

# Immunological Study of Periodontitis among Diabetic Patients in Babylon Province

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## Abstract

This study took place in Al- Hilla from July to December 2021 and included the collection of Gingival Crevicular Fluid (GCF) from 60 diabetic patients with gingivitis and 30 healthy controls. The levels of s-IgA, IL-1, and Matrix Metalloproteinase (MMP-8) in GCF were measured, and the results showed a statistically significant increase in comparison to the control group, indicating that diabetic patients have an immune response despite their reduced immunity due to high blood sugar and its effects.

**Keywords:** Diabetic Patients; Periodontitis; Babylon Province

## 1. Introduction

Systemic inflammation and inflammatory markers were greater in cases with chronic periodontitis than in healthy control subjects. (Mohan et al 2014).

Chronic hyperglycemia mixed with the inflammatory response in diabetes mellitus will eventually cause difficulties. Diabetes and periodontitis are both long-term illnesses. (Zambon et al, 1988).

GCF (gingival crevicular fluid) is a serum exudate that originates in the gingival tissues' microcirculation and runs into the periodontal pocket (gingival sulcus) bringing inflammatory mediators and tissue metabolic products. (Hanes and Krishna 2010)

GCF is a substance that reflects inflammatory reactions in the gingival tissue. (Sakai et al, 2006; Ramberg et al., 2016).

Interleukin-1 beta (IL-1 beta) - The antibacterial defense system relies heavily on significant cytokines in the human immune system. Immune cells can be stimulated to create cytokines by pathogens in the mouth. The production of surface antigens of *Streptococcus mutans* is linked to the antibacterial cellular reactivity of T-cells in the course of caries. (Słotwińska and Zaleska, 2012).

Infections are more common in diabetic people than in those who do not have the illness. Infection progression is also more challenging in this patient population. (Suzanne and Andy 1999)

Periodontal disease is a common consequence of diabetes, and diabetics frequently have a weakened immune system and are more susceptible to infection. (Fontana et al 1999)

In both diabetic and nondiabetic patients, periodontitis is linked to immune system changes. (Awartani, 2010).

**Objective:** Investigate the immune status by studying the levels of some cytokines and Immunoglobulin IgA in periodontitis among Diabetic patients.

**Procedure**

The study was conducted between July 2021 and December 2021 in Murjan Teaching Hospital and

Imam Al-Sadiq Hospital, after Oral clinical Examination for 60 periodontitis with Diabetic patients (30 m and 30 f of mean age 39 years) and 30 healthy individuals then Collection of Gingival Crevicular Fluid (GCF) from both.

GCF was collected using a paper point (size 30) inserted into the gingival crevice and held in place for 30 seconds until slight resistance was felt. A blood-stained paper point was ruled out. Following the collection of GCF, phosphate buffer saline (300 microliters) is poured on the paper tip in Eppendorf tubes. GCF was extracted from the paper point by centrifugation at 3000 rpm for 15 minutes, following which the paper point was removed and the GCF sample was stored at -40°C until analysis. (Escalona et al, 2016).

Total s-IgA levels, Interleukin 1β (IL-1β), and Matrix Metalloproteinase-8 (MMP-8) in GCF were determined using an enzyme-linked immunosorbent assay (ELISA) by using kits from Elabscience / China. Data collection in case sheet including the gender of the patient, age, gingival index and antimicrobial prophylaxis, other diseases etc

## 2. Statistical Analysis

The mean and standard deviation were used to express all of the data (S.D). A t-test was performed to compare groups, and P values less than or equal to 0.05 were considered statistically significant, while P values greater than 0.05 were declared statistically non-significant. (Daniel, 1999).

## 3. Results

The study results s-IgA, IL-1β and MMP-8 levels of GCF in Sixty Diabetic with periodontitis patients and thirty Healthy Control subjects seem to be governed by the intensity of periodontal inflammation, Table (1) and Fig (1,2,3) show High significant differences for s-IgA, IL-1β and MMP-8 levels between Diabetic Healthy Control groups at P ≤ 0.05 by using t-test.

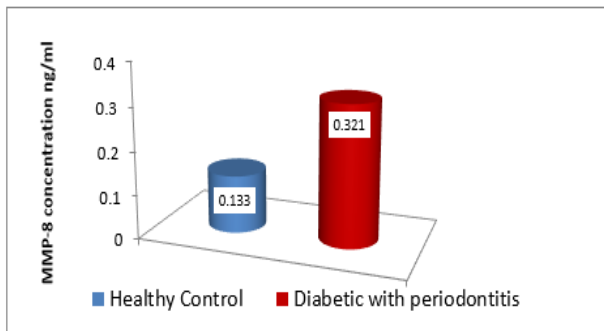


Fig. (1): Level of MMP-8 in GCF for Diabetic with periodontitis patients and Healthy Control

Parameter	Diabetic with periodontitis (mean ±SD) n=60	Healthy Control (mean ±SD) n=30	P value
MMP-8 (ng/mL)	*0.321±0.153	0.133±0.041	0.0001
IL-1β (pg/mL)	*22.181 ±8.219	5.419±1.318	0.0001
slgA (mg/dL)	*240 ± 130.0	118.3 ± 43.6	0.0001

\* Statistically High significant at p ≤ 0.05

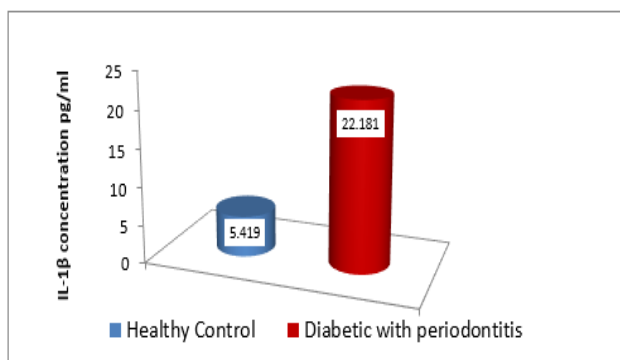


Fig. (2): Level of IL-1β in GCF for Diabetic with periodontitis patients and Healthy Control

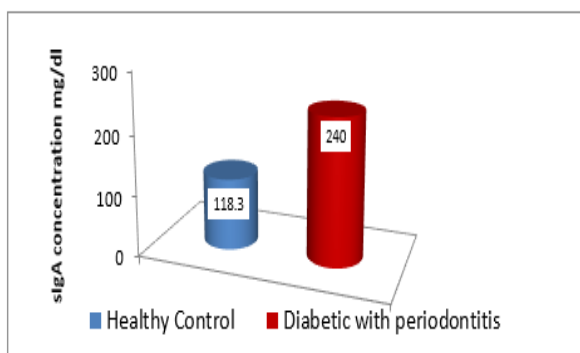


Fig. (3): Level of slgA in GCF for Diabetic with periodontitis patients and Healthy Control

### 4. Discussion

According to results, there is a highly significant concentration of MMP-8 in GCF for Diabetic with periodontitis patients than Healthy Control. MMP-8 levels can be used to identify areas or individuals who are at risk of developing periodontitis or who are not responding well to

routine therapy. (Leppilahti et al., 2015). MMP-8 appears to have a major role in periodontal disease, according to clinical research. (Hardy et al., 2012).

In addition, the IL-1β level increased significantly in GCF for Diabetic with periodontitis patients than Healthy Control which agreed with Bulut et al. (2001). IL-1 is present and raised fluid (GCF) of individuals with periodontal disease, and it has a role in many aspects of the immune response. In a variety of chronic inflammatory illnesses, such as periodontitis, (Toker et al. 2008 and Firat et al. 2011).

also, there is a highly significant concentration of slgA in GCF for Diabetic with periodontitis patients than Healthy Control, this is agreed with Anil (2006) and Awartani (2010).

Neutralizing enzymes, poisons, and viruses, as well as working in tandem with other components like lysozyme and lactoferrin. Marcotte and Lavoie (1998; Marcotte & Lavoie, 1998; Marcotte & Lavoie, 1998

### 5. Conclusion

Gingivitis and periodontitis are more common in people with diabetes. Diabetes affects periodontal tissues in a significant way. The development of diabetes and its consequences is heavily influenced by inflammation. As a result, periodontitis can have a significant impact on glycemic control.

Dentists should be familiar with the glycemic parameters that are used to diagnose diabetes and the diabetic management approaches. Dentists should be familiar with the glycemic parameters that are used to diagnose diabetes and the diabetic management approaches.

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