

Dental Caries Experience in relation to Salivary flow rate, salivary pH among 5 Years Passive Smokers children in Tikrit City, Iraq

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Abstract

Background: dental caries is the most prevalent oral disease that affecting oral cavity in all ages. Tobacco smoking have numerous negative effects on oral cavity including dental caries, periodontal disease. Also, numerous study reported that caries experience was higher among passive smokers group than control group. Aim of study: This study was conducted to assess the relation between dental caries and salivary flow rate, salivary pH among passive smokers 5 years children in Tikrit city/ Iraq. Materials and methods: 60 kindergarten children (28 girls, 32 boys) were included in this study. 30 children passive smokers group was compared with 30 children control group. caries experience was diagnosed and recorded according to criteria of decayed, missing and filling Surface index (dmfs index for primary teeth) (WHO, 2013). Stimulated salivary samples were collected for assessment of salivary flow rate and salivary pH. Results: Dental caries was higher among passive smokers children, the salivary flow rate was higher among control group than among study group with statistically no significant differences, also salivary pH was higher among control group than study group with statistically highly significant differences between these two group. Conclusion: The current study reported that dental caries was higher among passive smokers children, caries experience had no significant positive correlation with salivary flow rate and salivary pH. The lower salivary flow rate and salivary pH among passive smokers children lead to increase caries experience among them.

Keywords: Dental Caries Experience, Salivary flow rate, salivary Ph, Passive Smokers children

Introduction:

Dental caries is " a multifactorial, transmissible, infectious oral disease caused primarily by the complex interaction of cariogenic oral flora with fermentable dietary carbohydrates on the tooth surface over time" ⁽¹⁾. Dental caries result from interaction of diet , microflora , host and time ⁽²⁾. It affects enamel surfaces of children and exposed root of elderly people ⁽³⁾. Smoking tobacco is one of the major global problem that affects public health , mostly smokers know that smoking tobacco causing harm to themselves , yet they remain to smoke ⁽⁴⁾. Smoking is one of the important and major risk factors for oral disease such as periodontal disease and tooth loss ^(5,6) . Also numerous study reported that secondhand smoking (passive smoking) aggravate periodontal disease in non-smokers ^(7,8) . It is well known that patient with alteration in qualitative and quantitative saliva complains from oral dryness that causes several problems including difficulties in eating speaking , also causes altered

condition such as , dental caries , opportunistic infection and other disease of oral cavity (9,10) .

Materials and methods :

The current study was done in Tikrit city / Iraq . The sample was composed of 60 kindergarten children (32 boys , 28 girls) , thirty of them as control group and other 30 children as study group (passive smokers) . the criteria of passive smoker selection was : (9,16,17) .

1. One of the parents of the children is smoker.
2. The number of cigarettes smoked per day are at least 20.
3. The smoking is indoors (inside the house).
4. The exposure of subject to environmental smoking was at least for 5 years

Before collection of data the permission was obtained from kindergarten authority and parents to ensure full cooperation . Caries-experience was diagnosed and recorded according to decayed, missing and filling Surface index (dmfs index for primary teeth) .described by WHO 2013. Stimulated salivary samples were collected for the estimation of salivary flow rate and salivary pH . The measuring of salivary pH was done by using digital pH meter . While , salivary flow rate was calculated by dividing saliva volume that collected in milliliter (ml) by the time required for collection in minute (min). All data were analyzed using statistical package for social science (SPSS) version 21.

Results :

The sample was consist of 60 children , distributed into study and control group , male and female , as shown in the table (1) . Dental caries was higher among study group than control group as shown in the table (2) . Table (3) revealed that salivary flow rate was higher in the control group than in study group , and also the salivary pH was higher among control group than study group with statistically highly significant differences between two groups . correlation coefficient between caries experience dmfs and its component (ds , ms , fs) with salivary flow rate among two groups (study , control) was revealed in the table (4) . ds , dmfs and salivary flow rate has no significant positive correlation among study group . While , ms and fs components of dmfs have no significant inverse correlation with salivary flow rate among study group . Regarding control group, the ds , ms , dmfs component have highly significant positive correlation with salivary flow rate , while fs component has no significant positive correlation with salivary flow rate . Correlation coefficient between caries experience dmfs and its component (ds, ms, fs) with salivary pH among study and control group was illustrated in the table (5) . Concerning study group , there is no significant positive correlation between ms , fs , dmfs and salivary pH . While , no significant inverse correlation between ds and salivary pH has been found . regards control group , there was no significant positive correlation has been found between ds and dmfs with salivary pH . No significant inverse correlation between ms and salivary pH , highly significant inverse correlation between fs and salivary pH was detected in this study.

Table (1) : Distribution of the sample as study and control groups by genders .

Smoking				
Groups	Male		Female	
	No.	%	No.	%
Study group	16	53.33	14	46.66
Control group	16	53.33	14	46.66

Table (2) : Occurrence of dental caries .

	Study group		Control group	
	No .	%	No.	%
With caries	30	100.00	26	86.67

Table (3) : Salivary flow rate (ml/min) and pH (Mean \pm SE) among study and control group .

Variables	Smoking				t	df	P
	Study group		Control group				
	n	Mean \pm SE	n	Mean \pm SE			
Flow Rate	30	0.738 \pm .036	30	0.767 \pm .040	.550	57.552	.584
Salivary pH	30	7.310 \pm .059	30	7.620 \pm .049	4.035	56.200	.000 **

Table (4) : correlation coefficient between caries experience (dmfs)and its component (ds, ms, fs) with salivary flow rate among study and control group .

Variable	Study group		Control group	
	r	p	r	P
ds	.075	.694	.367	.046*
ms	-.162	.393	.438	.015*
fs	-.100	.598	.087	.646
dmfs	0.014	0.942	0.414	.023*

Table (5) : Correlation coefficient between caries experience dmfs and its component (ds, ms, fs) with salivary pH among study and control group .

Variable	Study group		Control group	
	r	p	r	P
ds	-.027	.885	.068	.722
ms	.304	.102	-.014	.941
fs	.088	.645	-.364	.048*
dmfs	0.057	0.763	0.045	0.815

* significant $p < 0.05$ **Discussion :**

The current study was designed to evaluate the relation between caries experience and salivary flow rate / salivary pH among passive smokers 5 years children in Tikrit city . dental caries occurrence was higher among study group than among control group .The present study showed that mean value of salivary flow rate was higher among control group than among study group , with statistically no significant difference . This result was agree with results of the some study that found that tobacco smoking decreases salivary flow rate and they supposed that nicotine effects on taste nerve apparatus (Rad *et al.* 2010; Kanwar *et al.*, 2013) . On the other hand , the result of this study disagree with others as they found that salivary flow rate not affected by smoking tobacco (Islas-Granillo 2014; Khemiss *et al.*, 2017; Al-Mufti and Saliem 2018) .Salivary flow rate had no significant positive correlation with caries experience (ds , dmfs) among passive smokers group . The same finding reported by (Ghulam, 2007; Al-Saadi, 2009; Hussein, 2015 ; Sahib , 2018) . The salivary pH was lower among study group than control group , with highly significant differences of salivary pH between these two group . The same result reported by other studies (Aligne *et al.*, 2003; De *et al.*, 2005; Goodwin, 2007; Keskinoglu, 2007; Avsar, 2008; Qamar *et al.*, 2016; Hussein, 2016 ; Al-Mufti and Saliem, 2018 ; Sahib ,2018) . This finding may be attributed to fact that cigarette nicotine may lower the salivary flow rate and salivary pH (Avşar *et al.*, 2008) . No significant inverse correlation has been found between salivary pH and dental caries among study group in this study , (Rajesh *et al.*,2015) reported that lowering salivary pH lead to increase in the dental caries that attributed to decrease in the buffering capacity .

References :

1. André V. Ritter, R. Scott Eidson and Terence E. Donovan. Dental Caries: Etiology, Clinical Characteristics, Risk Assessment, and Management .2015.
2. Wakai K, Naito M, Naito T, Kojima M, Nakagaki H, Umemura O, Yokota M, Hanada N, Kawamura T. Tooth loss and intake of nutrients and foods: a nationwide survey of Japanes dentists. Community Dent Oral Epidemiol BLJV.J 2010; 38: 43-49.
3. Marya .A textbook of public health dentistry.1st ed. Jaypee Brothers, New Delhi, 2011.
4. West R., & Brown J. (2015). *Smoking in England 2007–2014* .
5. Yanagisawa T, Ueno M, Shinada K, Ohara S, Wright FA, Kawaguchi Y. Relationship of smoking and smoking cessation with oral health status in Japanese men. J Periodontal Res. 2010;45:277–83.

6. Yanagisawa T, Marugame T, Ohara S, Inoue M, Tsugane S, Kawaguchi Y. Relationship of smoking and smoking cessation with number of teeth present: JPHC Oral Health Study. *Oral Disease*. 2009;15:69–75.
7. Walter C, Kaye EK, Dietrich T. Active and passive smoking: assessment issues in periodontal research. *Periodontol 2000*. 2012;58:84–92
8. Javed F, Bashir Ahmed H, Romanos GE. Association between environmental tobacco smoke and periodontal disease: A systematic review. *Environ Res*. 2014;133C:117–22.
9. Foglio Bonda PL, Migliario M, Rocchetti V, Pattarino F, Foglio Bonda A. Daily and annually variation of unstimulated whole saliva flow rate and pH and their relation with body profile in healthy young adults. *Eur Rev Med Pharmacol Sci* 2013; 17: 253.
10. Wu PK, Ke JY, Chung CY, Chen CL, Hwang TL, Chou1 MY, Wong MKA, Hu CF, Lee YC. Relationship between unstimulated salivary flow rate and saliva composition of healthy children in Taiwan. *Chang Gung Med J* 2008; 31: 281-286.
11. Rad, M., Kakoie, S., Brojeni, F.N. And Pourdamghan, N., 2010. Effect Of Long-Term Smoking On Whole-Mouth Salivary Flow Rate And Oral Health. *Journal Of Dental Research, Dental Clinics, Dental Prospects*, 4(4), P.110.
12. Kanwar, A., Sah, K., Grover, N., Chandra, S. And Singh, R.R., 2013. Long-Term Effect Of Tobacco On Resting Whole Mouth Salivary Flow Rate And Ph: An Institutional Based Comparative Study. *European Journal Of General Dentistry*, 2(3), P.296.
13. Islas-Granillo, H., Borges-Yañez, S.A., Medina-Solís, C.E., Galan-Vidal, C.A., Navarrete-Hernández, J.J., Escoffié-Ramirez, M. And Maupome, G., 2014. Salivary Parameters (Salivary Flow, Ph And Buffering Capacity) In Stimulated Saliva Of Mexican Elders 60 Years Old And Older. *The West Indian Medical Journal*, 63(7), P.758.
14. Khemiss, M., Khelifa, M.B. And Saad, H.B., 2017. Preliminary Findings On The Correlation Of Saliva Ph, Buffering Capacity, Flow Rate And Consistency In Relation To Waterpipe Tobacco Smoking. *Libyan Journal Of Medicine*, 12(1).
15. Al-Mufti, S.M.T. And Saliem, S.S., 2018. Waterpipe Smoking Effect On Clinical Periodontal Parameters, Salivary Flow Rate And Salivary Ph In Chronic Periodontitis Patient. *Journal Of Baghdad College Of Dentistry*, 30(1), Pp.63-68.
16. Ghulam I., 2007. Oral Health Status In Relation To Salivary Variables Among A Group Of Asthmatic Patients. M.Sc. Thesis, College Of Dentistry, University Of Baghdad.
17. Al-Saadi, A., 2009. Oral Health Condition And Salivary Constituents (Zinc, Copper, Calcium, Iron And Total Protein) Among The Selected Overweight Primary School Children. A Master Thesis, College Of Dentistry, University Of Baghdad.
18. Hussein, A.S., 2015. Dental Caries And Some Salivary Constituents Among 10 Years Old Passive Smokers In Al-Kufa City-Iraq.
19. Sahib, A.M., 2018. Oral Cleanness And Periodontal Health Status Among Coffee-Shop Workers In Najaf City/Iraq. *Journal Of Baghdad College Of Dentistry*, 30(4), Pp.15-19.
20. ALIGNÉ, C.A., MOSS, M.E., AUINGER, P. AND WEITZMAN, M., 2003. Association of pediatric dental caries with passive smoking. *Jama*, 289(10), pp.1258-1264.
21. DE, S., FENTON, J.E., JONES, A.S. AND CLARKE, R.W., 2005. Passive smoking, allergic rhinitis and nasal obstruction in children. *The Journal of Laryngology & Otology*, 119(12), pp.955-957.
22. GOODWIN, R.D., 2007. Environmental tobacco smoke and the epidemic of asthma in children: the role of cigarette use. *Annals of Allergy, Asthma & Immunology*, 98(5), pp.447-454.
23. KESKINOGLU, P., CIMRIN, D. AND AKSAKOGLU, G., 2007. Relationships between cotinine, lower respiratory tract infection, and eosinophil cationic protein in children. *European journal of pediatrics*, 166(5), pp.455-459.
24. AVŞAR, A., DARKA, Ö., TOPALOĞLU, B. AND BEK, Y., 2008. Association of passive smoking with caries and related salivary biomarkers in young children. *Archives of oral biology*, 53(10), pp.969-974.
25. QAMAR, A., BAIG, S., ALI, A., ZEHRA, N. AND MEMON, M.A., 2016. Resting salivary flow rate and pH decreases in chewable tobacco users. *Journal of Advances in Medicine and Medical Research*, pp.1-9.

26. RAJESH, K.S., ZAREENA, S.H. AND KUMAR, M.A., 2015. Assessment of salivary calcium, phosphate, magnesium, pH, and flow rate in healthy subjects, periodontitis, and dental caries. Contemporary clinical dentistry, 6(4), p.461.