

Oral Health Status in Diabetic Children

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ABSTRACT

Objectives: Diabetes causes numerous oral and salivary changes leading to cariogenic and gingival lesions. The present study was designed to elucidate the role of diabetes mellitus in oral health. **Methods:** A cross-sectional study including 60 diabetic children (case group) and 30 non diabetic children (control group) of age 3-14 years was conducted. HbA1c and blood glucose level was measured along with the oral health including gingival status and dental caries status was visually assessed. Gingival status was coded for healthy, marginal gingivitis and calculus. Dental caries status (decayed and filled) for both deciduous and permanent dentition was assessed. Data was recorded in a pre-coded oral health proforma, which was then entered and analyzed in SPSS version 10.0. Descriptive analysis such as percentage frequencies and means was performed. Exact Chi-square test was used to analyze any significant changes observed amongst the study population, where level of significance was $p < 0.05$ with confidence interval 95%. **Results:** The results show important difference between both groups of children. Dental caries level is significantly higher in diabetic children both in deciduous and permanent dentition than in non-diabetic children ($p < 0.05$). Gingival health was also observed to be debilitated in diabetic children than non-diabetic children ($p < 0.05$). **Conclusion:** The study highlights that special preventive measures must be adopted to maintain a good oral health of the diabetic children.

Keywords: Oral Health, Diabetic children.

INTRODUCTION

Diabetes mellitus (DM) has been linked with an increased risk for oral diseases¹. The oral complication of uncontrolled diabetes mellitus is devastating. These include gingivitis and periodontal disease, xerostomia and salivary gland dysfunction, increased susceptibility to bacterial, viral and fungal infection, caries, and periapical abscesses loss of teeth, impaired ability to wear dental prostheses, taste impairment, lichen planus and burning mouth syndrome². Changed oral environment may cause increase in pathogenic bacteria and cause destruction of hard and soft tissues of mouth leading to cariogenic and gingival lesions³. The pandemic of diabetes mellitus has grown to at least 171 million and this figure is likely to more than double by 2030⁴. Almost 5.2 million people of Pakistan are diabetics (year 2000) and ranking sixth largest diabetic population in the

world⁵.

In 1982 diabetes affected more than 3% of Pakistan's population and now it occurs in 10% of Pakistan population in both sexes 25 years or above. Sixty five percent of diabetics are females and approximately 15% of diabetic population comprises of children and young adults⁶.

Metabolic control is crucial for the progression of Type I DM, as well as for the prevention of hyperglycemic associated biologic alterations of the host. Well controlled glycemia help to maintain physiological function of the body and thus diminish the detrimental impact of the disturb glucose metabolism on the cells⁷.

The present study was designed to elucidate the role of diabetes on oral health by comparing the dentition and oral hygiene status in type 1 diabetes mellitus children with control group of healthy children.

MATERIALS & METHODS:

A convenient sample was obtained for the study. The study population was defined as 90 children, aged 3-14 year, out of which 60 diabetic children who were registered in Childhood Diabetes Register as having Type I diabetes mellitus (T1DM) at Children Hospital, Lahore and 30 non-diabetic children accompanying their elders who were under treatment in dental department of Sheikh Zayed Hospital, Lahore.

The criteria for inclusion in the study were that the subjects and their parents were willing to participate, based on informed consent.

On the basis of the above recruitment, a proforma of these subjects was filled, comprising of the basic information, gingival and dental status of the case and control groups.

The level of metabolic control of diabetic and normal children was determined by the glycosylated hemoglobin, HbA1c, reflecting levels of glycemia over the preceding 3-4 months by using GLYCOSAL™ HbA1c control kit, Product Code 901025J.

Blood glucose levels were also checked on the same day of both the groups with the help of Glucometer (ACCU CHEK ACTIVE, 2003 Roche Diagnostic Corporation).

For oral health assessment, the gingival status was recorded using mouth mirror in the presence of sufficient room light. It is recommended that for children probing should not be done. Therefore visual examination was conducted to verify the presence of healthy gums, marginal gingivitis or calculus deposits, which were coded in accordance to the CPITN coding of 0, 1, and 2 respectively.

The presence of caries was clinically diagnosed on all teeth surfaces by visual examination through mirror and CPITN (E) probe in room light. The probe "ball tip" of 0.5 mm diameter allowed easy detection of caries. No x-ray was taken. Teeth were wiped off with sterile gauze to remove food debris. Decayed and filled teeth were noted in both deciduous and permanent teeth. Missing teeth were not included in the study. An appropriate code for each tooth was determined with respect to the following criteria:

- 0 = No signs of disease (Sound).

- 1 = Decayed
- 2 = Filled tooth

RESULTS

It can be observed in Table 1 that there was a significant difference between case and control subjects in regard to healthy gum, gingivitis and calculus. There is a significant level ($p < 0.05$) of marginal gingivitis observed amongst diabetic children (65%). However, the percentage of calculus in diabetic children is comparable to that of healthy children and is not of much significant difference ($p > 0.5$).

Table 1: Distribution of oral hygiene status among study group

Gingival status	Controls (n=30) N (%)	Cases (n=60) N (%)	p value
Healthy	16 (53.3%)	13 (21.7%)	0.004
Marginal Gingivitis	11 (36.7%)	39 (65.0%)	0.014
Calculus	3 (10.0%)	8 (13.3%)	0.746

Table 2: Correlation of diabetic control level according to their HbA1c with gingival status among cases.

HbA1c level	Gingival status		Total
	Good (Healthy)	Poor (Gingivitis/ calculus)	
Moderate control diabetes (8.0-10.0%)	12	17	29
Poor-control diabetes ($< 10.0\%$)	01	30	31
Total	13	47	60

Chi-square= 4.408
p = 0.001

To observe difference within the diabetic group, diabetic cases were divided in two groups on the basis of their HbA1c levels in Table 2. The cases having HbA1c level 8.0 to 10.0% were considered having moderate-controlled diabetes and those with HbA1c level $> 10.0\%$ were considered having poor-controlled diabetes. These two groups of diabetics were compared with the oral health conditions of

evaluated with glycosylated hemoglobin to show the association with periodontal disease.¹³

An increased in dental caries experience was observed among diabetes in permanent teeth was 2.52 and in deciduous teeth was 2.46 where as in control group its value is 0.6.

Support for the role of metabolic control in relation to caries experience has been previously obtained from studies, which either have been prospective^{13, 14} or have used a very narrow age range of the subjects, included¹⁵. Results of the present study are similar to one of the previous study which also shows that diabetic children have higher DMFT values compared to those of control children despite their low sugar intake³.

The study has certain limitations. The relatively small sample size and the cross sectional study design do not allow us to draw definitive conclusion about the impact of diabetes mellitus on the dental health of diabetic children. The drawbacks of the sample formation may be avoided by extending the study to other regions of the country. However, this would carry the risk of additional confounding factors entering the data analysis, such as differences in social background of the population or fluoride levels in drinking water

In conclusion, the need for prophylaxis and frequent dental examinations among children and adolescents with type 1 diabetes is greater for the patients with poor metabolic control (HbA1 higher 13% or HbA1c higher 10%) than for those with good or moderate control of the disease. Our finding suggest that high caries experience and gingivitis in study population could be mainly related to changes in salivary parameters.

It can be proposed that dental professionals should be aware of the levels of glycemic control of their child patients with Type I diabetes, and prevention and intensified treatment should be focused on those with poor glycemic control. On the other hand, member of the team responsible for diabetic treatment should pay attention to dental care and guidance to dental treatment, especially in case of diabetic children.

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