Prevalence of caries according to ICDAS, and Mount and Hume Classification in SLB (B) Negeri Cicendo and Prima Bakti Bandung

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Prevalensi karies menurut klasifikasi ICDAS dan *Mount and Hume* di SLB (B) Negeri Cicendo dan Prima Bakti Bandung

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ABSTRACT
Dental caries is the most common oral problem in Indonesia, especially in school-age children and children with special needs. This study aims to determine the prevalence of caries in deaf children at Sekolah Luar Biasa (B) Cicendo and Prima Bhakti. This analytical observational study used a cross sectional design. Data were collected using purposive sampling technique by conducting oral examination based on ICDAS and Mount and Hume classification. The total sample was 92 deaf children aged 7-14 years. The prevalence of permanent first molar caries was 63% (232 teeth); based on the ICDAS classification, the highest prevalence was in the non-cavitary/D1 carious lesion category, which was 33.1% (122 teeth), while based on the Mount and Hume classification, the highest prevalence was in category 1.1, which was 33.4% (123 teeth). It is concluded that 63% of the permanent first molar teeth observed had caries which may be due to the anatomical structure of the teeth which have narrow pits and fissures, poor brushing habits, and repeated exposure to cariogenic substances.
Keywords: dental caries, ICDAS, Mount and Hume, special need children

ABSTRAK
Karies gigi merupakan masalah gigi dan mulut yang paling banyak dijumpai di Indonesia, terutama pada anak usia sekolah dan anak berkebutuhan khusus. Penelitian ini bertujuan untuk mengetahui gambaran prevalensi karies pada anak tunarungu di Sekolah Luar Biasa (B) Negeri Cicendo dan Prima Bhakti. Penelitian observasi analitik ini menggunakan desain *cross sectional*. Data dikumpulkan dengan teknik *purposive sampling* dengan melakukan pemeriksaan lisan berdasarkan klasifikasi ICDAS dan *Mount and Hume*. Total sampel adalah 92 anak tunarungu berusia 7-14 tahun. Diperoleh prevalensi karies gigi molar pertama permanen adalah 63% (232 gigi); berdasarkan klasifikasi ICDAS tertinggi pada kategori lesi karies non-kavitas/D1, yaitu 33,1% (122 gigi), yang menurut klasifikasi *Mount and Hume* prevalensi tertinggi pada kategori 1.1, yaitu 33,4% (123 gigi). Disimpulkan bahwa 63% gigi molar pertama permanen yang diamati mengalami karies yang mungkin disebabkan oleh struktur anatomi gigi yang memiliki pit dan fisur yang sempit, kebiasaan menyikat gigi yang kurang baik, dan paparan zat kariogenik yang berulang.
Kata kunci: karies gigi, ICDAS, *Mount and Hume*, anak berkebutuhan khusus

INTRODUCTION

According to the Indonesian Ministry of Health, children 6-12 years of age are the most vulnerable to experiencing dental and oral health problems, related to dental change and low awareness, so the children cannot maintain proper dental health. Dental and oral disease that is often suffered by Indonesians is caries.[1,2]

Caries is an infectious disease that results from bacterial interactions. Dental caries occurs due to the demineralization process of bacterial interactions on the dental surface. Bacteria are acidic, so over a period of time, the acid will damage dental enamel and cause cavities. The etiological factors for caries are bacteria, food, host, time. Other predisposing factors are socioeconomic factors, age, and environment.[2]

The increase in the prevalence of caries is quite large in Indonesian, including among school-age children and especially for children with special needs in the physical aspect including disorders such as blind, deaf, speech impaired, and disabled.[3,4] Caries prevalence is quite large in Indonesian society, especially when school children are prone to oral and dental diseases, especially children with physical or mental limitations will experience difficulties when carrying out dental care both at home and in dentist clinics where they need help from others when using special tools.[5,6]

According to research conducted previously by Prastika, it is known that there is still caries, especially in the dental of students at the Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi, therefore researchers are interested in conducting in-depth research on the prevalence of caries according to the International Caries Detecting and Assessment System (ICDAS) and Mount and Hume classification.[7,8]

This study aims to report the prevalence of caries according to ICDAS, and *Mount and Hume* Classification in SLB (B) Negeri Cicendo and Prima Bakti Bandung.

METHODS

This descriptive with cross sectional research using 92 deaf children aged 7-14 years who attended SLB (B) Negeri Cicendo Bandung and Prima Bhakti Cimahi. This research has approved by from the Committee of Research Ethics of the Medical Faculty of Maranatha Christian University no.004/KEP/1/2020.

Caries prevalence is a number that shows the amount of dental caries in a group of people in a certain area and time. The prevalence rate and frequency distribution of caries in this study were measured by two methods, i.e. ICDAS classification, Mount and Hume classification.

Classification of ICDAS is a method for assessing and detecting enamel caries and for planning remineraliza-

Table 1 Caries examination code with ICDAS classification

Code	Criteria
0	Healthy teeth, no evidence of caries
1	No change in dental enamel, visible on the surface of the pits and fissures, there was premature opaque caries
2	An opaque color, lesions on the dental enamel, can be seen from the buccal and lingual direction.
3	Caries but it does not involve dentin
4	No cavity on the surface of the enamel but there are shadows on the dentin
5	A cavity in the dentin that is opaque with clear evidence of exposed dentin
6	Extensive cavity, and loss of extensive dental structure (involving pulp)

tion therapy/monitoring the caries markings on the dental surface (Tabel 1),[9] using ordinal scale, and according to American Dental Association.

The examination of the degree of caries severity based on the level of caries depth is generally divided into non-cavitated carious lesions which includes codes 1-2 and cavitated which includes codes 3-6. Caries classification according to ICDAS, according to ADA, divided into D0 (sound) for scoring 0, D1 (initial) for scoring 1-2, D2 (moderate) for scoring 3-5, and D3 (advanced) for scoring 6.

Mount and Hume classification is defined as the method is used to detect the site and type of caries on dental surface which is often accumulated by plaque such as the occlusal, servical, and proximal parts.[10] This classification is based on sites; site 1 are defects in the pits and fissures on the occlusal surfaces of the dental posterior, site 2 are proximal area of dental enamel, and site 3 are the third cervical enamel and the recession at the root of tooth. The classification is based on sizes; size 0 is an early demineralized lesion, size 1 is cavity on enamel surface without involving dentin, size 2 is a cavity involving dentin, size 3 is a larger lesion covering the dentin and almost closer to the pulp area, and size 4 is an extensive caries with a large loss of dental structure. All of them uses ordinal scale and according to ADA. Measurement results are 1) 1.0, 2.0, 3.0: sound; 2) 1.1, 2.1, 3.1: minimal; 3) 1.2, 2.2, 3.2: moderate; 4) 1.3, 2.3, 3.3: enlarged; and 5) 1.4, 2.4, 3.4: extensive.

RESULTS

Caries frequency distribution according to ICDAS

According to the ICDAS classification, the frequency distribution of permanent first molar caries in deaf children aged 7-14 years at Extraordinary School State of Cicendo Bandung and Prima. Prevalence of permanent first molars caries according to ICDAS classification (Table 2) shows the caries in permanent first molars, which is 63% (232 teeth).

Table 2 Prevalence of permanent first molars caries according to ICDAS classification

Category	Dental frequency (n)	%
Caries	232	63
No caries	136	37
Total	368	100

Table 4 Frequency distribution of permanent first molar dental caries in various sites according to Mount and Hume

First Molar Dental Side	Dental Frequency (n)	%
Site 1 (Pit and Fissure)	232	100
Site 2 (Contact area)	0	0
Site 3 (Cervical)	0	0
Total	232	100

Table 5 Prevalence of dental caries in permanent first molar according to Mount and Hume classification

Category	Dental frequency (n)	%
Caries	232	63
No caries	136	37
Total	368	100

The frequency distribution of caries according to the ICDAS classification, it was found that 37% (136 teeth) were categorized as no caries/D0, as many as 33.1% (122 teeth) were categorized as non cavitated caries lesion/D1 (initial), and as many as 29,9% (110 teeth) were categorized as cavitated caries lesions with details of 47 teeth (12.8%) categorized as D2 (moderate) and as many as 17.1% (63 teeth) categorized as D3 (advanced). So the most categories are in D1 category. Category D1 (initial) was mostly found in teeth 36, i.e. 10.1% (37 teeth), in D2 category (moderate) the most were in dental 26, 36, and 46 with the same number of 3.5% (13 teeth), and in the D3 (advanced) category the most were 46, i.e. 4.9% (18 teeth) (Table 3).

Caries frequency distribution according to Mount and Hume classification

According to the Mount and Hume classification, the frequency distribution of caries for the first permanent molars of children with hearing impairment aged 7-14 years at Extraordinary School State of Cicendo Bandung and Prima Bhakti Cimahi shows that the result showed 100% (232 teeth) of dental with caries were categorized as site 1 (pit t and fissure) (Table 4).

The prevalence of caries according to Mount and Hume's classification, showing that 63% (232 teeth) had caries (covering categories 1.1, 1.2, 1.3, 1.4) and 37% (136 teeth) did not have caries (category 1.0) (Table 5). The frequency distribution of caries according to Mount and Hume's classification: 37% (136 teeth) were categorized as 1.0 (site 1 size 0)/sound, 33.4% (123 teeth) were categorized as 1.1 (site 1 size 1)/minimal, 5.4% (20

Table 3 Frequency distribution of permanent first molar dental caries at various sites according to ICDAS classification

Category	Caries classification	Dental 16 N	%	Dental 26 N	%	Dental 36 n	%	Dental 46 n	%	Total N	%
No caries	D0 (sound)	45	12.2	39	10.6	26	7.1	26	7.1	136	37
Non cavitated caries lesion	D1 (initial)	24	6.5	26	7.1	37	10.1	35	9.5	122	33.1
Cavitated caries lesion	D2 (moderate)	8	2.2	13	3.5	13	3.5	13	3.5	47	12.8
	D3 (advanced)	15	4.1	14	3.8	16	4.3	18	4.9	63	17.1
Total		92	25	92	25	92	25	92	25	368	100

Table 6 Frequency distrfxibution of permanent first molar dental caries at various sites according to the Mount and Hume

Caries classification	Dental 16		Dental 26		Dental 36		Dental 46		Total	
	n	%	n	%	N	%	n	%	n	%
1.0	45	12.3	39	10.6	26	7.1	27	7.4	136	37
1.1	24	6.5	26	7.1	37	10	34	9.2	123	33.4
1.2	3	0.8	6	1.6	5	1.4	6	1.6	20	5.4
1.3	3	0.8	3	0.8	4	1.1	3	0.8	13	3.5
1.4	7	4.6	18	4.9	20	5.4	22	6	61	16.7
Total	92	25	92	25	92	25	92	25	368	100

teeth) were categorized as 1.2 (site 1 size 2)/moderate, 3.5% (13 teeth) were categorized as 1.3 (site 1 size 3)/enlarged, and 16.7% (61 teeth) categorized as 1.4 (site 1 size 4)/extensive. The highest category was in the classification 1.1, category 1.1 the most was found in 36 teeth, i.e. 10% (37 teeth), category 1.2 the most was found in dental 26, 46 with the same amount of 1.6% (6 teeth), category 1.3 the most was found in dental 36 i.e. 1.1% (4 teeth), in category 1.4 the most were found in 46 teeth, i.e. 6% (22 teeth) (Table 6).

Caries frequency distribution by gender

The prevalence of caries by gender in a study conducted at Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi. In Table 7, it can be seen that the prevalence of caries in male is 52.2% (48 children) and the prevalence in female children is 35.1% (33 children), so it is known that the highest prevalence of caries is in male.

Table 7 Caries frequency distribution by gender

Gender	Caries				Total	
	Negative		Positive			
	n (person)	%	n (person)	%	n (person)	%
Male	8	8.7	48	52.2	56	60.9
Female	3	3.3	33	35.8	36	39.1
Total	11	12	81	88	92	100

Table 8 Distribution of dental caries frequency by age

Age (Year)	Caries				Total	
	Negative		Positive			
	n (person)	%	n (person)	%	n (person)	%
7	0	0	1	1.1	1	1.1
8	3	3.3	16	17.4	19	20.7
9	0	0	12	13	12	13
10	1	1.1	8	8.7	9	9.8
11	1	1.1	18	19.6	19	20.7
12	3	3.3	18	19.6	21	22.9
13	1	1.1	6	6.5	7	7.6
14	2	2.1	2	2.1	4	4.2
Total	11	12	81	88	92	100

Distribution of dental caries frequency by age

The prevalence of caries based on age in a study conducted at Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi, it can be seen that the prevalence of caries in children aged 7 years is 1.1% (1 child), 8 years old is 17.4% (16 children), 9 years old is 13% (12 children), age 10 years as much as 8.7% (8 children), age 11 and 12 years had the same number, i.e. 19.6% (18 children), 13 years old as much as 6.5% (6 children), 14 years old as many as 2.1% (2 children). The highest caries prevalence was at the age of 11 and 12 years, and the lowest caries prevalence was at the age

of 7 years (Table 8).

DISCUSSION

In this study, data was obtained that the prevalence of caries in children with special needs at Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi based on gender was higher in male, i.e. 52.2% (48 children) than girls 35.8%. (33 children). This result was caused by several factors, one of which was related to the unbalanced number of respondents, another factor is related to the lack of awareness in maintaining oral hygiene among male. This is reinforced by several studies, such as that conducted in Thailand by Petersen, et al regarding the description of oral health and habits in urban and rural primary school-age children, research by Saima, et al and Kola, et al which states that accordingly, where the prevalence of caries was higher in male due to better tooth brushing habits in female.[11-13]

Based on age, the results showed the prevalence of caries in children with special needs at Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi was the highest among respondents aged 11 years and 12 years with the same number, i.e. 19.6%. The high prevalence rate of caries is due to the fact that at the age of 12 years, eruptions in all permanent teeth have occurred except for the third molar, so that more teeth are at risk of experiencing caries, and the duration of exposure to cariogenic substances in dental is longer than the age below so that more prone to caries. By means of reference to the frequency distribution of the characteristics of respondents based on age, the highest prevalence was found at the age of 12 years as much as 19.6%. In a study conducted by Salmiah which stated that the highest prevalence of caries in children with special needs was in the age group >12 years, which was as much as 100%, this is because in line with a person's age, the number of caries will also increase due to a longer period of time for the dental has caries.[15] Research conducted by Barman, et al and Wyne, et al stated that it is not appropriate, where it is stated that the prevalence of caries actually increases with age related to the duration of exposure to cariogenic substances in dental that have erupted longer, so that respondents with older age reported greater risk of developing caries.[14,16]

The prevalence of caries according to the ICDAS classification was found to be 63% (232 teeth) who had caries, where if sorted from the highest prevalence, 33.1% (122 teeth) were categorized as non cavitated caries lesion/D1 (initial). A study conducted by Ismail et al, also stated the same thing where the highest prevalence of caries was in the non cavitated caries lesion/D1 (initial)

category, i.e. caries lesions were only limited to enamel. This is because enamel is the outermost layer of dental so that it is most easily exposed to cariogenic substances than dentin and pulp.[17] In the D1 (initial) category, the highest prevalence of caries was found in the mandibular region, namely on dental 36, namely 10.1% (73 teeth) and dental 46 as much as 9.5% (35 teeth). Regarding caries predilection, another study conducted by Francisco and Saima, et al also supported the statement that the prevalence of caries in the mandibular dental region was higher than the maxillary region regarding the surface of permanent first molars which contained more pits and fissures, arch curvature of the jaw in the mandibular region that supports the accumulation of food waste and plaque and the onset of eruption of permanent first molars in the mandibular region which is faster than the maxillary region so that it is longer exposed to cariogenic substances resulting in a greater risk of experiencing caries.[12,18]

Distribution of caries prevalence according to Mount and Hume's caries classification in children with special needs at Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi, the highest prevalence was found in category 1.1 (site 1 size 1 (minimum)) as much as 33.4% (123 teeth), in the category if sorted from high to low prevalence, it was found in category 1.2 (site 1 size 2 (moderate)) as much as 5.4% (20 teeth), in category 1.4 (site 1 size 4 (extensive)) as much as 16.7% (61 teeth) and in category 1.3 (site 1 size 3 (enlarged)) as much as 3.5% (13 teeth). This thing is supported by Fadila and Veronica's which stated that highest prevalence of caries was found in classification 1.1 (site 1 size 1, which means minimal caries lesions in pits and fissures) which were associated with the peak incidence of early caries lesions occurring 3 years after dental eruption, which is around age 12 years.[18,19] The study in category 1.1, the highest prevalence was found in the mandibular region, namely dental 36 as much as 10% (37 teeth) and in dental 46 as much as 9.2% (34 teeth). This is supported by Saima, et al, who also stated that the occlusal surface (pits and fissures) is more at risk of experiencing caries than interproximal, buccal and lingual surfaces related to surface morphology consisting of

deep pits and fissures that facilitate food retention and less able to be cleaned mechanically both by the tongue and salivary flow and using a toothbrush.[12]

The results of this study describe most of the dental conditions for children with special needs aged 7-14 years at Extraordinary School (B) State of Cicendo Bandung and Prima Bhakti Cimahi, where with these data it is expected to improve the level of oral hygiene among respondents. The choice for examination of permanent first molars is related to the prevalence of caries in these dental, which can represent a picture of the overall dental and oral health status of children. The selection of the age range of respondents was based not only on the eruption of permanent first molars that occurred at the age of 6-7 years, but considering that age is the ideal age group to train children's motor skills, especially with brushing and related early management of caries such as pit fissures sealants, topical fluorine applications and varnish applications to prevent the complications.[20]

It was concluded that at Extraordinary School B State of Cicendo Bandung and Prima Bhakti Cimahi, 1) the prevalence of caries in children with hearing impairment was found to be 63% (232 teeth); 2) the frequency distribution of caries according to the ICDAS classification in permanent first molars in children with hearing impairment, showed that the highest prevalence was found in non-cavitated caries lesion/D1 (initial) category, which was 33.1% (122 teeth); and 3) the frequency distribution of caries according to Mount and Hume's classification in permanent first molars in children with hearing impairment, the highest prevalence was found in category 1.1 (site 1 size 1)/minimum.

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