



Prevalence of Denture Stomatitis among Patients Visiting Private Dental Hospital in Chennai - An Institutional Study

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aim: The aim of the study was to assess the prevalence of denture stomatitis among patients visiting private dental colleges in Chennai.

Introduction: Denture stomatitis is the inflammation of the denture bearing mucosa mostly affecting elderly population. The classical signs of denture stomatitis are burning sensation, bad taste, discomfort and sometimes they are asymptomatic. It occurs mostly under the maxillary denture due to less salivary gland, high retention, poor cleansing activity of the tongue.

Materials and Method: This is a descriptive study which was performed under a university setting in which the data of patients who were diagnosed with denture stomatitis in the department of oral medicine at a private dental college in Chennai, India from June 2019- February 2021. The data was collected by reviewing patient records and the analysis of data of n =5,35,951 was done. The parameters such as age of the patient, gender of the patient, site of lesion and clinic type were noted in the study. The collected data was compiled, reviewed, tabulated in spss software (version 22.0) for statistical analysis.

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Results: The prevalence of denture stomatitis is about 30.58% and more common among the age group of 70-79 years and had a more female prediction. The most common site of denture stomatitis was the maxillary denture (80%) and most of the patients had undergone treatment in Undergraduate clinics (86.78%).

Conclusion: Thus the knowledge of prevalence of denture stomatitis and correlation with various parameters is essential in dental practices for improving clinical performance.

Keywords: Denture stomatitis; denture; prevalence; maxillary arch and mandibular arch.

1. INTRODUCTION

It is the pathological reaction of the palatal portion of the denture bearing mucosa [1]. The alternative name for this condition is denture sore mouth which indicates it is painless and asymptomatic. The appearance of affected mucosa is red (erythematous), swollen (edematous) and also has petechial hemorrhage (pin-points of bleeding). This usually occurs beneath a maxillary denture. It is accompanied by angular cheilitis, which is inflammation of the corners of the mouth, and is seen in association with *Candida albicans*. Stomatitis rarely develops under a mandibular denture. The affected mucosa is sharply defined with the shape of the covering denture. Patients complain of burning sensation, discomfort, or bad taste, but most of the patients are unaware of the problem [2]. The etiology of the disease is multifactorial and factors associated with the development of denture stomatitis include denture trauma, continuous denture wearing, salivary flow, denture cleanliness, nocturnal wearing, denture base material, age of denture, smoking, dietary factors, and pH of denture plaque. Other factors include xerostomia (dry mouth), diabetes or a high carbohydrate diet and even human immunodeficiency virus (HIV) can rarely be an underlying factor [3-7]. Poorly fitting dentures also cause pressure on the mucosa and mechanical irritation which lead to the similar clinical appearance, but this is rare.

The Newton classification of denture-related stomatitis into three types based on severity. Type one may represent an early stage of the condition, while type two is the most common and type three is uncommon. Type 1 is Localized inflammation or pinpoint hyperemia, Type 2 is diffuse erythema (redness) without hyperplasia and Type 3 is Inflammatory nodular/papillary hyperplasia usually on the central hard palate and the alveolar ridge.

Yeast infection of the oral mucosa is a common condition predominantly affecting either a denture-wearing elderly population or those of all

ages with prior local disturbance of the oral environment or systemic illness [8]. Yeast cells have the capability to adhere to the denture and form colonies over the oral surfaces including mucosa and acrylic dentures and their co-aggregate with other bacteria [9-11]. *Candida* species are increasingly associated with biomaterial-related infections at both the oral and systemic levels that are characterized by the formation of biofilms on these surfaces leading to clinically refractory disease [12-15]. Dental appliances such as dentures, appliances have the potential to alter the oral microbiota [16]. A microbial plaque composed of bacteria, yeasts, debris which is formed on the unpolished surface that contacts the mucosa of the denture. Over a period of time, this plaque may be colonized by *Candida* species. The local environment under a denture is more acidic due to less exposure to cleansing action of tongue and less salivary flow since lesser salivary glands are present in the maxilla, which favors high chance of *Candida* enzymatic activity and causes inflammation in the mucosa [17-20].

The diagnosis is by the clinical appearance and swabs are taken from the surface of the denture. The most important treatment to prevent denture stomatitis is to improve the denture hygiene, i.e. no nocturnal usage of denture, cleaning and disinfecting it, and storing it overnight in an antiseptic solution. The prevalence of oral mucosal lesions associated with wearing removable dentures decreases with age and affects women more than men [21-24]. Therefore, it was hypothesised that oral hygiene is not only the reason for these lesions and that age of the denture also has an influence on denture stomatitis. The main aim of this study is to assess the prevalence of denture stomatitis among patients visiting private dental hospitals in Chennai.

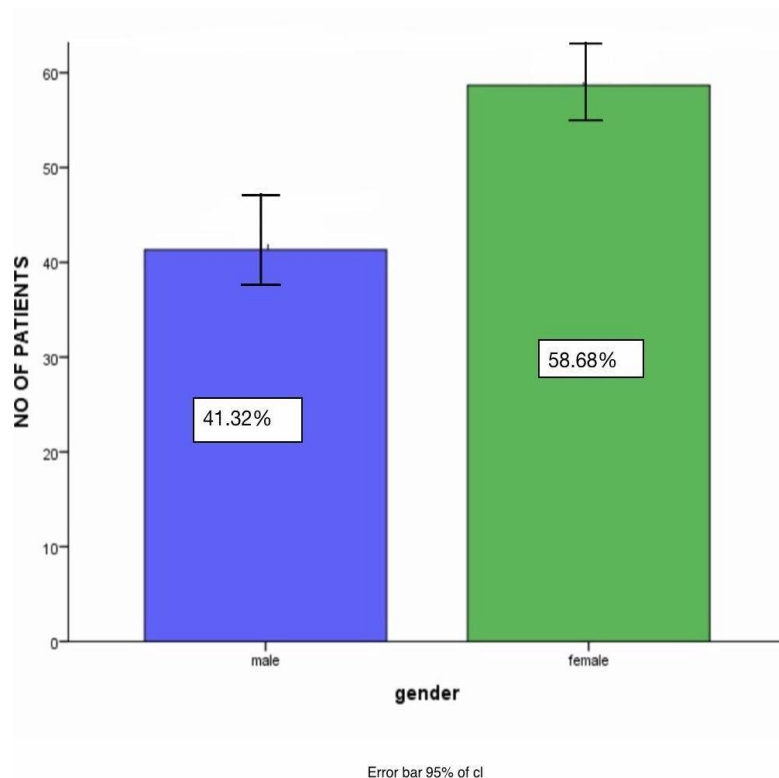
2. MATERIALS AND METHODS

This was a descriptive study which was performed in a university setting where the required data of patients who were diagnosed

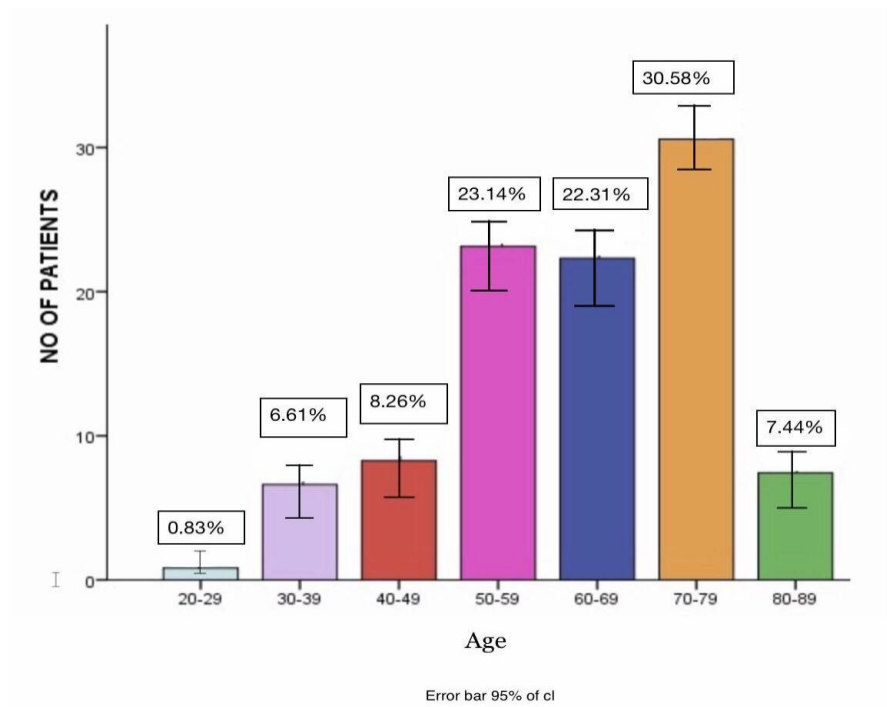
with denture stomatitis between 30-80 years of age reported to private dental college and hospitals, Chennai, India from June 2019-February 2021. The data was collected by reviewing the patient records and cross verified using photographs, reviewed by a reviewing expert and the data were tabulated in Microsoft Excel. The sample size of the study who were diagnosed as denture stomatitis was found to be n = 455 among 5,35,951 patients. The tabulated data was imported to spss software (statistical package for social studies) version 22.0 (IBMcorporation) for statistical analysis. Collection of data was done by simple random sampling methods within the university to minimise sampling bias. There is a high internal validity and low external validity in our study. The study included patients diagnosed with denture stomatitis. Improper and incomplete data, repeated data, were excluded from the study. The parameters such as age of the patient, gender of the patient, site of lesion and clinic type were noted in the study. Chi square test was used to compare the groups ($p < 0.05$) was considered significant and the results were interpreted.

3. RESULTS

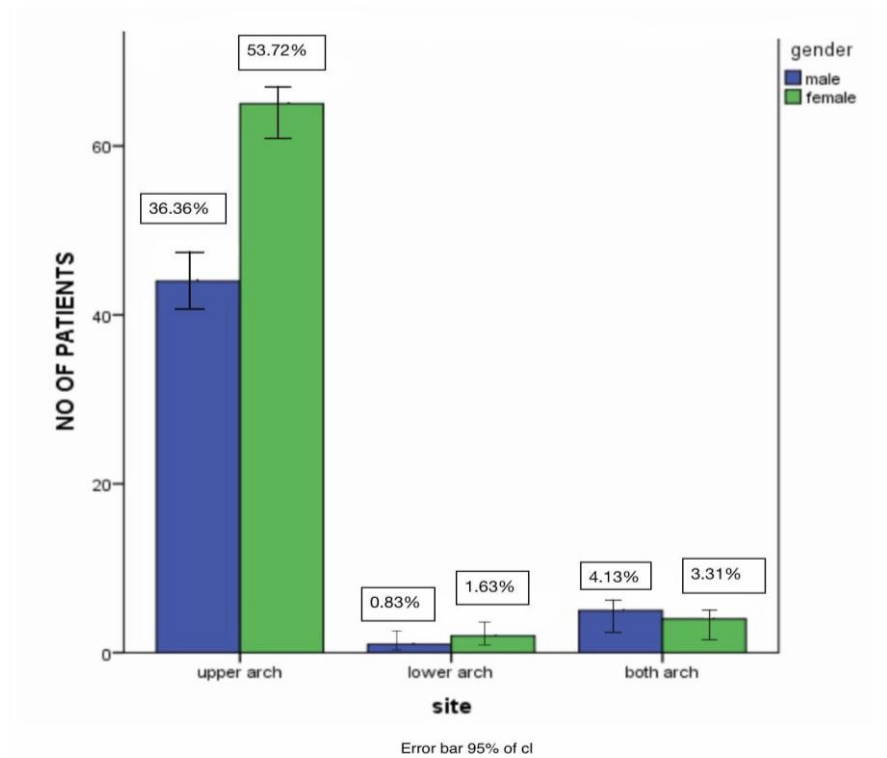
The current study shows the prevalence of denture stomatitis among patients visiting private Dental hospitals in Chennai. Out of n=455 patients who had denture stomatitis, 41.3 % were males and 58.6% were females (Graph1). The age group of the patients , 0.83% were in the age group of 20-29 years , 6.6% were in the age group of 30-39% years , 8.26% were in the age group of 40-49 years ,23.14% were in the age group of 50-59 years, 22.31 % were in the age group of 60-69 years, 30.58 % were in the age group of 70-79 years, 7.44 % were in the age group of 70-79 years, 0.83% were in the age group of 80-89 years (Graph 2). The correlation between the site of denture stomatitis and gender of the patients in that, 36.36% of the male and 53.72% of females had lesions in the upper arch, 0.83% of male and 1.65% of female had lesion in lower arch and 4.13% of male and 3.31% of female had lesion in both arches (Graph 3). 86.78% had treatment in Undergraduate clinics and 13.22% were treated in Postgraduate clinics (Graph 4).



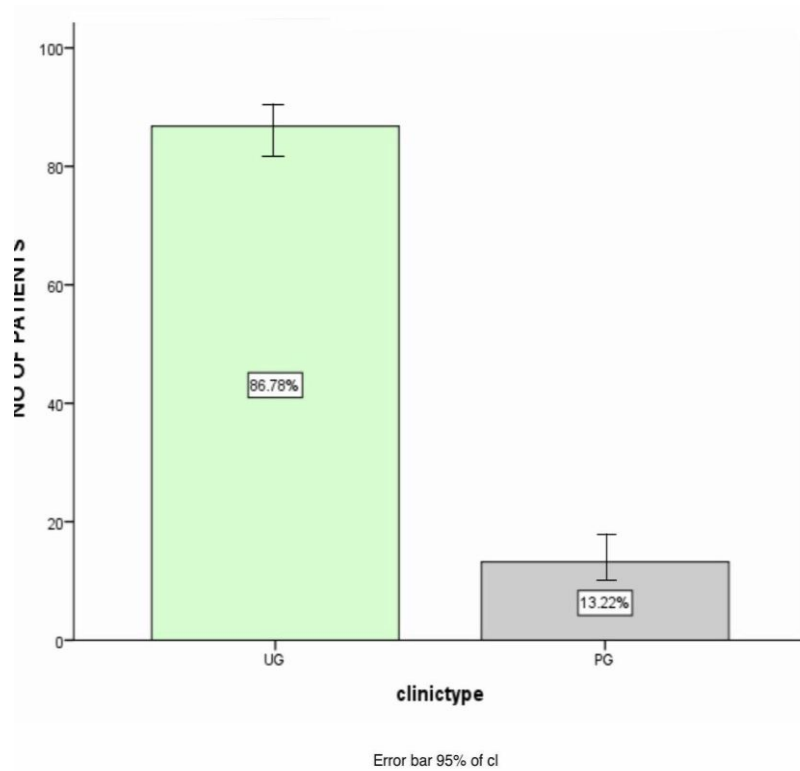
Graph 1. The bar graph depicts the prevalence of denture stomatitis between different genders of the patients visiting the outpatient department of general medicine at a private dental hospital in Chennai



Graph 2. The bar graph depicts the prevalence of denture stomatitis between different age groups of the patients visiting the outpatient department of general medicine at a private dental hospital in Chennai



Graph 3. The bar graph depicts the association between the site of lesion of denture stomatitis between male and female patients visiting the outpatient department of general medicine at a private dental hospital in Chennai



Graph 4. The bar graph depicts the prevalence of denture stomatitis treated among different clinics visiting the outpatient department of general medicine at a private dental hospital in Chennai



Fig. 1. Showing denture stomatitis

4. DISCUSSION

The prevalence of denture stomatitis and the associated risk factors differ in the various studies, mainly because of differences in research methodology (age of the study group, dental status of the study group, Dental School patients or community population, institutionalised or non-institutionalised patients, different method of assessment of various factors and statistical analysis, subjectivity of classification) [25]. The prevalence of denture stomatitis in the present study was only 0.08%.

The rate of incidence is lesser which might be attributed to wrong diagnosis of stomatitis as other systemic manifestation or other oral blisters. In a study done by Geering et al, the rate of incidence of the denture stomatitis was higher to 25% among the other oral mucosal lesions [26]. This increased rate is due to poor fitting denture, poor oral hygiene, increased candida infection in old age people. In this study denture stomatitis was more prevalent among the age group of 70-79 years, with certainty of 30.58% (chi square test, $p=0.561$; $p>0.05$) were affected (Graph2). Age was not related to

any type of denture stomatitis as many authors agree [27], whereas others report lower prevalence with increasing age [28]. Smoking was more frequent in denture stomatitis patients. MacEntee et al also observed a significant association between tobacco use and denture-induced lesions in a group of Canadians older than 75 years of age and Shulman et al found an association between smokers of >15 cigarettes/day and stomatitis. The histopathological alterations caused by smoking could increase tissue vulnerability to the condition. In this study the denture stomatitis was more predominant in the female patient rather than male, with the measure of 41.3 % were male and 58.6% were female (chi square test , $p=0.314$; $p> 0.05$) (Graph1) which was contra indicated by the study done by mc et al [26], this could be related to the increased frequency of smoking among men, particularly in older age. MacEntee et al. also reported an increased prevalence of denture-induced lesions (stomatitis, hyperplasia, angular cheilitis) in men. However, most authors reported that denture stomatitis was more frequently observed in women [29]. Around 13.22 % of the patients were treated in the postgraduate clinic (chi square test, $p=0.432$; $p> 0.05$) (Graph 4). Our study results were in accordance with previous literature which point out postgraduates are experts in treating patients exclusively , this is due to the fact the post graduates are well versed in treating patients and also have vast knowledge about the subject compared to the undergraduates. This might be a contributing factor for lesser incidence of denture stomatitis among the patients treated in post graduate clinics [26]. However, under effective training and knowledge on how to handle and manage patients, undergraduates can also be skilled in treating and managing patients.

The most important factor associated with denture stomatitis in the present study was the continuous wearing of the denture. The most common site of denture stomatitis is the upper arch where 36.36% of them were male and 53.72% of them were female (chi square test , $p=0.03$; $p<0.05$) (Graph3). None of the participants who rarely wore their dentures presented with denture stomatitis. This finding is supported by many researchers. Although the cause of denture stomatitis seems to be multifactorial there were some primary risk factors involved, such as trauma caused due to the continuous wearing of denture and candidal infection, both associated with continuous

denture-wearing [30].In this study, poor retention of the maxillary denture, causing increased movement during function was associated with increased prevalence of denture stomatitis. Continuous denture-wearing also increases the exposure to yeasts existing on the fitting surface of the prosthesis [31]. The reduced saliva flow under the fitting surface of the denture cannot adequately clean the area and increases the presence of microorganisms. The tongue cannot perform its cleaning action whereas the elevation of the temperature under the denture could also increase the microorganism population. Despite several advances in material science, still there is a huge prevalence of denture stomatitis. Special emphasis should be placed on the instructions to these patients on the use and maintenance of their dentures and the necessity for regular dental checkups. The study was geographically limited and predominantly considered of the South Indian population. Data which were unclear were excluded thereby reducing the sample size. Topical therapy is the first-line treatment. The use of clotrimazole or nystatin lozenges and/or pastilles, with the denture removed from the mouth, is recommended. The application of antifungal agents (eg, nystatin powder or cream) on the tissue-contacting surface of the denture is also recommended. Also modification such as use of denture adhesives, use of topical cream or gel, massaging the gums, removal of dentures during night will aid in relief.

Within the limit of the study, it was found that prevalence of denture stomatitis is more in the age group of 70-79 years with more female prediction. To ascertain the results of this study and to increase the level of significance, the sample size and the geographic area of coverage should be extended to all parts of south India. Conducting a multicentered study with an extended geographic area and a wide range of population in the future we can get better results. Establishing the proper diagnosis is a necessary condition for the effective treatment for the denture stomatitis. Thus this knowledge of prevalence of denture stomatitis and correlation with various parameters is essential in a dental practice for clinical performance.

5. CONCLUSION

Denture stomatitis is the oral mucosal lesion caused due to wearing of dentures usually involving *Candida* species. Less common forms of denture stomatitis may be due to mechanical

trauma or an allergic contact reaction. The early recognition of denture stomatitis provides an alert to the clinician with valuable diagnostic assets, this can be achieved by thorough examination of the oral cavity in such patients is of almost importance. Finally, establishing the proper diagnosis is an essential condition for effective treatment of the underlying diseases. In addition to topical or system anti fungal treatment, denture stomatitis requires excellent oral hygiene and replacement of any poorly fitting dentures.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval was obtained from the institutional ethical committee (ethical approval number: (SDC/SIHEC/2021/DIASDATA/O619-0320).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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