

# PREVALENCE OF DENTURE STOMATITIS AMONG DENTURE WEARERS IN PATIENTS REPORTED TO A PRIVATE DENTAL HOSPITAL.

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## ABSTRACT :

Denture Stomatitis( DS) is one of the common denture related complications in patients wearing dentures after years of denture use. There have been various studies on its prevalence despite the fact that its exact etiology is still unknown. Removable dentures have served as an important prosthesis in dentistry, whereby it helps in regaining the phonetics and masticatory functions as well as esthetics in edentulous patients. The aim of this study was to determine the prevalence and risk factors that can cause denture stomatitis in denture wearers. This study was designed as a retrospective clinical study. All the patients with removable dentures (Complete dentures , Removable Partial dentures , Cast partial denture ) were taken into account and the data was retrieved. The data was analysed and results were recorded. Out of the 1415 subjects wearing dentures (complete or partial ) , 80 were found to have denture stomatitis in which 57.4% were women and 42.6% were men. The majority of the DS patients were in the age group range of 51-80 years. Temporary partial dentures (50%) were the most prevalent type of prosthesis in patients with denture stomatitis. When the medical history was reviewed most of the patients did not have any underlying systemic diseases(61.1%) did not have any medical condition, (18.5%) were diabetic, (11.1 %) were hypertensive. When all the diabetic patients(2577) were evaluated , 9.32% had denture stomatitis .In the study, it was observed that denture stomatitis was prevalent in elderly patients with slight female predilection. Diabetes was the most prevalent systemic illness associated with denture stomatitis .

**Keywords :** Age , Candida Albicans, Denture Stomatitis, Diabetes, Gender.

## INTRODUCTION:

Denture Stomatitis(DS) or Denture related stomatitis is a type of yeast infection most commonly affecting the palatal mucosa. As the name indicates, this type of oral mucosal lesion is associated with dentures wearers in the denture bearing areas of the oral mucosa(Walsh, Riley and Veitz-Keenan, 2015). Several studies suggest that it has a prevalence of 25 to 67%(Kossioni, 2011). Women were predominant in having denture stomatitis (Arendorf and Walker, 1987). Elderly individuals have a higher frequency rate and some studies suggest that

as the age increases, individuals wearing dentures are more prone to developing DS (Kossioni, 2011; Borić and Štefić, 2018). Edema and inflammation of the oral mucosa covered by the denture are signs of the disease. The objective signs include pain, itching and burning feeling, however denture stomatitis is asymptomatic in the majority of patients (Newton, 1975; Arendorf and Walker, 1987), (Wilson, 1998).

There have been several studies on the etiology of denture stomatitis. But despite its high prevalence, the etiology of DS is not completely understood. There are multifactorial risk factors associated with denture stomatitis with ill fitting dentures being the most common (Naik and Pai, 2011). Other factors include, dietary factors, improper use of denture, failure to maintain the hygiene of denture as well as prolonged denture usage (Budtz-Jørgensen and Bertram, 1970). The presence of these factors or a combination of these factors eventually leads to the colonization of *Candida albicans* on both the denture and mucosa and causes DS (Wilson, 1998).

The causative microorganism of DS is the *Candida* species, the most common being *C. albicans*. In a study by Webb et al., it stated that *C. albicans* account for more than 80% of all the candidal species. It could contribute to the fact that *Candida* is a normal commensal in the oral cavity along with other microflora (Webb *et al.*, 1998). Patients may present with any of the four forms of infection with *Candida albicans* namely pseudomembranous, erythematous, hyperplastic candidiasis or angular cheilitis or in combination with any of these forms (Reichart, 1982). Old age, diabetes mellitus, nutritional deficiency, malignancy, predisposing factors that cause denture stomatitis includes, malignancy, Sjogren's syndrome, irradiation, drug therapy, use of broad spectrum antibiotics and smoking tobacco are some of the predisposing factors that cause Denture stomatitis (Budtz-jørgensen, 1970).

Many classification was proposed for denture stomatitis with Newton's classification 1962 being the first ever and most accepted. He classified this into 3 types namely punctiform hyperemia (class I), diffuse hyperemia (class II) and granular hyperemia (class III) (Barbeau *et al.*, 2003) with localised infection and pinpoint hyperaemia and is usually trauma induced, covering the entire or a part of the denture covering area, involving the central part of hard palate and alveolar ridge being the clinical features respectively (MacEntee, Glick and Stolar, 1998).

Dentists frequently provide removable or fixed prostheses to edentulous patients to support masticatory function. The common prosthesis offered to completely edentulous patients worldwide is complete denture. According to Nyquist, denture stomatitis is trauma induced and accounted for the majority of cases of denture stomatitis (Bergendal, 1982).

Recent studies have focused on the association of Diabetes mellitus (DM) with denture stomatitis. According to Drocke et al., type 2 DM is identified as a major risk factor for developing denture stomatitis than non-diabetics (Steele *et al.*, 2015).

The aim of the current study was to determine prevalence and risk factors that contribute to the occurrence of denture stomatitis in patients that reported to Saveetha Dental hospital.

## **MATERIALS AND METHOD:**

The study was designed as a retrospective clinical study analysing all the patients with a diagnosis of Denture Stomatitis. The data of 86000 patient records were reviewed and analysed between June 2019 and March 2020 from which 1415 patients were denture wearers records with complete documentation (complete dentures, acrylic partial dentures, cast partial dentures) were included in our study. The records with incomplete medical documentation, replication of results in different time periods with improper clinical photographs or diagnosis were excluded from the study. Data obtained were chronologically recorded and

tabulated. The data was imported and transcribed in SPSS version 22. The Data was described as frequency distribution and percentile. Statistical analysis was performed using Statistical Package for the Social Sciences ,version 22(SPSS).Descriptive analysis were based on quantitative variables and frequencies for categorical variables.A Chi square test, was applied to determine the p value, the p value less than or equal to 0.05 was considered to be statistically significant with a confidence interval of 95%.

## **RESULTS AND DISCUSSION:**

The sample size consisted of 1415 individuals who were removable denture wearers, where the male and female patients ranged between 15-80 years of age visiting the hospital. Among 1415 patients evaluated, denture stomatitis was present in 80 individuals among all the cases.

On comparing the prevalence of denture stomatitis among male and female population, women were found to be more prevalent having denture stomatitis 57.4% than Men 42.6% (Figure 1). The age of prevalence peaked in the range 51-80 yrs (61.1%) with 33 individuals followed by 15 individuals in 31-50 years(27.8%) and 6 individuals in 15-30 years (11.1%)(Figure 2).

In our study the prevalence of denture stomatitis among those wearing Temporary partial dentures was markedly higher (50%) than those wearing complete dentures (46.3%) and CPD(3.7%) (figure3). When the presence of any systemic illness was reviewed among the patients, the majority of the denture wearers had no systemic illness(61.1%) followed by diabetes (18.5%), hypertension (11.1%) thyroid problem(3.7%), polio and TB (1.9%).(figure 4)

The results of the association between the gender and systemic illness present revealed that female patients were more susceptible to develop denture stomatitis. The prevalence of diabetes in males was found to be 7.41% and 11.11% in females, whereas hypertension showed contrary results where males were 7.41% and females 3.7%, which was found to be statistically significant ,  $P = 0.04 (< 0.05)$ .(figure 5).

The results of the association between the age and systemic illness present revealed that the elderly patients were more susceptible to develop denture stomatitis. The prevalence of diabetes was found to be increasing as the age increases, none in 15-30 yr olds although thyroid was the only illness present among this age group (1.85%), 31-50 yr old =5.56% and 51-80 yr old = 12.96%.  $P$  value = 0.4(>0.05),(figure 6).

Denture stomatitis is one of the most common oral mucosa lesions in elderly patients who are denture wearers. DS is said to have multifactorial etiology by previous studies such as traumatic occlusion, poor oral hygiene , microbial factors, denture age ,smoking, systemic conditions, diabetic mellitus, immunodeficiency and medications. Nocturnal denture wearing also contributes to the prevalence of DS (Naik and Pai, 2011; Silva *et al.*, 2011).The negative effect of nocturnal wearing is pronounced due to the absence of mechanical effects of saliva and its antimicrobial compounds (lysozyme, lactoferrin, salivary peroxidase, immunoglobulin A), which are its integral part(Ikebe *et al.*, 2002).

Our study showed that patients who were 51-80 years old were prevalent to develop denture stomatitis. Milos *et al* had similar results in their study where DS were prevalent in elderly patients wearing dentures in the population of Vojvodina and Europe where secondary role was found to be attributed to denture age and oral candidal infection.(Cankovic *et al.*, 2017),(Sadamori *et al.*, 1990).This could contribute to the fact that as there is an increase in age and the denture age , the prevalence of DS is higher. Therefore denture age could be considered as one of the predisposing factors in developing DS. However . in a study conducted on a

sample of Lebanese adults showed results where a statistically significant relationship between DS and the evaluated factors except for the denture's age which was found irrelevant(Aoun and Cassia, 2016).

There was a slight female predilection in our study. This is also in concordance with previous studies. More than 80% of the sample consisted of older female subjects. Lidia et al study showed a statistically significant difference in the prevalence of denture stomatitis in male and females(Rodrigues *et al.*, 2019). Hormonal difference between men and women could explain these results.It has been suggested that during or after menopause, there is atrophy of oral mucosa, increasing the probability of developing an inflammatory reaction(Kaplan and Moskona, 1990).

A high proportion of elderly patients in the study area were denture wearers in kelantan(Saini *et al.*, 2010). In a previous study, where the population were randomly selected geriatric denture wearers, out of 463 individuals , the prevalence of denture stomatitis was found to be as high as 65%(Jeganathan, Payne and Thean, 2008).

This study showed denture stomatitis prevalent in partial removable dentures wearers. This is similar to the study by Emami et al.(Khiyani *et al.*, 2019)

The common systemic illness that was found in the medical history of the patients with DS was diabetes. This is in concordance with previous studies Ljubomir et al correlated Candida infection due to poor glycemic control. The level of glycemic control appears to be a more significant factor, because poor control leads to reduced salivary flow, increase in salivary glucose level.(Javed *et al.*, 2009) These factors facilitate oral candidal growth and colonization. There has been no reported association between hypertension and denture stomatitis. However some authors reported that high levels of cholesterol may facilitate infection.(Salerno *et al.*, 2011),(Aziz *et al.*, 2016),(Aziz *et al.*, 2016; Lindsay Grayson *et al.*, 2017)

Diabetic denture wearers have found to have oral complications , denture stomatitis (DS)being the most prevalent. Its etiology is believed to be multifactorial with poor oral hygiene and maintenance of dentures as well as nocturnal wearing of dentures as some of the risk factors. Therefore adequate control of the underlying metabolic disease along with a well manufactured and adapted prosthesis together with good oral hygiene maintenance of the patient could decrease the incidence of DS.Hence treatment of denture stomatitis includes controlling the risk factors as well as replacing the denture.

Previously our team had conducted numerous clinical trials (Venugopal and Maheswari, 2016)(Misra *et al.*, 2015; Steele *et al.*, 2015; Subashri and Uma Maheshwari, 2016; Chaitanya *et al.*, 2017; Maheswari *et al.*, 2018)and lab animal studies(Dharman and Muthukrishnan, 2016; Rohini and Jayanth Kumar, 2017; Chaitanya *et al.*, 2018; Patil *et al.*, 2018) and in Vitro students(Subha and Arvind, 2019)(Choudhury, 2015; Muthukrishnan and Kumar, 2017)over the past 5 years. Now we are focusing on epidemiological studies . The idea for this study stemmed from the current interest in our community.

## **CONCLUSION :**

This study demonstrated that denture stomatitis was prevalent in elderly patients between 51-80 yrs old with slight female predilection irrespective of the presence of any underlying systemic disease. On considering the systemic illnesses, diabetes was the most commonly associated systemic illness with denture stomatitis . Hence control of the possible risk factors like diabetes is important for denture wearers to avoid new incidence of denture stomatitis.

## **AUTHOR OF CONTRIBUTION :**

Author 1(V.Sharon keziah ), carried out the retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 ( Dr. Deepika Rajendran ) aided in conception of the topic , has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3(Dr.Pradeep Kumar.R) has Participated in the study design and has coordinated in developing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

#### **CONFLICT OF INTEREST :**

There is no conflict of interest.

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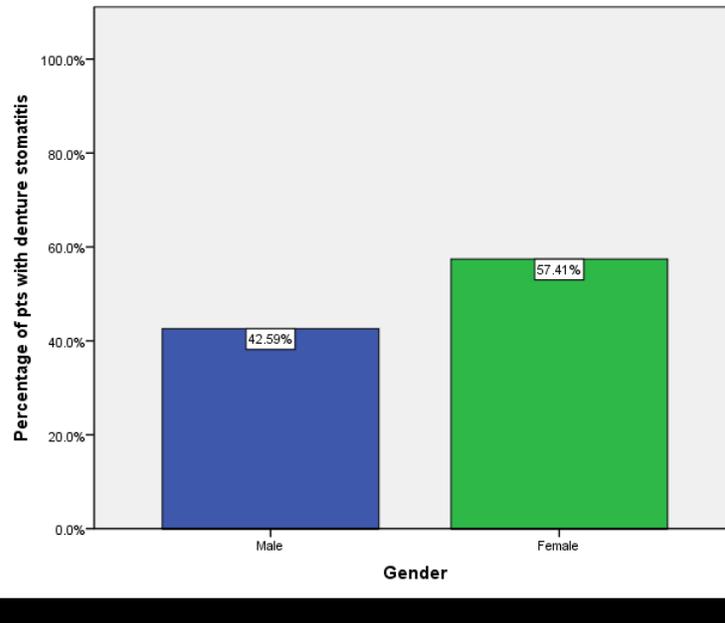


Figure 1- Bar graph represents the prevalence of denture stomatitis among men and women. X axis represents the gender and Y axis represents the percentage of patients with denture stomatitis .Blue and green bars denote male and female respectively. Denture stomatitis is found to be predominant in the female population (57.41%) than male (42.59%).

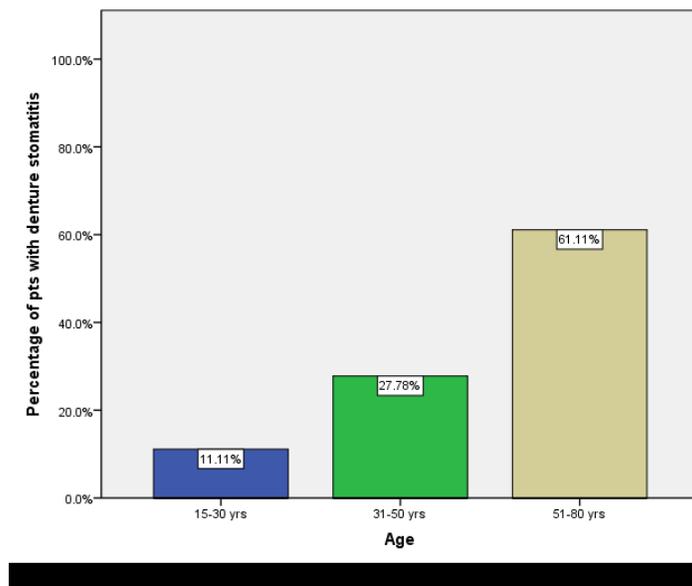


Figure 2- Bar graph representing the distribution of age groups of patients having denture stomatitis with the X axis represents the presence of denture stomatitis in 3 different age groups ,15-30yrs (blue ), 31-50 yrs (green) and 51-80 yrs(brown) and Y-axis denotes the percentage of patients with denture stomatitis.Denture Stomatitis was more prevalent in 51-80 yr old (61.11%) than the other age groups.

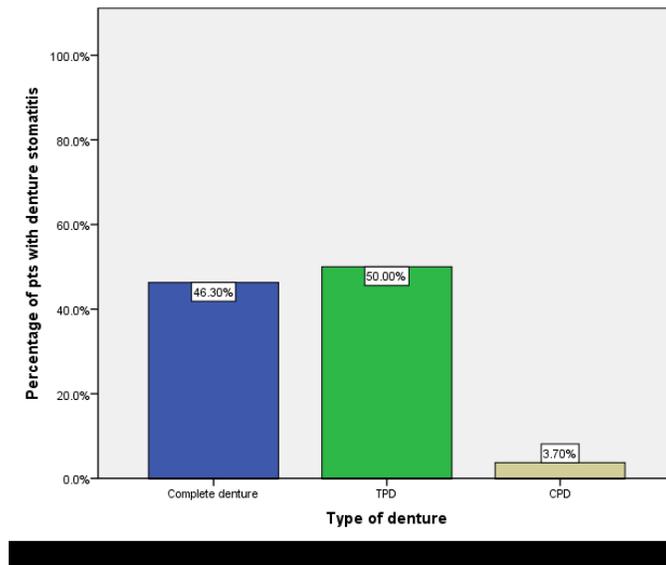


Figure 3- Bar graph representing the type of dentures used by denture stomatitis patients . X axis depicts the type of denture and Y axis is the percentage of patients with denture stomatitis.. Blue , green and brown bars denote complete denture , Temporary partial denture (TPD) and cast partial denture (CPD) respectively. It was found that Partial denture wearers were more with a combined 53.70% (TPD=50% and CPD = 3.7%) compared to complete denture wearers(46.30%).

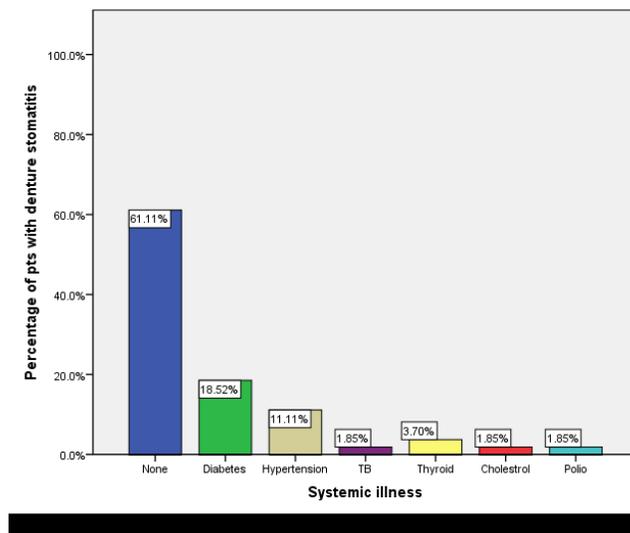


Figure 4 - Bar chart representing the systemic illnesses present in patients with denture stomatitis . The color blue, green , brown , purple , yellow , red and turquoise denotes None , Diabetes , Hypertension, TB, Thyroid , Cholesterol and Polio respectively. Majority of the patients did not have any underlying systemic disease (61.1%), Diabetes(18.2%)was the most common disease followed by Hypertension (11.11%), Thyroid (3.70%) , TB(1.85%), Cholesterol (1.85%) and Polio(1.85%).

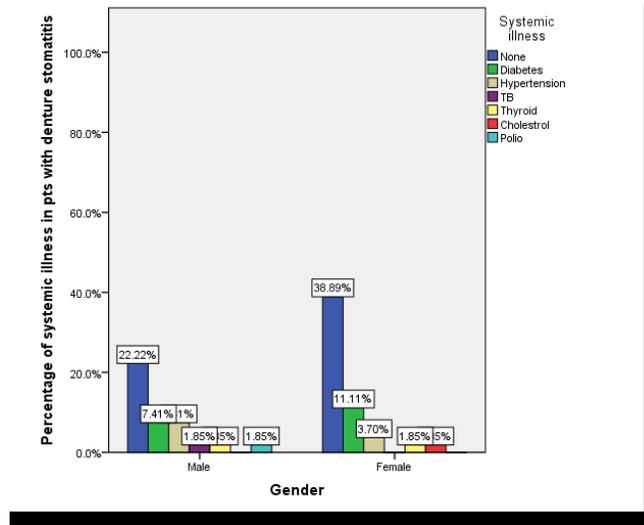


Figure 5- Bar graph represents the association between Gender and Systemic illness in patients with denture stomatitis. X axis represents the gender and Y axis represents the percentage of systemic illness in patients with denture stomatitis . The color blue, green , brown , purple , yellow , red and turquoise denotes None , Diabetes , Hypertension, TB, Thyroid , Cholesterol and Polio respectively. A Majority of the patients with denture stomatitis did not have any underlying systemic illness. Considering the systemic illness involved, Diabetes was found to be higher in women (11.11%) than in men(7.41%) . Hypertension was prevalent among males (7.41%) than in females(3.70%). Association between gender and systemic illness was done using Chi square test, P value = 0.04, where  $p < 0.05$  hence was found to be statistically significant.

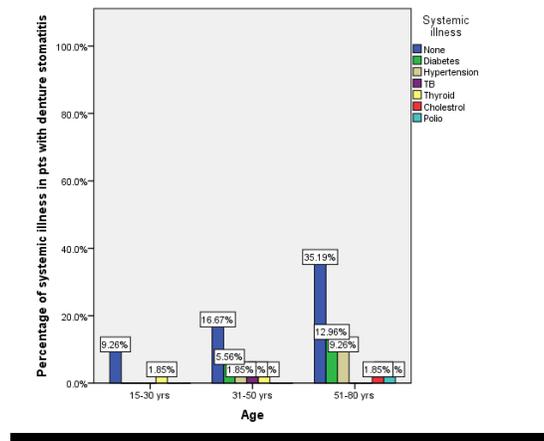


Figure 6 -Bar graph represents the association between Age and Systemic illnesses of patients with denture stomatitis . X axis represents the different age groups and Y axis represents the systemic illness among the patients with denture stomatitis .Most of the systemic diseases were prevalent in the older age group (51-60 yr olds ). Although the majority of the population did not have any underlying disease, Diabetes was found to be most common among the age groups 31-50 yrs(5.56%) and 51-80 yrs(12.96%). However thyroid (1.85%)was prevalent in the younger population 15-30 yr. The association between age of the patient and their underlying illness of the patients with denture stomatitis was done using Chi square test, p value = 0.4; where  $p > 0.05$ , hence was found to be statistically not significant.