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RESEARCH ARTICLE

EFFECT OF PERIODONTAL TREATMENT ON GLYCEMIC CONTROL OF DIABETIC PATIENTS WITH CHRONIC PERIODONTITIS.

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Abstract

Introduction: Periodontitis is related to diabetes mellitus. However, whether periodontal therapy can affect glycemic control remains unclear. This study aims to evaluate the effects of scaling and root planing (SRP) on the glycemic control of patients with Type 2 Diabetes Mellitus (T2DM).
Materials and Methods: 100 T2DM patients with periodontal disease were enrolled in the study. The test group was treated with scaling and root planing (SRP); the control group received oral hygiene instructions. Blood was collected at baseline and 5 months later for HbA1c levels.
Results: Baseline mean± SD HbA1c for the test and control groups were 6.68 ±1.22and 6.54 ±1.11%, respectively. Significant difference in HbA1c reductions was found between test and control groups at 5 months.
Conclusions: Statistically significant differences were found in the changes of HbA1c levels between test and control groups.

Introduction:-

Diabetes mellitus (Type 1 and Type 2) is a prevalent chronic disease of adults and children in the World. Type 1 diabetes occurs predominantly in youth, although it can occur at any age. Type 2 diabetes is the most prevalent type of diabetes in the world, affecting approximately 90 to 95 percent of people with diabetes. Although most people with diabetes who are older than 45 years of age have Type 2 diabetes.[1] The prevalence of type 2 diabetes among adolescents is increasing at an alarming rate.[2]

Periodontitis, a common public health issue, has been considered a complication of T2DM[,3,4] It is an inflammatory disease that leads to periodontal tissue destruction.[5] Periodontal tissue destruction is mediated by bacterial toxins and inflammatory cytokines in response to bacterial flora and their products.[6] The total surface area of the inflamed and ulcerated epithelium of the periodontal pocket in an individual with periodontitis is at least equal to the surface area of the palm of the hand.[7] The bacteria and their toxin may enter the blood from this ulcerated area and lead to systemic inflammation, which plays a major role in insulin sensitivity and glucose dynamics.

Observational studies consistently showed that DM is one of the risk factors for the severity and progression of gingivitis and periodontal disease [8, 9]. On the other hand, periodontal disease may be a possible risk factor for poor

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glycemic control and promote the existence of diabetic complications [9, 10]. In addition, it has been showed that periodontal disease has a devastating effect on glycemic control among type 2 diabetic patients and a significant reduction of Glycated hemoglobin(HA1c),0.40 %, was observed after 3–4 months of periodontal therapy done on patients with both Type 1 and 2 DM and periodontitis [11]

Impairment of glycemic control in diabetic patients can cause a decline in polymorphonucleate leukocytes activity. It can also damage the micro vascular endothelium which as a result can cause periodontal disease[12]. Diabetic patients with severe periodontitis are six times to have poor glycemic control than patients with healthy periodontium [13]. However, improved glycemic control has been postulated to reduce the severity of periodontal disease [13]

Glycosylated haemoglobin (HbA1c) forms by irreversible binding of glucose to haemoglobin through non-enzymatic reaction. HbA1c levels reflect glycaemic control over the previous 1–3 months because it is based on the average life span of an erythrocyte. Wolff et al[14] found an association between periodontitis and HbA1c in non-diabetic adults, although a clearcut association could not be established. We include non-diabetic patients with periodontitis and healthy controls without periodontitis, and evaluate the effects of nonsurgical, periodontal therapy on HbA1c levels.

Thus, the aim of this study was to compare HbA1c levels in T2DM patients at baseline and after 5 months of post treatment.

Method:-

All individuals who participated in this study had chronic periodontitis and had been diagnosed to have T2DM for more than 1 year. In addition, patients should have the following attributes: (1) 35 to 65years old; (2) with at least 16 natural teeth; (3) with at least four teeth with probing pocket depth (PPD) of 5 mm, and bleeding on probing (BOP), distributed in two or more oral quadrants; and (4) the HbA1c level within 3 months before recruitment should at least be 5.5%. The following exclusion criteria were adopted: (1) accompanied with other systemic immune diseases; (2) administered with antibiotics, immunomodulators, or any other form of hormone within the past 3 months; (3) underwent modified diabetes treatment strategy within 3 months; (4) had periodontal treatment within the past 12 months; (5) needed extraction or endodontic treatment; (6) smokes more than four cigarettes per day; (6) pregnant or lactating women.

They were divided into two groups. Test group consisted of fifty patients with periodontitis and control group consisted of fifty patients with periodontitis. Test group received the SRP while as control group received oral hygiene instructions only. HbA1c levels,of all the patients were recorded. After 5 months, all the patients were re-examined, and clinical parameters and HbA1c levels were evaluated and compared with the baseline values.

Results:-

Primary outcome

Table 1 shows the comparison of HbA1c status at baseline and at the end of the study (5months after baseline) in test and control groups. Baseline mean ±SD HbA1c percentages for the test group measured are 6.68 ±1.22 and controls 6.54±1.11. The percentages of HbA1c decreased for the test group 0.17, whereas the control group decreased 0.05%. There was statistically significant difference between groups ($p < 0.05$) (Table 1).

Table 1:-Comparison of HbA1c status at baseline and at the end 5months in Test and Control groups

HbA1c	Baseline	5 months
Test group	6.68 ±1.22	6.51±1.13
Control group	6.54±1.11	6.49±0.09

Discussion:-

Whether SRP can improve diabetes mellitus remains controversial. HbA1c is one of the most important markers in T2DM patients and is used to evaluate the severity of diabetes as well as the glucose control condition. Any reduction in the HbA1c level is likely to reduce the risk of complications. Each 1% reduction in the HbA1c level would bring a relative risk reduction of 21% for any diabetes related endpoint, 21% for diabetes-related deaths, 14% for myocardial infarction, and 37% for microvascular complications.[15]The periodontal tissues are highly vascular.

During inflammation, this vascularity is further increased, the inflammatory cytokines such as TNF-α, IL-1, IL-6, and inflammatory mediators have been found to have important effects on glucose and lipid metabolism.[16,17] With the reduction in the severity of the periodontal parameters, there was a decrease in inflammation and hence, a reduction in the metabolic parameter (HbA1c) was also observed in the individuals.

The present study compares the levels of HbA1c in patients with periodontitis, before and after nonsurgical periodontal therapy. Chronic exposure of haemoglobin to blood glucose is reflected by HbA1c, and it is not affected by any fluctuation of blood glucose on the day of assay. Therefore, in this study, it was decided to measure HbA1c levels. It reflects data on glucose in the blood over a period of time, ranging from 30 to 90 days. Hence, to detect any change in HbA1c level, reexamination was performed after 3 months of SRP.

The mean percentage reduction in HbA1c was statistically significant ($P < 0.05$) in the present study. Other studies by Navarro-Sanchez et al., Ricardo et al., Rodrigues et al., Patricia et al., Stewart et al., and Grossi et al. also reported a significant reduction in HbA1c level.[16,18,19,20]

In conclusion, periodontitis patients with T2DM should receive SRP after a thorough examination, which improves the periodontal condition as well as glycemic control.

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