Assessment of pufa index in diabetes vs. non diabetic patients.

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Abstract

Introduction: Dental caries have been more prevalent in diabetic patients than non-diabetics. Non-treatment of caries can have severe consequences such as pain, abscess formation, space infection, etc. The present study aims to evaluate the PUFA index in diabetes and non-diabetic patients.

Materials and methods: A total of 400 patients in which 200 were diabetic and 200 were non diabetic were included in this study. Data was collected by reviewing patient records from Dental Information Archiving System. All the required data was recorded and analyzed statistically by Chi square test. Statistical significance was set at $p<0.05$.

Results: From the analysis, we have found that the overall mean value of PUFA index in non-diabetic and diabetic were 2.36 ± 1.12 and 4.73 ± 1.72 respectively. From the Chi square test, males were significantly having higher PUFA index values than females (p-0.041).

Conclusion: From this study, we can conclude that the patients with diabetes have higher PUFA value than the non-diabetic patients. The pufa index can be used as a tool to highlight the adverse consequences to dental professionals and health authorities.

Introduction

Diabetes Mellitus (DM) is a chronic metabolic disorder caused by an absolute or relative deficiency of insulin, an anabolic hormone. Insulin is produced by the beta cells of the islets of Langerhans, which are located in the pancreas. The absence, destruction, or other loss of these cells results in type 1 diabetes (insulin-dependent diabetes Mellitus [IDDM]). The other type of DM is type 2 diabetes (Non–Insulin-Dependent Diabetes Mellitus [NIDDM]) who has insulin resistance, and their beta cells lack the ability to overcome this resistance [1]. The relationship between diabetes and dental caries has received the attention of researchers because both of the diseases are associated with carbohydrates. The insulin deficiency in diabetes may lead to hyposalivation and elevated salivary glucose levels, which leads to reduction of salivary flow rate, lower buffer capacity, increased risk for dental caries, and bacterial infections which may put diabetic patients at a high risk of caries development [2-4].

Dental caries is a major oral health problem around the world, affecting 60-90% of schoolchildren and the vast majority of adults. In many developing countries, access to oral health services is limited and teeth are often left untreated or are extracted because of pain or discomfort [5]. For the last 70 years, data on prevalence of dental caries have been collected worldwide using the Decayed, Missing, Filled Teeth (DMFT)/ decayed extracted filled teeth (deft) index. This classical index provides information on caries as well as its restorative and surgical treatment, but it fails to provide information on the clinical consequences of untreated dental caries, such as pulpal abscess, which may be a more serious condition than the carious lesions themselves. A deep carious lesion with pulpal involvement is usually considered under the code "caries of dentin" and pulpal involvement is not mentioned at all in the caries scoring system in the latest edition of WHO - Oral Health Surveys-Basic Methods [6]. PUFA index was developed by Monse et al. to assess the pulpo-periapical extension of untreated caries.

PUFA is an index used to assess the presence of oral conditions resulting from untreated caries. The index is recorded separately from the DMFT and scores the presence of either a visible pulp, ulceration of the oral mucosa due to root fragments, a fistula or an abscess [7]. Lesions in the surrounding tissues that are not related to a tooth with visible pulpal involvement as a result of caries are not recorded. The assessment is made visually without the use of an instrument. Only one score is assigned per tooth. If the primary tooth and its permanent successor teeth are present and both present stages of odontogenic infection, both teeth will be scored. Uppercase letters are used for the permanent dentition and lowercase letters used for the primary dentition. The codes and criteria for PUFA index are as follows: P/p:

Table 1: *Gender distribution among diabetic and non-diabetic patients.*

Gender	Diabetic patients	Non diabetic patients
Male	60.5%(121)	54%(108)
Female	39.5%(79)	46%(92)

Table 2: *Age wise distribution among diabetic and non-diabetic patients.*

Age	Diabetic	Non diabetic
30-45 years	69%(138)	41%(82)
45-60 years	31%(62)	59%(118)

Table 3: *Mean value of PUFA index in diabetic and non-diabetic.*

	Diabetic patients	Non diabetic patients
Mean PUFA value	4.73 ± 1.72	2.36 ± 1.12

Pulpal involvement is recorded when the opening of the pulp chamber is visible or when the coronal tooth structures have been destroyed by the carious process and only roots or root fragments are left. No probing is performed to diagnose pulpal involvement. U/u: Ulceration due to trauma from sharp pieces of tooth is recorded when sharp edges of a dislocated tooth with pulpal involvement or root fragments have caused traumatic ulceration of the surrounding soft tissues, e.g., tongue or buccal mucosa. F/f: Fistula is scored when pus releasing sinus tract related to a tooth with pulpal involvement is present. A/a: Abscess is scored when a pus containing swelling related to a tooth with pulpal involvement is present [8]. Our team has extensive knowledge and research experience that has translated into high quality publications [9-28]. This study aims to evaluate the PUFA index in diabetic and non-diabetic patients.

Materials and Methods

A total number of 400 patients in which 200 are diabetic and 200 were non diabetic. Data of patients were collected by reviewing the records from Dental Information Archiving System (DIAS). Approval from the ethical committee was taken before the starting of the study. All the case sheets included in this study were approved and verified by the external reviewer. Also, cross verification of data was done by photographs to avoid errors. During data collection, patients of all age groups and gender were included. Parametric and non-parametric correlations were made following which the graphs were made. Non parametric tests were done by running a chi-square test and the parameters considered were statistically analyzed and interpreted. Statistical significance was set at $p < 0.05$.

Results

Out of a total number of 400 patients, it was found that 200 patients were diabetic and 200 patients were non diabetic patients. Among diabetic patients, 60.5% were male and 39.5% were female. Among non-diabetic patients, 54% were male and 46% were female (Table 1). From the analysis, the proportion of male patients was higher than the female patients. With regard to age, among diabetic patients 69% were 30-45 years old and 31% were 45-60 years old and among non-diabetic patients, 41% were 30-45 years old and 59% were 45-60 years old (Table 2). The mean value of the PUFA index was found to be 4.73±1.72 for diabetic and 2.36±1.12 for non-diabetic patients (Table 3). From the Chi square test, males were significantly having higher PUFA index values than females (p-0.041). There was no significant association between age and the PUFA index value (p-0.134).

Discussion

The prevalence of dental caries and its burden on the general population are of significant public health interest. Therefore, it is important to identify patients who may be at a high risk of dental caries and oral disease [29]. Diabetes mellitus may increase one's susceptibility to dental caries. In addition, people with diabetes are also more prone to infections, including dental abscesses that are a result of progressive dental caries [2].

Svensson, et al. [30] found a difference in caries risk and rates for diabetic patients *vs*. non-diabetic patients. This finding may be due to related xerostomia or the decreased salivary flow caused by the diabetes condition and the lack of preventive and regular dental care in diabetic children. Also, according to other studies, diabetes can be a risk factor for caries due to increased glucose in the saliva and increased glucose in the gingival cervical fluid [31]. Increasing the level of glucose in saliva affects the activity of microorganisms. Streptococcus mutans and Lactobacillus are considered to be related to caries and are the most cariogenic bacteria [32] because they have the ability to create a low pH environment and progression of caries. [33] Research studies show that Streptococcus mutans and Lactobacillus found in stimulated saliva explain better the development of caries than Streptococcus mutans and Lactobacillus found in plaque [34,35]. For this reason, the combined analysis of dental caries, salivary components, and bacterial pathogens in saliva is a powerful method of following the oral diseases in children with type 1 diabetes mellitus [36].

A study by Mehta, et al. [7] assessed the consequences of untreated carious lesions using pufa index among 5-6 years old school children in an urban Indian population. The study stated that the overall mean pufa index was 0.9 ± 1.93. Since the study was conducted in children the pufa index values were lesser.

The PUFA index in the diabetes and non-diabetes was observed with the fact that the subjects examined represent

a selected population. Another limitation of this study is that we didn't record the various etiology of dental caries as dental caries have a multifactorial etiology. Further studies can be done with a larger sample size. PUFA index data may be used for planning, monitoring and evaluating access to emergency treatment and may have a higher potential than the DMFT to get oral health onto political agendas.

Conclusion

From the analysis, it can be found that the mean value of PUFA index was higher in diabetic than in non-diabetic. PUFA index can be used as an effective tool for evaluation of clinical consequences of untreated decay. It can provide valuable data for planning of preventive services and provision of treatment to those with urgent treatment needs.

Funding

Conflict of Interest

There is no conflict of interest.

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