

sCD14 Protein Analysis in Children with Very High and Low pufa Index

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Abstract

Oral health of children is very important in supporting growth and development. Oral health, including the health component of the primary. In addition, the oral health of children has an important function in the function of the masticatory system. The prevalence of active caries which is still not repaired in children aged 10 years is approximately 52.3%. 100% Children in Mekar Jaya Primary School and Elementary School Cikawari Bandung Regency has an index of PUFA are very high, so it is necessary for controlling risk factors by analyzing protein sCD14. sCD14 in the saliva plays an important role to protect the soft tissues and hard tissues in the oral cavity of pathogenic bacterial infections. Objective: to determine the index level of sCD14 and PUFA.

Descriptive survey techniques, the sampling technique is simple random sampling. Indicators measured are carries morbidity as measured by the index of the individual PUFAs and sCD14 protein levels were measured using the ELISA test.

Individual PUFA Index Mekar Jaya Primary School showed the same value for the index were very low and very high 31.1% and 33.8%, in Cikawiri Elementary School are in the very high category as much as 42.6%. The average concentration of sCD14 in the group category of very high PUFA index by 8.91 ng / mL and the average concentration of sCD14 in the group category of PUFA index is very low at about 28.02 ng / mL.

As a conclusion there is a negative relationship between the average level of sCD14 and indices of PUFA in Mekar Jaya Primary School and Elementary School Cikawari Bandung regency. In a very high PUFA index, the average sCD14 concentration was 8.91 ng / mL and 28.02 ng / mL in the index of PUFA very low.

Clinical article (J Int Dent Med Res 2017; 10(3): pp. 887-890)

Keywords: sCD14, indices of PUFA, children, caries, saliva.

Received date: 16 May 2017

Accept date: 20 July 2017

Introduction

Children dental and oral health is very important in supporting their growth and development because it is included in the major health components. In addition, children and oral health have an important function in mastication function system.¹ Saliva contains a number of proteins and glycoproteins that protect oral tissues, but little is known about the role of human saliva in innate immunity².

The accuracy of salivary lipid peroxidation and lipid profile may help physicians and other health professional to pay much attention for the

use of saliva as a screening tool for patients at risk of cardio and /or cerebrovascular diseases.³

The active caries prevalence which has not been managed in the community aged 10 years-old and above is 52.3%.⁴ 100% children in Mekar Jaya Elementary Schools in Bandung Regency have a very high pufa index,⁵ so it is necessary to control the risk factor by means of sCD14 analysis. CD14 is a co-receptor involved in the recognition of Gram-negative and positive bacteria. Infections are known to influence serum sCD14 levels, and CD14 gene promoter polymorphism (CD14 C-260T) has been reported to be associated with many infectious diseases.⁶

The objective of the research is to know the sCD14 level and pufa index, in order to know the sCD14 level and pufa index as instruments for early detection of dental caries risk.

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Materials and methods

The design of the research used was cross-sectional studies technique.⁷ The sample size was simple random sampling technique.⁷ The indicator measured was caries incidence with individual pufa index and sCD14 level using ELISA method. pufa Index score is calculated by accumulating pufa every individual the same as the accumulated score for dmf - T/DMF - t.⁸

sCD14 was measured using saliva as a sample. Collecting saliva is done without the use of stimulation. The subject of research suggested to collect saliva for 90 seconds,⁹ then collected saliva taken for examination by using a suction method (method of exploitation). Unstimulated saliva of the children was collected with a disposable needle-less syringe from buccal and labial vestibules, then sCD14 assess after saliva centrifugation and performed calculations using the Elisa test.

Results

Data values individual PUFA Mekar Jaya SDN and SDN Cikawari as follows:

Rating	Category	Number	%
Individual PUFA	Very Low	23	31,1
	Low	5	6,8
	Moderate	13	17,6
	High	8	10,8
	Very High	25	33,8
Total		74	100

Table 1. Values of individual PUFAs SDN Mekar Jaya.

Rating	Category	Number	%
Individual PUFA	Very Low	46	24,2
	Low	4	2,1
	Moderate	29	15,3
	High	30	15,8
	Very High	81	42,6
Total		190	100

Table 2. Values of individual PUFAs SDN Cikawiri.

Table 1 shows the values of individual PUFAs in SDN Mekar Jaya is almost equal to the value of PUFA is very low (0.0 to 1.1) and very high (> 6.6), which is 31.1 percent and 33.8 percent. The percentage of PUFA lower values

(1.2 to 2.6), moderate (2,7- 4,4) and high (4.5-6.5) are in the range of 6-18 percent.

Table 2 shows the individual PUFAs in SDN Cikawiri most are in the category of very high (> 6.6) is as much as 42.6%, the other was on the criteria of very low (0.0 to 1.1), low (1, 2 to 2.6), moderate (2,7- 4,4) and high (4.5-6.5).

CD14 Data from both the above categories is shown in Table 5.3 and 5.4 below:

Samples	Category PUFA	CD14 Concentration (ng / mL)
1	Very high	5,49
2	Very high	5,70
3	Very high	13,39
4	Very high	5,24
5	Very high	9,78
6	Very high	4,63
7	Very high	9,62
8	Very high	5,03
9	Very high	5,00
10	Very high	12,72
11	Very high	3,44
12	Very high	7,14
13	Very high	5,03
14	Very high	7,88
15	Very high	33,58
Average		8,91

Table 3. PUFA Concentration of CD14 on a Very High.

Table 3 shows the average concentration of CD14 on a very high PUFA about 8.91 ng / mL. Value CD14 on a very high PUFA is in the range 3.44 to 33.58 ng / mL.

Samples	Category PUFA	CD14 Concentration (ng / mL)
1	Very low	7,17
2	Very low	30,82
3	Very low	30,51
4	Very low	31,74
5	Very low	30,82
6	Very low	29,59
7	Very low	30,21
8	Very low	29,59
9	Very low	29,90
10	Very low	28,06
11	Very low	28,37
12	Very low	26,84
13	Very low	28,68
14	Very low	30,21
15	Very low	27,76
Average		28,02

Table 4 Concentration of CD14 on a Very Low PUFA.

Table 4 shows the average concentration of CD14 on a very low PUFA approximately 28.02 ng / mL. Value CD14 on a very high PUFA is in the range 7.17 to 31.74 ng / mL.

Discussion

Individual pufa index in Mekarjaya Elementary School shows almost the same value for very low and very high pufa index, those are 31,1 % and 33,8 %. PUFA index results with very high criteria indicate the severity of the state of the dentition indicated by the involvement of the pulp, which is experiencing a state of oral mucosal ulcers, fistulas, and abscesses due to caries.⁸ This result according to with monse research,¹⁰ that stated result of result same with this research, pufa codes prevalence was 38.6%

This result showed to improve oral health care facilities¹⁰ and to improve oral health services. Dental caries is a multifactorial disease with various social, cultural, and economic factors playing an important role in its etiology.¹¹ So, besides improving oral health care facilities and oral health services, the government must be intervention social, cultural and economic factor to reduce the severity of caries in this site.

sCD14 value at very high pufa is in the range 3.44 to 33.58 ng/mL. The average of sCD14 concentration in very high pufa index is around 8,91 ng/mL. sCD14 value at very low pufa is in the range 7.17 to 31.74 ng/mL. The average of sCD14 concentration in very low pufa index is around 28,02 ng/mL. sCD14 protein concentration in the index is very high pufa showed lower levels of, inversely proportional to the sCD14 in respondents with very low indices of pufa.

The result no different with Zhao et al. Zhao that stated that The concentration of sCD14 in saliva was equivocal in both groups; ranging between 509 pg/ml and 1443 pg/ml in caries free group and between 609 pg/ml and 1829 pg/ml in the caries-active group.¹² This result is in line with the theory that the present invention is based on the recognition of the fact that the expression of the salivary protein sCD14 (soluble CD14) is considerably reduced in the saliva from caries active individuals compared to the saliva of Caries free individuals. Gigho, et al, stated that expression of the salivary protein sCD14 was reduced in samples of patients with active caries, while in patients are free of caries can be

detected the presence of protein sCD14 clearly in saliva.¹³

The average of sCD14 concentration in very high pufa index is around 8,91 ng/mL. This result no different with research of Biria, et all, that state mean concentrations of sCD14 in ECC and CF groups were 57.82 and 31.92 ng/ml.¹⁴ CD14 is a 55 kDa membrane glycoprotein expressed predominantly on the surface of monocytes/macrophages and neutrophils, Which plays a crucial role in the recognition of several microbial products, such as lipopolysaccharide (LPS, endotoxins) and peptidoglycan, Which are major components of Gram-negative and Gram-positive bacteria, respectively, thus participating in the initiation of immune responses.¹³

Results above showed that saliva is recognized as a rich source of host factors capable of modulating the caries process.¹² Early detection of white-spot lesions, arresting demineralization and promoting remineralization are some of the preventive clinical methods currently used in dental caries management¹⁵.

In addition, considerable emphasis is placed on developing efficient caries risk assessment strategies to determine the likelihood of an individual developing new carious lesion and/or to determine the status of the caries process on individual tooth surfaces^{15,16}. As a disease of the mineralized tissues of the teeth, pathogenesis of caries involves demineralization of enamel by acid producing bacteria and destruction of the organic substance resulting in cavitation^{15,17}. Caries risk assessment methods, identification of biomarkers are being emphasized to control the incidence of the largely preventable disease.¹²

The average of sCD14 concentration in very high pufa index is around 8,91 ng/mL. sCD14 value at very low pufa is in the range 7.17 to 31.74 ng/mL The average of sCD14 concentration in very low pufa index is around 28,02 ng/mL. This result showed same with Ueahar, et all that showed that human major salivary gland cells constitutively expressed a bacterial pattern recognition receptor, CD14, by immunohistochemistry.²

CD14 was completely absent in the saliva of 20 age-matched patients affected by two to eight carious lesions but appeared in their saliva a few weeks after dental restoration. These results suggest that the absence of salivary soluble CD14 could represent a useful index of

caries activity, and might be used to detect early carious lesions not visible by oral inspection. These results suggested that saliva CD14 is important for the maintenance of oral health and possibly intestinal homeostasis.² The above results indicate diagnostic test method can be used to mark the tendency of an individual regarding the existence of active caries is very high or very low pufa index in the oral cavity.

Saliva test Gives more benefit than a blood test.¹⁸ The use of saliva as a diagnostic tool could be very advantageous in detection and monitoring of many cancers. The number of studies showing a potential, in all stages of cancer care, is superior to the studies that have not demonstrated any interest. However, the analysis of salivary cancer biomarkers is influenced by several factors such as saliva collection protocol and the degree of stimulation of the salivary flow rate. Consequently, interpretation of results is sometimes difficult. Moreover, there is a need to study collection methods of saliva and analysis method as well as encouraging more studies including more biomarkers could be very useful for screening and diagnosis of many cancer illnesses.¹⁹

Conclusions

The conclusion is there is a negative relationship between the average of sCD14 levels and pufa index in Mekar Jaya Schools in Bandung Regency. In very high pufa index, the average of sCD14 concentration is 8,91 ng/mL and 28,02 ng/mL in very low pufa index.

Declaration of Interest

The authors report no conflict of interest and the article is not funded or supported by any research grant.

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