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Evaluation of Periodontal Health Status among Subjects with Oral Candidiasis - A Retrospective Study

Research Article

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Abstract

The human oral cavity hosts a complex microbiome composed of both bacterial species and fungal species. While the role of bacteria in oral health is increasingly well characterized, the role of oral fungi remains largely uncharacterized with the exception of oral candidiasis. The main purpose of this study was to evaluate the periodontal health status of patients with oral Candidiasis. This study was designed as a retrospective study design, conducted among patients who reported to the university dental hospital. Subjects above 18 years of age, diagnosed with oral candidiasis were included in this study. Smokers and medically compromised patients were excluded from this study. Data was collected and analysed using IBM SPSS Statistical Analyzer(23.0 version). The results of this study showed that 76.67% of the population reported with periodontitis, 16.67% were with gingivitis and 6.67% had clinically healthy gingiva.This indicates the increased prevalence of periodontitis in patients with oral candidiasis with higher predilection in the age group 51-70 years.

Keywords: Oral Candidiasis; Periodontal Status; Periodontal Diseases; Oral Fungi.

Introduction

The Candida species are opportunistic pathogens that can cause disease in hosts who are compromised by underlying local or systemic pathological processes [1-3]. Candida albicans is the species most often associated with oral lesions but other candida species including C. glabrata, C. tropicalis, C. parapsilosis, C. krusei have also been isolated in the saliva [4-6]. Fungal organisms commonly colonise the tongue, palate and buccal mucosa but may also occur in subgingival plaque of adults with periodontitis [7-9]. The Candida species have virulence factors that facilitate colonization and proliferation in the oral mucosa and possibly within periodontal tissue [10-12]. These fungal organisms can coaggregate with bacteria in dental biofilm and adhere to epithelial cells. These interactions, which are associated with their capacity to invade gingival connective tissue, may be important in microbial colonization that contributes to progression of periodontal diseases [13-15]. Species of Candida mainly Candida albicans have been recovered from periodontal pockets in 7.1% to 19.6% of patients with chronic periodontitis [16-18]. Both Candida albicans and Candida dubliniensis were capable of colonising in periodontal pockets in patients with chronic periodontitis [19-21].

Many mechanisms have been proposed to explain the increased susceptibility to periodontal disease in patients harbouring oral candidiasis, such as alterations in immune response, alteration in vascularization hereditary patterns, altered neutrophil function, reduced phagocytic capacity and chemotaxis [22-25]. Several virulence factors have been attributed to Candida species such as dimorphism, phenotypic switching, interference on host immune system, ability to respond to environmental changes and adhesion and invasion into the epithelium. These are the factors which may be responsible for the development of periodontal disease. Adherence is considered the first stage of the infection process for Candida species. Several studies showed evidence of the prevalence of Candida albicans in the gingival crevicular fluid contributing towards its adherence ability for colonization of periodontal sites [26]. Moreover conditions where there is nutrient limitation

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will trigger phenotypic changes, like pleomorphism and thigmotropism which inturn ensures the colonisation of candida species in periodontium [27]. Changes in cellular and humoral immune responses may allow different species such as Candida to colonise the subgingival environment. Periodontal alterations are believed to be the result of an exacerbated immune response [25].

Colombo APV et al., reported that the proportion of yeast in periodontal pockets is similar to that of some bacterial periodontal pathogens, which suggest a role for Candidiasis in the pathogenesis of periodontal disease [28]. Machado et al., Stated that prevalence of oral candidiasis play an important role in gingival-periodontal diseases and systemic diseases. Even Though Candida species constitute a reservoir of opportunistic microorganisms within periodontal pockets [29] studies have failed to explain about the putative role of candidiasis in the pathogenesis of periodontitis. Thus the aim of this study was to evaluate the periodontal health status of patients with oral Candidiasis.

Materials and Methods

This study was designed as a retrospective study, conducted in a group of subjects reported to the university dental hospital. After obtaining approval from the institutional ethical committee, the dental records of patients who reported to the University dental hospital between June 2019 to March 2020 were assessed for eligibility to be included in the study. A total of 86,000 patient records were screened for eligibility by the principal investigator based on the following inclusion and exclusion criteria.

Inclusion criteria

- Subjects above 18 years of age
- Subjects who reported between June 2019 to March 2020
- Subjects who were diagnosed with oral candidiasis
- Subjects whose records have complete data regarding the periodontal parameters, clinical examination details and photographs during the followup and maintenance visits.

Exclusion criteria

- Smokers
- Medically compromised patients
- Patients records with incomplete data

A total of 30 dental records which satisfied the inclusion and exclusion criteria were recruited for the study. The age range of patients included for this study was 18-70 years.From the dental records of the study population, data such as age, gender, periodontal status were obtained. The data was analysed by IBM SPSS Statistical Analyzer (23.0 version). Frequency distribution for categorical variables and descriptive analysis for quantitative variables were carried out. The association between the variables were analysed and assessed using Pearson Chi-square test. p value less than or equal to 0.05 was considered to be statistically significant.

Results and Discussion

Out of 30 patients with oral candidiasis, the results showed that 76.67% of patients were with periodontitis, 16.67% of patients were with gingivitis and only 6.66% of patients had clinically healthy gingiva.Thus there seems to be higher prevalence with more than three-fourth of population having periodontitis (Figure-1). This is in agreement with the results of the study conducted by Urzúa et al., who observed the association of oral candidiasis and periodontitis in their study and stated that prevalence of chronic periodontitis and aggressive periodontitis were higher among oral Candidiasis patients due to the colonisation of Candida species in the subgingival microflora [30]. Similarly Sardi et al concluded in their study that the main virulence factors and host immune responses of candida species lead to the progression of periodontal disease [31]. This is however contradicting to the results of the study conducted by Jarvensivu A et al and Razina et al who reported that it was unclear of oral candidiasis contribute to the development of periodontal disease or if they show specificity for the chronic or aggressive forms of the periodontal disease [32, 33]. With regard to age, prevalence of periodontitis was found to be higher in patients of age group 51-70 years compared to other age groups (Figure-2). This is consistent with the results of the study conducted by Yang YL who reported that periodontitis was more prevalent in oral candidiasis patients of older age groups [34]. This can be attributed towards the fact that oral mucosa becomes smooth, thin, acquires edematous appearance with loss of elasticity and stippling with age resulting in the tendency for the progression of candidal infections thereby leading to periodontal destruction [35]. An additional complication in

Figure 1. This bar graph represents the periodontal health status of patients with oral candidiasis. X-axis represents the periodontal health status and Y-axis represents the percentage of patients. More than three-fourth of the population had periodontitis (red bar) and the rest with gingivitis(blue bar) and only a negligible showed healthy periodontium(green bar).

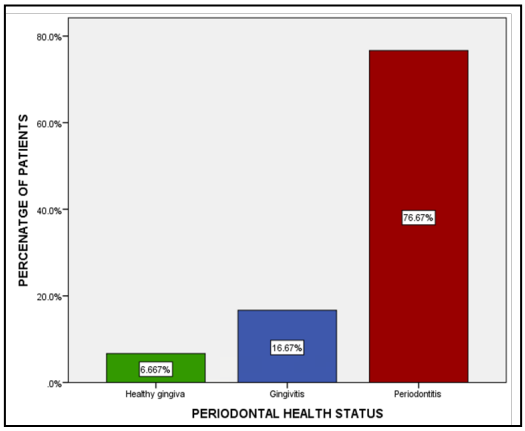


Figure 2. This bar graph shows the association between age and periodontal health status of patients with oral candidiasis.X-axis represents the age group and Y-axis represents the percentage of patients.Prevalence of periodontitis was found to be higher in the 51-70 years age group compared to others which was statistically significant. Chi-square test: Pearson's chi-square value:18.677, df: 4, p value: 0.001(<0.05). Hence this proves that age influences periodontal health status of patients with oral candidiasis.

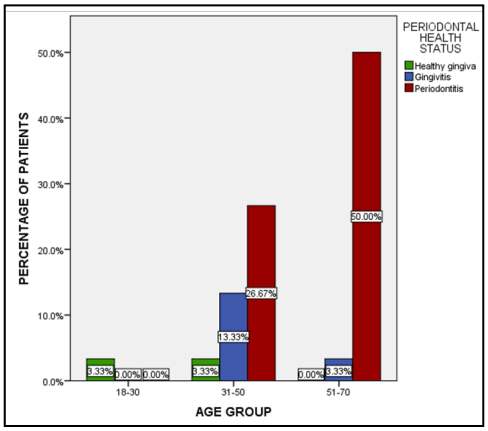
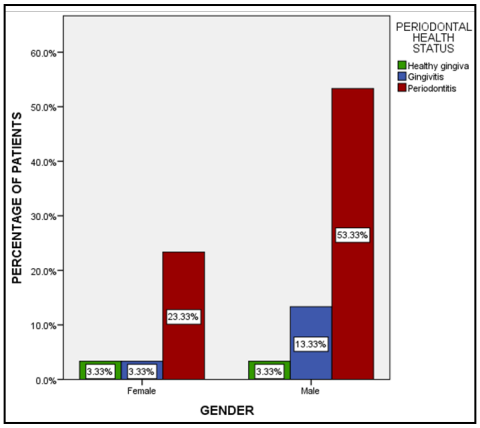


Figure 3. This bar graph shows the association between gender and periodontal health status of patients with oral candidiasis. X-axis represents the gender and Y-axis represents the percentage of patients.Prevalence of periodontitis was found to be higher in males when compared to females which did not reach statistical significance. Chi-square test: Pearson's chi-square value:0.621, df: 2, p value: 0.733(>0.05). Hence proving that gender does not influence the periodontal health status of patients with oral candidiasis.



older patients is the use of prosthesis, which have considerable potential to alter the mucosal integrity if not maintained properly. This is in contradiction with the results of the studies conducted by Gonźalez S et al and Hannula J et al., who reported that it was not possible to determine the influence of age in the development or progression of periodontal diseases in patients with oral candidiasis [32, 33]. Considering the gender influence, gender did not influence the periodontal health status of patients with oral candidiasis as shown in the results (Figure-3). This is in agreement with the study conducted by Matic Petrovic S et al where no statistically significant correlation was observed between gender and periodontal health of patients with oral candidiasis [36]. The limitations of this study include small study population, retrospective study and absence of control group. Thus future studies with prospective study design, large sample size and more standardised study design are needed to confirm the results.

Acknowledgements and Declarations

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Conclusion

Within the limitations of the present study, it can be concluded that 76.67% of patients with oral candidiasis showed increased prevalence of periodontitis with higher predilection in age group 51-70 years. Thus patients with oral candidiasis should also be addressed for regular periodontal screening and maintenance to decrease the risk of periodontitis.

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