DESCRIPTION OF DENTAL CARIES ON PANORAMIC RADIOGRAPH AT RSGM UNJANI CIMAHI INDONESIA

(GAMBARAN KARIES GIGI PADA RADIOGRAF PANORAMIK DI RSGM UNJANI CIMAHI INDONESIA)

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ABSTRACT

Panoramic radiograph was a diagnostic method that can see the overall picture of caries in the maxilla and mandible, with a wide range of caries lesions. The large detail area seen on the panoramic radiograph was instrumental for diagnosing caries location for the entire jaw. This study aimed to determine the appearance of dental caries based on panoramic radiographs at RSGM Unjani. This research was a descriptive study using probability techniques in the form of simple random sampling with 43 panoramic radiographs as a sample. The results of the study showed that in panoramic radiographs at RSGM Unjani that the highest frequency based on sex was female patients, the highest frequency based on age were patients in the 45-65 years age group, the highest frequency was based on the incidence location of dental caries were patients with dental caries in the anterior teeth and M1 teeth, and the frequency of caries in deciduous teeth was 100% in the 5-11 years age group. The

study conclusion was all panoramic radiographs at RSGM Unjani have caries.

Keywords: caries; panoramic radiograph; RSGM Unjani

ABSTRAK

Radiograf panoramik merupakan alat penunjang diagnosis yang dapat melihat gambaran karies secara menyeluruh di rahang atas dan rahang bawah, dengan cakupan lesi yang luas. Detail area luas yang terlihat pada radiograf panoramik ini sangat berperan dalam diagnosis lokasi karies untuk keseluruhan rahang. Tujuan dari penelitian ini untuk mengetahui gambaran karies gigi berdasarkan radiograf panoramik di RSGM Unjani. Penelitian ini merupakan penelitian deskriptif dengan menggunakan teknik probability berupa simple random sampling dengan jumlah sampel 43 radiograf panoramik. Hasil penelitian menunjukkan bahwa seluruh sampel radiograf menunjukkan frekuensi tertinggi berdasarkan jenis kelamin adalah pasien berjenis kelamin perempuan, frekuensi tertinggi berdasarkan usia adalah pasien pada kelompok usia 45-65 tahun, frekuensi tertinggi berdasarkan kejadian karies gigi adalah pasien dengan karies gigi pada gigi anterior dan gigi M1, dan frekuensi karies pada gigi desidui ada pada 100% pada kelompok umur 5-11 tahun. Berdasarkan hasil analisis yang telah dilakukan, maka didapatkan kesimpulan bahwa gambaran karies gigi berdasarkan radiograf panoramik di RSGM Unjani seluruhnya mengalami karies.

Kata kunci: *karies; radiograf panoramik; RSGM Unjani*

INTRODUCTION

Caries is a disease that is common in society, this generally occurs in developing countries such as Indonesia. In developing countries people do not yet know the causes and effects of caries. Caries can result in decreased physical functions such as mastication, inflammatory pain, spread of tooth decay, and even a decrease in alveolar bone. These impacts can be avoided if diagnosed and treated early.[1,8]

Caries begins with the process of demineralization of the hard tissues of the teeth (enamel, dentin and cementum) which is followed by the destruction of the organic matter of the teeth by the creation of acid by hydrolysis of the accumulation of food residues on the tooth surface. Not only that, aggressive tooth surfaces can also cause plaque to stick easily and help the growth of dental caries. The two germs most universally responsible for dental caries are Streptococcus mutans and Lactobacillus.[9]

If it is concluded that caries is caused by cariogenic microbiota, substrate (carbohydrates), host (teeth and saliva), and the duration of the interaction process between these aspects.[10]

Another aspect that can influence the formation of caries is the assessment of the patient's risk factors. The formal designation for this examination is caries risk assessment (CRA). The aspects used in CRA are the patient's oral health history such as past experience, socioeconomic factors, and biological factors. Risk factors and precipitating factors, such as diet, saliva, and microbes, are biological factors that will be assessed together with socio-economic factors in the form of predictive models and biological factors. Exposure to fluoride, frequency of eating sweet foods and drinks, age, food consumed by the patient, and the habit of cleaning the teeth by the patient are factors for assessing CRA. In addition, salivary flow and the amount of S. mutans in saliva also includes an assessment of individual biological factors.[11]

Clinically the diagnosis of caries can be enforced by means of direct visual examination, translumination, and the use of a sonde. This is easily seen on the buccal and lingual surfaces, not so easily on the occlusal surface and difficult on the proximal surface due to the presence of adjacent teeth.[12]

Radiographs are very useful for detecting carious lesions because the carious process is caused by demineralization of enamel and dentin. The lesion appears on the radiograph as a radiolucent because the demineralized tooth cannot absorb x-ray photons as an unaffected part. The lesions detected on the radiograph are simply the result of bacterial activity on the tooth surface and the radiograph cannot tell whether the lesion is active. Long inactive lesions will still appear as demineralized "scars" in hard tissue. The reason is that remineralization occurs on the outer surface because the mineralized solution from saliva cannot diffuse into the body of the lesion.[13]

X-rays are absorbed by hard tissue and when X-rays are directed at the teeth, an image is formed on the film placed behind

them. The loss of minerals by caries will affect the image on the film, and this is used to detect caries on teeth in radiographic examinations.[14]

Panoramic radiography is a technique in showing a panoramic tomographic image in which a panoramic view of a person's facial structures which includes the maxilla, mandible and their supporting tissues occurs where there is only minimal distortion and overlap of the entire anatomy seen from the contralateral side. Panorex or orthopantomogram which is another name for panoramic radiography is very often performed in dentistry due to its simple use technique, as well as a broad view covering all teeth and jaws with the use of a fairly low radiation dose.[15]

The advantage of panoramic radiography is that it will show a panoramic view of all the broad tissues seen in one film such as the structure of a person's face which includes the maxilla, mandible and supporting tissues where there is only distortion and minimal overlap of the entire anatomy seen from the contralateral side. In terms of radiation dose, the patient will receive a fairly low radiation dose, apart from that this radiography can be used on patients who cannot open their mouths, then the examination process is fairly fast, namely 3-4 minutes (which includes time to position the patient and the device). .[16]

Disadvantages of panoramic radiography are that panoramic radiographs can only see body sections, structures or abnormalities clearly, visible soft tissue shadows can also blur hard tissue structures, shadow artifacts and radiographic movement together during the procedure can produce distortion and magnification on movies.[17]

Panoramic radiographic examination is an examination that can be used as a supporting examination of the marginal or alveolar bone tissue, a treatment plan for the treatment of disease and an overall evaluation of general diseases and certain specific oral diseases in making a diagnosis and determining a treatment plan for patients infected with caries. Panoramic radiographs can provide information in determining a caries diagnosis where it cannot be seen by the eye on clinical examination such as root caries or secondary caries.[17]

Panoramic radiography (also known as pantomography) is an extraoral radiographic technique that produces a beam projection covering the maxillary and mandibular dental arches and their supporting structures in a panoramic view. Panoramic radiography is very useful clinically in the diagnosis of a disease of the mouth and teeth where the projection of irradiation requires a wide view. Panoramic

radiographs are often used in evaluating the initial diagnosis of dental and oral disease in patients to obtain information that will assist in determining treatment plans or other radiographic investigations.[18]

During infancy and childhood, primary teeth are still present and caries is common due to the use of bottle feeding for too long so that most of the cases that exist are rampant caries. The prevalence of caries in women is higher than men. Gender shows that there is a difference in the percentage prevalence of caries in men by 87.2%, lighter than women by 89.9%. 3 In adolescents and adults, with increasing age, the likelihood of developing caries on the teeth will increase, marked by an increase in plaque accumulation. and microorganisms, mostly occur in M1 teeth.[19,20]

In Indonesia, the highest caries prevalence was in the age range 45 to 54. [3] West Java Province was a large contributor caries prevalence compared to the proportion of caries sufferers in Indonesia in 2018, So, it is necessary to identify early diagnosis to minimize this situation.

On radiographic examination, dental caries can be seen from the anatomy of the dental crown from incisal or occlusal to root with radiolucent characteristics that should look opaque. Radiolucency of the dental anatomy that appears on the radiograph is the result of demineralization due to caries, the demineralization that occurs will reduce tooth density and can even form cavities.

Efforts to identify a comprehensive and effective diagnosis can be carried out by panoramic radiographs, with a wide field of view and small radiation, making this radiograph very helpful in early identification of caries in all teeth in the jaw.

Based on this, the author was interested and considers this research essential to saw the role of panoramic radiography in identifying caries. This research will be carried out by calculating caries based on panoramic radiographs at RSGM Unjani Cimahi.

METHOD

Research design

The research method used in this research is descriptive type, namely by taking secondary data in the form of a panoramic radiographic database, aiming to determine description of dental caries based on panoramic radiographs at RSGM Universitas Jenderal Achmad Yani Cimahi Indonesia.

Object of research

The object of this study was 43 randomized panoramic radiographs from patients at RSGM Universitas Jenderal

Achmad Yani Cimahi Indonesia in 2019.

Number of Samples and Sampling Techniques

The number of samples required for this study that met the inclusion criteria, obtained by using a probability technique in the form of simple random sampling. The number of samples in this study was determined using the following proportion estimation formula:

$$n = \frac{Z_{\alpha/2}{}^2 \,.\, \mathrm{p} \,.\, \mathrm{q}}{d^2}$$

n = sample size
p = proportion of caries in West Java 45.7% (Rikesdas)
q = 1 – p (54.3%)
Zα/2 = standard devariate alpha (1.96)
d = margin of error (15%)

$$n = \frac{1{,}96^2 \,.\, 0{,}457 \,.\, 0{,}543}{0{,}15^2}$$

n = 42,369

n43≈

Based on the calculation results, then the minimum sample in this study is as many as 43 samples.

Research Ethical Aspects

Data obtained from panoramic radiograph at RSGM Unjani. In practice, this research has received ethical approval from the ethics committee of Jenderal Achmad Yani University with the number 004/UM1.01/2021.

RESULT

Overview of Research Subject Characteristics

Based on the Table 1 The appearance of caries seen from the panoramic radiograph of RSGM UNJANI showed that there were more female patients than male patients.

Table 1. Frequency distribution of patient characteristics by sex (n = 43)

Variable	Amount	Percentage
Gender		
Man	21	48.84
Woman	22	51.16
Total	**43**	**100.00**

Chronological Age Overview

Table 2 Caries features on panoramic radiographs of 43 samples grouped by patient age.

Table 2. Frequency distribution of patient characteristics by age (n = 43)

Variable	Amount	Percentage
Age		0.00
0-11 years old	5	11.63
12-25 years	8	18.60
26-45 years old	12	27.91
45-65 years old	14	32.56
>65 years old	4	9.30
Total	**43**	**100.00**

DISCUSSION

Based on the Table 1 The appearance of caries seen from the panoramic radiograph of RSGMP UNJANI showed that there were more female patients than male patients. The result is in

line with the Basic Health Research (Riskesdas) 2018, which showed that most caries sufferers suffered by female patients with the highest proportion of 45.7% compared to male patients with highest proportion 44.8%.[3] One of the studies with the same opinion was conducted by Amelia Kristanti Rahardjo et al. in 2016, which showed that the prevalence of caries in female patients (59.8%) was more significant than the prevalence of caries in male patients (40.2%).[5] Other studies proposed by Esperanza Angeles Martinez-Mier and Andrea Ferreira Zandona shows that the caries rate in women tends to be higher than in men due to biological factors, habits and diet.[6]

Table 2 shows that the highest frequency is patients in the 45-65 year age group, as many as 14 people (36.56%). The caries picture on the panoramic radiograph of the RSGMP UNJANI shows that the highest frequency is patients in the 45-65 year age group, this is in line with the Basic Health Research (RISKESDAS) Research and Development Agency of the Indonesian Ministry of Health in 2018 which showed that caries sufferers with a high proportion were in age 45 years and over.[3]

CONCLUSION

Based on the results of the analysis that has been carried out, it is concluded that the description of dental caries based on panoramic radiographs at RSGM UNJANI all experienced caries, with details of the highest frequency by gender being female patients, the highest frequency by age being patients in the 45-65 year age group. , the highest frequency based on the incidence of dental caries were patients with dental caries in the anterior teeth and M1 teeth, and the caries frequency in primary teeth was at 100% in the 5-11 year age group.

CONFLICT OF INTEREST

The author hereby declares that there is no conflict of interest in the written scientific article.

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REFERENCES

1. Budisuari MA, Oktarina, Mikrajab MA. Relationship between eating patterns and brushing habits with dental and oral health (caries) in Indonesia. Health Systems Research Bulletin. 2010; 13(1): 83-91.

2. Lee HY, Choi YH, Park HW, Lee SG. Changing Patterns in the Association Between Regional Social-economic Context and Dental Caries Experience According to Gender and Age: A Multilevel Study in Korean Adults. International. Journal of Health Geographic. 2012; 11(3): 46-50.
3. Basic Health Research (RISKESDAS). Research and Development Agency of the Indonesian Ministry of Health; 2018: 179.
4. Masthoff M, Gerwing M, Masthoff M, Timme M, Kleinheinz J, Berninger MSC. Dental Imaging – A basic guide for the radiologist. Fortschr Röntgenstr. 2018: 243.
5. Rahardjo AK, Widjiastuti I, Prasetyo EA. Prevalence of Posterior Teeth Caries by the Depth of Cavity, Age and Gender at RSGM FKG UNAIR in 2014. J Conserv Dent 2016; vol 6 no 2: 66-70.
6. Martinez-Mier EA., Zandona AF. The Impact of Gender on Caries Prevalence and Risk Assessment. Dental Clinics of North America 2013; 57(2): 301–315.
7. Liwe M, Mintjelungan Nc, Gunawan P.Prevalence of Caries in Permanent One Molars in Children aged 6-9 Years in Elementary Schools, South Tomohon District.Journal of E-Dental (Eg); 2015 Mar: 1(1) :60-8.
8. Tarigan R, Karies Gigi. Jakarta: EGC, 2014: 1-23.
9. Soeyoso UM, Muntaha A, Zaman C. Prevalensi dan faktor risiko karies gigi murid Sekolah Dasar kelas III-IV Negeri 161 Kota Palembang 2009. Jurnal Kesehatan Bina Husada 2010; 6(1): 12-20.
10. Hurlbutt M, Novy B, Douglas Y.Dental caries:a pH-mediated disease.J Calif Dent Hygienist's Assoc 2010; 25: 11-6.
11. Ford TRP. Restorasi Gigi (The Restoration of Teeth). Second Edition: 1-14.
12. White, S.C, Pharoah, M.J. Oral Radiology: Principle and Interpretation. 6 Ed. Mosby Co., Philadelphia. 111-272.
13. Carranza F. A., Takei H., Newman M., Klokkevold P. 2018. Clinical periodontology. 13th ed. W.B. Saunders Co, Philadelphia. 249.
14. Kardjokar R. F. Textbook of dental and maxillofacial Radiology. Jaypee Brothers Medical (P) LTD, St Louis, 2009: 146-200.
15. Hasan A, Aydin O. Diagnostic Imaging in Oral and Maxillofacial Pathology. Croatia: Intech Europe. 2011: 216-36.
16. Pamadya S, Azhari, Pencitraan CBCT 3d kasus temuan incidental pada

radiograf panoramik, Medika Kartika 2018, vol 1.

17. Sischo L, Broder HL. Oral health-related quality of life: What, why, how, and future implications. J Dent Res. 2011;90(11): 1264–70.

18. Ferraro M, Vieria A. Explaining gender differences in caries: a multifactorial approach to multifactorial disease. International J of Dentistry 2010: 1-5.

19. Karjod kar. Textbook of Dental and Maxillofacial Radiology. Second edition.Jitendar P Vij; New Delhi. 2009: 159.

20. Frommer, Herbet H. Radiology for the dental professional. 9th ed. United States of America. Elsevier, 201: 269.