

Description of Dental Caries in Primary Molars and the Effect of Giving Dental Health Education on Dental and Oral Hygiene in Preschooler

Sukanto¹, Rizqy Ibnurrafif ^{2(CA)}, Sulistiyani¹, Sri Lestari³, Peni Pujiastuti⁴, Dyah Setyorini¹, Niken Probosari¹, Roedy Budirahardjo¹, Berlian Prihatiningrum¹

¹Department of Pediatric Dentistry, Faculty of Dentistry, Jember University, Indonesia

²Faculty of Dentistry, Jember University, Indonesia

³Department of Conservative Dentistry, Faculty of Dentistry, Jember University, Indonesia

⁴Department of Prosthodontics, Faculty of Dentistry, Jember University, Indonesia

ABSTRACT

Caries is a tooth surface disease characterized by demineralization caused by acids produced by bacteria during the metabolism of sugar food. Molars are the primary teeth that are most prone to caries. One of the causes of caries is poor dental and oral hygiene. Preschoolers have a lower awareness of and adherence to oral hygiene, increasing the risk of caries. The objective of this study was to examine the caries description of primary molars as well as the effect of dental health education on dental and oral hygiene in preschooler. This study was pre-experimental, with a one-group pretest-posttest design model and a purposive sampling technique. The sample size was 66 children aged 4 to 6 years who attended five preschool facilities in the agro-industrial environment in Arjasa District. SPSS was used to analyze data obtained from objective examinations and questionnaires. The findings included the distribution of primary molars with the most caries-free category in the maxillary first and second primary molars, the distribution of caries in primary molars with the category of enamel caries spread evenly across all maxillary and mandibular primary molars, the distribution of caries in primary molars with the categories Dentin and pulp caries were most common in mandibular first and second primary molars, and the provision of dental health education could improve dental and oral hygiene in preschooler.

KEYWORDS: Caries in the primary molars, dental health education, and dental and oral hygiene

ARTICLE DETAILS

Published On:
16 June 2023

Available on:
<https://ijmscr.org/>

INTRODUCTION

Caries is a disease that causes demineralization of the tooth surface as a result of acids produced by bacterial metabolism of sugar food¹. Molar teeth are among the primary teeth that are most prone to caries. Caries prevalence in primary teeth was higher in posterior teeth than in anterior teeth, with mandibular molars accounting for 21,7%, maxillary molars accounting for 10,1%, maxillary anterior teeth accounting for 6,5%, and mandibular anterior teeth accounting for 0,4%². The mandibular second primary molars had the highest percentage of caries (52,34%), followed by the mandibular first primary molars (45,61%), the maxillary second primary molars of 38,81%, and the maxillary central incisors of 38.36%³.

Caries is a multifactorial disease caused by interactions between the host, microorganisms, substrate, and time. Among these factors are host factors, such as teeth with pits and fissures, and saliva, which aids in self-cleaning and maintaining the pH of the oral cavity through its buffering ability^{4,5}. Dental and oral hygiene are also factors in the occurrence of caries because they provide a conducive environment for cariogenic bacteria to proliferate and can increase plaque accumulation⁶.

Dental health education is the first step in increasing knowledge so that children can begin and become accustomed to practicing dental and oral hygiene⁸. One type of dental health education for children is teaching them how to properly brush their teeth⁹. This explanation prompted the researchers to investigate the caries description of primary

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molars and the effect of dental health education on dental and oral hygiene in preschooler.

RESEARCH METHOD

This study was pre-experimental in nature, with a one-group pretest-posttest design model, and was carried out between September and November 2022 at Bhakti Mandala Kindergarten, KB At-Taqwa, KB Al-Mahrus II, SPS Manggis 30, and RA/BA/TA Baitur Rahman, Arjasa District, Jember Regency. The study included 30 preschooler's education facilities in Arjasa District, Jember Regency. Purposive sampling was used to select the research subjects, and the sample size was 66 people. The ICDAS index, the PHP-M index, and a questionnaire were used as research measurement tools.

This study classified caries in primary molars using the ICDAS index of codes 0 to 6 and the ICDAS category of caries free, enamel caries, and dentin and pulp caries. The PHP-M index rates dental and oral hygiene, with a score of 0-20 = good, 21-40 = moderate, and 41-60 = poor.

RESULTS

The number of subjects in this study was 66, with 45,5% (30 children) being boys and 54,5% being girls (36 children). By age, 4 years represented 9,1% (6 children), 5 years represented 47% (31 children), and 6 years represented 43,9%. (29 children). The caries examination revealed that there were 224 caries-free teeth (ICDAS Code 0) and 304 caries-affected teeth (ICDAS Codes 1-6) (Table 1).

Table 1. Distribution of Caries in Primary Molars Based on ICDAS Code

Number of Primary Molar	Number of Caries in Primary Molars Based on ICDAS Code							
	Code 0	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	
54	32	3	2	10	3	12	4	
55	35	2	2	12	0	8	7	
64	36	0	5	11	0	8	6	
65	38	2	1	12	1	8	4	
74	21	5	2	10	0	16	12	
75	18	4	3	8	4	13	16	
84	24	2	3	8	1	17	11	
85	20	3	5	9	1	10	18	
Total	n	224	21	23	80	10	92	78
	%	42,4	4	4,4	15,2	1,9	17,4	14,8

Based on the ICDAS categories of caries-free, enamel caries, and dentinal and pulpal caries, it was found that the maxillary primary molars had the highest caries-free rate of 26,7% (141 teeth), while the number of enamel caries categories was evenly distributed between the maxillary and mandibular molars and mandibles, respectively 11,8% and 11,7% (62 teeth), and the highest number of dentin and pulp caries categories was 22,5% (119 teeth) in mandibular molar teeth (Table 2).

Table 2. Distribution of Caries in Primary Molars Based on ICDAS Categories

Teeth	Caries Free		Enamel Caries		Dentinal and Pulpal Caries	
	n	%	n	%	n	%
Maxillary First Primary Molar	68	12,9	31	5,9	33	6,3
Maxillary Second Primary Molar	73	13,8	31	5,9	28	5,3
Total	141	26,7	62	11,8	61	11,6
Mandibular First Primary Molar	45	8,5	30	5,7	57	10,8
Mandibular Second Primary Molar	38	7,2	32	6	62	11,7
Total	83	15,7	62	11,7	119	22,5

Before receiving DHE, the number of children in the good category was 12,1% (8 children), moderate 72,7% (48 children), and bad 15,2% (10 children), and after receiving DHE, the number of children in the good category was 30,3% (20 children), moderate 57,6% (38 children), and 12,1% bad (8 children) (Table 3).

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Table 3. Distribution of Dental and Oral Hygiene Based on the PHP-M Index

Category of Dental and Oral Hygiene	n	%
<i>Before DHE (Dental Health Education)</i>		
Good	8	12,1
Moderate	48	72,7
Poor	10	15,2
<i>After DHE (Dental Health Education)</i>		
Good	20	30,3
Moderate	38	57,6
Poor	8	12,1

The following are the findings of a statistical analysis using the Wilcoxon test for changes in dental and oral hygiene in preschooler before and after DHE administration (table 4).

Table 4. Result of Wilcoxon Test

	Dental and Oral Hygiene Following DHE Administration - Dental and Oral Hygiene before DHE Administration
Z	-2,951 ^b
Asymp. Sig. (2-tailed)	0,003

Table 4 shows that the significance value of the Wilcoxon test results is 0,003, indicating that there is a significant change in the plaque index value before and after DHE administration. As a result, it is possible to conclude that providing DHE has an effect on dental and oral hygiene in preschooler.

DISCUSSION

According to the findings, the number of teeth free of caries (ICDAS Code 0) was 42,4% (224 teeth), with the maxillary primary molars having the highest distribution (26,7%) (141 teeth). This demonstrates that the maxillary primary molars had more caries-free teeth than the mandibular molars. This is because caries was a multifactorial disease, with saliva being one of the host factors. Saliva acted as a self-cleaning or mechanical cleaner to reduce plaque accumulation, as well as a tooth lubricant to prevent tooth wear when chewing. Saliva also had a buffering ability, which allowed it to maintain the pH balance of the oral cavity and prevent tooth demineralization. The salivary glands, one of which was the parotid gland, secrete saliva through the Stensen duct, which emptied into the area at the level of the upper second molar¹⁰. Suzuki et al. (2009) discovered that the position of the Stensen duct influences oral cleaning of maxillary molars¹¹.

According to the findings, the number of teeth with caries (ICDAS Code 1-6) was 57,6% (304 teeth), with enamel caries categories evenly distributed in the maxillary and mandibular molar teeth, namely 62%. In the category of dentinal and pulp caries, mandibular molars had the highest distribution (22,5%) (119 teeth). This is because of morphological factors in the teeth, such as the depth and shape of the occlusal surface, which contained pits and fissures¹².

Dental and oral hygiene in children, which is usually still relatively poor, is another factor that causes caries in preschooler. According to the findings in Table 3, dental and oral hygiene in preschooler before receiving

DHE was in the moderate category at 72,7%, the bad category was 15,2%, and the good category was only 12,1%. Plaque, a layer of biofilm that adheres tightly to the tooth surface and is cariogenic, accumulated as a result of poor dental and oral hygiene¹³. Unclean plaque promotes bacterial colonization on the tooth surface and could cause tooth demineralization via acid-producing metabolic processes¹⁴.

Preschool education can take the form of DHE, which aims to improve dental and oral health through counseling and instruction on how to brush your teeth⁹. Counseling on how to properly brush your teeth using a combination technique can lower the PHP-M index in preschool children¹⁵. This is consistent with the findings of the previous study, which showed that providing DHE to preschool children resulted in an improvement in children's dental and oral hygiene, with details in the moderate category decreasing to 57,6%, the bad category decreasing to 12,1%, and the poor category decreasing to 12,1%, and the well category increasing to 30.3%.

Based on the statistical analysis of the Wilcoxon test in Table 4, it is possible to conclude that DHE administration has an effect on preschoolers' dental and oral hygiene. These changes indicate a decrease in the plaque index, which indicates an improvement in dental and oral hygiene because the children were counseled, and during the counseling process, the children paid attention to the material and there were demonstrations with props such as dental phantoms and toothbrushes. The use of these props as a medium for counseling has an important role for children because children remember what they see more and more. The media

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can also help you understand how to brush your teeth properly¹⁶. Following the demonstration, the children practiced brushing their teeth one by one to ensure comprehension of the counseling that had been given.

Aside from individual factors, children's success in maintaining healthy teeth and mouths is inextricably linked to the influence of their parents. Parents play an important role in the development of dental and oral health in children, so parents must be involved beginning with preschool-aged children¹⁷. According to the findings of Lestari and Mujiyati's (2019) research, the active role of parents in maintaining their children's dental and oral health affects the incidence of caries in children¹⁸. As a result, the role of parents becomes increasingly important because children understand, observe, and imitate what their parents teach them¹⁷.

The findings include the caries distribution of primary molars with the caries-free category most commonly found in first and second maxillary primary molars, the caries distribution of primary molars with the enamel caries category spread evenly across all maxillary and mandibular primary molars, the caries distribution of primary molars with the category of dentinal and pulp caries most commonly found in primary first and second mandibular molars, and provision of dental health education can improve dental and oral hygiene in preschooler.

This study should be expanded into a time series involving primary molar caries in schools and other areas of Jember Regency. Dental and oral health workers must also provide routine counseling to preschool children and parents on how to maintain dental and oral health as a preventive measure for dental and oral disease problems, as well as conduct routine Health Service checks on dental and oral hygiene in preschooler.

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