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| ORIGINAL RESEARCH PAPER                                                                               | Dental Science |
| CORRELATION OF SALIVARY GLUCOSE LEVELS & PERIODONTAL STATUS IN DIABETIC INDIVIDUALS- A CLINICAL STUDY | KEY WORDS:     |

|                              |                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
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**INTRODUCTION**

Diabetes mellitus (DM) is one of the most archaic diseases recognized by mankind around 3000 years before. Increased bold glucose levels are either because of ineffective mechanism of action of insulin or insufficient secretion of insulin by beta cells of Langerhans of pancreas, or both is a distinguishing feature of DM.[1]

According to International Diabetes federation, by 2050, every1 in 8 adults, approximately 853 million population world widely will be living with diabetes with an increase of 46%.

Diabetes currently affects half a billion people throughout the world. Almost 1 in 2 remains undiagnosed. Without a diagnosis, people living with diabetes do not receive timely care and are at risk of serious and life-threatening complications like diabetic ketoacidosis, diabetic nephropathy, and diabetic neuropathy.

Periodontitis is a chronic inflammatory condition affecting the tooth-supporting structures leading to loss of attachment of teeth and alveolar bones, bleeding on probing and increased gingival inflammation. [2]

For chronic periodontitis, diabetes mellitus is a potential risk factor and between them it is a bidirectional relationship. [3] The greater frequency and severity of periodontitis in diabetic individuals have been attributed to a variety of underlying pathogenic causes; however, the function of salivary glucose has not been thoroughly investigated. Moreover, little is understood about how diabetes affects salivary biochemical markers, particularly salivary glucose, and how these changes affect periodontal health. [5] Saliva is the fluid secreted by major salivary glands, minor salivary glands as well as gingival crevicular fluid. Saliva contains several proteins like amylase, mucin, histatin, cystatin, peroxidase, lysozyme, and lactoferrin, electrolytes like Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup>, HCO<sub>3</sub><sup>-</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, HPO<sub>4</sub><sup>2-</sup>, SCN<sup>-</sup>, and F<sup>-</sup>; immunoglobulin like IgA, IgG, and IgM, and organic molecules like glucose, amino acid, urea, uric acid and fat. [6]

Individuals with diabetes have altered salivary glucose concentrations due to hormonal or neurological changes. [7] Persistent hyperglycaemia resulting in enhanced glucose in saliva making it a reliable early detection tool. [8] The most common method for diabetes monitoring is through blood analysis. However, person having diabetes has to undergo repeated invasive diagnostic methods which cause physical as well as psychological trauma. Saliva on the other hand is environmentally friendly, requires less handling, is easy to collect, non-invasive, and practical to store. [9]

undertaken to detect the periodontal status in diabetic patients using saliva as diagnostic tool.

**Material & Methodology:**

This cross-sectional study was conducted on patients visiting the outpatient department of oral medicine & radiology from June 2025 to November 2025. A total of 469 subjects were enrolled in the study. Verbal informed consent was obtained from the patients. 200 were diabetic individuals while 169 were control.

The study included participants aged 18 or above who gave verbal informed consent to be a part of the study.

**Exclusion criteria**

- i. Patients having auto immune disorder
- ii. Pregnant or lactating women
- iii. Patients having history of steroid intake
- iv. Patient taking anticoagulant therapy
- v. Patients with bleeding disorders.
- vi. Patients who are systemically compromised

Patients were restricted from having food or beverages at least two hours before saliva sample collection. Unstimulated saliva was collected in a graduated tube.

**Figure 1- Collection of saliva**

For the salivary glucose estimation, saliva was centrifuged at 3000 rpm for 20 minutes. Supernatant clear fluid was processed by glucose oxidase-peroxidase method in

automatic analyser. Plaque detection was done using Plaque disclosing solution. The periodontal pocket depth was measured using a calibrated UNC-15 probe. The periodontal probe was inserted into the bottom of the pocket and the readings thus obtained were recorded.



Figure 2]

[Figure 3

## RESULTS:

| Study group ( Diabetic) | Sex    | Number |
|-------------------------|--------|--------|
|                         | Male   | 84     |
|                         | Female | 116    |

| Control group ( Healthy) | Sex    | Number |
|--------------------------|--------|--------|
|                          | Male   | 56     |
|                          | Female | 113    |

| Age group | Diabetic |
|-----------|----------|
| 18-35 yrs | 21       |
| 36-50 yrs | 36       |
| 50-60 yrs | 58       |
| 60-70 yrs | 85       |

## Glucose salivary levels

|               | Mean +_ SD    | p valve |
|---------------|---------------|---------|
| Study Group   | 16.22 +_ 2.42 | 0.01    |
| Control Group | 6.54 +_ 1.36  | 0.02    |

## Age wise glucose salivary Levels in Study Group

|           | Mean +_ SD   | p value |
|-----------|--------------|---------|
| 18-35 yrs | 4.02 +_ 2.26 | 1.26    |
| 36-50 yrs | 5.54 +_ 1.78 | 0.6     |
| 50-60 yrs | 7.82 +_ 1.34 | 0.01    |
| 60-70 yrs | 8.96 +_ 1.12 | 0.01    |

## Periodontal status in Study Population

|               | Periodontitis | P value |
|---------------|---------------|---------|
| Study Group   | 79.5%         | 0.001   |
| Control Group | 25.44%        | 0.02    |

## Correlation of Salivary Glucose level with periodontal status among study group

|                         | Periodontal status (Healthy) | Periodontitis     |
|-------------------------|------------------------------|-------------------|
| Salivary glucose levels | 14.02+_1.73 mg/dl            | 17.8+_1.14(mg/dl) |

## DISCUSSION:

Diabetes mellitus is a metabolic disorder in which blood glucose levels are higher. It is the disease which is spreading very rapidly affecting any age group. DM is associated with low grade chronic inflammation throughout the body. Changes in the oral cavity can help practitioner to detect the underlying disease at an early stage. Periodontitis is the bacterial inflammation of the periodontium and tooth supporting mechanism. The changes in gingival as well as periodontal status can help the practitioner in early diagnosis of underlying diabetes. Diabetes & periodontitis influence each other because of certain factors like inflammation, decreased immune response, delayed wound healing.

Present study was conducted on 469 individuals in whom 200 were diabetic while 169 were healthy controls. Diyah Fatmasari et al conducted the study on a smaller sample size consisting of 40 individuals. [10]

In present study population, out of 200 diabetic individuals, www.worldwidejournals.com

females have predominance as 116 and 84 were males. In study conducted by Diyah Fatmasari et al 30 were females while 10 were males.[10]

The mean salivary glucose levels in diabetic patients was 16.22 +\_ 2.42 and that of control was 6.54 +\_ 1.36., so salivary glucose concentration was higher in diabetic patients than control group (p=0.01). These results are in concordance with the results of study conducted by other researchers. [11,12,13]

Kjellman et al had also reported significantly higher salivary glucose values in diabetic persons when compared with normal healthy individuals. [14]

As the age advances salivary glucose levels were significantly higher than the younger age group population. (p=0.01). Similar observation was noted by Ryan ME et al in their analysis. [15]

79.5% study group had periodontitis while only 25.44% control group had periodontal inflammation. This difference makes study result highly significant (p=0.001). Polak D et al & Elenkova et al had observed concurrent results. [16,17]. Mean salivary glucose levels were higher in study population (14.02+\_1.73 mg/dl) as compared to healthy normal control group (17.8+\_1.14 mg/dl). Lasisi TJ et al, Hegde A et al had similar findings. [18,19]

In our study, we used Basic Fuchsin as plaque disclosing solution and UNC -15 number probe for the periodontal status in study population. Loe suggested that periodontitis can be predictor of diabetes mellitus. The loss of attachment leading to periodontal pocket can serve as indicator for periodontal disease. [20]

Nagalaxmi V & Priyanka V had conducted a pilot study to find out that whether saliva can be a marker for predicting diabetes mellitus. [21]

The results of present study are also predicting that saliva can be used as tool for measuring the glucose levels. We can educate the patients about the increased levels of inflammatory mediators in diabetes which can lead to bleeding gums, tooth mobility & loss of attachment of tooth leading to loss of tooth.

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