

## Study on Occurrence of Oral Manifestations in Diabetic Patients with varied glycated hemoglobin value

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**Abstract:** This study focuses on the relationship between oral hygiene and increase in blood glucose. The increased glucose level in blood is known as diabetic, and thereby the study is conducted on people with pre-existing diabetic condition. Glycated Hemoglobin(HbA1c) is used as a standard measure for this study for determining the intensity of diabetic condition on subjects. Different dental manifestations were examined and attempts to establish the pattern of distribution of prevalence of the dental issues in diabetic patients, and also attempts to establish the influence and relationship between the increase of HbA1c value and the different oral manifestations.

### Introduction

#### Background and purpose:

WHO, Global status report on non-communicable diseases 2014, states diabetes as “Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin or body cannot effectively use the insulin it produces. This leads to increased concentration of glucose in the blood”<sup>1</sup>. Diabetes causes many systemic disorders and due to its high inflammatory response to the periodontal microflora, it is believed to promote many periodontal diseases and many other oral manifestations. This study aims to identify the relationship between the presence of diabetes and its effect in the oral hygiene and dental manifestations.

#### Scope of Study

This study is done to investigate the following question: Whether oral manifestations is a common phenomena in pre-existing diabetic patients? Whether there is a strong relationship between the value of Glycated Hemoglobin(HbA1c) and the oral manifestations.

This study is used to examine the manifestations such as periodontitis, gingivitis, dental caries, salivatory functions, tooth loss, burning mouth syndrome and taste disorders besides identifying the prevalence of periodontal diseases.

#### Survey of Literature:

There were several studies conducted on diabetes and oral manifestations<sup>2,3,4,5</sup>. “Dental Considerations for the patient with diabetes”<sup>6</sup> which focuses on studies and concludes that periodontal disease is the main oral clinical manifestations in the diabetic patients. Further more, burning mouth syndrome, sensation of dry mouth,

sialadenosis have been attributed to diabetics. Another study on Identification of Unrecognized Diabetes and Pre-diabetes in a Dental Setting<sup>7</sup> was also done published in this area.

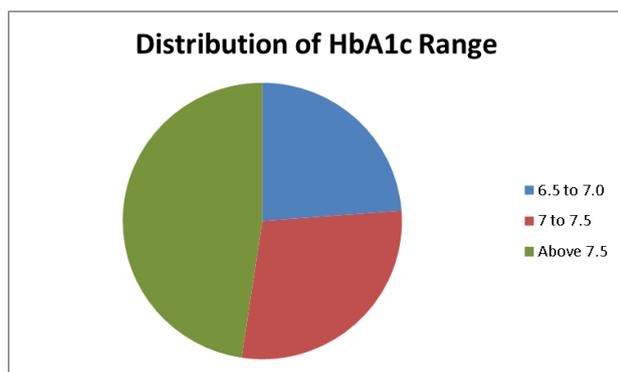
There are no published studies in specific approach discussed in this study, i.e. studying prevalence of set of dental manifestations against the Glycated Hemoglobin(HbA1c) in terms of the basic influence and influence through the changes in values.

### Target Population:

Keeping in mind the study's goals, the study was conducted on patients with known diabetics. Patients were subjected to HbA1c test and data was collected. Total number of samples are 45 In this 27 are males and 18 are females

The significance of subjects taken for this study is that

- Most of the patients study were having pre-existing diabetes and had varied HbA1c values ranging from 6.5 (Most Controlled) to above 7.5 (Least Controlled) levels. The distribution represented in Figure 1.
- The distribution of Female and Male samples were maintained at the ratio of 40:60.
- Most of the subjects taken are found to have a good dental health awareness and practicing reasonable dental care .



**Figure 1 – Distribution of HbA1c Range**

### Measurement Base lining:

Glycated Hemoglobin(HbA1c) is used as a standard measure for this study for determining the intensity of diabetic condition on subjects. When the average amount of plasma glucose increases, fraction of glycated hemoglobin increases in a predictable way. It helps to measure average blood glucose levels of a patient's past eight to twelve weeks. As this provides a relative measure of prevalence of diabetic, it is important to use this as a base measure for identifying the relationship between the disease and its influence.

### Experimental

Study was conducted by visiting one of the diabetic treatment center and subjected the visiting patients, and followed the below mentioned four step process.

#### STEP 1: Interviewing

As part of the interview, patients are approached in person and the study was introduced and informed, consent forms duly signed by patients were first collected. Data is collected during the interview on information of the patient such as Name, Age, Sex, Duration of diabetic condition, current HbA1c reading, their oral hygiene awareness and their dental care practices and all findings were documented.

**STEP 2: Oral Inspection**

Oral inspection was conducted to find out the prevalence of a set of dental manifestations. Patients were inspected for presence, severity and occurrence (e-g dental caries, missing teeth)

**STEP 3: Briefing**

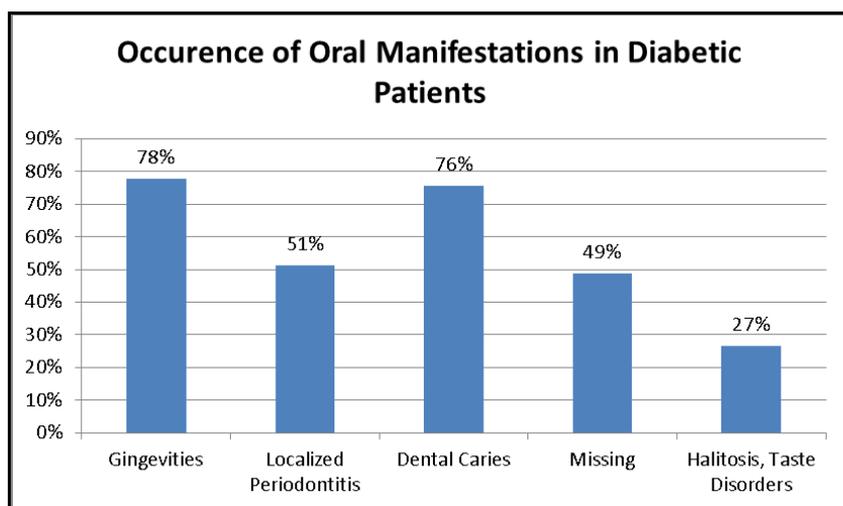
Patients were briefed of the existing oral manifestations and were suggested to take appropriate care for prevention and cure of such manifestations. Oral hygiene instructions were given to all patients included in the study.

**STEP 4: Data Analysis**

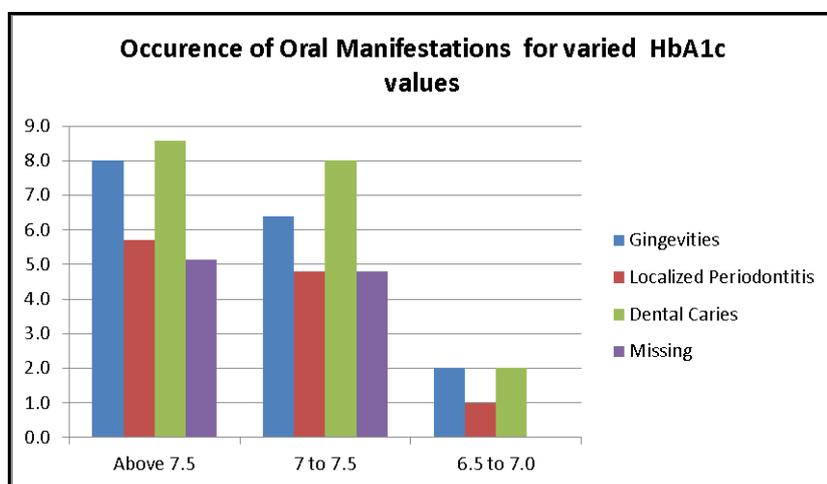
Collected data were collated into tables and then the values were converted to % of prevalence on different events, using weighted average. Weighted average ensures that the contribution % of each range to evenly study the prevalence, Data tables were prepared using weighted average method and the prevalence was converted to % values. This helped to find the distribution

**Results**

Study shows that there is significant amount of presence of dental manifestations like gingivitis (76%) dental caries (74%) and localized periodontitis (50%) found in the overall population of study. Gingivitis and Dental Caries were more prevalent forms of manifestations in this target population as illustrated in Figure 2.



**Figure 2 – Occurrence of Oral Manifestations in Diabetic Patients**



**Figure 3 – Occurrence of Oral Manifestations for varied HbA1c values**

Among these different manifestations found, more detail analysis led to the finding that the higher ranges of HbA1c levels, the higher the prevalence of manifestations. Best Controlled diabetic subjects (HbA1c range 6.5 to 7.0) has significantly lower prevalence rate compared to least controlled groups (HbA1c range 7.0 and above) as illustrated in Figure 3.

## Discussion

Based on the study conducted and the analysis of varied data collected through, this study would like to conclude with two significant points:

1. In spite of the basic awareness of oral hygiene and reasonable dental care taken, certain amount of dental manifestations, specific ally the manifestations like gingivitis and dental caries are mostly prevalent in the diabetic patients.
2. There is a directly proportional relationship found between the dental manifestations with increased HbA1c levels. This lead to a conclusion that poorly managed diabetic condition will cause serious threat to dental hygiene.
3. Earlier research on this subject<sup>8</sup> had found and reported that the occurrences of periodontal disease is higher in diabetic patients where as this study reveals that the dental caries is most common oral manifestation on diabetic patients with varied glycated hemoglobin levels.
4. Earlier research<sup>9</sup> had used hemogram, serum urea, urine examination, fasting serum lipid profile, blood culture, etc. to study the conditions of oral manifestations of diabetes. But in this study, we use glycated hemoglobin levels to determine the oral manifestations.

## References:

1. Global status report on non-communicable diseases 2014, Word Health Organization ([http://www.who.int/topics/diabetes\\_mellitus/en/](http://www.who.int/topics/diabetes_mellitus/en/))
2. Tavares P.D, Soparkar P, and Joshipura K, The Prevalence of Root Caries in a Diabetic Population, Journal of Dental Research, June 1991; vol. 70, 6: pp. 979-983.
3. Richard. S.M, H. an De Millar., Interrelated effects of diabetes, arteriosclerosis and calculus on alveolar bone loss, The Journal of the American Dental Association, Vol. 66, Issue 2, February, 1963, p191-198
4. Graves D.T., Naguib G., Lu H., Leone C., Hsue H., and Krall E., Inflammation is More Persistent in Type 1 Diabetic Mice, Journal of Dental Research, April 2005; vol. 84, 4: pp.324-328.
5. Janket S.-J., Wightman A., Baird A.E., Van Dyke T.E., and Jones J.A., Does Periodontal Treatment Improve Glycemic Control in Diabetic Patients? A Meta-analysis of Intervention Studies , Journal of Dental Research, December 2005; vol. 84, 12: pp. 1154-1159.
6. Sylvia Marti Alamo, Yolanda, Jimnez Soriano and Graceia Sarrion Perez M., Dental Considerations for the patient with diabetes, Journal of Clinical and Experimental Dentistry 2011;3(1):e25-30.
7. Lalla E., Kunzel C., Burkett S., Cheng B., and Lamster I.B., Identification of Unrecognized Diabetes and Pre-diabetes in a Dental Setting J DENT RES, July 2011; vol. 90, 7: pp. 855-860.
8. Mihaela G., Sabina Z., Florica S., Alexandra B., Cristiana P., Luciana N., Elisabeta L and Norina F., Oral epithelial hyperplasia in diabetes mellitus Gr.T. Popa University of Medicine and Pharmacy, Iassy, Romania. Romanian journal of internal medicine = Revue roumaine de médecine interne 01/2009; 47(2):201-3.
9. Sarita B, Suresh P, Aravind G, Vijay B.S., Oral manifesations in type-2 diabetes and related complications, Indian Journal of Endocrinology and Metabolism, Sep-Oct 2012 / Vol 16, Issue 5, p 777-779.

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