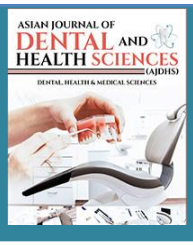

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Risk Factors for Caries in Elementary School Children Based on Caries Management by Risk Assessment (CAMBRA)

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Abstract

Background: the prevalence of dental caries in children aged 10 to 14 years is almost 41.4%. The CAMBRA method helps doctors identify the cause of dental caries by identifying risk factors in each patient. Based on research, the etiology of dental caries was found by identifying risk factors in each participant. This study aims to describe what factors influence dental caries in children based on CAMBRA. Method: This research uses observational analysis with. The respondents were students at SDN Kadipiro I, Bantul, Special Region of Yogyakarta, Indonesia. Purposive sampling was used to create the sample, which included 82 children between the ages of 10 and 12 years. The research was carried out by finding dental caries risk factors using the CAMBRA method: 1. cavity or new dentin lesion, 2. white spot, 3. restoration in the last three years, 4. saliva volume, 5. plaque index/PHPM, 6. water pH saliva, and 7. Frequency of consumption of sweet foods. Data were analyzed using the SPSS version 25.0 program which included frequency analysis. Results: The results of the analysis showed five risk factors for caries, namely the condition of the teeth, cavities or new dentin lesions were found in 58 respondents (70.7%), predisposing factors, the number of plaque was obtained in 44 respondents (53.7%), the frequency of protective factors was obtained and the frequency of caries was obtained. 63 respondents experienced dental caries. Conclusion: The risk factors for dental caries based on CAMBRA that influence children's dental caries are the criteria for lesion depth of dentin, saliva pH, and amount of plaque.

Keywords: CAMBRA, risk factors, caries, children

INTRODUCTION

Dental caries together with periodontal disease are the most common dental and oral diseases in society, including children. Dental caries is an infectious disease that has become a global health problem. Dental caries has a prevalence five times higher than asthma and seven times higher than allergic rhinitis. It is estimated that 89% of Indonesian children under the age of 12 suffer from dental caries.[1–3]

Basic Health Research in 2018 recorded that 45.3% of the Indonesian population had dental and oral health problems and in the Special Region of Yogyakarta the figure was 47.7%. The prevalence of dental caries in children aged 10-14 is 41.4%.[4] Dental caries that is not treated in children will cause many unfavorable things, for example the emergence of pain, the possibility of infection, and the occurrence of foci of infection in the body, disruption of daily activities, psychomotor problems, and growth disorders.[5,6] Dental caries is one of the problems that often arises during a child's growth and development, in addition to other problems, namely malnutrition, obesity and allergies.[7]

Dental caries is a multifactorial disease, one of which involves substrate etiological factors, in this case carbohydrates, as the most essential medium for cariogenic bacteria. Caries is an irreversible microbiological disease of calcified tooth tissue which is characterized by demineralization of inorganic material and destruction of organic tooth material and will cause cavities. Caries is a disease of hard tooth tissue which is characterized by decalcification of inorganic dental material and loss of mineral content and is followed by damage to the organic tooth matrix. Caries is a multifactorial disease, which is the interaction of several factors. Newburn developed the concept of caries tetralogy, which concluded that there are 4 main factors that interact in the process of caries occurrence. The four factors are: (1) teeth (2) bacteria, (3) carbohydrate substrate/diet, (4) time as an additional factor.[8,9]

Caries Management by Risk Assessment (CAMBRA) builds an understanding of dental caries, which is a disease initiated by a complex biofilm (not just one pathogen), which dynamically changes with the environment and local chemical factors on the tooth surface, pellicle and saliva. The CAMBRA philosophy was first introduced nearly a decade ago when an informal group called the Western CAMBRA Coaliton was formed that included stakeholders from education, research, industry, government agencies and private practitioners in the western region of the United States. This research is focused on obtaining caries risk factors based on the Caries Risk Assessment Form. Caries risk prediction equation, and the contribution of caries risk factors.[10]

METHOD AND MATERIAL

The research design used is quantitative research, namely observational. This research did not manipulate variables but looked at the reality directly from respondents, namely the risk factors for child caries based on CAMBRA. This research was carried out at SDN Kadipiro I, Bantul Regency, Special Region of Yogyakarta. The total sample was 82 children, with a sampling technique using side purposive with research sample inclusion

criteria: male/female aged 9-12 years and willing to be research samples.

Data collection was carried out quantitatively using the following measuring instruments: Decay Index, Check-list of tooth condition variables, Check-list of biological predisposing factor variables, Check-list of protection factor variables. The analysis used is descriptive analysis presented in a frequency distribution.

RESULT

Table 1. Distribution of respondent characteristics

Respondent characteristics	Frequency	Percentage
Gender		
Male	44	53.7
Female	38	46.3
Mother's education		
Elementary School	13	15.9
Junior High School	23	28.0
Senior High School	36	43.9
Bachelor	10	12.2

Based on table 1, it was found that 44 (53.7%) of the respondents were male with 36 (43.9%) of their mothers' education being high school.

Table 2. Frequency distribution Condition of teeth

Variable	Yes		No	
	n	%	n	%
Cavities/dentin depth lesions	58	70,7	24	29,3
Proximal enamel lesions	10	12,2	72	87,8
White spots on the surface	30	36,6	52	63,4
Restoration in the last 3 years	7	8.5	75	91.5

Based on table 2, it was found that 58 (70.7%) respondents had cavities/dentin depth lesions, 72 (87.8%) respondents had proximal enamel lesions, 52 (63.4%) respondents had white spots on the surface, and 75 respondents did not have any damaged teeth.

Table 3. Frequency distribution of biological predisposing factors

Variable	Yes		No	
	n	%	n	%
Biofilm maturation	34	41,5	48	58,5
There is high plaque ≥27	38	46,3	44	53.7
Consuming sweet foods more than 3 times a day	55	67.0	27	33.0
Factors that reduce the rate of saliva flow	0	0	82	100
Saliva volume <1ml/minute	47	57.3	35	42.7
There are deep pits and fissures	37	45,1	45	54,9
Take medication	0	0	82	100
There are open roots	11	13,4	71	86,6
Using orthodontic appliances	0	0	82	100

The results of the analysis of the frequency distribution of predisposing factors in table 3 show that 48 respondents (58.5%) had no mature biofilm, 44 respondents (53.7%) had a low number of plaques, and 55 respondents (67.0%) consumed sweet foods more than 3 times/day. A total of 82 respondents (100%) had no factors that influence saliva flow rate, 47 respondents (57.3%) had a volume of less than 1 ml/minute, and 45 respondents (54.9%) had no deep pits and fissures. Table 5 also shows that 82 (100%) did not consume drugs that affect saliva flow, 71 respondents (86.6%) did not have open roots, and 82 respondents (100%) did not use orthodontic devices.

Table 4. Frequency distribution of Protection Factors

Variable	Yes		No	
	n	%	n	%
Fluoridation of drinking water	26	31,7	56	68,7
Fluoride toothpaste at least once a day	80	97,6	2	2,4
Fluoride toothpaste at least twice a day	73	89	9	11
Mouthwash (0.05% Na F) every day	1	1,2	81	98,8
Fluorine varnish (last 6 months)	8	9,8	74	90,2
Topical fluoride (last 6 months)	4	4,9	78	95,1
Chlorhexidine mouthwash (every 1 x / week in the last 6 months)	2	2.4	80	97.6
Xylitol gum/lozenge 4 times a day for the last 6 months	2	2.4	80	97.6
Calcium phosphate for the last 6 months	6	7,3	76	92,7

The frequency distribution of protective factors in table 4 shows that 56 respondents (68.7%) have no fluoridation of drinking water, 80 respondents (97.6%) brush their teeth at least once a day, and 73 respondents (89%) brush their teeth at least once a day. 2 times a day. A total of 81 respondents (98.8%) did not use mouthwash (0.05% NaF) every day, 74 respondents (90.2) did not get fluor varnish (last 6 months), and 78 respondents (95.11) did not get topical fluoride treatment (last 6 months). The results of measuring gargling with Chlorhexidine (every 1 x / week in the last 6 months) showed that 80 respondents (98.8%) did not do it, 80 respondents (98.8%) did not have the habit of chewing xylitol gum/lozenge 4 x a day for 6 months last time, and 76 respondents (92.7%) did not receive calcium phosphate during the last 6 months.

Table 5. Description of the frequency of dental caries

Variable	Yes		No	
	n	%	n	%
Dental caries	19	23,2	63	75,8

Table 5 shows that the frequency distribution of caries is that 63 respondents experienced dental caries.

DISCUSSION

Based on the research results, before chewing the apple, the average value was 2.113 in the apple group, after chewing the apple, the average value was 0.431, based on the Wilcoxon test, the significance value was 0.001 < 0.05. This means that there is a difference between the pre-test and post-test in the apple group.

Based on the results of statistical tests, it was found that the lowest debris index value before chewing an apple

Children are at varying degrees of risk for caries throughout their lives. Increasingly, recent findings suggest that for success in caries prevention, dental health professionals must initiate preventive interventions from the first year of life. The consequences of childhood dental caries include a higher risk of new carious lesion cavities in both primary and permanent teeth, increased risk of hospitalization and emergency department visits, increased costs and time of treatment, inadequate physical development (especially height and weight). body), loss of time at school and reduced ability to receive lessons, and reduced quality of life related to dental and oral health.[11]

The concept of caries balance/imbalance is a visual depiction of the multifactorial nature of caries. This illustrates the determinants of caries, and the dynamic interaction of the biofilm with the oral environment. It is this oral environment that will determine the nature of the biofilm on each tooth surface and if the condition is severe enough to cause demineralization and visible changes on the tooth surface. Demineralization occurs due to an imbalance between existing risk factors and protective factors. This entire process is called a caries risk assessment. Caries balance/imbalance is a balance between caries indicators, risk factors and protective factors that will determine whether the caries process continues, stops or remineralization occurs.[11]

CAMBRA is an evidence-based approach to prevent or treat the causes of dental caries at an early stage rather than waiting for permanent damage to the teeth. This philosophy requires an understanding that dental caries is a disease of infectious biofilm bacteria that arises in an oral cavity environment dominated by pathological factors. Researchers suggest this disease is a consequence of a shift in the homeostatic balance of normal microflora due to changes in local environmental conditions, for example pH, which favor the growth of cariogenic pathogens.[12]

The essence of the CAMBRA philosophy of care is the assessment of each individual patient's disease indicators, risk factors and protective factors to determine current and future dental caries disease.[13] Caries risk assessment (CRA) is an important component of caries management and should be considered the standard of care and included as part of the dental examination. This is important in decision making to guide the dentist in determining the diagnosis, prognosis and treatment plan for each patient.

Implementation of caries risk assessment in clinical practice is best done using the CRA form, to ensure that each patient is systematically assessed in the same way, based on the best available research.[11] Several versions of the CRA form exist, and with clinical outcomes use multiple indicators and risk factors.[10] The American Dental Association (ADA) developed two forms that determine low, moderate or high risk: one for

patients aged 0-6 years, and another for patients aged over 6 years. The American Academy of Pediatric Dentistry (AAPD) has developed two forms that determine low, moderate or high risk: one for pediatric patients aged 0-5 years, and one for children aged over 5 years. There are also two forms published by the California Dental Association (CDA), validated risk assessment tools using large cohorts of patients and found significant comparisons regarding the number of cavities in the future.[14]

While all these forms differ in terms of risk factors, disease indicators and protective factors, they all agree that the strongest predictor of future dental caries is the patient's experience with caries, such as carious lesions or new restorations within the last three years, although each form uses different variables to describe the caries experience.[14,11]

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the risk factors for dental caries based on CAMBRA that influence children's dental caries are the criteria for dentin depth lesions, saliva pH and plaque amount.

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CONFLICT OF INTEREST

The authors declare that they have no conflict interests.

ETHICAL CLEARANCE

This research has received a certificate of appropriate research ethics from the Yogyakarta Health Research Ethics Commission No. DP.04.03/e-KEPK.1/130/2023.

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