equipment which can minimize the exposure to spread radiation. The thyroid collars which are highly suggested to be worn by children and pregnant women because they are very vulnerable to the effect of radiation.<sup>18,19</sup>

Questions about dental radiographic examination (dental X-ray) cannot stand by itself in upholding and detecting patients' diseases since previous medical interview (anamnesis), complete physical/clinical examination, the history of patients' health have to be performed. These questions were answered correctly by 73.6% of the respondents. Radiographs cannot be used to detect disease prior to clinical examination. A clinical examination should be done completely by considering the history of the patient, doing the previous radiographic review; if there is any, the risk of being affected by caries should be evaluated and the need for dental health in patients should be considered before radiographic examination is done.<sup>18</sup>

Questions about the condition of dental X-ray which could cause hazard for the body were answered correctly by 39.1% of the respondents. The research conducted by Ashok NG and Kumar VJ indicated that there was the lack of knowledge of the safety of dental radiography.<sup>20</sup> The research conducted by Al-Faleh, W., et.al. revealed that more than a half of the respondents (55%) never or almost never asked about taking any measures for safety before doing radiographic examination.<sup>21</sup> Dental radiographic examination can provide benefit for patients' dental health rather than getting the risk of getting injured if clinical examination has not been done, referred to, exposed, and processed properly. Radiology examination can only be done by medical professionals for special purpose when the benefit is more than the risk of biological injury in patients, and it is done only when there is a specific indication in specific patients.<sup>16</sup>

Questions about the possibility of an organ to have the risk of making dental radiography were answered correctly by 81.6% of the respondents. Radiation in dental radiography was done in the area of the students' heads and necks. The IPA students of SMA had studied about the materials of

endocrine in which one of them is thyroid. In these materials, the students were taught about anything which was related to endocrine, including its location, thyroid.<sup>9</sup> Thyroid is an organ which becomes the attention in dental radiography because of its anatomical position and its relatively high radio sensitivity. The research conducted by Memon, A, et. al. provided some supports for hypothesis that exposure to dental X-ray, especially double exposure which could be related to the increase in the risk of thyroid cancer.<sup>22</sup> The research conducted by Al Faleh, W., et. al. indicated that most of the respondents agreed that eyes are one of the organs which was affected by radiation.<sup>20</sup>

Questions about the long-term effect which occurred due to the exposure to needless and excessive radiation in the body such as genetic mutation, fetus defective, cataract, and cancer were answered correctly by 44.3% of the respondents. The research conducted by Ricketts ML., et.al. pointed out that the majority of the patients were not informed about the risk of radiation concerning the examination, and they had wrong perception on the use of radiation and its risk.<sup>23</sup> X-ray is dangerous for human beings and it can cause genetic damage, leukemia, and oncogenesis. Exposure to radiation in thyroid during pregnancy is related to low birth weight. Thyroid protective collars can substantially decrease exposure to radiation in thyroid during the procedure of dental radiography. Therefore, it is recommended that all patients, especially children, productive-aged women, and pregnant women use them.<sup>19,24</sup>

Figure 1 shows that 85.6% of the respondents have never had dental radiographic examination. This is probably because dental radiographic examination is a supporting examination so that not all dental cases should be handled by doing dental radiographic examination. According the regulation by BAPETEN No. 4/2020, Article 40, paragraphs 1 and 2, all medical exposures should be through the process of justification by considering one of them –clinical indication which indicated that patients should be given medical exposure.<sup>17</sup>

Respondents' source of information about dentistry radiography shown in Figure 2 indicated that 64.4% of the respondents read from social media or internet. The data from BPS (Central Bureau of Statistics) revealed that 33.38% of the internet users in Indonesia were in the aged-group of 13-24 years.<sup>25</sup> Access to internet today is becoming rapid and easy so that it can be done anywhere and anytime by using cell-phones. Today, social media begin to replace the role of conventional mass-media in spreading information and news, along with the increase in the development and acceleration of social media.<sup>26</sup> The Covid-19 pandemic has caused the use of Smartphone to be much more frequent.<sup>27</sup>

Figure 3 showed the result of the level of knowledge of dentistry radiographic examination in the students of SMAN13, Palembang. The result of the research showed that the respondents' knowledge of dentistry radiographic examination

was categorized as moderate (62.07%). This was probably related to their basic knowledge of the learning materials at school. Lesson topics are usually about general knowledge about radiation only.

History of radiographic examination may play a role in increasing patient knowledge about radiographic examination in dentistry. Almost all respondents did not have a history of radiographic examination, so it was certain that the respondents had never received an explanation of radiographic examination from medical personnel such as dentists. Therefore, in this study most of the respondents' knowledge was mostly obtained through social media, so that the respondents' knowledge of radiographic examination was at a moderate level. The role of dentists is very important in providing introduction and knowledge about radiographic examination in dentistry. Researchers argue that if dentists play an active role in introducing radiographic examinations and treatment actions in dentistry to the public through videos uploaded on social media, then the knowledge of respondents or the public will automatically increase for the better.

## CONCLUSION

The level of knowledge among high-school students in Sukarami Sub-district, Palembang in this study, regarding dental radiographic examination was moderate. Previous history of radiographic examinations and information from social media can help in improving knowledge about radiographic examinations in dentistry.

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None.

## FOOTNOTES

All authors have no potential conflict of interest to declare for this article. This study has received ethical approval approved by the the Research Ethics Committee of the University of Sumatera Utara (1224/KEP/USU/2021). All procedures conducted were in accordance with the ethical standards.

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