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Dental Caries Rate for Permanent First Molars among Children Aged 8-9 Years

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ABSTRACT

Caries in permanent first molars is the main cause of the high prevalence of extractions since the first molars are the first teeth to erupt. Such eruption is due to poor behavior in maintaining dental health as well as the anatomical shape of the first molars which have pits and fissures as the places for the food waste to stop. This study aims to determine the dental caries status of permanent first molars among children aged 8-9 years at SDN 35 of North Pontianak. This was a descriptive study with a survey method. The results of the study showed that the highest caries incidence rate of 20% was found in the first permanent molars, namely tooth 4.6. Caries incident was mostly found among female respondents by 69% and aged 9 years by 64%. It can be concluded that there were 65 healthy teeth with the highest number for tooth 1.6 by 48%. Furthermore, there were 119 dental caries with the highest number for tooth 4.6 by 78%. The rates of dental caries among female respondents and those aged 9 years were higher by 69% and 64%, respectively. Dental caries rate among respondents aged 9 years were larger, namely 64%. It is recommended to conduct further study regarding the level of understanding in maintaining dental health among children.

INTRODUCTION

Dental and oral health is still a crucial issue to be considered. It was revealed that dental and oral diseases still affect 90% of the Indonesian population (Achmad, et al., 2021; Maharani, et al., 2019). Dental and oral diseases among Indonesians are related to oral hygiene problems (Leli et al., 2010). The results of the 2018 National Basic Health Research Survey (RISKESDAS) showed that 45.3% of Indonesians had problems with damaged/caved teeth (Badan Penelitian dan Pengembangan Kesehatan, 2019). It was further found that West Kalimantan Province was ranked 13th in Indonesia with a proportion of dental and oral problems of 60.5% (Badan Penelitian dan Pengembangan Kesehatan, 2019). Therefore, dental care should be considered and improved.

In the field of dentistry, caries is the most common case found in clinics. Almost people all over the world have experienced dental caries. In developing countries, 30%-90% of children aged 12 years and 55%-95% aged 35-44 years. Based on the results of 2018

RISKESDAS regarding dental and oral health status, on average, 267 million of Indonesian population had 4-5 problematic teeth. Furthermore, based on the results of 2018 Riskesdas regarding the prevalence of dental caries according to WHO standards, in the mean age of 5-6 years, 8.43% and 67.3% of children had a dental caries experience rate (dmf-t) of ≥6, which was included in the category of severe early childhood caries ((Badan Penelitian dan Pengembangan Kesehatan, 2019).

In the 2018 RISKESDAS, dental and oral examinations were often performed in the age group 12 years and over by using handheld instruments (mouth mirror and flashlight). The prevalence of residents who had dental and oral problems in the last 12 months was 60.82%. 10.04% of the population who had oral problems received care or treatment from dental health workers. In addition, there were five districts/cities with the highest prevalence of dental-mouth problems, namely Kapuas Hulu (75.5%), Singkawang (70.5%), Ketapang (70.5%), Kubu Raya (64.3%), and Sanggau (64.1%). Districts/cities with the lowest oral-tooth prevalence were Sintang District (44.7%), Melawi (52.2%), Mempawah (52.5%), Pontianak City (54.6%), and Landak (59.4%). Of those experiencing oral problems, Districts/cities which showed the highest and the lowest percentage of receiving dental care/treatment from dental health workers were Pontianak District (18.6%) and Sekadau District (3.6%), respectively (Badan Penelitian dan Pengembangan Kesehatan, 2019).

Caries leads to teeth damage due to low molecular weight carbohydrates, for example sugar, which seeps into plaque and is metabolized quickly by bacteria (Listrianah, 2017). Factors that play a role in the process of caries including the process of tooth tissue resistance, bacteria, food sources such as carbohydrates, dental protective factors such as saliva, and its components, and time. In addition, there are also external risk factors, namely oral hygiene, education level, economic level and nutritional status (Manoy, Kawengian & Mintjelungan, 2015).

An initial survey which was conducted during practical field work (PKL) activities at SDN 35 of North Pontianak through an examination using hand instruments. It was found that 7 out of 10 Grade 3 students experienced dental caries in their first molars and this became a problem while chewing food. This study aims to determine the dental caries status of permanent first molars among children aged 8-9 years at SDN 35 of North Pontianak.

METHOD

This was a descriptive study with a survey method. The main objective of such descriptive study is to create an objective picture or description of a situation. The situation described here was the condition of the permanent first molars among children aged 8-9 years at SDN 35 of North Pontianak.

The study population involved all Grade 4 students aged 8-9 years at SDN 35 of North Pontianak as many as 46 respondents or 184 permanent first molars. The study sample refers to a portion of the population to be studied that can represent the population. The sampling technique applied here was total sampling so that the entire population would be the samples. The inclusion criteria were children who were present during the study process, children who were willing to be examined, and got permission from their parents. Data were analyzed descriptively by presenting the frequency distribution of respondents.

RESULTS AND DISCUSSION

Table 1. Frequency distribution of respondents by gender

Gender	Number	Percentage (%)
Male	16	35%
Female	30	65%
Total	46	100%

Table 1 shows that the number of male respondents was two times less than the number of female respondents.

Table 2. Frequency distribution of respondents by molar teeth

No.	Molar teeth	No caries		Caries		Total	
		F	%	F	%	F	%
1	1.6	22	12	24	13	46	25
2	2.6	21	11	25	14	46	25
3	3.6	12	7	34	18	46	25
4	4.6	10	5	36	20	46	25
Total		65	35	119	65	184	100

Table 2 shows that of the 46 respondents (184 first molars), the tooth most affected by caries was tooth 46 at 20%.

Table 3. Frequency distribution of dental caries by gender.

No	Molar teeth	Male		Female		Total (F)
		F	%	F	%	
1	1.6	7	29	17	71	24
2	2.6	7	28	18	72	25
3	3.6	11	32	23	68	34
4	4.6	12	33	24	67	36
Total		37	31	82	69	119

Table 3 shows that there were 119 students with dental caries, with the highest number among female respondents at 69%.

Table 4. Frequency distribution of dental caries by age.

No	Molar teeth	8 years		9 years		Total (F)
		F	%	F	%	
1	1.6	11	46	13	54	24
2	2.6	7	28	18	72	25
3	3.6	10	29	24	71	34
4	4.6	15	42	21	58	36
Total		43	36	76	64	119

Table 4 shows that 119 students had dental caries, with the highest number at the age of 9 years at 64%.

Dental caries is a chronic disease with a fairly high prevalence among elementary school-age children (6-11 years). Meanwhile, the target for dental health services in 2010 includes 90% caries-free children aged 5 years. In this sub-chapter, the discussion will explain the description of the caries rate among students at SDN 35 of North Pontianak which is located in the target area of Telaga Biru Community Health Center (Gayatri, 2016).

Based on the study results among 46 respondents with a total of 184 molar teeth, there were 65 teeth that were not infected with caries by 35%, while there were 119 teeth that were infected with caries by 65%. At the age of 9 years, there were 64% of teeth affected by caries. The first molars, both upper and lower, erupted at the age of 6-7 years, meaning the age of the respondent's teeth was around 2-3 years. If teeth that are 2-3 years old already showed 65% dental caries, of course the caries rate may even greater when such condition is not treated.

First molars erupt at the age of 6-7 years and many parents assume that every time a child's teeth change, the primary teeth will change to permanent teeth (Heydari, et al., 2018; Urvasizoglu, et al., 2022; Duruk, & Gümüşboğa, 2020). This is a trigger of a perception that even if the first molar tooth is damaged, there will be a replacement for the tooth later. Even though there are 20 primary teeth and 32 permanent teeth, there are teeth that will not be replaced, one of which is the first molar. Parents are less aware that the impact will actually be very significant if there is no treatment to prevent caries since an early age. The adverse impact that may occur if children experience caries at an early age is disruption on the function of the

teeth as chewer. In addition, children will also experience problems in carrying out their daily activities as they grow up at the age of 6-7 years. Certain habits that children have when they are toddlers, for example liking to eat sweet foods, will continue until their teenage years if parents do not play an active role in maintaining the tooth and oral health (Eddy, & Mutiara, 2015).

Regarding healthy teeth, upper molars are the location where caries is rarely found by 66%. Meanwhile, the teeth that are often damaged due to caries are the lower molars. The high percentage of caries in the permanent first molars on the lower jaw can be caused by a larger number of pits and grooves. In general, the permanent first molars of the lower jaw erupt earlier than the first molars of the upper jaw (la Monaca, et al., 2019; Saber, et al., 2018; Voronkova, 2019). These teeth appear first in the oral cavity, causing the permanent first molars of the lower jaw to be more susceptible to caries than the permanent first molars of the upper jaw.

The frequent finding of deep fissures in molar teeth is one of the factors that make teeth susceptible to caries. Pits and fissures are due to dental anatomy that is susceptible to caries in the occlusal area, which is generally narrow and irregular. Fissure depth (40-1220 µm) and morphological characteristics (UV and Y fissure shapes) favor bacteria and food waste as the initial entry point for caries (Santini, et al., 2017; Yougbaré, et al., 2021; Rowińska , et al., 2021; Pinna, 2021). The complex, irregular and unpredictable shapes of pits and fissures are the beginning of caries formation (Montolalu et al., 2015; de Paiva, et al., 2018; Juntavee, et al., 2023)

Based on table 3, it can be seen that male respondents had fewer rate of dental caries by 37 teeth, than female respondents by 82 teeth. The increase in dental caries rate among girls is influenced by rapid tooth eruption and hormonal changes. Generally, the time for girls' teeth to erupt is 1 to 6 months faster than boys due to hormonal factors (estrogen). Faster eruption causes teeth to be exposed to cariogenic foods for longer. During puberty, the composition of saliva can also change (Bilbilova, 2020; Meyer et al., 2021). Such factors may be the cause of caries among girls (Wala, 2014).

CONCLUSION

Based on the results of study conducted on 46 students with a total of 184 teeth at SDN 35 of North Pontianak under the guidance of Telaga Biru CHC regarding the number of dental caries, it was concluded that there were 65 teeth that were not affected by caries with the highest number for tooth 1.6 by 48%. Furthermore, there were 119 dental caries with the highest number for tooth 4.6 by 78%. So there is a need for students to understand how to always maintain their dental health. It is recommended to conduct further study regarding the level of understanding in maintaining dental health among children.

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