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Oral health status of diabetic patients visiting a private dental hospital, Chennai

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ABSTRACT

Diabetes mellitus is the second most common non-communicable disease in India. There are various diseases of the oral cavity resulting as a complication of diabetes. This underlying systemic disease could affect the prognosis of any dental treatment. The aim of the study is to evaluate the prevalence of various types of oral lesions associated with diabetes. A total of 343 diabetic patients visiting the dental hospital in Chennai over a period of one year (1 June 2019 to 1 June 2020) were selected for the study. Detailed case history and clinical examination were carried out under visible light. The study population was age 30 years and above. Data collected were analysed using SPSS software and the results were recorded. The majority of the diabetic patients were males, aged 61-75 years. Dental caries was the most common oral disease, followed by pulpitis and periodontitis. The premalignant lesions like Oral Sub Mucous Fibrosis, Lichen Planus and Leukoplakia were also found. It was found that male diabetic patients are more prone to oral diseases compared to females. Hence, it is recommended that awareness on oral hygiene and periodic oral health examination will improve the oral health status of diabetic patients.

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INTRODUCTION

The number of diabetic patients has been increasing significantly over the past few years. The reduced consumption of healthy fruits and vegetables along with an active lifestyle are deteriorating in the present generation and could be contributing to the change (Pratha and Prabakar, 2019). Physical activity, urbanization and obesity show high prevalence that causes type 2 diabetes (Thibault *et al.*, 2016).

Diabetic Mellitus is a metabolic disorder characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism (Neralla *et al.*, 2019). It includes three general main classifications of diabetes: type 1 otherwise known as insulin-dependent or juvenile diabetes, type 2 previously known as non-insulin-dependent or adult-onset diabetes,and it can be gestational, which is the other type. However, the two most common types of diabetes include type 1 and type 2 (Asif *et al.*, 2019).

Oral health is an important aspect of an individual's general health. There are various factors that could affect one's oral hygiene such as poor maintenance, smoking, other habits, nutrition and an underlying systemic illness, to name a few. Diabetes is one such systemic disease that can cause oral complications

if it is uncontrolled (Prabakar *et al.*, 2018b; Neralla *et al.*, 2019; Pavithra and Jayashri, 2019).

Uncontrolled Diabetic Mellitus has been linked to several oral diseases such as periodontitis (Wu *et al.*, 2015), dental caries (Aitken-Saavedra, 2015; Kumar and Preethi, 2017), pulpitis, halitosis (Leite *et al.*, 2013), denture stomatitis, burning mouth syndrome, lichen planus, keratosis, tongue abnormalities (Jendle and Riddell, 2019) and lichenoid drug reactions (Gupta and Jawanda, 2015; Jendle and Riddell, 2019).

Diabetes has been associated with dental caries. It has been previously demonstrated that the risk of dental caries is found to be twice as much as in non-diabetic patients (Prabakar *et al.*, 2016). Among the various types of caries, root surface caries has found to be more predominant in previous studies. According to some reports, the incidence of dental caries is higher in type 1 diabetes, whereas others propose escalated prevalence in type 2 diabetes (Mohapatra *et al.*, 2019).

There have been other studies based on the relationship of diabetes, pulpal and periapical diseases. It was observed that conditions induced by periodontitis might affect the dental pulp through the periapical route. Likewise, periodontal diseases can have a significant impact on the metabolism in a diabetic person (Taylor, 1996; Sampaio *et al.*, 2011). Periodontitis increases the risk of poor glycemic control over time (Bissada and Sharawy, 1970; Lim, 2007).

There are previous reports on denture wearers with diabetic Mellitus and the oral complications post-treatment (Khatri, 2019). Denture stomatitis has reportedly been associated with diabetic patients wearing dentures, especially type 2 DM where there is a positive correlation between candida in denture-bearing mucosa and high serum glucose level (Bars, 2015).

In a study on diabetic patients and association with oral cancer and oral potentially malignant disorders, it has been proved that diabetic patients suffering from oral carcinomas have higher mortality compared to non-diabetic patients. The most common Oral Potentially Malignant Diseases are leukoplakia, erythroplakia, and oral submucous fibrosis (Ho, 2013; Bars, 2015; Harini and Leelavathi, 2019).

Among the immunologically mediated diseases like Oral Lichen Planus and pemphigoid, certain studies found a statistically significant association with these lesions and diabetics (Ho, 2013; Bars, 2015; Rey, 2019).

Infectious oral disease caused by viruses like Oral candidiasis (Mathew *et al.*, 2020), Herpes also is known to have a strong association and increased risk in diabetic patients (Rodrigues *et al.*, 2019; Ke, 2016). Ulcerative lesions like traumatic ulcer and recurrent aphthous ulcer have been the most prevalent in various studies (Silva, 2015; Prabhakar *et al.*, 2011; Prabakar *et al.*, 2018a).

Moreover, it was hypothesised that patients with longer duration of type 2 diabetes have poorer oral health than non-diabetic patients (Kumar and Preethi, 2017; Kannan *et al.*, 2017; Samuel *et al.*, 2020).

Hence the aim of this study was to evaluate the prevalence of various oral lesions among diabetic patients.

MATERIALS AND METHODS

The study was designed as a retrospective study analysing all the patients with diabetes. The data of 86000 patient records were reviewed and analysed between June 2019 and March 2020 from which 2577 patients were diabetic. 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 related to age, gender and diabetic status was obtained and tabulated in the excel sheet. The data analysis consisted of a descriptive analysis followed by the analytical phase. The Data obtained were further analysed using the Statistical Package for Social Sciences version 22 (SPSS). The results were tabulated and $P<0.005$ was considered statistically significant.

RESULTS AND DISCUSSION

There were a total of 343 diabetic patients. Figure 1 shows the prevalence of diabetes among males and females. Out of 343 subjects(68.2%) were males and (31.78%) females . Males showed a significantly higher predominance than females. Figure 1 shows the Gender Wise distribution of Diabetic Patients visiting a dental hospital. It is found that diabetes has a higher prevalence in men than in women.Figure 2, Age-wise distribution of diabetic patients visiting the dental hospital. It is found that among 61-75 yrs age group 61.9% were diabetic, followed by 30-45 years (10%),46-60 years (22.9%) and 75-81 years (5.3%). Figure 3 shows the prevalence of oral lesions associated with diabetic patients visiting a dental college. Most of the diabetic patients reported to the hospital were found to have dental caries (33.8%), pulpitis(18.3%), periodontitis (17.7%), keratosis(4.3%), lichen planus

(4%) and denture stomatitis (9.32%). The least common lesions were allergies, orofacial tuberculosis, orofacial neuralgia, halitosis and pemphigus. Association between gender and the oral lesion was done using the chi-square test (p value= 0.012) and was found to be significant. (Figure 4). Hence male diabetic patients are more prone to Oral diseases compared to females.

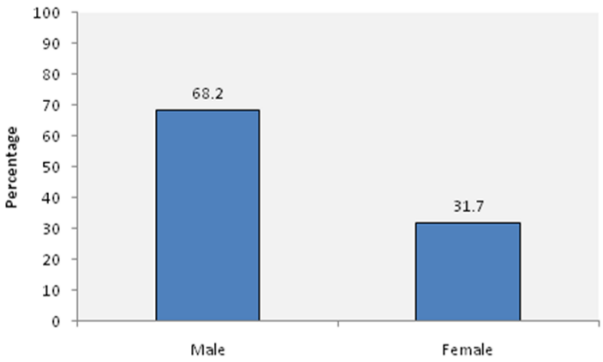

Figure 1: Gender Wise distribution of Diabetic Patients visiting a dental hospital

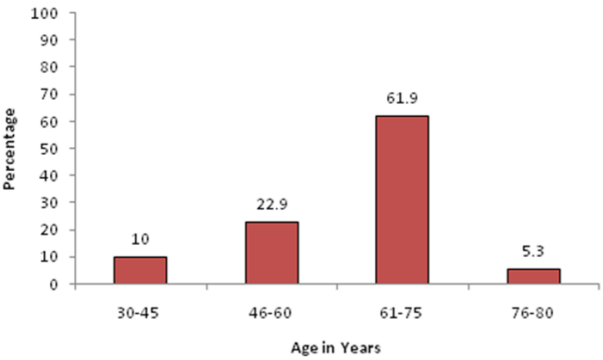

Figure 2: Age-wise distribution of diabetic patients visiting a dental hospital

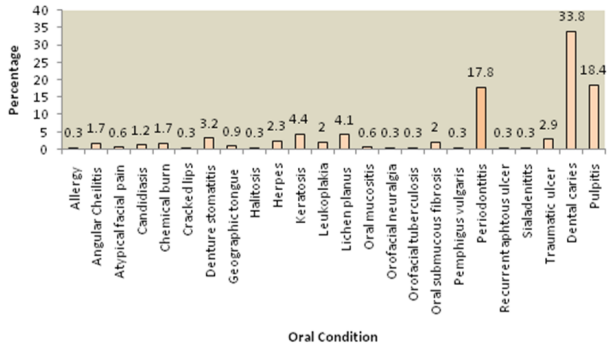

Figure 3: Oral conditions among diabetic patients. The graphs show the prevalence of various oral diseases among diabetic patients visiting a dental hospital.

Diabetes stands as a serious and alarmingly increasing disease worldwide. It is the second most communicable disease in India (Kaveeshwar, 2014).

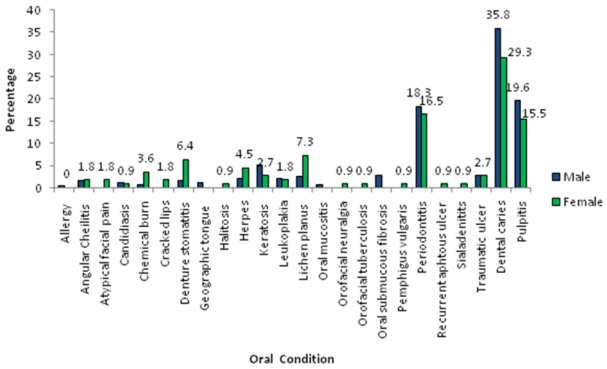

Figure 4: Gender wise distribution of Oral condition among diabetic patients

Type 1 DM is most common in children and adolescents, whereas type 2 DM is common in adults (Mealey and Ocampo, 2000; Ramos-Garcia, 2020).

In the present study, men were found to be predominant with oral complications related to diabetes mellitus than women (Alcouffe, 1989; Merchant *et al.*, 2002; Strauss and Stefanou, 2014). The previous study by Alcouffe et al. revealed similar results where women showed better oral hygiene than men (Alcouffe, 1989). Similarly, in a study by (Strauss and Stefanou, 2014) showed that females practice more interdental cleaning than men. The majority of diabetic patients with oral lesions were in the age group of 61-75 years. This is similar to studies by (Saeed *et al.*, 2019; Ali *et al.*, 2013).

In the present study the number of people with diabetes mellitus increased with age, which is similar to a study done by (Ueno *et al.*, 2010). The present study showed the highest prevalence of dental caries in diabetic patients. Similar results were found in a study done by Manjunath et al. Therefore, this study concludes diabetic patients show higher risk and prevalence of dental caries.

According to Ferizi et al., children with type 1 DM show high scores of dental caries. Previous studies reported that type 1 diabetes was more prevalent than type 2 DM in patients with dental caries (Ferizi *et al.*, 2018; Rodrigo and Rodrigo, 2017). Many possible risk factors have been listed by researchers in the association of dental caries with diabetes mellitus, higher glucose or sucrose concentration in the saliva, reduced salivary flow and change in Ph and buffer, cariogenic diet as well as accumulation of plaque due to poor oral hygiene. Therefore management and treatment of the underlying factor could reduce the chances of developing dental caries (Alves *et al.*, 2012).

In the present study, pulpitis and periodontitis were the second most common oral diseases associated with diabetic patients. In a study done by Guadalupe et al., it has been established that there is an interrelationship between periodontal disease and diabetes Mellitus. The prevalence of periodontitis is significantly higher among middle-aged people with diabetes than in similar-aged that were non-diabetic (Wang, 2009; Alves *et al.*, 2012). Higher prevalence could contribute to the fact that the accumulation of plaque and infectious bacteria that causes a different host immune response to the inflammation in diabetics than the non-diabetics.

The present study showed the frequency of potentially malignant disorders like Leukoplakia, Oral Submucous fibrosis and erythroplakia which is also found among similar studies done by (Dikshit *et al.*, 2006). The present study showed a significant association of Oral lichen planus among diabetic patients. A similar conclusion was derived. However, the exact etiopathology remains unclear since lichenoid reactions could be caused due to the medications taken by the patients such as anti-diabetic drugs (Rey, 2019).

In the present study, denture stomatitis(3.2%) was found to be more common oral complications. Denture Stomatitis being the most prevalent, its etiology is believed to be multifactorial with poor oral hygiene and maintenance of dentures as well as the 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 Denture Stomatitis (Bars, 2015).

In the present study, 4.4% of diabetic patients had keratosis and Ulcerative lesions like traumatic ulcer (2.9%) and a recurrent aphthous ulcer (0.3%). Infectious oral disease caused by viruses like Oral candidiasis, Herpes was least common in the present study, which is similar to previous studies done by (Ke, 2016). Allergies, Orofacial tuberculosis, Orofacial neuralgia were found among 0.1% of diabetic patients.

The present study creates the need for public health awareness as most of the patients remain undiagnosed for diabetes. Regular screening and increasing referrals to dental professionals can help to improve the oral health status of diabetic patients.

CONCLUSIONS

From the present study, it is found that dental caries, pulpitis and periodontitis are more prevalent among diabetic patients. It is also evident that male diabetic patients are more vulnerable for oral diseases compared to females. The present findings have implications for both Diabetic Mellitus and oral health care. The present study emphasizes the need for oral health care among patients with diabetes mellitus.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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