Tikrit Journal for Dental Sciences 12(2) (2024) 427-432
https://doi.org/10.25130/tjds.12.2.18

Tikrit Journal
for
Dental Sciences
https://tjds.tu.edu.iq
ISSN:2073-1213

Salivary Flow Rate / Salivary PH Effect on Dental Caries Experience Among 5 Years Passive Smokers Children in Ramadi City / Iraq

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Keywords:
Salivary flow rate, smoking, salivary PH, dmfs

Article Info.:

Article History:
Received: 1/10/2023
Received in revised form: 24/11/2023.
Accepted: 26/11/2023
Final Proofreading: 26/11/2023
Available Online: 1/12/2024

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Citation: Khaudhair AT. Salivary Flow Rate / Salivary PH Effect on Dental Caries Experience Among 5 Years Passive Smokers Children in Ramadi City / Iraq. Tikrit Journal for Dental Sciences 2024; 12(2): 427-432.
https://doi.org/10.25130/tjds.12.2.18

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Abstract

Background: The most common oral condition affecting people of all ages is dental caries. Smoking tobacco has a number of detrimental impacts on the oral cavity, such as dental caries and periodontal disease. Additionally, many studies revealed that the prevalence of caries increase in the study group than in the control group.

Aim of study: This study was carried out in Ramadi, Iraq, among five-year-old passive smokers children to predict the association between caries and salivary pH and flow rate.

Method: In this study, 60 kindergarten children (28 girls and 32 boys) were examined. The comparison between the 30 passive smoking children and the 30 control children was done. According to the decayed, missing, and filling Surface index (dmfs index for primary teeth) criteria, caries experience was identified and reported according to (WHO, 2013). In order to measure salivary flow rate and pH, stimulated salivary samples were taken from samples.

Result: Children who are passive smokers have higher rates of dental caries, higher salivary flow rates than study groups despite statistically insignificant differences, and higher salivary pH levels than control groups despite highly statistically significant differences between these two groups.

Conclusion: This study concluded that children who are passive smokers are more prone to have dental caries. Caries experience did not significantly positively correlate with salivary flow rate or pH. Children who are passive smokers have decreased salivary flow rates and pH levels, which increases their risk of developing caries.

Introduction:

Saliva is a main complicated oral fluid was produced by three glands of salivary glands (1). Saliva can have both anti-oxidant and toxic privileges, for that the saliva is the main defender against stress of oxidation(2). physicochemical properities of saliva have examined by anumber of studies such as pH, buffer capacity, , and antibacterial capability(3). Dental caries is a "multifactorial, transmissible, infectious oral disease

primarily caused by the complex interaction of cariogenic oral flora with fermentable dietary carbohydrates on the tooth surface over time" (4). Diet, bacteria, host, and time interact to cause dental caries(5). It affects the exposed roots of elderly persons and the enamel surfaces of children (6). The function and structure of saliva can be changed by a variety of toxic chemicals such smoking (7). The somking of cigarette are penetrate in every part of the oral cavity . The large number of studies that concern about the correlation of passive smoker parent and caries in children found that there is a strong connection between them (8,9). Most smokers are aware that smoking tobacco harms them personally, yet they continue to smoke, making it one of the biggest global problems that impacts public health (10) .Smoking is essential and significant risk factors for oral diseases, (11,12). Additionally, multiple studies have shown that passive smoking (secondhand smoke) aggravates periodontal disease (13,14). It is good known that patients who experience changes in their saliva's quality and quantity often experience oral dryness, which can make it difficult to eat or speak. It can also lead to other conditions like dental caries, opportunistic infections (15, 16).

Material and Method

The present investigation was carried out in Ramadi city, Iraq. The sample consisted of 60 kindergarteners (28girls and 32 boys), 30 were in the control group and 30 were in the study group (passive smokers). Selection criteria for passive smokers were(15),

1. One of the children's parents smokes.
2. Smokers average at least 20 cigarettes every day.
3. Smoking takes place indoors, inside the home.
4. The person was exposed to ambient smoking for at least five years.

To guarantee complete participation, authorization was sought from the kindergarten administration and parents prior to data collection. According to the decayed, missing, and filling Surface index (dmfs index for primary teeth), caries experience was identified and recorded and outlined by WHO in 2013. Between 8 and 10 a.m the children asked to start collecting unstumilated saliva The children have an instruction not to smoke, eat, or put anything in their mouths before approximately one hour before the collection .The examiner assemble the saliva in a quiet room while the child in upright position. first the child asked to swallow their slaiva then wait until the saliva return to collect then asked to spill it into special comtainer during the procedure order them not to move the body or head.

Six parameters were calculating like flow pH, , and buffering capacity of saliva. A complete kit called GC saliva kit check buffer was utilized. After collecting saliva into a container using a container, the total amount of saliva was measured. The equation for measure the flow rate is derived by dividing the total volume by 5 to obtain the result in milliliters per minute (mL/min)

pH strips eas used to calculate pH of an unstimulated saliva sample. 3.5 to 6 scale was found in pH strips. after obtaining sample by using pipette ,2-3 drop was put into the strip and define the color change and compared it to special table come with Kit (17). SPSS version 21was used to calculate the whole data.

Result

The sample was made up of 60 kids who were divided into study and control groups and were both boys and girls, as stated in table (1). According to table (2), the study group had more dental caries than the control group did. Table (3) showed that there were statistically highly significant differences between the two groups, with salivary flow rate being higher in the control group than in the study group and salivary pH being higher in the control group. The table (4) shows the correlation coefficient between salivary flow rate and the three factors that make up caries experience (ds, ms, and fs). There is no positive link between ds, dmfs, and salivary flow rate in the study group. While there is no discernible inverse

association between salivary flow rate in the study group and the, ms, or fs components of the dmfs. salivary flow rate have a highly significant positive association with the ds, ms, and dmfs components for the control group, , while the fs component not show this result

The table (5) shows the correlation coefficient between salivary pH and the caries experience inboth groups. Ms, fs, and dmfs and salivary pH do not significantly positively correlate with study group. However, no evidence of an inverse relationship between salivary pH and ds has been discovered. Regarding the control group, salivary pH and ds and dmfs did not significantly positively correlate. Inverse correlations between ms and salivary pH were not found to be significant, however inverse correlations between fs and salivary pH were found to be significant.

Discussion

The current study was done to assess the relationship between caries experience and saliva flow rate / pH among 5 years child who was passive smokers in Ramadi city. Dental caries were more common in the passive smoker group. The current investigation shown that, despite their being no statistically significant difference, the mean salivary flow rate was higher in the control group than in the study group. This finding was in line with other studies' findings that smoking causes salivary flow to decrease and that nicotine has an impact on the taste nerve apparatus (18,19).

According to the current study, smoking has a detrimental impact on salivary flow rate since the mean value of salivary flow rate in the smoker group was fewer than the non-smoker group. Despite this difference between the two groups was non statistically significant., it may be due to the effect of smoking on taste receptors, which are a primary receptor site in the oral cavity that are constantly exposed to tobacco particles. Generally, tobacco use reduces taste receptor sensitivity with a resulting depression in salivary reflex. Presumably, this could change the taste receptors' response and, consequently, alter salivary flow rate. Saliva's relevance stems from its role in maintaining a healthy oral environment, removing cariogenic meals from the oral cavity, and other functions(20).

The decreased salivary flow rate, which results in a reduced ability to remove cariogenic food from the mouth and a reduced ability to buffer acid produced by cariogenic bacteria, may be the cause of the higher dental caries index in smoker Or, there may be an increase in dental caries as a result of the bacterial community changing toward lactobacillus and the cariogenic streptococci in smokers(21).

The findings of this investigation, however, differ with those of other studies that have demonstrated that smoking does not impact salivary flow rate (22,23,24).Salivary flow rate among the group of passive smokers did not significantly positively correlate with caries experience (ds,dmfs). A similar conclusion was found by (25,26,27,28). for the control group, the study group's salivary pH was lower, with the differences between the two groups' salivary pH being very significant. The similar outcome was found in several research (29,30,31,32).

This attributed to nicotine from cigarettes can decrease salivary flow rate and pH (31). Decreasing salivary pH can increase dental caries because decrease in the buffering capacity, no significant negative association between salivary pH and dental caries has appear in the study group (32).

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

Smoking				
Groups	**Boys**		**Girls**	
	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 ± SE) among study and control group .

Variables	**Smoking**				**T**	**Df**	**P**
	Study group		**Control group**				
	N	**Mean ± SE**	**N**	**Mean ± SE**			
Flow Rate	**30**	**0.806 ±0.243**	**30**	**0.769±0.228**	**0.62**	**28**	**0.538**
Salivary pH	**30**	**39.531 ±2.112**	**30**	**31.545 ±1.697**	**2.691**	**28**	**0.012****

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	**0.026**	**0.883 ns**	**- 0.273**	**0.045 ***
Ms	**0.291**	**0.550**	**0.606**	**0.0003 ****
Fs	**- 0.019**	**0.914 ns**	**0.225**	**0.232 ns**
Dmfs	**0.068**	**0.698 ns**	**0.246**	**0.041 ***

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	- 0.043	0.823 ns	0.035	0853 ns
Ms	0.026	0.890 ns	-0.185	0.329
Fs	0.249	0.184 ns	0.439	0.05 *
Dmfs	- 0.028	0.882 ns	0.107	0.572 ns

* significant $p<0.05$

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