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How is the Oral Hygiene of Elementary School Students?- Saliva pH, Saliva Volume and Saliva Viscosity

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ABSTRACT

Background: Salivary pH, saliva volume, and saliva viscosity as part of the host affect the health of the oral cavity. High saliva viscosity affects the decrease of salivary flow rate which causes the accumulation of food debris which can eventually lead to plaque and tartar. Objective: This study aims to determine the effect of saliva status on the OHI-S index in elementary school children. Methods: This type of research is observational with a cross-sectional design. The study was conducted on elementary school students in four elementary schools in Sleman City, Yogyakarta, with a total sample of 100 children. The independent variable is salivary status and the dependent variable is the OHI-S index. Collecting data by examining salivary status and examining OHI-S and analyzing data using Chi-Square. Result: there is an effect between pH, volume, and viscosity of saliva on the OHI-S index in children aged 9-11 years with $p<0.05$. Conclusion: saliva status affects the oral hygiene of elementary school students.

Keyword: saliva status, oral hygiene, elementary school.

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INTRODUCTION

Saliva is needed to maintain normal oral function and maintain homeostasis. The flow of saliva from the major salivary glands (parotid, submandibular, and sublingual) and many minor salivary glands is controlled by the sympathetic nervous system. Saliva serves to lubricate and moisten the surface of the tongue, hard and soft tissues during mastication and swallowing. These changes can cause secondary changes in the oral flora, creating a more cariogenic environment. The quality and quantity of saliva can change, for example xerostomia is a dry taste in the mouth.Saliva plays a role in caries prevention, because the presence of saliva is important in maintaining the balance of ion exchange on the tooth surface.[1–3]

The function of saliva in maintaining the health of oral tissues, among others; a) As a lubricating fluid by coating and protecting the mucosa against mechanical, chemical, thermal irritation, helping smooth air flow and helping speech and swallowing food, b) as a reserve of ions because the liquid is saturated especially with calcium ions which will facilitate the remineralization process of teeth. c) acts as a buffer that helps neutralize plaque pH after eating, thereby reducing the occurrence of demineralization, d) as a cleanser of food debris and helps swallow food, e) as an anti-microbial and also controls microorganisms in the oral cavity, and f) Forms pellicle which serves as a barrier, for example against acids from fermented food scraps[4,5]

Saliva contains calcium, fluorine, phosphate, sodium, potassium, chloride, and bicarbonate. The consistency of hard food will affect the salivary glands to increase the flow and buffering capacity of saliva. This results in a high bicarbonatecontent, resulting in a high saliva pH. Saliva flow is related to the volume and pH of saliva, while the volume of saliva is influenced by various things and within

24 hours the volume of saliva collected is 1,000 ml to 1,500 ml.[2,6,7]

At bedtime, the maximum saliva volume is 0.1 ml/min. When awake and there is no food stimulation, the volume will increase to 0.3 ml / min. Salivary volume in children is said to be low if the volume of saliva that is stimulated is below 0.7 ml / min and that is not stimulated is 0.1 ml. /minute5. Children with low nutritional status will have low salivary volume, pH, and flow.[8]

Saliva has a process that can balance demineralization, namely the remineralization process. If fluoride ions are present, saliva is able to remineralization early caries by neutralizing acids. Thus, calcium and phosphate ions will return to the enamel surface. In other words, the caries process is considered to be the result of an imbalance between demineralization and remineralization processes that occur continuously [6]. The time required for the remineralization process is determined by the age of the plaque, the nature of the carbohydrates consumed, the availability of fluoride, and the flow rate of saliva that can dissolve food waste.[9,10]

METHODSANDMATERIALS

This type of research is an observational study with a cross-sectional design, where data are collected at the same time. The research population is elementary school children aged 9-11 years in Sleman Regency. The location of the research was carried out in an elementary school in Gamping District, Sleman City. The research sample was 100 children who were taken by stratified random sampling method. The inclusion criteria for the study sample were ages 9-11 years, the nutritional status of the children was good and they did not have any systemic disorders. Exclusion criteria were willing to be a sample of the study and parents were willing to sign the informed consent. Independent variables: pH, saliva volume and viscosity, dependent variable OHI-S index control variables were physically and mentally healthy children and uncontrollable variables were tooth structure and position and fluoride content of drinking water. The instruments in this study were pH strips to measure pH, saliva collection cups to measure the viscosity and volume of saliva and OHI-S index to measure oral hygiene.

Data analysis was carried out using the SPSS statistical program for univariate analysis to calculate the proportion and bivariate analysis using chi-square to determine the effect of pH, volume and viscosity of saliva on the OHI-S index in elementary school children.

RESULTS

The study was conducted on 100 respondents of children aged 9-11 years the following results were obtained.

Table 1: Frequency distribution of respondent characteristics

No.	Variable	N	Percentage (%)
I	Age		
	9-10 years	42	42
	11-12 years	58	58
	total	100	100
2	Gender		
	Male	38	38
	Female	62	62
	total	100	100

Table 1: Shows that most respondents in the study were from the age of 11-12 years (58%) with female gender, namely 62 respondents (62%).

Table 2: Frequency distribution ofsaliva status in elementary school children

No.	Variable	N	Percentage (%)
1	Saliva pH		
	High	88	88
	Low	12	12
	total	100	100
2	Saliva Volume		
	High	79	79
	Low	21	21
	total	100	100
3	Saliva Viscosity		
	High	49	49
	Low	51	51
	total	100	100

Table 2: Shows that the highest saliva pH was with high criteria (alkaline) as many as 88 (88), saliva volume included in high criteria 79 respondents (79%) and saliva viscosity was low as many as 51 respondents (51%).

Table 3: Frequency distribution of OHI-S Index in elementary school children

No.	OHI-S Index	N	Percentage (%)
1	Good	88	88
2	Moderate	12	12
3	Bad	0	0
Total		100	100

Table 3 shows that respondents have an OHI-S index with good criteria as many as 88 respondents (88%).

Table 4.: Results of the chi-square analysis of saliva pH of OHI-S Index

Saliva pH	OHI-S Index				Total		p-value
	Good		Moderate				
	N	%	N	%	N	%	
High	88	100	0	0	88	100	0.000
Low	0	0	12	100	12	100	
Total	88	88	12	12	100	100	

Table 4 the results of the chi-square analysis of saliva pH of OHI-S index shows that the p-value is 0.000 (p <0.05), which means that there is a significant relationship between pH saliva and OHI-S index.

Table 5: Results of the chi-square analysis of saliva volume of OHI-S Index

Saliva volume	OHI-S Index				Total		p-value
	Good		Moderate				
	N	%	N	%	N	%	
High	73	92	6	8	79	100	0.027
Low	15	71	6	29	21	100	
Total	88	88	12	12	100	100	

Table 5 the results of the chi-square analysis of saliva volume of OHI-S index shows that the p-value is 0.027 (p <0.05), which means that there is a significant relationship between saliva volume and OHI-S index.

Table 6: Results of the chi-square analysis of saliva viscosity of OHI-S Index

Saliva viscosity	OHI-S Index				Total		p-value
	Good		Moderate				
	N	%	N	%	N	%	
High	44	86	7	14	51	100	0.016
Low	44	89	5	11	49	100	
Total	88	88	12	12	100	100	

Table 6 the results of the chi-square analysis of saliva viscosity of OHI-S index shows that the p-value is 0.016 (p <0.05), which means that there is a significant relationship between saliva viscosity and OHI-S index.

DISCUSSION

This study aims to determine the effect of Saliva status on the OHI-S Index in elementary school children. The results of this study indicate that most respondents in the study were from the age of 11-12 years (58%) with female gender, namely 62 respondents (62%).

The average salivary pH score was 7.25 (88%) children had high salivary pH criteria, the saliva volume was high, namely 1.46 (79%), and the viscosity of saliva was included in the normal criteria as much as 51%. The chi-square analysis of saliva status of OHI-S index shows that the p-value <0.05. The degree of acidity of saliva in children is quite high. because children's saliva is mucus and the volume saliva is high, so the pH of saliva is neutral. Saliva also plays a role in the prevention of plaque and calculus, because the presence of saliva is important in maintaining the balance of ion exchange on the tooth surface. The function of saliva in maintaining the health of oral tissues, among others; a) As a lubricating fluid by coating and protecting the mucosa against mechanical, chemical, thermal irritation, helping smooth air flow and helping speech and swallowing food, b) as a reserve of ions because the liquid is saturated especially with calcium ions which will facilitate the remineralization process of teeth. c) acts as a buffer that helps neutralize plaque pH after eating, thereby reducing the occurrence of demineralization, d) as a cleanser of food debris and helps swallow food, e) as an anti-microbial and also controls microorganisms in the oral cavity, and f) Forms pellicle which serves as a barrier for example against the acid fermented food scraps.Saliva contains calcium, fluorine, phosphate, sodium, potassium, chloride, and bicarbonate. The consistency of hard food will affect the salivary glands to increase the flow and buffering capacity of saliva. This results in a high bicarbinate content, resulting in a high saliva pH.[4,5]

Dental plaque can not be avoided growth on the tooth surface, but the growth rate of each individual is different. Factors that influence the growth of plaque is the condition in the oral cavity, namely saliva. Salivary status that affects plaque growth is the viscosity or viscosity of saliva. Salivary flow is related to the volume and pH of saliva, the volume of saliva is influenced by various things and within 24 hours the volume of saliva collected is 1,000 ml to 1,500 ml. At bedtime, the maximum saliva volume is 0.1 ml/min. When awake and there is no food stimulation, the volume will increase to 0.3 ml/min. Salivary volume in children is said to be low if the volume of saliva that is stimulated is below 0.7 ml/minute and that is not stimulated is 0.1 ml/minute. Children with low nutritional status will have low saliva volume, pH, and flow as well.[7,11]

CONCLUSIONS

Based on the research results, it can be concluded that there is saliva status affects the oral hygiene of elementary school students

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CONFLICTOFINTEREST

The authors declare that they have no conflict interests.

ETHICALCLEARANCE

The study was conducted after obtaining approval from the Ethics Committee of the Health Polytechnic of the Ministry of Health Yogyakarta No. LB.012.01/KE-02/XXIII/590/2018

REFERENCES

1. Fisher-Owens SA, Gansky SA, Platt LJ, Weintraub JA, Soobader M-J, Bramlett MD, et al. Influences on children's oral health: a conceptual model. Pediatrics. 2007;120(3):e510–20.
2. Pedersen AML, Sørensen CE, Proctor GB, Carpenter GH, Ekström J. Salivary secretion in health and disease. J Oral Rehabil. 2018;45(9):730–46.
3. Plemons JM, Al-Hashimi I, Marek CL. Managing xerostomia and salivary gland hypofunction: executive summary of a report from the American Dental Association Council on Scientific Affairs. J Am Dent Assoc. 2014;145(8):867–73.
4. Dodds M, Roland S, Edgar M, Thornhill M. Saliva A review of its role in maintaining oral health and preventing dental disease. Bdj Team. 2015;2:15123.
5. Wirawan E, Puspita S. Hubungan pH saliva dan kemampuan buffer dengan DMF-T dan def-t pada periode gigi bercampur anak usia 6-12 tahun. Insisiva Dent J Maj Kedokt Gigi Insisiva. 2017;6(1):25–30.
6. Gao X, Jiang S, Koh D, Hsu CS. Salivary biomarkers for dental caries. Periodontol 2000. 2016;70(1):128–41.
7. Hanson B, Cox B, Kaliviotis E, Smith CH. Effects of saliva on starch-thickened drinks with acidic and neutral pH. Dysphagia. 2012;27(3):427–35.
8. Justino AB, Teixeira RR, Peixoto LG, Jaramillo OLB, Espindola FS. Effect of saliva collection methods and oral hygiene on salivary biomarkers. Scand J Clin Lab Invest. 2017;77(6):415–22.
9. Mount GJ, Hume WR, Ngo HC, Wolff MS. Preservation and restoration of tooth structure. John Wiley & Sons; 2016.
10. Kidd EAM, Bechal SJ. Dasar-dasar Karies penyakit dan Penanggulangan. EGC, Jakarta, hal. 2013;98–118.
11. A'yun Q, Subekti A. Effect of A'yun's predictor software on the behavior, saliva pH, and PHPM index. Maj Kedokt gigi Indones. 2018;4(2):89–94.

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