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Prevalence of *Candida* among Denture and Non Denture Wearers.

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ABSTRACT

To assess the prevalence of *Candida* spp. among denture and non-denture wearers. To study the prevalence of *Candida* spp. among denture wearers in relation to Diabetes mellitus. A total of 60 individuals were enrolled in the study. Of the subjects, 30 were denture wearers (15 - Diabetic and 15- non diabetic) and 30 were non-denture wearers. The salivary samples are collected by oral rinsing technique. Each subject was instructed to perform an oral rinsing using phosphate-buffered saline (PBS) for 60 seconds and the salivary samples were collected in sterile containers. The samples were processed immediately in Sabouraud's dextrose agar (SDA) and incubated at 37°C for 48 hours for the recovery of *Candida* spp. Out of the 60 subjects the prevalence of *Candida* spp. was 73% in denture wearers and 40% in non-denture wearers. The prevalence of *Candida* spp. in relation to Diabetes mellitus was 93% in Diabetic denture wearers and 53% in non-diabetic denture wearers. The rate of *Candidal* growth was higher in denture wearers and it was more frequently identified in denture wearers with Diabetes when compared to non-diabetic denture wearers.

Keywords: *Candida*, Denture wearers, Diabetes, poor oral hygiene.

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INTRODUCTION

There are about 300-400 species of micro-organisms and 20 species of *Candida* in the oral cavity [1]. Most of the yeast infection in the oral cavity is caused by the genus *Candida*. Any changes in the oral cavity, such as tooth loss and denture wearing will cause changes in the oral micro flora [2]. *Candida* is recognized as a normal commensal of almost half of the population which does not cause any harmful effects [3,4]. But *Candida* can become a pathogen during favourable conditions. Immuno-compromised status like diabetes, trauma caused by the prosthesis due to ill fitting dentures, nocturnal wear of the denture, age of the denture, other systemic conditions and unhygienic maintenance of the dentures by the patient are few of the causative agents which makes the oral cavity unhealthy and suitable environment for *Candida* to turn pathogenic resulting in oral candidiasis[5].

Oral Candidiasis is an opportunistic infection which causes pathological changes in the mucosal surface of the oral cavity [6,7]. This is due to the prosthesis that acts as a focus and trauma caused by the denture facilitates the infection [5]. Candidiasis may appear as various symptoms including pain, burning sensation, difficulty in swallowing, change of taste, but often they are asymptomatic [8]. About 50- 65 % of patient wearing dentures have been reported to have over growth of oral *Candida* [1], leading to *Candida* associated denture stomatitis (inflammation of the denture bearing site of the mucosa). Oral candidiasis has also been reported to have strong association with lung candidiasis and deglutition pneumonia [9] . It was recorded in the U.S between the year 1995 and 2002 that among the nosocomial blood stream infections 9.5% were fungal organisms with *Candida* species being the fourth leading cause of all cases [10] .

Denture wearing constitutes a stable factor which can affect the oral health. This should be taken into consideration while making predictions and assessing oral health management. Therefore in this study we have compared the prevalence of *Candida* among denture and non-denture wearers. As per literature there is a significant higher total count of *Candida* species in denture wearers compared to non-denture wearers. We have also compared the prevalence of *Candida* among denture and non-denture wearers in relation to Diabetes.

MATERIALS AND METHODS

A total of 60 subjects participated in the study. Thirty subjects were denture wearers (15- diabetic and 15- non-diabetic) at least for past one year, comprised the experimental group and thirty subjects were non-denture wearers comprised the control group. All subjects were patients selected from the outpatient section of the department of prosthodontics, SBDCH, Chennai.

Patient included in the study are denture and non-denture wearers, diabetic denture wearers, patient belonging to the age group between 40-80 years both male and female. An exclusion criterion includes smokers, patient who are already treated or currently taking antibiotics, antifungal, steroids or immunosuppressive drugs in the past six months.

Patients were clearly explained about the purpose of the study, followed by a detail medical and dental history was collected. The informed consent was obtained from the subjects.

Sample collection

The salivary samples were collected by oral rinsing method ^[11]. Each subject was instructed to remove their dentures and perform an oral rinsing using phosphate-buffered saline (PBS) for 60 seconds and the salivary samples were collected in sterile containers. The samples were immediately transported to the Microbiology laboratory.

Each oral rinse was centrifuged at 3500 rpm for 10 minutes. The supernatant was discarded and the concentrated oral rinse was then inoculated in Sabouraud’s dextrose agar (SDA) and incubated at 37°C for 48 hours for the recovery of *Candida* spp.

RESULTS

Out of the 60 subjects the prevalence of *Candida* was 73% (n=22) in denture wearers and 40% (n=12) in non-denture wearers (Table 1). The prevalence of *Candida* in relation to diabetes was 93% (n=14) in diabetic denture wearers and 53% (n=8) in non-diabetic denture wearers. *Candida albicans* was the most commonly isolated species in both the groups.

Table 1: Prevalence of *Candida* in percentage (%)

Denture wearers	73% (22/30)
Non-denture wearers	40% (12/30)

Table 2: Prevalence of *Candida* in relation to Diabetes in percentage (%)

<i>Candida</i> spp.	Diabetic denture wearers (n=15)	Non-diabetic denture wearers (n=15)
<i>Candida albicans</i>	11 (73%)	6 (40%)
<i>Candida non-albicans</i>	3 (20%)	2 (13%)

Figure 1: Prevalence of *Candida* in (%)

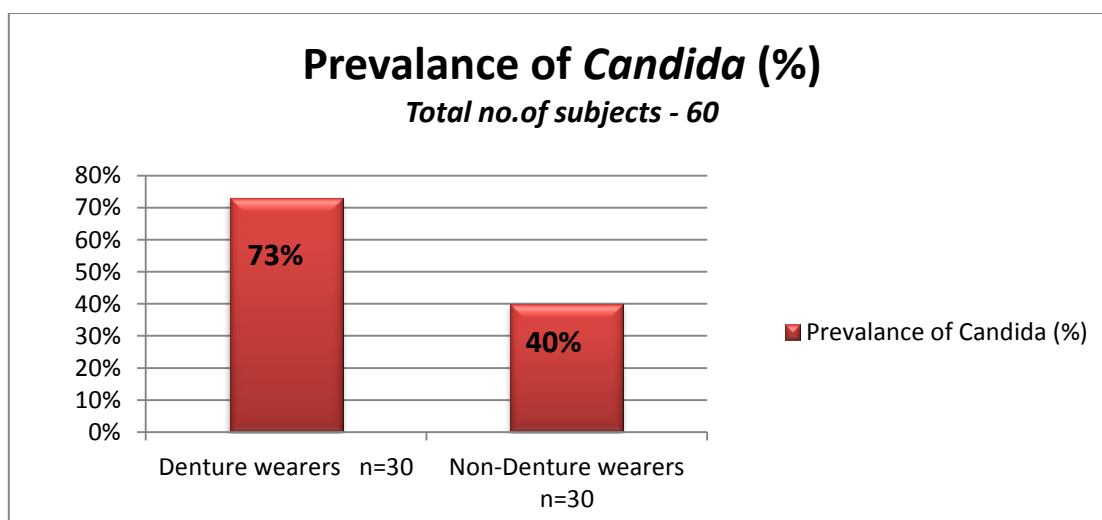
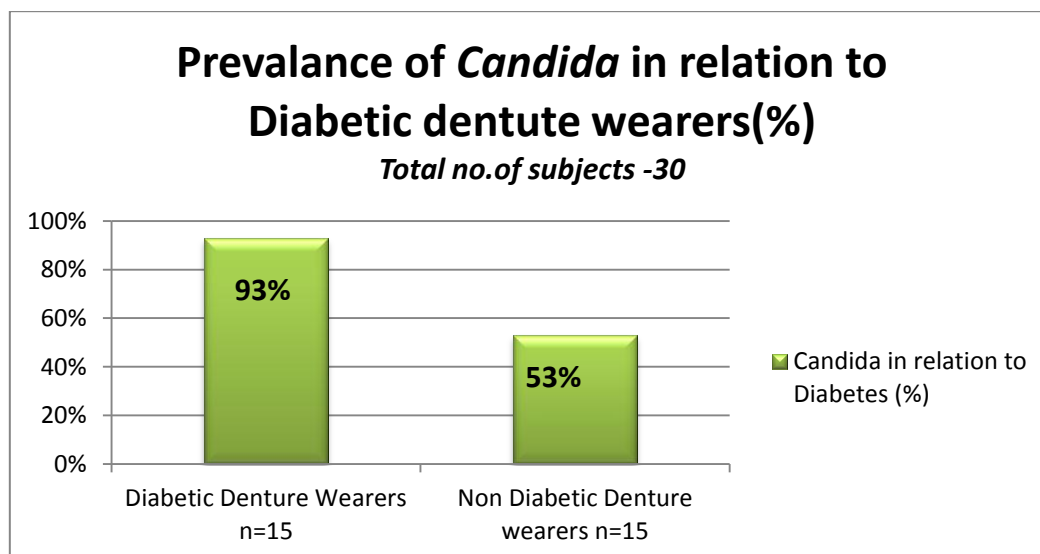


Figure 2: Prevalence of *Candida* in relation to Diabetes (%)



DISCUSSION

The sole factor of this study is Denture wearing increases the Candidal colonization in the oral cavity and its growth rate was found higher in Diabetic denture wearers when compared to non-diabetic denture wearers due to their immuno-compromised status. There was a significant correlation between the duration of denture usage and the blood glucose level.

In our study there was a higher oral Candidal growth in denture wearers (22/30) when compared to non-denture wearers (12/30). In relation to diabetes the Candidal growth was increased in diabetic denture wearers (14/15) when compared to non-diabetic denture wearers (8/15). The most commonly isolated species in the both the groups was *Candida albicans*. A similar trend of result was observed Mohammad Hossein Lotfi-Kamran et al [12] and other investigators [13-16] that Candidal carriage was higher in denture wearers with diabetes.

CONCLUSION

Immuno-compromised status like diabetes, trauma caused by the prosthesis due to ill fitting dentures, nocturnal wear of the denture, age of the denture, and unhygienic maintenance of the dentures by the patient are few of the causative agents which makes the oral cavity unhealthy and suitable environment for *Candida* to turn pathogenic resulting in oral candidiasis[17].

Candida infection is more common among denture wearers and it is strongly associated with diabetes, hence controlling serum glucose level is essential. Unclean dentures are a chronic source of potentially harmful bacteria and fungi that may be associated with oral and systemic diseases.

Dentures need to be cleaned daily with effective antimicrobial and antifungal agents but there comes a time when a denture can no longer be cleaned effectively and must be replaced. So better oral hygiene is necessitated among denture wearers.

REFERENCES

- [1] Hiroyuki Mizugai, Emiko Isogai, Kimiharu Hirose, Itsuo Chiba. *J App Res* 2007; 7(3).
- [2] Sumi Y, Nagaosa S, Michiwaki Y, et al. *J J Gerodont* 2001;16:171-178.
- [3] Arenforf TM, Walker DM. *Brit Dent J* 1979; 147:267-272.
- [4] Arenforf TM, Walker DM. *Arch Oral Biol* 1980; 25:1-7.
- [5] E Emami, P de Grandmont, PH Rompré, J Barbeau. *J Dental Res* 2008;87(5):440- 444.
- [6] Gonsalves WC, Chi AC, Neville BW. *Am FAM Physician* 2007; 75:501-7.
- [7] Ben-Aryeh H, Berdicevsky I, Gutman D, Szargel R. *Int J Oral Surg* 1980; 9:113-5.
- [8] Samaranyake LP. Host factors and oral candidiasis. In: MacFarlane TW, Samaranyake LP, editors. *Oral candidosis*. London: Butterworth & Company Ltd; 1990. P.66-103.
- [9] Honda E, Mutoh T, Maeda N, et al. *J J Gerodont* 2000; 14:297-306.
- [10] Wisplinghoff H, Bischoff T, Tallent SM, Seifert H, Wenzel RP, et al. *Clin Inf Dis* 2004;39:309–317.
- [11] Coulter WA, Kinirons MJ, Murray SD. *Int J Paediatric Dent* 1993; 3:17-21.
- [12] Mohammad Hossein Lotfi-Kamran, Abbas Ali Jafari, Abbas Falah-Tafti, Ehsan Tavakoli, Mohammad Hossein Falahzadeh. *Dental Res J* 2009;6(1).
- [13] Willis AM, Coulter WA, Fulton CR, Hayes JR, Bell PM, Lamey PJ. *Diabet Med* 1999; 16(8): 675-9.
- [14] Konsberg R, Axell T. *Oral Surg Oral Med Oral Pathol* 1994; 78(3): 306-11.
- [15] Belazi M, Velegraki A, Fleva A, Gidakou I, Papanau L, Baka D, Daniilidou N, Karamitsos D. *Mycoses* 2005; 48: 192-6.
- [16] Sahin I, Oksuz S, Sencan I, Gulcan A, Karabay O, Gulcan E, Yildiz O. *Ethiop Med J* 2005; 43: 103-9.
- [17] E Emami, P de Grandmont, PH Rompré, J Barbeau. *J Dental Res* 2008;87(5):440- 444.