

ORIGINAL ARTICLE

The Difference in Severity of Caries Code 5 or 6 according to ICDAS among Caries Risk Groups in Dusun Pendul Society

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ABSTRACT

Background: Dental caries is one of the most common human diseases and affects most individuals. The severity of dental caries can increase over time if it is not handled properly. The basis for the development of efforts to prevent caries is to understand the risk of the caries.

Aims: The purpose of this study is to determine the difference in severity of caries code 5 or 6 according to ICDAS among caries risk groups in Dusun Pendul society.

Subjects and Methods: The type of this study was observational analytic with cross sectional design. The study took place in December 2018 - January 2019 in Dusun Pendul. The research subjects were 87 selected using the accidental sampling method with the criteria of age ≥ 5 years. Caries severity was assessed using the ICDAS code 5 or 6 and the risk status of dental caries was assessed using the caries risk assessment according to the American Dental Association. Data analysis used in this study was the Kruskal-Wallis hypothesis test which was then followed by the Mann-Whitney U test.

Results: The results of this study indicate that there is a significant difference in severity of caries in each caries risk group ($p < 0.05$).

Conclusion: There is a difference in severity of caries code 5 or 6 according to ICDAS among caries risk groups in Dusun Pendul society, the higher the caries risk status the higher the caries severity.

Keywords: Dental Caries, ICDAS, Caries Risk, Caries Risk Assessment, Society

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INTRODUCTION

Dental caries is a complex and continuous biological dynamic process of tooth decay^[1]. Caries is taken from the Latin word which means damage or decay. The damage can affect enamel, dentine, and cementum^[2]. Dental caries is a progressive damage to enamel, dentine, and cementum which is initiated by bacterial activity on the surface of vulnerable tooth^[3].

Dental caries is one of the most common human diseases and affects most individuals^[4]. Epidemiological studies of dental caries are very useful in determining the needs and effectiveness of dental care. The most common epidemiology of dental caries is the DMF index^[1]. Based on the results of the basic health research called Riskesdas in 2013, DMF-T score in Indonesia stood at 4.6, where dental caries occurred in the Indonesian population, amounting to 460 teeth out of 100 people. The Special Region of Yogyakarta itself has a DMF-T score of 5.9, above the average Indonesian DMF-T score^[5].

The International Caries Detection Assessment System (ICDAS) is another way to detect the presence of dental caries lesions^[6]. This system can record the severity and incidence of dental caries lesions^[7]. The ICDAS uses codes that range from the initial changes seen in enamel to large cavities. Code 0 is a healthy tooth and there are no signs of caries lesions, codes 1 and 2 show early signs of caries lesions in tooth enamel, codes 3 and 4 describe caries lesions that begin to spread in tooth enamel, while codes 5 and 6 describe caries lesions as the most severe ones of all codes, which occurred in the depth of dentine^[6].

The basis for the development and application of caries prevention programs is a good understanding of caries as a multifactorial disease and is caused by interactions between the composition of microorganisms from plaque, substrate, and host factors^[8]. According to Purkait^[1] in caries formation, bacteria ferment carbohydrates to produce acids that damage the tooth structure. The bacteria synthesize sucrose from carbohydrates which then help the bacteria and plaque to attach and grow on hard and smooth tooth surface in certain period.

The diagnosis and treatment of dental caries for a long time are based on identification of demineralization or cavitation on the tooth surface, and its treatment with caries tissue extraction and appropriate restoration placement, however, it is now known that caries management protocols without addressing risk factors are responsible for this disease will only produce new caries lesions that arise and failure of each treatment given^[9]. Assessing patient caries risk status is an important component in modern dental caries management, the emphasis is on non-operative or preventive approaches^[10]. One method of caries risk assessment that is often used is conducting surveys using the Caries Risk Assessment (CRA) questionnaire form that was made by the American Dental Association^[11].

The purpose of this study was to determine whether or not there are differences in caries severity code 5 or 6 according to the ICDAS among caries risk groups in Dusun Pendul, Argorejo, Sedayu, Bantul, D. I. Yogyakarta.

SUBJECTS AND METHODS

This type of research was observational analytic with a cross sectional study design. The population of this study were all the people in Dusun Pendul, Argorejo, Sedayu, Bantul, D. I. Yogyakarta which consisted of RT 49, 50, 51, and 52 with a total of 730 people. The sampling was based on the inclusion criteria, which are the Pendul society who are above and the same age as 5 years old and those who have caries code 5 or 6 according to the ICDAS, and the exclusion criteria that have been determined by researchers, namely Pendul society who are

under the age of 5 years old and who does not have caries code 5 or 6 according to ICDAS also who does not want to be the subject of the study.

The subjects of the study were 87 selected using the accidental sampling method with the criteria of age 5 years old. The study took place in December 2018 to January 2019 in Dusun Pendul. The caries severity was assessed using the ICDAS code 5 or 6 form and the caries risk status was assessed using the caries risk assessment questionnaire according to the American Dental Association. The data analysis used in this study was the Kruskal-Wallis hypothesis test which was then followed by the Mann-Whitney U test.

RESULTS

The study on difference in caries severity code 5 or 6 according to the ICDAS among caries risk groups in Dusun Pendul, Argorejo, Sedayu, Bantul, D. I. Yogyakarta was held in December 2018 to January 2019. The study was conducted on 138 research subjects by interviewing and doing intraoral clinical examinations on the subjects of the study, but from 138 people only 87 people met the inclusion criteria.

Table 1. Characteristics of Respondents by Age

Age	Frequency	Mean of Teeth with Caries Code 5 or 6 ICDAS	Frequency of Caries Risk Respondents (CRA)		
			Low	Moderate	High
5-11 years old	20	2.1 teeth	1	7	12
12-25 years old	9	1.78 teeth	1	4	4
26-45 years old	19	2.47 teeth	1	6	12
46-65 years old	33	3.03 teeth	0	13	20
>65 years old	6	2.83 teeth	0	3	3

The table 1 above shows that the majority of respondents are the 46-65 years old group with 33 people. The highest average number of teeth with caries code 5 or 6 in this study is in the age group of 46-65 years which is equal to 3 teeth.

Table 2. Results of the Assessment of the Caries Code 5 or 6 according to ICDAS

	Frequency	Percentage (%)
Respondents with caries code 5 or 6 ICDAS	87	63.04
Respondents without caries code 5 or 6 ICDAS	51	36.96
Total	138	100

The table 2 above shows that of the 138 subjects studied, there were 87 people who had dental caries code 5 or 6 according to ICDAS. Based on the data in the table above, the frequency of respondents with caries code 5 or 6 can be seen as follows:

Frequency of Respondents with Caries Code 5 or 6 ICDAS

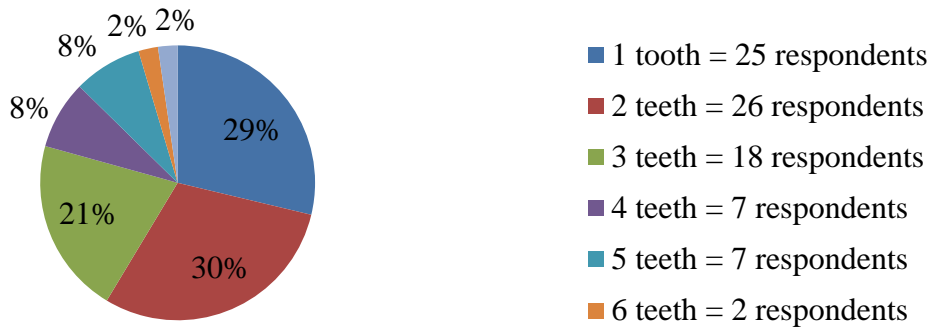


Figure 1. Frequency of Respondents with Caries Code 5 or 6 according to ICDAS

Based on the level of risk of caries, the respondents in Dusun Pendul can be grouped as three groups of caries risk categories as follows:

Table 3. Results of Respondents Grouping based on Caries Risk Assessment

Caries Risk Groups (CRA)	Frequency	Percentage (%)
Low	3	3.45
Moderate	33	37.93
High	51	58.62
Total	87	100

The table 3 above shows that of the 87 subjects studied, it was found that the number of teeth with caries code 5 or 6 according to the ICDAS was dominated by high caries risk group. Shapiro-Wilk normality test is carried out next with the following results:

Table 4. Results of the Shapiro-Wilk Normality Test

	Shapiro-Wilk		
	Statistic	df	Sig.
Moderate	0.261	33	0.000
High	0.212	51	0.000

The table 4 above shows that the results of the normality test in the moderate and high caries risk groups are 0,000 which mean that the data are abnormally distributed because $p < 0.05$. Data could be said to be normally distributed if the value of $p > 0.05$. Furthermore, a Kruskal-Wallis test is performed because the data is a non-parametric type and there are three groups of variables, the result is as follows:

Table 5. Result of Kruskal-Wallis Test

Caries Risk Groups (CRA)	Mean Rank	Sig.
Low	13.00	0.007
Moderate	37.73	
High	49.88	

The Kruskal-Wallis test result in table 5 above shows a significance value of 0.007, which means there is a significant difference between the mean values of caries risk groups because $p < 0.05$. The Mann-Whitney U test was then carried out to determine the difference in mean ranks among caries risk groups with the following results:

Table 6. Results of Mann-Whitney U Test

Caries Risk Groups	Mean Rank	Sig.
Low	7.50	0.045
Moderate	19.50	
Low	7.50	0.020
High	28.68	
Moderate	35.23	0.023
High	47.21	

The results of the Mann-Whitney U test in table 6 above show significance value between the low and medium caries risk groups, the low and high caries risk group, the moderate and high caries risk group have significant differences because $p < 0.05$.

DISCUSSIONS

This study has showed difference in caries severity according to the ICDAS between low, moderate, and high caries risk groups according to the American Dental Association in the Dusun Pendul region. The results of respondents' characteristics based on the age of Pendul society show that the age of 46-65 years old is dominating with 33 people and has the highest number of teeth with caries code 5 or 6 which was equal to 3 teeth and also, the majority of respondents at this age group have high caries risk. This is related to the important factors that affect dental health in the age of the adults as in the Senjaya study, those factors are the reduced production of saliva and the habit of cleaning the teeth and mouth. The decreasing production of saliva with various enzymes can cause dry mouth, decrease the ability to taste food, and possibly accelerate the accumulation of plaque and calculus which can cause caries^[12].

The Kruskal-Wallis test result shows that the significance value obtained after the test data analysis were 0.007, which means that there is significant difference between the mean values of caries risk groups because p value is smaller than 0.05, it can be said that the number of

teeth with caries code 5 or 6 according to the ICDAS among caries risk groups are not the same or different. The result of this study is in line with the study conducted by Carta^[13], that there is difference in caries severity code 5 or 6 according to the ICDAS in the low, medium, and high caries risk groups.

The continued analysis for the Kruskal-Wallis test is the Mann-Whitney U test. The results of the Mann-Whitney U test between low, medium, and high caries risk groups show increased significance values. These significance values can be said to be statistically significant because the p values are smaller than 0.05, which means there are significant differences between low, medium, and high caries risk groups^[14]. This is in accordance with the results of Carta's study^[13], which states that severe caries, namely codes 5 and 6 according to ICDAS are mostly found in individuals with moderate and high caries risk compared to low caries risk.

The difference in caries severity can occur due to the presence of different risk factors that support the occurrence of caries in each caries risk group^[13]. Based on the results of the caries risk assessment of the American Dental Association in Dusun Pendul society, risk factor that supports individuals to have high caries risk is frequent consumption of sweet foods and drinks between meals, as stated by Bebe^[15], people who consume high component of glucose or sweet foods are 7.1 times more likely to experience dental caries than the ones who consume little or no sweet foods. Another factor is if there are 3 or more new cavities or non-cavities caries lesions or new restorations and teeth lost due to caries in the last 36 months, it is indicating high caries risk^[16]. Experiencing severe dry mouth (xerostomia) is also a high caries risk factor^[11], which means that the flow of saliva released in the mouth is slow, this can reduce salivary buffer capacity which then can reduce the pH of saliva so that it becomes one of the factors causing the development of caries^[17].

The risk factors which support individuals to have moderate caries risk in this study are the exposure of teeth to fluoride, Cruvine^[18] showed that the habit of brushing teeth with toothpaste containing fluoride could contribute to the lower incidence of dental caries. Another factor is if there are 1 or 2 new cavities and/or non-cavities caries lesions or restorations in the last 36 months, it is indicating moderate caries risk^[16]. The plaque which can be seen clearly is also a risk factor for caries incidence because just like in the Utami's study^[19] which states that there is a relationship between dental plaque and the severity of dental caries, the individuals with high dental plaque index have 3.3 times greater risk of dental caries than the individuals with low plaque index. The presence of unusual dental morphology that interferes with dental and oral hygiene can also be a risk factor for dental caries. Research conducted by Bebe^[15] showed that the structure of crowded teeth has a risk of 5.6 times greater for dental caries than normal teeth arch. While the risk factor that support individuals to have low caries risk is the absence of high and moderate caries risk factors that those individuals have^[11].

CONCLUSION

There is a difference in severity of caries code 5 or 6 according to ICDAS among caries risk groups in Dusun Pendul society. The number of teeth with caries code 5 or 6 according to the ICDAS is dominated by high caries risk groups, the higher the caries risk status the higher the caries severity.

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