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Bacterial Flora in Oral Infections in Relation to Diabetes.

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ABSTRACT

Oral infections i.e., dental caries, gingivitis and periodontitis are the most common chronic oral diseases encountered worldwide. Diabetes has already reached the epidemic status and is characterised by increased susceptibility to infection, poor wound healing and increased morbidity and mortality associated with disease progression. Diabetes alters the response of periodontal tissues to local factors. Hence diabetes as such is not the reason for higher rate of infection. Poor hygiene of oral cavity, irrational use of antibiotics in diabetics, immuno suppression and other infections in the body enhances the growth of bacterial flora[2-3]. This study was done to know the relation between diabetes and the spectrum of bacteria in three common dental infections i.e., dental caries, gingivitis and periodontitis and to compare its prevalence in diabetic and non-diabetic patients. A total of 60 patients including 30 diabetic and 30 non-diabetics were taken in the study. Samples were collected from each patient using a sterile cotton swab at the site of lesion in the oral cavity. They were then inoculated in appropriate medias. A total of 50 strains were isolated from diabetics and 42 from non-diabetics. The isolated flora in diabetic was high in peridontitis (54%) as compared to non-diabetics which had higher isolated flora in dental caries (42%) followed by gingivitis (33.3%). Thus the study reemphasizes that perodontitis is higher in diabetic patients as compared to non-diabetic patients. Also dental caries and gingivitis were higher in non-diabetic patients.

Keywords: bacterial flora, periodontitis, gingivitis, dental caries, diabetes.

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INTRODUCTION

Diabetes is a Greek word described by Aretaeus meaning siphon. Mellitus was later coined by Cullen, which means honey. Diabetes mellitus is defined as a chronic and progressive metabolic disease characterised by hyperglycemia due to defect in the mechanism of insulin secretion or action or both. Diabetes leads to long term complications to almost all the systems of the human body [1].

Oral health plays a major role in the general health status of a person. But diabetic patients are found to exhibit a poor oral health[7]. Oral complications of diabetes includes dry mouth, dental caries, gingivitis, fungal infections, periodontitis, peri apical abscess, burning mouth syndrome[12-13], etc.. Most common opportunistic infection in oral cavity of diabetic patients is oral candidiasis. However the occurrence of microbial flora in each of these dental problems differs. Among all the oral complications of diabetes dental caries, gingivitis and periodontitis are the most common. Dental plaque is considered to be the initiative for all of these [8], which mostly depends on the oral hygiene of a person.

Dental caries

Diabetes leads to decreased activity of the salivary gland, thereby causing dry mouth. This in turn favours the formation of dental plaque and increased microbial population within the oral cavity. Thus the progression of dental caries is considerably increased in case of diabetic patients.

Gingivitis

Typical signs and symptoms of gingivitis include swollen, red, painful gums that may bleed on brushing. Sometimes it may lead to halitosis and bad taste. Untreated cases can progress into periodontal damage. Higher level of gingivitis is observed in diabetic patients with poor glycemic control [6].

Periodontitis

Periodontitis are infection and lesion that affects the tissues of the attatchment element of the tooth leading to destruction or loss of tissues supporting the tooth. Like gingivitis, periodontitis is also higher in patients with poor glycemic control than in patients with well controlled diabetes. It can be aggressive, chronic or necrotising periodontitis.

MATERIALS AND METHODS

The study population included both diabetic and non-diabetic patients attending oral medicine and periodontic OPD during July 2013 in Balaji dental college and hospital, pallikaranai, Chennai.

The inclusion criteria considered in this study were patients clinically diagnosed with dental caries, gingivitis and periodontitis; both diabetic and non-diabetic patients; subjects in any age group; without any other co existing disease. Exclusion criteria considered were

subjects on antibiotic coverage; patients with other co existing disease and systemic illness, malignancies; subjects wearing dentures.

All patients included in this study were clearly explained about the purpose and nature of the study. Swabs were collected from the site of lesion of each subject after obtaining an informed consent from them.

History was obtained from them including other systemic illness, antibiotic intake, intake of any steroids or immunosupressent drugs, history of malignancies, history of wearing dentures.

Sample collection

A total of 60 patients including 30 diabetic and 30 non-diabetics were included in the study. Samples were collected from each patient using a sterile cotton swab at the site of lesion in the oral cavity. The sample collected likewise was transported to the Central Microbiology Laboratory immediately. The samples were processed immediately in the laboratory. Microscopic examination was carried out. The swabs were inoculated on to Nutrient agar, MaConkey agar and blood agar plates.

Plating of the samples

The culture plates were incubated at 37^{o}c in incubator aerobically. After 24 hrs, the plates were examined for the presence of growth. Then the growth was subjected to Gram stain, Hanging drop, Oxidase test, Catalase tests and other biochemical tests.

RESULTS AND DISCUSSION

The study shows that dental caries was higher in non-diabetic patients, the highest number of patients were observed in 21-30 age groups and the order of occurrence was (21-30) > (10-20) > (31-50) respectively (Table 1).

Periodontitis was much higher in diabetic patients than in non-diabetic patients and the highest number of patients was observed in 51-60 age groups. The order of occurrence was (51-60) > (41-50) > (61-70) respectively (Table 1).

Table 1: According to Age – in diabetics and non-diabetics

	Diabetic patients (n = 30)			Non Diabetic Patients (n = 30)		
Age Groups	Periodontitis	Gingivitis	Dental Caries	Periodontitis	Gingivitis	Dental Caries
10 – 20	-	-	-	1	-	5
21 – 30	-	-	-	-	2	6
31 – 40	1	1	1	2	3	2
41 – 50	3	1	1	1	-	2
51 – 60	8	3	4	-	2	1
61 – 70	3	2	1	2	1	-
Total	15	7	8	6	8	16

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Figure 1: Order of prevalence of dental lesion in non-diabetic patients

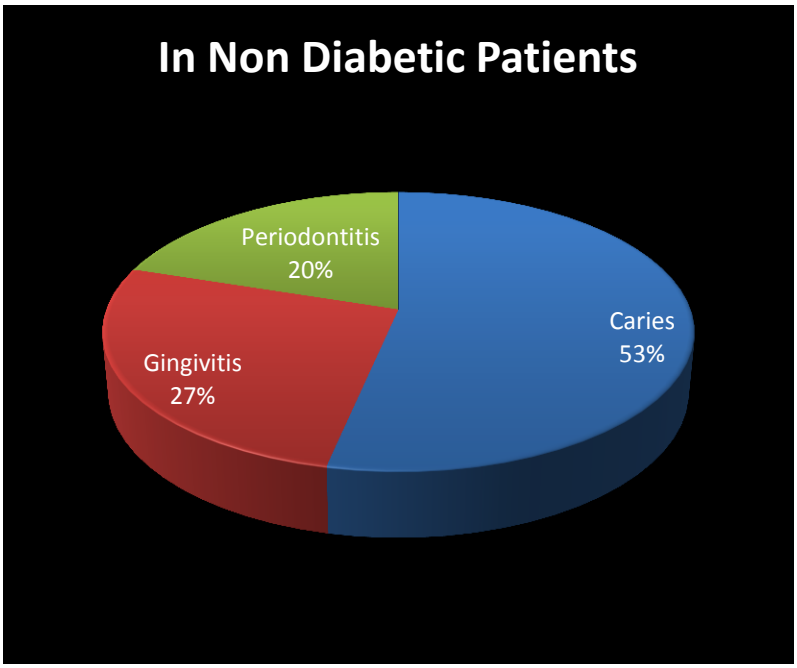
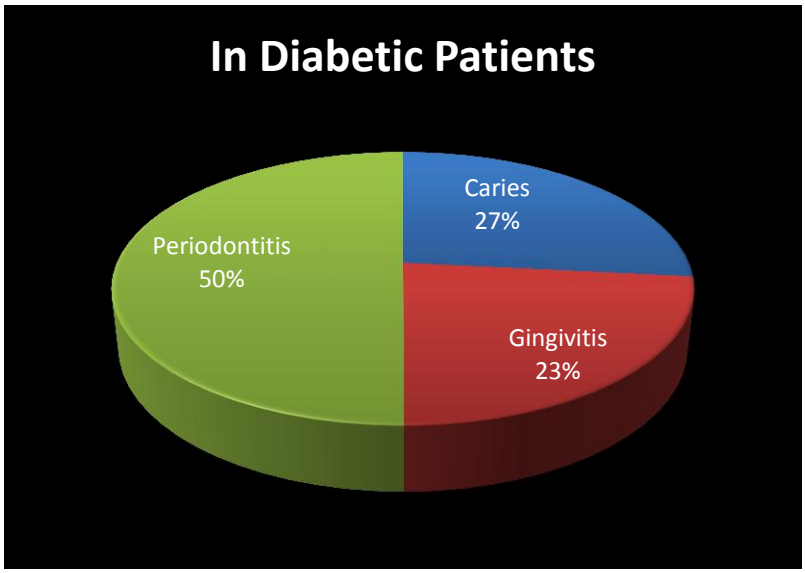


Figure 2: Order of prevalence of dental lesion in diabetic patients



A total of 92 strains were isolated in the study out of which 50 strains were from Diabetic patients and 42 strains were from Non-diabetic patients.

Figure 2 represents : In the 50 strains isolated from Diabetic patients, 27 strains were from Periodontitis, 17 from Gingivitis and 6 from Dental caries.

Figure 3 represents : In 42 strains isolated from Non-diabetic patients, 18 were from Dental caries, 14 from Gingivitis and 10 from Periodontitis.

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Figure 2

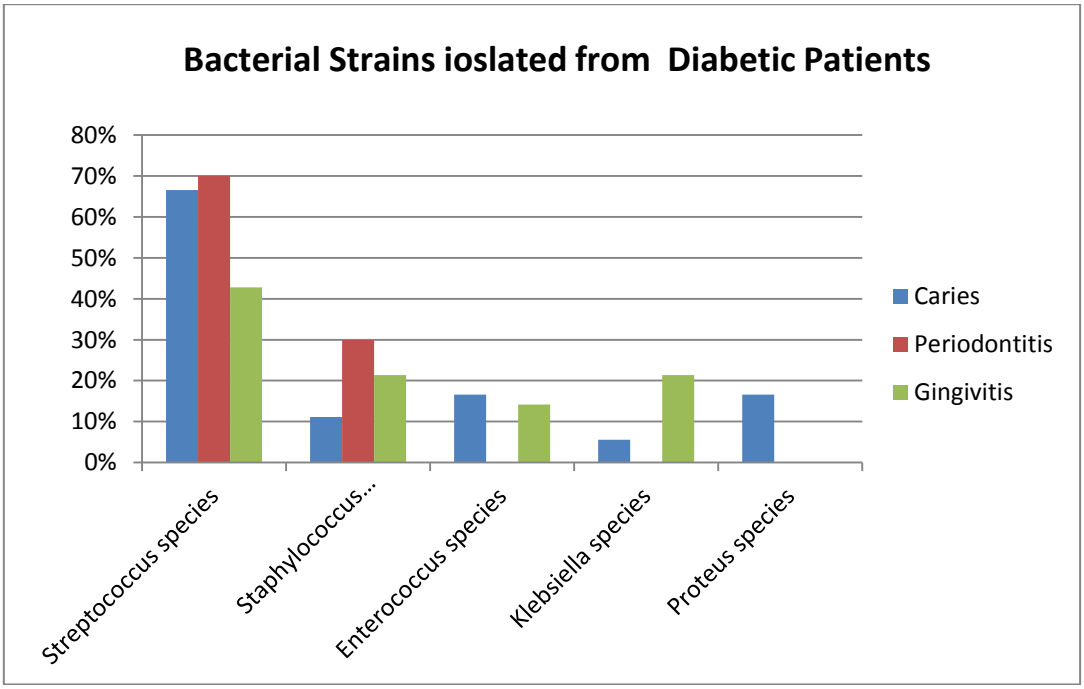
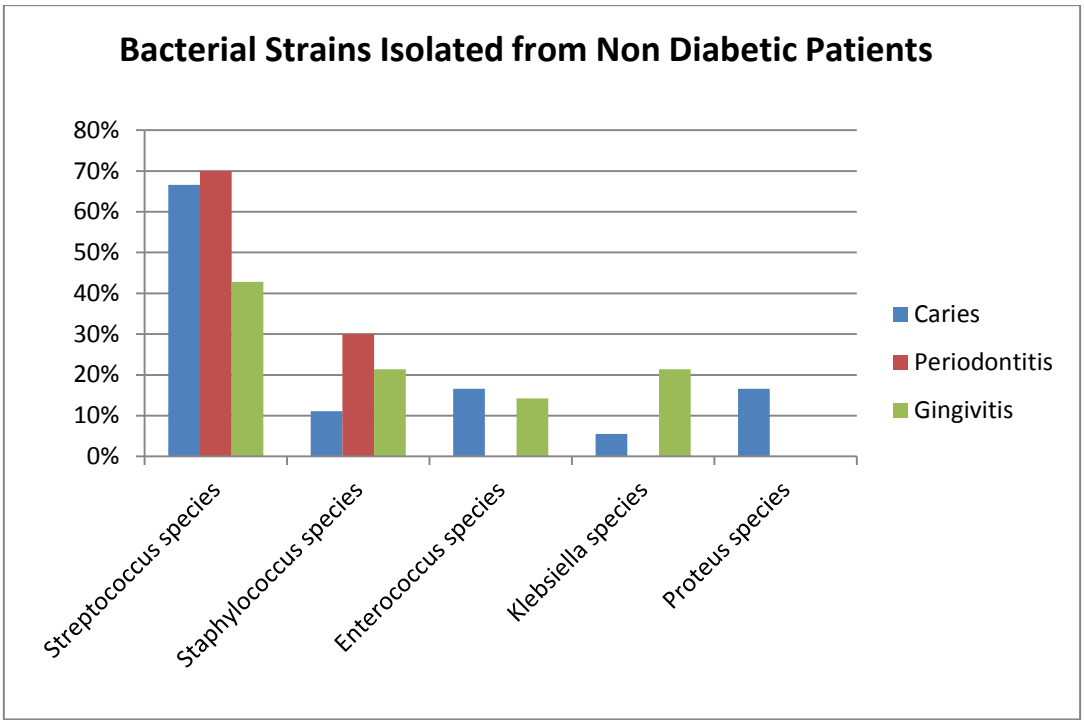


Figure 3



According to figure 2 and 3 higher number of isolates were obtained from diabetic patients i.e., 50 strains. Out of which 27 were from periodontal lesions. Hence the present study revealed that periodontitis is more common among diabetic patients and dental caries and gingivitis is more common among non-diabetic patients.

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CONCLUSION

The ultimate goal of dental health care is maintenance of healthy dentition for many reasons like asthetics, dietary intake and nutrition, overall general health and improvement in the quality of life. Many systemic illness particularly diabetes can predispose to the development or worsening of periodontal disease [9-11]. So efforts should be taken to focus attention on regular diabetic check up and proper control of glycemic index in diabetic patients to avoid oral complications.

This study shows that higher number of isolates were grown in samples taken from diabetic patients (50 strains) than in non-diabetic patients (42 strains)[14-15]. Among the isolates obtained Streptococcus species (59.78%) was found to be the most commonest organism followed by Staphylococcus aureus (21.73%) and Klebsiella species (7.6%). So the present study revealed that periodontitis is more common in diabetic patients and dental caries is more common in non-diabetic patients. The prevalence of bacteria is related to the severity of the disease, immune status of the patient and other predisposing factors. Our study shows that both gram positive and gram negative organisms are involved in the oral lesions of diabetic and non-diabetic patients. Out of which gram positive organisms (66.2%) are found to be more causative agents in diabetics. Thus from this study it is also concluded that gram positive bacteria play a major role in causation of periodontitis, gingivitis and dental caries in diabetic patients.

A comparative study of Diabetic and Non-diabetic patients shows the bacterial flora frequency is higher in Diabetic patients as compared to Non-diabetic patients [4].Therefore it is mandatory for all diabetic patients to have a proper glycemic control, maintain good oral hygiene and also regular dental check-ups to prevent oral complications

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