Original Article

Unstimulated Salivary Flow And Salivary Ph An Indicator Of Dental Caries In Pediatric Population

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Introduction: A healthy mouth is the gateway to a healthy body. Oral health is an integral component of the overall health and well-being and dental caries is probably the commonest chronic disease in the world (**Levine 2011**)[1].Worldwide, 60–90% of school children and nearly 100% of adults have dental cavities, often leading to pain and discomfort. (**WHO, April 2012**)[2]. Unfortunately, many children are afflicted with dental caries at an early age. According to the **National Health Survey[3]** conducted nationwide in 2004 in India, the percentage prevalence of dental caries were found to be 51.9% in 5 year old, 53.8% in 12 year old and 63.1% in 15 year old children.

AIM: To analyse the possibility of early detection of caries prone children from their rate of flow of unstimulated saliva and salivary pH.

DMF: For children over 7 (seven) years and upto 11 or 12 the decayed, missing and filled primary molars and canines have been used to determine a dmft or dmfs when the surfaces are counted. A primary molar or canine is presumed missing because of dental caries when it is missing before the normal exfoliation time.

III. **dft and dfs:** Description: In the deft and defs as described, both 'd' and 'e' are used to describe teeth with dental caries. Because of that 'd' and 'e' are sometimes combined and the index becomes the dft and dfs.

Teeth not counted:
1) Missing teeth including unerupted and congenitally missing.
2) Supernumerary teeth
3) Teeth restored for reasons other than dental caries are not counted as f.

Over 7,187 DMF index publications included in PubMed (**Larmas M, 2010**)[102]. underlines its leading role in the present epidemiological caries research.

Materials and Methods:

A. **Study setting** :

- Department of Pediatric Dentistry, Guru Nanak Institute of Dental Sciences and Research, Kolkata, India

B. **SAMPLE SIZE** :
122 samples were studied. (54 Males, 68 Females)

C. **SAMPLE DESIGN**:
Patients were selected randomly from the outdoor. Their caries statuses were checked by clinical methods and DMFT/deft/DMFS/dmfs (as per WHO guidelines) were recorded first. Followed by documentation of salivary pH, rate of flow of saliva.

I. **Method of Data Collection and Experiment Design**
Patients were selected randomly from outpatient department as per inclusion and exclusion criteria, irrespective of gender. The procedures were explained to the guardians of the children and their written consents were obtained. All procedures were conducted between 10 am to 11:30 am each day to exclude possibilities of diurnal or circadian variations. salivary pH was determined using Universal pH (pH 1-10) indicator paper (MERCK Specialities Pvt. Ltd, Mumbai)

This was followed by measuring the rate of flow of unstimulated saliva by allowing saliva to drool for 10 mins and the expectorated saliva was collected in a measuring cylinder via a funnel and represented in milliliters per minute. Patients were observed throughout the procedure and a timer was set which indicated the time of cessation of saliva collection. Also, the patients were strictly informed to not swallow but to expectorate saliva.

Salivary pH determination

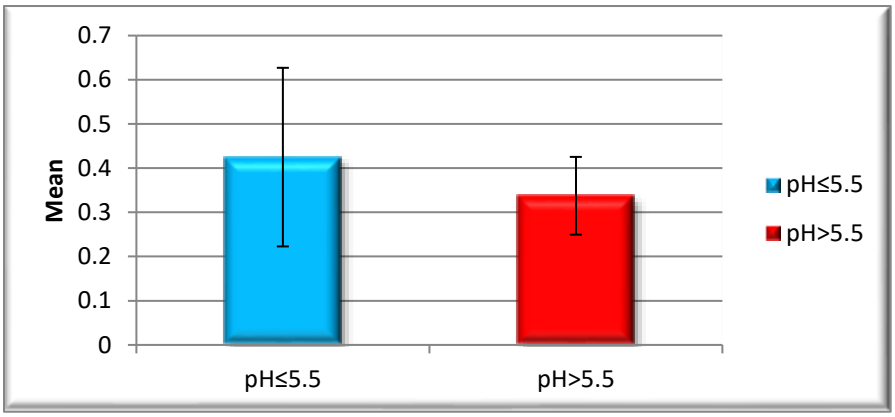
Unstimulated saliva collected in calibrated tube for 10 mins

Results

Distribution of mean salivary rate of flow according to pH group

Group	Number	Mean	SD	Minimum	Maximum	Median	p-value
pH≤5.5	4	.4250	.2021	0.2500	0.7000	0.3750	0.0657
pH>5.5	118	.3375	.0880	0.1000	0.5500	0.3500	

p-value:0.0657**, Statistically not significant**
Difference of mean salivary rate of flow according to pH group was not statistically significant (p=0.0657**).**



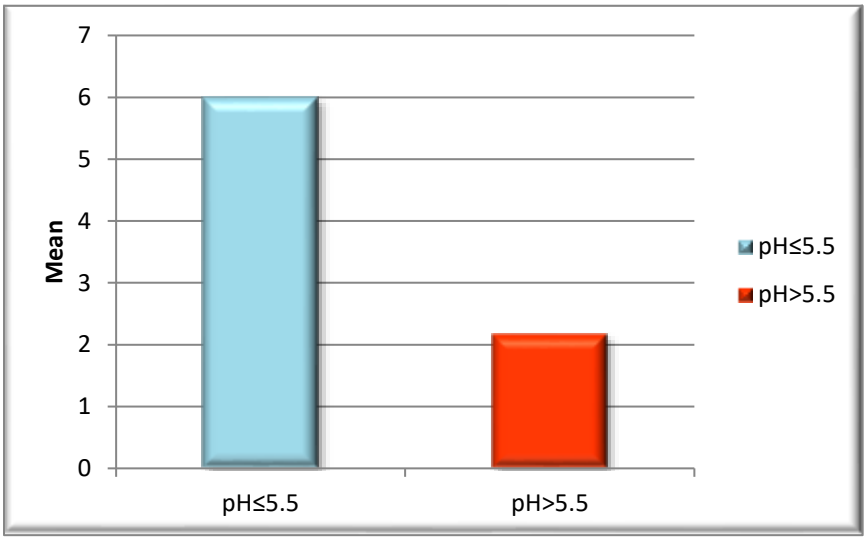
Graphical representation1.

Distribution of mean deft according to Salivary pH

Group	Number	Mean	SD	Minimum	Maximum	Median	p-value
pH≤5.5	3	6.0000	1.7321	4.0000	7.0000	7.0000	0.0049
pH>5.5	95	2.1684	2.2769	0.0000	10.0000	2.0000	

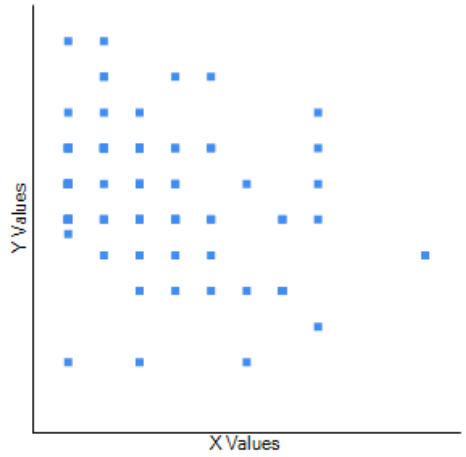
p-value:0.0049**, Statistically significant**

Difference of mean deft according to pH group was statistically significant (p=0.0049**).Mean deft was significantly higher in children with a salivary pH < 5.5 (critical pH), or viceversa.**



Graphical representation:2

Graph 3: Correlation between deft and Salivary rate of flow(ml/min)



Graphical representation:3
X-axis=deft
Y-axis=Salivary rate of flow(ml/min)

The value of R is -0.3151. The value of R^2, the coefficient of determination, is 0.0993. The P-Value is 0.001582. The result is significant at $p < 0.05$. The negative correlation was found between deft and Salivary rate of flow.

Discussion: Dental caries is the single most common chronic disease according to the first ever United States Surgeon General's report on oral health in America published in (**May 2000)**[100]. Dental caries is five times more common than asthma and seven times more common than hay fever. Furthermore, **Edelstein and Douglass** noted, dental caries is not self-limiting like common cold nor amenable to treatment with a simple course of antibiotics, like an ear infection.
Rate of flow of saliva (mean in ml/min) was found to be 0.3, 0.37, 0.36 in age groups 6-8, 9-11 and 12-14 years with p=0.0016, which is statistically highly significant but clinically not much significance could be concluded.

Conclusion: Children with salivary pH lesser that 5.5 were found to have significantly higher caries experience, which could also be explained vice versa. Even though no statistically significant correlation was found between Salivary pH and rate of flow of unstimulated saliva. The rate of flow of unstimulated saliva was found to be inversely proportional to caries experience, hence indicating that a low salivary flow increases caries. Within the study limitations, results from this analysis of a small sample of school children suggest anobvious relationship between dental caries and salivary pH and rate of flow of unstimulated saliva. Leaving scope for further study as dental caries is known to be a multifactorial disease.

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