

## ARE DIABETICS VICTIMS OF ORAL CANCER?

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Abstract: Diabetes Mellitus (DM) is a serious condition with potentially devastating complications that affects the body as a whole including the oral cavity. Although DM is a global problem affecting millions of people both in the developed & the developing world, very little has been studied regarding its association with oral cancer. But recently few studies have shown a possible correlation between diabetes and oral pre malignancies. There have been studies that stated an association between positive history of diabetes and oral cancer in Indian population. The present study aimed at finding out a causal relationship between Diabetes Mellitus & Oral Cancer in a secondary & tertiary care teaching hospital setting. To find out the prevalence of Diabetes Mellitus in patients with Oral pre-cancer to establish a causal relationship between Diabetes Mellitus & Oral Cancer. To test this hypothesis Hospital based clinical study was conducted ad analyzed data of 150 oral pre-cancer/cancer patients of our hospital randomly to study the association between diabetes mellitus and pre-cancers and cancers. These patients were subjected to standard blood glucose tests. Results showed that out of 150 subjects only 12 had diabetes. Following statistical analysis it was found that there was no statistically significant correlation between oral pre-cancer and Diabetes Mellitus. With preliminary data, we conclude that there is no causal relation between Oral cancer and the presence of Diabetes Mellitus. The association in our study may have been lost because of possible reduced sugar intake and nutritional deficiency due to inability to eat. A separate study with newly diagnosed oral cancers that are not nutritionally compromised will have to be studied.

Keywords: Diabetes Mellitus, Oral Cancer, Potentially Malignant Disorder

# **INTRODUCTION**

Association between diabetes and inflammatory oral lesions were first published in the 19th century [1]. Gingivitis and destructive periodontitis with a rapid loss of the teeth were described as pathognomic symptoms of diabetes [2,3]. The discovery of insulin treatment justified a close correlation between the disorder of the carbohydrate metabolism and oral inflammatory complications [4]. The adequate treatment of diabetes results in marked improvement of the gingival and periodontal lesions.

The inflammation-mediated carcinogenesis is a well-known empirical fact, but the exact pathway of this transition has not been established [5-8]. We aim to find correlation between diabetes and precancer / cancer of the oral cavity if any. Oral Precancerous lesions and conditions are thought to be the manifestations of the initial stages of oral cancer and are also termed as Premalignant or Potentially Malignant. Precancerous Lesion can be defined as a morphologically altered tissue which has greater than normal risk of transforming into malignant lesion. Precancerous Condition can be defined as a

generalized state associated with a significantly increased risk of cancer.

There are not many studies concerning this problem. Our study aims at finding out a causal relationship between Diabetes Mellitus & Oral pre cancer/cancer in a secondary & tertiary care teaching hospital setting.

#### **MATERIALS AND METHODS**

Our present study is based on the data collected from the first round of intervention from a randomised oral cancer screening trial that was conducted in our hospital. We considered a total of 150 cases of precancers which included leukoplakia, erythroplakia and OSMF. A detailed medical history was recorded and RBS was done for these subjects. This data was then used to assess the role of diabetes mellitus in the development of pre-malignant oral lesions.

Oral screening was done on a voluntary basis. Two oral physicians performed the examinations, and the data were recorded on a specially prepared proforma.



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Manipal College of Dental Sciences, Mangalore, Karnataka, India. Besides the relevant personal data, the recorded information of laboratory values related to previous treatment of the diabetes, possible complications, as well as alcohol consumption and smoking habits were also recorded.

This was followed by a clinical examination, including a thorough examination of the oral cavity and bimanual palpation of the cervical region. Details were recorded on state of the teeth and periodontium, mucosal lesions and precancerous lesions. Oral premalignant lesions considered in this study were oral Leukoplakia, Oral Sub Mucous Fibrosis (OSMF) and Erythroplakia.

Oral leukoplakia is a non-removable white patch in the oral mucosa and is the most common type of oral pre-malignant lesion. OSMF is an irreversible, premalignant condition with a moderate malignant potential in between that of oral leukoplakia and erythroplakia. Erythroplakia is a red patch lesion that is considered the most severe oral patch lesion with high malignant potential.

## **Statistical Analysis:**

Statistical analysis was done after entering the data from the check lists to SPSS Version 15. For describing continues data, we used the mean ± standard deviation (SD). Frequency and percentage describe categorical variables. For comparison, we used Mann-Whitney U-test, Chi2 test and Independent T-test in our analysis. We used fishers test to compare our findings with predicted prevalence which was announced by previous studies. P-value less than 0.05 were considered significant.

## RESULTS

We evaluated 150 patients with the confirmed diagnosis of oral precancer, which included OLP, Leukoplakia, Erythroplakia and OSMF. Of all patients, 22 (14.7%) were female and the rest male (Table.1). The mean age was 47years (Table.2). For diagnosis of DM we used the criteria that were employed by American Diabetes Society in 2007. As per those guidelines we had only 12 patients with DM type II and none with DM type I (Table.3). The mean duration of oral precancer was 23.61± 18.1 months in our patients. There was a significant relationship between the mean duration of oral precancer and the presence of DM type II (27.3  $\pm$ 20.5 month comparing to  $18.7 \pm 16.8$  month, p=0.024). Habit history was positive in 108 males and 19 female subjects in this study and only 23 patients were without any habits (Table.4). 11 out of 12 patients with DM had a positive habit history (Table.5). Considering family history of the patients, 12% had a positive family history for DM. There was no significant relationship between the presence of positive family history for oral precancer and the DM.

Table.1: Demographic profile of diabetics

GENDER

	Frequency	Percent
Male	128	85.3
Female	22	14.7
Total	150	100.0

Table.2: Mean age range of subjects

**Descriptive Statistics** 

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	150	15.00	89.00	47.0467	15.20126

 Table.3:
 Prevalance of Diabetes
 Mellitus among patients with Oral Precancer

	DM	
	Frequency	Percent
Yes	12	8.0
No	138	92.0
Total	150	100.0

### Table.4: Habit profile of patients with oral precancer

HABIT

	Frequency	Percent
Yes	127	84.7
No	23	15.3
Total	150	100.0

**Table.5:** Prevalance of habits in patients with DiabetesMellitus and Oral Precancer

DM	*	H.	AB	П

			HABIT		
			Yes	No	Total
DM	Yes	Count	11	1	12
		%	8.7%	4.3%	8.0%
	No	Count	116	22	138
		%	91.3%	95.7%	92.0%
Total		Count	127	23	150
		%	100.0%	100.0%	100.0%
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a. p=.693 ns(Fishers exact test)

## DISCUSSION

DM is defined as a syndrome in which hyperglycemia occurs because of insulin defects. Skin lesions are commonly associated with DM and are based on dysregulation of glucose, insulin, and lipids [9]. Initial reports on the prevalence of DM among patients with oral LP were announced by Grinspan, et al [10].

An association between DM and human cancers, such as cancer of the liver, stomach, pancreas, colon, endometrium, and kidney, has been reported in the past [11, 12]. Mitochondrial dysfunction has been implicated as the pathophysiology of diabetes-provoked cancer [13]. Some epidemiological studies have found DM as a risk factor for oral tumors [14] as

well as oral pre-malignant lesions such as leukoplakia [15], erythroplakia [16] and lichen planus [17], although there are some studies which contradict these findings [18, 19].

Our study did not find any association between DM and oral precancerous lesions (p > 0.05). The only precancerous lesion found in patients with DM was OLP (0.5%). No cases of leukoplakia or erythroplakia were seen either in the diabetic or in non-diabetic group. An association between DM and premalignant oral lesions among women was observed in a study done in India by Dikshit et al. [16]. Since Grinspan et al first reported an association between OLP and DM many authors have reported a strong link between lichen planus and DM [20–22]. However, this relationship could not always be established [23, 24, 25]. Similar to our study, Borghelli et al., found a low prevalence of OLP (0.55%) in 729 persons with diabetes [24].

Petrou-Amerikanou et al., suggested that immune system may play a crucial role in the appearance of OLP in type I DM patients [17]. Lichenoid lesions among patients with DM may also be attributed to a number of oral hypoglycemic medications taken particularly by older individuals [26]. Likewise, we did not find any association of benign oral tumors (fibroma, p = 0.624) in our study, contrary to the findings reported by Ujpal et al. [15]. These contradicting results could be due to the fact that the association was reported without adjustment of confounders such as smoking and alcohol consumption that are well known to cause various oral malignancies and premalignancies, as well as sample size of the study. Studies have shown that for the subjects at risk of pre-cancer/cancer (because of smoking, alcohol etc.); diabetic status could increase the likelihood of developing oral pre-cancer/cancer, as seen in previously mentioned studies that suggested an association between DM and pre-malignant oral lesions[16].

We found diabetes as an independent risk factor. Even though there are studies that showed a positive correlation, we believe that diabetes solely may not be an associated factor in the causation of oral pre cancers. More elaborate studies are required to show a significant association between diabetes mellitus and oral cancer, as these initial findings may be coincidental.

#### CONCLUSION

In conclusion, diabetic patients who smoke and consume alcohol may constitute a relatively high-risk group for developing oral precancer, but further research is needed to obtain epidemiologic data and establish the mechanisms involved in this process. Until this information is available, dentists must screen all adult patients and pay more attention to the gum and labial mucosa of diabetic patients. Increased surveillance and screening by dentists will certainly facilitate research in this area.

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