

Level of Public Knowledge Regarding Dental Radiographic Examination in Medan Perjuangan District

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Abstract

Aids in establishing the diagnosis, radiography also plays an important role in determining treatment plans and evaluating the results of treatment that has been carried out previously. The purpose of this study is to determine the extent of the community's level of knowledge regarding dental radiography in Medan Perjuangan District. The type of research used is descriptive survey research with a cross-sectional approach. The population of this study is the community in Medan Perjuangan District. The sample size is 200 people who meet the inclusion and exclusion criteria. By using questionnaires and analyzed descriptively. The result of this study is that the level of public knowledge regarding the uses, benefits, effects, and dose limits as well as radiation protection of dental radiography obtained very few results that can be answered correctly. The satisfaction of this study is that the level of public knowledge in Medan Perjuangan District regarding dental radiography examinations individually obtained results in the good category of 2.0%, the fair category of 14.0%, and the poor category of 84.0%.

Keywords: Radiography, Dentist, Dentistry

Introduction

The role of radiography in dentistry is increasing in line with the development of knowledge, currently, radiography in dentistry is a device that is often used (Anggara, Iswani, & Darmawangsa, 2018). The development of radiology technology has contributed greatly to the expansion of science and diagnostic capabilities (Babu, Bhanushali, Moureen, Amitha, & Akshatha, 2017). Radiation protection in patients and the provision of the lowest possible radiation to patients according to clinical needs are important aspects of radiological diagnostic services that need special attention (Adiana & Syafiar, 2014).

The ability of radiography examination to project clinically invisible areas magnifies the contribution of radiography diagnostic information thus causing clinical radiography examination to be considered a follow-up examination of clinical examination (Watanabe, Faria, & Camargo, 2017). In addition to being a tool in establishing the diagnosis, radiography also plays an important role in determining treatment plans and evaluating the results of treatment that has been carried out previously (Raidha, Epsilawati, & Wardani, 2018);(Anggara et al., 2018).

Radiography used in dentistry based on photography and film placement techniques can be divided into two, namely extraoral techniques and intraoral techniques.

Extraoral radiography techniques with an X-ray film placed outside the patient's mouth, including panoramic radiography techniques, lateral projection cephalometry, and others. Intraoral radiography technique is a radiographic imaging technique of the teeth and surrounding tissues by placing a film in the patient's oral cavity, including periapical, bitewing, and occlusal radiography (Sumono & Indriana, 2023).

More than 80% of dental cases require radiographic examination in the management of dental and oral diseases and a high level of radiographic accuracy is needed for the implementation of dental and oral disease cases (Gajanayake, Liyanage, Wadusinghearachchi, Perera, & Epa, 2024). Dental radiography is a science that is often used to support the diagnosis in dentistry and to obtain a real image of the image produced by x-rays. X-rays are electromagnetic radiation with a wavelength that is shorter compared to wavelengths of light. Radiation is the transfer of energy through space and matter in the form of electromagnetic waves that can pass through a vacuum and disperse energy (Rai et al., 2018).

The effect of energy dispersion depends on the anatomical structure of an object and the energy of the X-rays. The invention of X-rays began with the discovery of Wilhelm Conrad Roentgen (1845-1923), a physicist at the University of Augsburg while working with cathode ray tubes in 1895. Roentgen found that the light from the tube can penetrate opaque materials and activate fluorescent screens or photo films (Fathiyya, Pramanik, & Firman, 2019). Research Hayati (2019) Demonstrate the level of knowledge of pregnant women about the effects of X-ray radiation in the field of dentistry during pregnancy in private practice Desa Suka Damai Kecamatan Lueng Bata Banda Aceh results were obtained in the categories of good (20%), fair (36.7%), poor (16.7%), and poor (26,7%).

Many subjects do not know about x-ray radiation or X-ray photos in the field of dentistry and its effect on pregnancy, due to the lack of socialization so that the public lacks information about it (Arzani & Bagherzadeh, 2021). Patient's knowledge and perception of dental radiography involving 200 samples (patients) with different statuses and levels of education. The results showed that as many as 132 patients felt that taking radiographs was necessary but 64 patients felt that taking radiographs was harmful to their health.

Regarding patient knowledge of radiography in pregnant women, most of the patients totaling 114 people (57%) felt that radiography should be avoided for pregnant women, 15% of patients felt that if radiography was really necessary, it should be done and the remaining 19% did not know about the role and dangers of dental radiography for pregnant women. Then related to patient knowledge of children's radiography, as many as 32 patients said they did not allow dental radiography to be taken on their children, while 21% of patients would only allow it if it was necessary and another 20% had no knowledge of dental radiography in children.

Based on these results Purmal et al concluded that there was a significant relationship between education level and patient perception related to dental radiography in pregnant women and children (Watanabe et al., 2017). Knowledge and attitudes of

parents towards dental radiography in children. The results showed that the majority of respondents (44%) answered that they did not know about questions based on dental radiography knowledge and 41% answered correctly. Only a small percentage of respondents (15%) answered incorrectly (Mandinić et al., 2021).

Most respondents realized that radiation from dental radiography was too small to put their child in significant danger (58.6%), while others did not realize that radiation from the environment was higher than radiation from dental radiography. A high level of parental knowledge about dental radiography is associated with a high level of formal education and having a child who has had a dental radiography photograph before (Ramadhan, Sitam, Azhari, & Epsilawati, 2020).

Public knowledge about radiography examinations affects people's perceptions and attitudes towards these examinations. The public needs to know the role of radiography in the field of dentistry so that the public has the right view of the examination and does not feel anxious if it is done. A lack of public knowledge about radiography examinations can lead to these examinations being considered dangerous and have no meaningful benefits.

Based on the background, the problem can be formulated, namely, how is the level of knowledge of the community in Medan Perjuangan District regarding dental radiography examination. This study aims to determine the level of knowledge of the community in Medan Perjuangan District about dental radiography. Theoretically, this study can be a source of information for the health office and provide an overview of public understanding regarding dental radiography examinations. Applicatively, the results of this study can be used as educational materials and provide advice to the public about the importance of dental radiography examinations before treating conditions that cannot be seen directly.

Research Methods

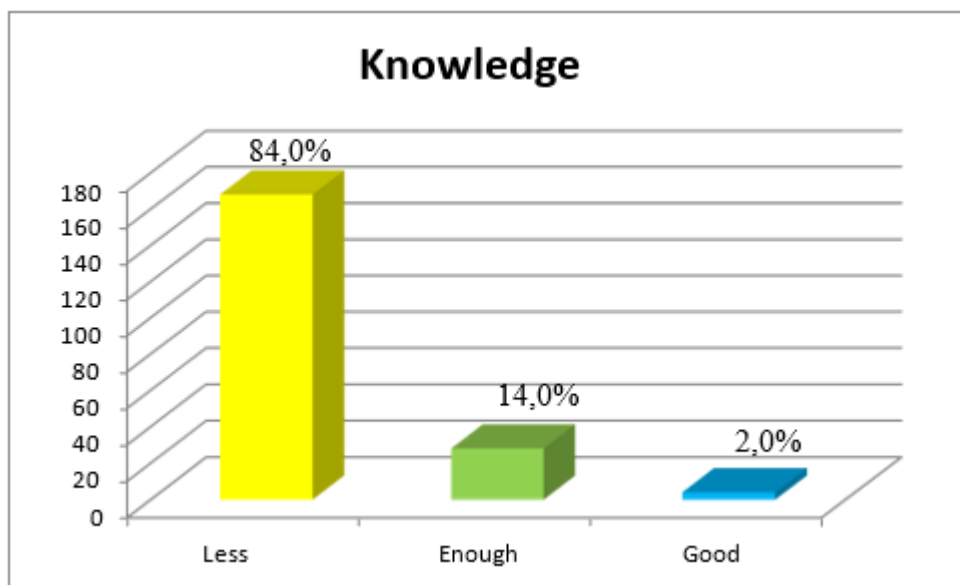
The type of research used is descriptive research with a cross-sectional approach using questionnaires as a tool to collect data. The location of this research was carried out in Medan Perjuangan District. The research was conducted in the form of a questionnaire that will be distributed to the local community. This research was conducted from December 2019 to May. The population in this study is people living in Medan Perjuangan District. The sample of this study is people between the ages of 20-60 years. The sampling technique uses simple random sampling. Namely, sample selection based on inclusion and exclusion criteria.

The data collection method was carried out through the dissemination of questionnaires containing questions about the level of knowledge about dental radiography in general, and the dangers and protection of dental radiation. The type of data used in this study is primary data from the general public in Medan Perjuangan District.

Results and Discussion

The research on the level of public knowledge about dental radiography examinations was carried out in Medan Perjuangan District with a sample of 200 people. This study was conducted in February 2021, with the obstacle that some respondents were not willing to fill out the questionnaire because they did not want to, there were also respondents who were willing to fill out the questionnaire but did not want to write it and as a result the respondents told the researcher to write the answer.

Data collection in this study was carried out by using questionnaires and conducting interviews with the people of Medan Perjuangan District. The results of the level of public knowledge about dental radiography examination in Medan Perjuangan District are in the poor category, which is 84.0% and is included in the graph below.



Grafik 1. Level of Public Knowledge Regarding Dental Radiographic Examination in Medan Perjuangan District.

Discussion

This type of research is descriptive with the number of respondents in Medan Perjuangan District as many as 200 people, at the age of 20-60 years with the reason that the person concerned is mature enough to make decisions and want to be involved as a respondent or not. In this study, the majority of respondents were 20-29 years old, which was as many as 139 people. To obtain respondent data, data collection is carried out by distributing questionnaires and direct interviews where questionnaires are given and filled out directly by respondents.

Research Faleh (2020), showed the same results in this study regarding public perceptions and viewpoints about dental radiography and dentist safety. A total of 437 samples, completed a questionnaire containing questions surrounding the practice of dentistry about the dangers of dental radiography. The results were obtained from 88.6% of respondents who performed dental radiography as dental treatment, the majority of

them relied on dentists to choose the type of radiography, and 40% of respondents said that dentists never explained the dangers of dental radiography.

More than half of the respondents (55%) never or rarely asked about the safety of the procedure before taking a dental radiogram. Lack of public knowledge is recommended to increase awareness about this problem, namely radiographers to conduct education in ensuring the safe use of radiation protection (Rahman, Nurrachman, Astuti, Epsilawati, & Azhari, 2020).

Research Venkatesh (2017), showed the same results also regarding the identification of parents' knowledge and attitudes about children's dental radiography. A total sample of 357 questionnaires were received, 54 were incomplete and 3 were issued, so the analysis was carried out with only 300 questionnaires. More than half of respondents believe that dental radiography is safe to use, but parents' knowledge of dental radiography is still low.

Furthermore, 92% of parents said that the dentist explained the reason for having a dental X-ray, but only 8% felt that there were related risks explained to respondents regarding dental X-rays. Although parents' knowledge of dental radiography is lacking, they also have a positive attitude about dental radiography.

The results of the study showed the percentage of public knowledge about what radiography (X-ray photos) was, data was obtained that answered "Yes, with the right reason, as many as 51.0% of respondents answered that radiography is an examination using X-rays to see a disease in the body. According to research by Susanti NT dkk (2016), Radiation is the release of energy through space or substance in the form of electromagnetic waves or particles. Radiation is caused by medical procedures such as x-ray radiation in the field of dentistry in particular, x-ray radiation is mainly used for dental radiodiagnosis, while for radiotherapy purposes it is often used for the treatment of head and neck cancer.²⁶

The results of the study showed the percentage of public knowledge that in dentistry there is a radiographic examination (X-ray photo), data was obtained that answered "Yes, with the correct reason, as many as 19.0% of respondents answered that radiography in dentistry is a supporting examination to find out the state of the oral cavity more clearly before carrying out treatment. According to research by Supriyadi (2012), Radiographic examination is a very useful supporting examination in dental practice and is a means needed in determining diagnosis and treatment, especially for diseases or abnormalities in the oral cavity. There are two important things in a radiographic examination, namely the technique of making a dental radiograph, and what is no less important is how to accurately interpret the picture of the lesion or abnormality on the radiograph (Maleachi & Tjakraatmadja, 2018).

The results showed the percentage of public knowledge that radiography (X-ray photos) is important in supporting dental and oral care who answered "Yes, with the right reasons, as many as 16.5% of respondents answered that dental radiography can help very useful information enforce a disease in the oral cavity. X-rays in dentistry are used as a supporting examination that can provide information on objects or conditions of the oral

cavity that are abnormal either due to accidents, congenital abnormalities or other events that may cause abnormal conditions.

The information that can be provided by this medical support examination is an image called a radiograph, and it is a very appropriate way to know what abnormalities occur to determine a good dental and oral care plan so that appropriate results are obtained. Public knowledge about the types of radiography in dentistry which is divided into intra-oral (intra-oral) and extra-oral (extra-oral), the results of the study show that the percentage of answering "Yes with the right reason is 5.0%. Respondents answered that they knew that the type of radiography in dentistry was examined inside the mouth and outside the mouth.

According to research by Goenharto S (2016), Establishing a diagnosis and determining a treatment plan requires some analysis that requires data from direct examination, the existence of color photography is very useful in giving a clearer picture to the patient about the condition of his teeth. Radiography used in the field of dentistry is known as 2 types of clinical photos, namely, intra-oral photos and extra-oral photos. Intra-oral photos are photos that cover the patient's oral cavity by placing a film in the patient's oral cavity, while extra-oral photos are photos that cover the patient's head and jaw where by placing a film outside the patient's mouth.³⁰

The results of this study were whether people had done a radiographic examination (X-ray photo) before to the dentist, who answered "Yes, for the reason that answered that as many as 23.5% of respondents had previously come to the dentist to do a radiographic examination because it was recommended that before using braces (ortho aircraft) first do an X-ray. Many answered never, which was 67.0%.

According to research Purmal dkk (2013), explained that the absence of such experience can affect respondents' low knowledge about dental radiography examination. The public can find out several important things in dental radiography examinations through the information received, one of which is through dentists. Respondents who perform radiographic examinations certainly get the right explanation about the examination, and patients should be given education about radiography examinations along with the presentation of the results of the examinations that have been carried out so that the public has a good perception of why the examination is carried out.⁷

Public knowledge about radiography (X-ray photos) that has negative effects if done without the consent of the doctor in Table 9 shows a percentage result of 22.0% answering "Yes for the right reasons. The respondent replied that to do an X-ray first, you must have permission from a doctor because the danger of radiation rays if given, is not according to the recommendation. According to the study of Woroprobosari NR (2016), the effective dose given to patients per radiograph is a low dose, the initial interaction between ionizing radiation of a material occurs at the electron level in the first 10-13 seconds after exposure.

The biological effects that can occur in humans are grouped into 2 categories, namely, the first (somatic effect) which is divided into deterministic effects in the form of skin damage to the body, damage to the hematopoietic system of the bone marrow, and

eye lens and radiation syndrome. The ability of X-rays to produce images indicates that X-rays can penetrate the skin, and tissues, there is a clear relationship between the severity of the disease and the dose so that a safe dose of radiation from these deterministic effects can be regulated.

The second is the stochastic effect, this stochastic effect can occur even within the recommended radiation limits and is determined by the probability effect, which is the minimum radiation dose that has a stochastic effect in increasing the potential for tumors and genetic damage. Therefore, there is no true threshold value that can guarantee that x-ray exposure is completely safe. One example of dangerous stochastic effects is cancer and genetic disorders.^{19,20}

In the percentage results, showing that public knowledge about radiographic examinations (X-rays) that are carried out periodically is good or bad for health, as many as 11.0% answered "Yes, for bad reasons. Respondents answered that it is bad for health because it has side effects caused by radiation rays if done too often. Menurut Purmal K dkk (2013), Regarding the reason for taking dental radiography, as many as 44 respondents said that they had never known why they took radiographic photos, the majority believed that taking dental radiographic photos was to see tooth decay (31%). While others believe that taking dental radiographic photos is a routine procedure for them (20%).

Some of them (8%) said that all of those reasons included routine screening procedures. Therefore, patients need to be educated about radiography so that it is not used as a regular examination or routine screening. Because radiography has side effects every time you do it periodically.⁷

The results of public knowledge about establishing the diagnosis of dental and oral diseases needed to conduct radiography examinations (X-ray photos) were obtained by the percentage, namely, 12.0% answered "Yes for the right reasons. Respondents answered one of the data collections and were very helpful for dentists in determining the diagnosis to see the less obvious abnormalities in the mouth. According to research by Kanter dkk pada tahun (2014), dental radiography can provide very useful diagnostic information for dentists. The need to enforce the diagnosis to determine the treatment plan so that you can see the invisible so that it can be known is very helpful for dentists in determining the diagnosis and treatment plan.²⁹

Public knowledge about the benefits of X-rays in dental and oral care was obtained, 4.5% answered "Yes with the right reasons. Respondents answered that it is useful for determining the diagnosis of oral diseases. According to research by Ramadhan AZ (2019), The use of X-rays that are often used for imaging in the field of dentistry can penetrate human body tissues. X-rays are described as high-energy waves in which each node of light contains a collection of photons whose strength is equivalent to one quantum of energy. X-rays in the field of dentistry are used for diagnostic radiology purposes, and optimal radiography examination results and can provide benefits to help determine disease diagnosis, determine treatment plans, and evaluate treatment results.¹³

Public knowledge about the effects of radiation rays that can cause damage to the body, the percentage of respondents who answered "Yes, for the right reason, respondents answered that radiography influences x-rays that cause effects on the body. According to research by Ernawidiarti et al. (2017), ionizing radiation is one of the sources of danger which is a benchmark for the possibility of occupational accidents and diseases. Ionizing radiation is any radiation that is capable of producing ions by interaction with matter such as cells in the human body. Ionization is the process by which atoms are made into ions by the removal or addition of one or more electrons that produce the effect, several biological components will change radiation exposure, and the influence of x-rays can cause damage to hematopoietic indicators (formation and development of blood cells).³¹

Public knowledge that the unnecessary use of radiography can cause loss of sensitivity and taste was obtained, 7.0% of respondents answered "Yes for the right reasons. Respondents replied that because of the unnecessary effects of radiation on the body if it is often exposed, it will cause a bad taste in the mouth. According to research by Yunus B (2009), Radiation therapy in the neck and head area for cancer treatment has been shown to result in damage to the structure of the salivary glands with varying degrees of damage to the salivary glands affected by radiation therapy. This is indicated by a decrease in saliva volume. The amount and severity of salivary gland tissue damage depends on the dose and duration of irradiation. Radiation therapy to the head and neck can cause several side effects such as mucositis, salivary gland dysfunction, taste dysfunction, and hearing loss.

In the results of the percentage of knowledge of respondents about the unnecessary use of radiography (X-ray photos) can cause cancer in the oral cavity, 6.5% answered "Yes for the right reasons. Respondents answered that the effects of radiation sourced from the emitted X-rays are prone to causing oral cavity cancer. According to research by Widyanigrum(2018), The oral cavity is an important part of the body and is the entrance to the digestive system.

Diseases that affect the oral cavity affect general health, one of the diseases that is still difficult to overcome today is oral cancer which is also known as oral cancer which is a disease with high lethality in the form of invasive local tumors that are destructive in orofacial tissues, metastasize through cervical lymphonodi, and easily spread to other organs of the body. The consequences of cancer itself are side effects of medical therapy, namely radiotherapy undergone or treatment of cancer.

Imaging of tumors and oral cancers generally begins with conventional radiographic examination, especially in cases of superficial soft tissue periods. The most widely used conventional radiography for imaging tumors and oral cancers is intraoral radiography and panoramic radiography. The ability of radiology to detect oral cancer and determine the degree of oral cancer metastasis in cervical lymphonodiy is essential, as a proper diagnosis will determine the most effective type of therapy for the patient. If used excessively, it will cause cancer in the oral cavity.

The results of the percentage, public knowledge about the unnecessary use of radiography (X-ray photos) can cause the mouth to feel dry and burning, showed that

5.5% answered "Yes with the right reason. Respondents answered that the radiation emitted caused a feeling of heat in the oral cavity, and there were also those who answered that they had previously done a dental X-ray feeling the same thing, namely a feeling of heat and a dry mouth.

According to research by Murdiastuti K (2011), The use of ionizing radiation in the health sector can have negative impacts, one of which is xerostomia or dryness of the oral cavity. The decrease in saliva secretion as a side effect of radiation therapy causes complaints in the patient's oral cavity such as pain, burning, difficulty speaking, soft tissue damage, and a shift in the growth of oral microflora.

On the results of the percentage of respondents' knowledge about the maximum dose limit that is acceptable during radiography (X-ray photos), 4.0% answered "Yes, for the right reasons. Respondents answered that the dose that the body should receive is 1mSv. According to research by Yunus B dkk (2020), The radiation dose received by a person in carrying out an activity must not exceed the dose limit value that has been set by the authorized agency. By using a well-prepared and managed radiation protection program, all activities that are at risk of radiation exposure are quite high and can be handled in such a way that they do not exceed the predetermined dose limit value.

The value of the dose limit imposed in Indonesia is stated in the Decree of the Director General of the National Atomic Energy Agency No.PN03/160/DJ/89 concerning occupational safety provisions against radiation. The rule refers more to publications International Commission on Radiological Protection (ICRP) No.26 In 1977, the dose limit value in the provision was not the highest limit. However, because each irradiation carries certain risks, unnecessary irradiation should be avoided and the dosage should be kept as low as possible. NBD in Indonesia as stated in the Decree of the Director General of the National Atomic Energy Agency, the dose limit value for members of the general public in terms of whole-body irradiation is 1 mSv in a year.³⁵

In the results of the percentage of respondents' knowledge about one of the protections when doing radiography (X-ray photo) using protective clothing (apron), as many as 59.5% answered "Yes for the right reason. The respondent replied that knowing that to do an X-ray photo, he must use protective clothing before taking an X-ray photo. According to research by Kartika Y dkk (2020), Radiation safety or so-called radiation protection is a branch of science that studies techniques for human health and environmental problems and is related to providing protection to a person.

Radiation workers have the responsibility to ensure radiation safety during medical procedures implementing radiation procedures according to established regulations. One of the things that is emphasized is the existence of personal protective equipment used in the implementation of X-ray photos, personal protective equipment that is generally used is an apron.³⁶ Based on the results of this study, there are still many people in the Medan Perjuangan sub-district who do not answer correctly and know exactly the content of the questions in the questionnaire, this may be because the community has not fully understood the benefits of radiography in dentistry, whether it has been or not. Perform a previous examination using dental radiography.

Conclusion

The level of public knowledge regarding dental radiography examination in Medan Perjuangan District is in the good category of 2.0%, the fair category is 14.0%, and the poor category (84,0%).

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