

Utilization of dental radiology services during the COVID-19 pandemic and factors that influence it in Banda Aceh

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ABSTRACT. The COVID-19 pandemic spread worldwide until it finally entered Indonesia in March 2020. Radiographic examination is used to make a diagnosis, make a treatment plan and evaluate optimal treatment outcomes. In March 2020, the Central Board of the Dental Medical Radiology Association (PPIRKG) appealed to postpone all radiological examinations except in emergency conditions. Still, the need for dental care continues to increase. To determine the use of radiography services in dentistry during the COVID-19 pandemic and the factors that influence it in Banda Aceh. The total subjects in this study were 104 patients from the Dental Radiology section of RSGM FKG USK. Questionnaires were given through social media in the form of online questionnaires. **Results:** The results showed that the utilization of dental radiology at the RSGM FKG USK during the 2020-2021 COVID-19 pandemic decreased. The utilization of dental radiology services at the RSGM during the COVID-19 pandemic has reduced several factors. The number of patient visits to the radiology of the RSGM FKG USK has decreased dramatically during 2020-2021. Most patients stated that they preferred to self-isolate at home and did not go to the RSGM during the COVID-19 pandemic. However, they thought radiology services at the RSGM during the pandemic were going well.

KEYWORDS: Pandemic, COVID-19, Radiology, Dental Clinic

INTRODUCTION

The COVID-19 pandemic has spread worldwide and was first discovered in China in December 2019. It spread to other countries until Indonesia finally got involved in March 2020. The virus is recognized to transmit from human to human through droplets of fluid that comes out while coughing and sneezing. Therefore, the virus can be able to get into the open mucosa. Some general signs and symptoms of COVID-19 infection are respiratory disorders such as fever, cough, and shortness of breath. More severe cases will lead to pneumonia, kidney failure, and death.

Radiographic examination is a test used in dentistry to create a diagnosis, make a treatment arrangement, and evaluate an optimal treatment result. Radiography is the utilization of X-rays to form the shadow of an object in the examined film.

The dental professional organization has issued several recommendations for dentistry services during the COVID-19 pandemic, including radiological examination services of dentistry which can be a source of infection and transmission of COVID-19. The condition can occur among radiology staff or patients who do not wear a mask during the examination, or the film of radiograph result which could not be disinfected because it can damage the image quality and diagnostic information, particularly in the intraoral result of radiographic examination. The intraoral radiographic examination technique can cause cough stimulation, saliva secretion, and gag reflex, increasing the risk of virus transmission. The Sars Cov-2 virus in the infected patient's saliva becomes a risk of direct transmission from human to human. Therefore, the Center for Dental Radiology

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Association (PPIRKG) appealed to postpone all radiology inspections except for an emergency.

As time goes by, the need for dental care will continue to increase. However, the COVID-19 outbreak will lead society to anxiety and fear. Consequently, many people do not trust the health care system and are reluctant to contact health workers.

According to previous research, based on initial data taken from two health care facilities that provide dental x-ray photo service, namely RSUD MEURAXA Banda Aceh and my dental practice, stated that the utilization of radiography services in terms of level dental and oral radiology visitors in MEURAXA Hospital as a total of 1985 visitors in

2019 and decreased as much as 1036 in 2020, while the percentage level of dental and oral radiology visitors was 100 visitors at my dental practice in 2019, then reduced to 40 in 2020. The above shows the decreasing number of dental and oral radiology department visitors during the COVID-19 pandemic.

Based on the background and results above, the researchers intend to examine the utilization of dental radiology services during the COVID-19 pandemic and the factors that influence it in Banda Aceh

MATERIALS AND METHODS

Research design in the study is a descriptive method with a cross-sectional approach, namely research to describe a condition by analyzing data in one-on-one time without re-monitoring. The research was conducted at the Hospital of Syiah Kuala University in July 2021, and the research subject used the google form to fill out the research questionnaire.

The population in the research is RSGM radiology patients from 2019-2020-2021. The study subjects were Dentist patients who were recommended to take a dental x-ray at the RSGM Syiah Kuala University by intraoral or extraoral technique according to age classification. The sampling was carried out by a purposive sampling method based on the researcher's consideration following inclusion and exclusion criteria. After counting, the research subject obtained a total of 1306 people.

The inclusion criteria in this study are the research subject agreed to the informed consent available on the link. First, who already took two x-rays of periapical teeth or panoramic before and during the COVID-19 pandemic. They furthermore have a smartphone and can access google forms. Exclusion criteria in the research are who is uncooperative and never takes a periapical x-ray or panoramic during the covid-19 disease.

The initial stage was creating a google form and then checking the validity and reliability questionnaire to 32 respondents, indicating that the

whole questions were valid and reliable. Furthermore, preparing to distribute google forms to research respondents. Several google forms were distributed through high school friends, relatives, neighbors, and neighboring religious study groups. The research has been done online by instructing the fill in personal data at once asked for approval as a research subject by reading the informed consent that has been given in the form of a distributed google form via the What's App community

group to acquire subject identity data including name, age, gender and other information required to complete the data subject. Then, the subject who has read the informed consent and agreed to participate in the research preferably fill out a subject selection form via online google form with a time estimation of filling out the questionnaire in the study for about ± 10 minutes. The obtained data will be collected, processed, and presented in the discussion chapter by researchers.

Data Analysis

Data that has been accumulated through questionnaires would be processed by using Microsoft Excel 2010. The data that has been processed will be presented as a percentage to observe the overview of the utilization of dental radiology services during COVID-19 disease in Banda Aceh.

RESULTS

One hundred four research subjects were willing to fill the questionnaire appropriate to research

inclusion criteria. The research result can be viewed in the table as follows.

Table 1. Research Subjects

Gender	Quantity	Percentage
Male	29	27,9%
Female	75	72,1%
Total	104	100%

Table 1. indicates that the majority of research subjects are women with 75 people (72.1%) and the research subjects are men with a total of 29 people (27.9%).

Table 2. Subject frequency distribution based on age

Variable	Category	Quantity	Percentage
Age	17-25 years old	70	67,3%
	26-35 years old	20	19,2%
	36-45 years old	8	7,7%
	46-55 years old	3	2,9%
	56-65 years old	1	1,0%
	> 65 years old	2	1,9%
Total		104	100%

According to **Table 2.** There are six frequency distribution table categories based on the subject's age. The majority of issues of RSGM radiography, Faculty of dentistry, Syiah Kuala University include into 17-25 years old of aged categories with 70 people. Then followed by the 26-35 years old variety

with a total of 20 people. Furthermore, the research subjects were 36-45 years old, as many as eight people. Last, the subjects aged 56-65 as many as a person and those aged > 65 years old as many as two people.

Table 3. Subject distribution frequency based on educational background

Variable	Category	Quantity	Percentage
Education	Junior High School	2	1,9%
	Senior High School	46	44,2%
	Bachelor	47	45,2%
	Others	9	8,7%
Total		104	100%

Table 3. shows the frequency distribution based on the subject's last education. The majority of issues graduated with bachelor's degrees, as many as 47 people. Subjects who graduated from senior high school with a total of 46 people, two people graduated from junior high school, and other categories included nine people.

Table 4. indicates distribution frequency based on the shooting radiographic that subjects had done during visits to RSGM FKG USK. 57 people took periapical images than 38 people took panoramic photos, and nine topics shot both of them at once

Table 4. Subject distribution frequency based on radiography type

Variable	Category	quantity	percentage
Radiographic type	Periapical	57	54,8%
	Panoramic	38	36,5%
	both	9	8,7%
Total		104	100%

Based on **Table 5.** indicates the number of respondents (44.2%) who had performed RSGM patient FKG USK visits decreased radiological inspection services at RSGM during the covid-19 pandemic in 2020 and 2021. during the covid-19 pandemic.
Based on **Table 6.** shows that there are 46

Table 5. RSGM Radiology patient's visit, Syiah Kuala University in 2019-2020-2021

Visit (year)	periapical	panoramic	Total of patient
2019	1102	613	1715
2020	142	0	142
2021	995	169	1164

Table 6. Distribution frequency for those performing Radiology Examination Service of RSGM, Syiah Kuala University.

Variable	Category	Quantity	percentage
performing dental and oral radiology services	Yes	46	44,2%
	No	58	55,8%
Total		104	100%

Table 7 indicates that RSGM Dentistry of Syiah Kuala University's radiology services was worse during the pandemic than most respondents stated "No" in the questionnaire. **Table 8.** shows that the reasons for Canceling Radiology Examination are generally because of having no desire to go to the clinic, as many as 22 people and other causes are worrying about traveling by public transportation.

Table 7. Patient Response to Dental Radiology Services of RSGM, Syiah Kuala University during the pandemic compared before the pandemic.

Variable	category	quantity	percentage
Radiology services are better before and during the pandemic	Yes	49	47,1%
	No	55	52,9%
Total		104	100%

Table 8. Reason of cancellation of performing Dental Radiology Examination and Mouth of RSGM FKG Syiah Kuala University

Reason of cancellation	Quantity	Percentage
Worries about traveling by public transport	5	8,06%
Self-isolation desire	21	33,8%
I do not want to go to the clinic because of worry about	22	35,48%

Table 9. indicates the frequency of subject visits to the dental radiology section and mouth of the RSGM FKG Syiah Kuala University. Most subjects visit about two times, a visit to the dental radiology section and mouth, followed by three visits.

Table 9. Distribution frequency table of the visit to Dental and Oral Radiology RSGM FKG Syiah Kuala University

Visit frequency	quantity	percentage
Two times	69	66,3%
Three times	29	27,9%
Four times	5	4,8%
Five times	1	1,0%
Total	104	100%

DISCUSSION

This descriptive research aims to observe how to utilize the dental radiology services during the COVID-19 pandemic and the factors that influence it in Banda Aceh. This research was conducted at the RSGM Faculty of Dentistry, Syiah Kuala University, with the subjects targeted are patients of the RSGM radiography section, Faculty of Dentistry, Syiah Kuala University. In addition, the number of subjects in the research is 104 people, and the analysis has been carried out for 14 days. Based on **Table 5.** which consists of 29 men and 75 women. The result of the study conducted by Yunus Muliaty (2018) indicated that female subjects access more dental radiology services than male subjects.

Based on **Table 5.2.** shows the frequency of research subjects based on the age of the subject ranging from 17 to 65 years old, which is classified to 70 subject's ages are run from 17-25 years old, 20 people are 26-35 years old, eight people are 36-45 years old, three people are 46-55 years old, a person is 56-65 years, two people are over 65 years old. In contrast to the results of research conducted by Isil Yurdaisik (2021), most patients' age range in the radiology department are 41-50 years old.

Based on **Table 5.3.** indicates that subject frequency distribution by last education level, as many as two subjects have previous education at junior high school level. Furthermore, 46 issues have primary education at senior high school level, 47 topics have last education at Bachelor degree, and nine subjects have previous education that is not included in the abovementioned categories.

Based on **Table 5.4.** indicates distribution frequency by type of radiography that has been carried out, as many as 57 people did Periapical type x-ray photo, then 38 people performed panoramically, and other types of x-rays did as many as nine people who were 29 years old. **Table 5.3.** shows subject frequency distribution by the class year of Profession Program of Dentistry Faculty of Syiah Kuala University. The subjects' class years range from 2016-2020. Research subjects class 2016 are seven people, class of 2017 as many as two people, class of 2018 as the total of 38 people, class of 2019 as many as 17 people, and a class of 2020 as many as five people.

Based on **Table 5.5.** shows the number of patients who come to perform of taking radiographs at the RSGM Faculty of Dentistry, Syiah Kuala University. It indicates the increasing

number of visitors from year to year, 2020 to 2021. RSGM medical school of Syiah Kuala University was not operating because of the pandemic in early 2020, and it started re-opening to the public in the middle of 2020. Need to know that all activities at either the Dentist's clinic or oral and dental Hospital are discontinued or limited due to the increase of COVID-19 cases.

Based on Table 5.6. indicates how the Dental Hospital radiology service and Mouth, Faculty of Dentistry, Syiah Kuala University (RSGM USK) during COVID-19 disease, it be obtained that 46 people (44.2%) who have received radiology services at the RSGM during COVID-19 pandemic and several 58 people or (55.8%) decided not to take advantage of radiology examination services at RSGM during the COVID-19 pandemic. The utilization of radiology services during the pandemic at RSGM USK in terms of the number of patient visits had decreased by several factors. In contrast to Isil Yurdaisik's (2021) research, 64% of patients who took radiographs were satisfied or felt that radiology services were good. In contrast to a study conducted in Egypt where 75% of radiology visitors took advantage of radiology and are confident with the existing services. Utilization and satisfaction of patients are the essential factors that represent the quality of the Hospital. Patients' satisfaction reflects a discrepancy between existing services and service levels expected by patients. In addition, by excellent service, then healing can be obtained. Based on the table, we can observe the attachment regarding subjects' answers based on the questionnaire. On questions about COVID-19, has the issue made an appointment earlier to take the examination to the dental and oral radiology department? There were 82 people (78.8%) answered "Yes" on the questionnaire, and 22 people (21.2%) answered "No" on the questionnaire.

On the question of the subject's knowledge about whether the examination in the dental and oral radiology department was allowed during COVID-19, as many as 102 people (98.1%) answered yes to the questionnaire, and two people (1.9%) answered no on it. Visit the dental and oral radiology department in March 2020 based on the Central Board of the Radiology Dentistry Association (PPIKARGI) issued an appeal to postpone all radiology inspections except for medical emergencies. However, as time goes by and the increasing needs of various dental care, it is required to adapt to dentistry service procedures. Indonesian Dentist Association (PDGI) and the Association of Dental and Oral Hospitals

Indonesian Education (ARSGMPI) released Dentist's handbook in the New Normal Era and Practice Management Guidelines of Dental and Oral Hospital as the essential guide. It includes implementation procedures of dental radiology examination.

On the question of the subject's opinion, does the subject need to perform a dental mouth radiology examination during the COVID-19 pandemic, as many as 95 people (91.3%) answered yes to the questionnaire, and nine people (8.7%) answered no to the questionnaire. According to research conducted by Alharbi et al. (2020), they are decreasing dental and oral patients since dentist practice closing is only 38%. That research shows that society still requires dental procedures since the COVID-19 pandemic.

The questions regarding the subject's experience about ever and not canceling or postponing x-rays in the last six months, there were 42 people (40.4%) answered yes to the questionnaire, and 62 people (59.6%) answered no on it. A visit to the radiology department during the pandemic was allowed for emergencies only. In the research in Turkey, it was obtained that 94.6% of patient visits to the radiology department are due to emergencies only. Shortly during the pandemic, it was great to delay visits when taking radiological images was non-emergency. On questions regarding the clinic or Hospital that was visited by the subject at the time of dental x-rays applied health protocols, as many as 104 people (100.0%) answered yes to the questionnaire and 0 people (0%) responded no to the questionnaire. Based on the result of a survey conducted at the University of Washington Medicine, the radiology department of the university had prepared a lot of preparations to encounter COVID-19, among other things, including screening before scheduling radiographs, isolation from patients, training of employees at home illness, travel restrictions for workers in Hospital and getting to the utilizing of PPE has been conducted to reduce the spread of the COVID-19 virus in Hospital. Furthermore, based on the survey, other hospitals respond to the distance of COVID-19 by strengthening the screening and using PPE during work.

On the question about clinic staff/ Hospital that the subject visited at the time of performing X-rays of teeth and mouth wearing PPE (Personal Protection Equipment) complete, as many as 91 people (87.5%) answered yes to the questionnaire and 13 people (12.5%) answered no to it. Wearing PPE during a pandemic is highly recommended. Actually, before the existence of the

pandemic, the radiology department had already adjusted the restricted infection control system. However, since the pandemic, more protection has been tightened, and a minimum standard of wearing PPE, such as wearing disposable surgical masks, caps, gloves, hands, long-sleeved gowns and glasses, and face shields. Goggles and face shields must be disinfected with soap/detergent and pouring water containing as much as 70% disinfectant.

On the question, before performing dental x-rays, the radiology department officer asked for the antigen swab test / PCR results. As many as 65 people (62.5%) answered yes to the questionnaire, and 39 people (37.5%) answered no. In a survey conducted at the University of Washington Medicine, employees in the radiology department must perform detection symptoms associated with COVID 19 early. For patients suspected of experiencing COVID-19, the whole procedure had to be postponed until the diagnosis of illness is released.

On the question about before taking a dental x-ray, the officer asked about the history of COVID-19. As many as 29 people (27.9%) answered yes to the questionnaire, and 75 people (72.1%) answered no to it. The COVID-19 pandemic period on the patient's condition who should get treatment to a dental practitioner, so that management is carried out at the stage before arrival, the location of waiting in the waiting room, the set of dental care and the step after dental care. Before patient arrival, firstly make sure the patient does not experience symptoms of COVID-19 by screening on the patient's medical history. On the question about during the COVID-19 pandemic, has the subject found it easier to obtain dental and oral radiology services, 36 people (34.6%) answered yes to the questionnaire, and 68 people (65.4%) responded no to the questionnaire. The spread of COVID-19 is high in Indonesia, 121,226 sufferers confirmed the SARS-Cov-2 virus infection. Some of them are dentists, which increases the worries for dentists in doing their jobs for radiography. Patients who require intra-oral dental x-rays will find it difficult to access the services during the pandemic because intraoral radiography is not recommended to be performed. Still, this radiograph could not be avoided for image detail and economic reasons.

On questions regarding subject availability to take dental x-rays more than once during the pandemic, as many as 34 people (32.7%) answered were willing, and 70 people (67.3%) were not helpful. Most respondents decided not to take x-

rays more than once during the pandemic. Based on research conducted in Malaysia, the patient refused to take radiographs because the patient did not know what the use of taking radiographs and lack of knowledge about how much the dangers of taking radiographs. Research conducted by Wafa Alfaleh et al. said that the patient was not informed about how hazardous radiographs will be carried out, affecting the patient's negative perspective regarding dental and oral radiology. Regarding the subject, the subject's relatives will be recommended to examine dental and oral radiology during the pandemic. As many as 24 people (23.1%) answered yes to the questionnaire, and 80 (76.9%) answered no. From the result, it is obtained that respondents did not recommend their relatives to perform the examination. It is because the patients were not satisfied with the services provided by the radiology department to them. On questions regarding the subject feeling secure and confident doing the dental and oral radiology department check during the pandemic, as many as 27 people (26%) answered yes on the questionnaire, and 77 people (74%) answered not on the questionnaire. It is the opposite of the research of Musfirah Nisa et al., in Makassar City, where patients feel secure and brave going to the dental and oral Hospital with excuses. The policy that was implemented has been effective because the tools that were used by medical personnel have been sterile and clean. The last question regarding the subject's satisfaction with the service of the dental and oral radiology department at the hospital/clinic that was visited by the subject during COVID-19, as many as ten people (9.6%) answered yes to the questionnaire, and 94 people (90.4%) responded no to the questionnaire. The discovery from research which was conducted by Isil Yurdaisik (2021) in Turkey, indicated that 95% of the patients who took images in the radiology department were satisfied with hospital services during the pandemic. This result is in contrast to the finding which was found by researchers were only 9.6% subjects who are confident with the assistance of the radiology department. The difference in these findings is due to environmental conditions in the research area, and differences in patients understanding of the employees in the radiology department causes dissatisfaction regarding what patients obtained.

Based on Table 5.7. indicates the subject's feedback about the service of the dental and oral radiology department and whether it was better than before the pandemic there are 49 people

(47.1%) answered yes to the questionnaire, and 55 people (52.9%) answered no on the questionnaire. Based on a previous study according to patients at a dental and oral Hospital and clinic in Makassar, the policy that was implemented was effective because the tools used by medical staff were visibly sterile and clean therefore everyone who did a dental and oral examination already dared to go to the Hospital by obeying health protocol.

Based on Table 5.8. shows the reasons for canceling radiological examinations and the most common reason is that the subjects did not want to go to the clinic. As many as 22 people, in the study that was conducted in Saudi Arabia that dental fear is the most common reason for canceling an appointment to the Dentist. The increasing dental anxiety is related to the patient's anxiety of performing maintenance and added to increasing the transmission of COVID-19 in Arabia. As many as a thirds of patients were afraid to go to the Dentist during the pandemic. 42 other factors affect the reason to cancel or postpone the cancellation of the inspection radiology. The majority answered that they did not want to go to the clinic because of enabling factors consisting of

family resources (income, insurance coverage), service quality, and distance.

Based on Table 5.9. indicates the frequency of visits to the dentistry of radiology department that the majority of respondents have made two visits to the RSGM Faculty of dentistry, Syiah Kuala University, according to a review conducted in Iran, Brazil, and America that the follow-up for the result of dental care during the pandemic lead to the patient that they should return to the clinic, because with the follow-up, it can prevent the disease comes back and gets worse, For example, root canal treatment requires scheduling meetings several times and Several radiographs are necessary either.

This research is still minimal and has several obstacles, including no conducting of collected variables related to full service utilization regarding the theoretical framework, including the factors that affect service utilization. Researchers conducted interviews using questionnaires via google form only for patients who ever had a radiological examination previously based on the patient's memory.

CONCLUSION

The utilization of dental radiology services at RSGM during the COVID-19 pandemic has decreased in terms a number of factors. The number of patient visits in RSGM FKG USK radiology drastically decreased during 2020-2021. Majority of patients stated that they preferred to

isolate themselves at home and decided not to go to the RSGM during the COVID-19 pandemic. However, several patients indicated that radiology services at the RSGM were running correctly during the pandemic.

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