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# Correlation Between pH of Saliva and Dental Caries among Children of Rajshahi City

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## Abstract

**Background: The aim of the study was to assess the salivary pH in dental caries children. The study was carried out with the objective of evaluation of pH of saliva by pH scale among healthy and caries children.**

**Materials & Methods: A hospital-based study was conducted in the Department of Microbiology of Rajshahi in collaboration with Dental unit, Rajshahi Medical College Hospital, Rajshahi for a period between January to December 2017. All the cases were purposively selected from whom salivary sample were collected to measure pH using a chair side test strip. pH paper was rolled over the saliva on slide. Compare the colour against the standard to obtain a measurement.**

**Results: The present study suggests that there is a significant relation between salivary pH and caries.**

**Conclusion: We hypothesize that low salivary pH are associated with a higher dental caries rate.**

**Key words: Caries, pH, pH scale.**

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## Introduction

Dental caries is the most prevalent oral disease. Its high morbidity potential has brought this disease into the main focus of the dental health professions.

Several factors, such as adherence to enamel surfaces, production of acidic metabolites, pH of saliva, the capacity to build up glycogen reserves, the ability to synthesize extracellular polysaccharides and subsequent bacterial growth on tooth surfaces lead to formation of dental caries.[1] Again saliva parameter such as its quality as well as pH, viscocity and buffering action contribute to enamel demineralization and increase the susceptibility to dental caries.[2] Salivary pH between 4.1 to 4.9 is suggestive of bacterial infection.[3]

A neutral or alkaline pH can neutralize acid formed by the action of microorganism on carbohydrate food substance. The critical pH values for demineralization usually ranges between 5.2 to 5.5.[4] *Streptococci* produce large amounts of a membrane associated ATPase, capable at low pH which helps to pump H+ ions from the cells and thus reduce intracellular acidification leading to dissolution of calcium

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phosphate and initializes loss of tooth mineral substances.[5]

## Materials and Methods

Cross-sectional type of descriptive study was conducted in the Department of Microbiology of Rajshahi in collaboration with Dental unit, Rajshahi Medical College Hospital, Rajshahi for a period of one year. It was conducted by using predesigned partially structured data sheet. A total of 200 saliva sample from children suffering from dental caries, age between 6 to 18 years, attending Dental unit, Rajshahi Medical College Hospital, Rajshahi were collected. The sample and relevant information were collected, interviewed after taking prior consent using predesigned questionnaire. 30 saliva samples from healthy oral cases were also obtained.

**Inclusion criteria:** Dental caries affected children between 6 to 18 years old.

**Exclusion criteria:** 1) person refusing to participate in the study. 2) Age less than 6 years 3) Age above 18 years. 4) Person receiving antibiotic for more than 7 days

**Microbiological Methods:**

**Collection of specimen:**

Participating children were instructed not to brush, eat or drink anything for at least two hours before the collection of samples.

**Collection of saliva:**

Children were asked to rinse their mouth with water thoroughly 10 minutes before collection of saliva to avoid the contamination of food debris. Saliva samples were collected by spitting into a wide mouth plastic container between 10am- 11am to control the circadian variation.[2,6]

**Evaluation of salivary pH:**

pH of saliva was estimated using a chair side test strip. Strip was rolled over the saliva and colour of the strip changed instantly. The resulting colour was compared with the matching pH colour chart provided by the manufacturer.

## Results

**Figure I: Association between dental caries and salivary pH**

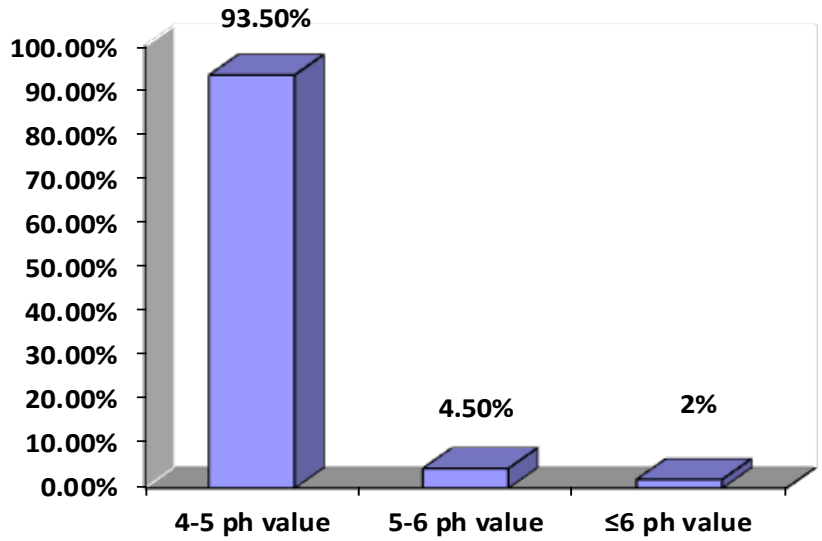

**Table I: pH value of caries children**

| 6-12 Years | | 13-18 Years | |
|---|---|---|---|
| N | pH value | N | pH value |
| | | 73 | 4-5 |
| 114 | 4-5 | 9 | 5-6 |
| | | 4 | >6 |

Distribution of pH value among study population was shown in this table. Table I shows that 114 children had pH value 4-5 that belong to 6-12 years of age group. Among 13-18 years age group 73 children had pH value 4-5, 9 had 5-6 and 4 children had ≥6.

**Table II: Salivary pH value of healthy children**

| Age | Number | pH value |
|---|---|---|
| 6-12 years | 12 | 6.5-7.2 |
| 13-18 years | 18 | 6.8-7.5 |

Distribution of salivary pH value of 30 healthy children is shown in table II. 12 children had pH value 6.5-7.2 that belong to 6-12 years of age. 18 children had pH value 6.8-7.5 that belong to 13-18 years.

## Discussion

Evaluation of pH value of saliva was done in this study. Our study findings show that salivary pH determine the caries association that was more acidic. In 187 (93.5%) patients, salivary pH was between 4-5, in 9 (4.5%) patients, pH was between (5-6) and in 4(2%) samples pH was more than 6.

Our study was in accordance with the study conducted by Rifa *et al* (2018) in Indonesia, Arab (2016) in Iran, Yang *et al* (2015) in China and Cunha-Cruz *et al* (2013) in Washington.[2,7,8,9] All those literatures revealed salivary pH values to acidic and there was a positive relation between caries and pH values.

Study among healthy oral cavity revealed that 12 children had pH value 6.5-7.2 that belong to 6-12 years of age. 18 children had pH value 6.8-7.5 that belong to 13-18 years. Salivary pH dropped from 7.2 to 4.3 in S. Mutans infection[10]. Patients with dental caries tend to have acidic pH between 5-5.8.[4] These results suggested that decrease salivary pH is associated with increased risk of dental caries.

## Conclusion

We hypothesize that low salivary pH are associated with a higher dental caries rate. A larger scale study is required to evaluate this subject further.

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