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Evaluation of oral health hygiene in young children suffered with type 1 diabetes mellitus

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Abstract
Although juvenile periodontitis is rare among both healthy subjects and those with T1DM, some studies demonstrated differences in oral microflora in children with T1DM and documented the impact of metabolic control of diabetes on periodontal health, indicating a higher risk of periodontitis in children with T1DM. The results of studies on the association of diabetes and dental caries are inconsistent, and studies that examined various aspects of oral health among pre-pubertal children with T1DM are scarce. The aim of the present study was to compare the oral health of young children with T1DM with that of non-diabetic children.
The present study was planned in the Department of Pediatrics, Indira Gandhi Institute of Medical Sciences, Patna From may 2018 to feb 2019. Total 100 cases were enrolled in the present study. The 50 cases were enrolled in the group A as type 1 diabetes mellitus (T1DM) cases and 50 cases were enrolled in the group B as control cases. All enrolled cases were belonging to the age group of 10–15 years.
Despite the similarity between oral hygiene levels in children with type 1 diabetes and healthy children, the prevalence of gingivitis and periodontal diseases in children with type 1 diabetes was higher than healthy peers. The goal of therapy is to promote oral health in patients with diabetes, to diagnose diabetes in dental patients receiving routine stomatological care and to enhance the quality of life for patients with this disease. Hence, there is a need for appropriate health education as good oral health is important for diabetic individuals.

Keywords: oral health knowledge, oral health status, type 1 diabetes, etc

Introduction
Oral hygiene is the practice of keeping one's mouth clean and free of disease and other problems (e.g. bad breath) by regular brushing of the teeth (dental hygiene) and cleaning between the teeth. It is important that oral hygiene be carried out on a regular basis to enable prevention of dental disease and bad breath. The most common types of dental disease are tooth decay (cavities, dental caries) and gum diseases, including gingivitis, and periodontitis [1].
General guidelines suggest brushing twice a day: after breakfast and before going to bed, but ideally the mouth would be cleaned after every meal. Cleaning between the teeth is called interdental cleaning and is as important as tooth brushing [2]. This is because a toothbrush cannot reach between the teeth and therefore only removes about 50% of plaque off the surface [3]. There are many tools to clean between the teeth, including floss and interdental brushes; it is up to each individual to choose which tool he or she prefers to use.
Sometimes white or straight teeth are associated with oral hygiene, but a hygienic mouth may have stained teeth and/or crooked teeth. For appearance reasons, people may seek out teeth whitening and orthodontics. Tooth decay is the most common global disease [4]. Over 80% of cavities occur inside fissures in teeth where brushing cannot reach food left trapped after eating and saliva and fluoride have no access to neutralize acid and remineralize demineralized teeth, unlike easy-to-clean parts of the tooth, where fewer cavities occur. Teeth cleaning is the removal of dental plaque and tartar from teeth to prevent cavities, gingivitis, gum disease, and tooth decay. Severe gum disease causes at least one-third of adult tooth loss.
Since before recorded history, a variety of oral hygiene measures have been used for teeth cleaning. This has been verified by various excavations done throughout the world, in which chew sticks, tree twigs, bird feathers, animal bones and porcupine quills have been found. In historic times, different forms of tooth cleaning tools have been used. Indian medicine (Ayurveda) has used the neem tree, or daatun, and its products to create teeth cleaning twigs and similar products; a person chews one end of the neem twig until it somewhat resembles the bristles of a toothbrush, and then uses it to brush the teeth. In the Muslim world, the miswak, or siwak, made from a twig or root, has antiseptic properties and has been widely used since the Islamic Golden Age. Rubbing baking soda or chalk against the teeth was also common; however, this can have negative side effects over time [5].
The Australian Healthcare and Hospital Association's (AHHA) most recent evidence brief [6] suggests that dental check-ups should be conducted once every 3 years for adults, and 1 every 2 years for children. It has been documented that dental professionals frequently advise for more frequent visits, but this advice is contraindicated by evidence suggesting that check-up frequency should be based on individual risk factors, or the AHHA's check-up schedule. Professional cleaning includes tooth scaling, tooth polishing, and, if tartar has accumulated, debridement; this is usually followed by a fluoride treatment. However, the American Dental Hygienists' Association (ADHA) stated in

1998 that there is no evidence that scaling and polishing only above the gums provides therapeutic value, and cleaning should be done under the gums as well [7]. The Cochrane Oral Health Group found only three studies meeting the criteria for inclusion in their study and found little evidence in them to support claims of benefits from supragingival (above the gum) tooth scaling or tooth polishing [8]. [needs update]

Dental sealants, which are applied by dentists, cover and protect fissures and grooves in the chewing surfaces of back teeth, preventing food from becoming trapped and thereby halt the decay process. An elastomer strip has been shown to force sealant deeper inside opposing chewing surfaces and can also force fluoride toothpaste inside chewing surfaces to aid in remineralising demineralised teeth [9].

Hyperglycemia in addition to damage to different systems in the body may weaken the functions of the salivary glands, resulting in a decrease in the flow of saliva and the alterations in the components of saliva. consequently, many dental and mucosal changes can occur which include the spread of different pathogenic bacteria, taste saliva is the body's natural protective mechanism against dental caries. saliva acts as a critical regulator and internal defense system against this disease through its physical and chemical properties as flow rate and buffer capacity and through its inorganic and organic constituents such as calcium bicarbonate, phosphorus and enzymes [10-11]. Dental decay caused by a breakdown made from acid bacteria [12]. It include signs of pain and difficulty in eating [13-14]. Complications can include tissue inflammation surrounding the teeth, composition of abscess, infection or tooth loss [13, 16]. The reason of decay is an acid microbes which dissolves solid tissues of the teeth, acid is produced from microbes when diet, sugar residues are broken on surface of the tooth [16]. Modifications in saliva components can affect development, signs and the severity of oral changes in diabetics to detect salivary components in DM may be useful in the understanding and management of oral manifestations [17].

Although juvenile periodontitis is rare among both healthy subjects and those with T1DM, some studies demonstrated differences in oral microflora in children with T1DM and documented the impact of metabolic control of diabetes on periodontal health, indicating a higher risk of periodontitis in children with T1DM [12]. The results of studies on the association of diabetes and dental caries are inconsistent [13], and studies that examined various aspects of oral health among pre-pubertal children with T1DM are scarce. The aim of the present study was to compare the oral health of young children with T1DM with that of non-diabetic children.

Methodology

The present study was planned in the Department of Pediatrics, Indira Gandhi Institute of Medical Sciences, Patna from may 2018 to feb 2019. Total 100 cases were enrolled in the present study. The 50 cases were enrolled in the group A as type 1 diabetes mellitus (T1DM) cases and 50 cases were enrolled in the group B as control cases. All enrolled cases were belonging to the age group of 10–15 years.

All clinical assessments were performed by two examiners (Pediatric Dentists) who were unaware of the child's group assignment. The subjects were seated in a reclining chair during the evaluations. Clinical examinations were conducted under artificial lighting with the aid of a dental mirror and explorer.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Inclusion and exclusion criteria- Patients agreeable to provide written informed consent were included in the study. Physically and mentally incapacitated patients, patients of Type 1 diabetes mellitus, patients of chronic renal failure additionally patients on immunosuppressive therapy or who had undergone any transplantation and those using alcohol/smoking were excluded.

Results & Discussion

The term "diabetes mellitus" is used to identify a group of disorders characterized by elevated levels of glucose in the blood. This elevation is the result of a deficiency in insulin secretion or an increased cellular resistance to the actions of insulin, leading to a variety of metabolic abnormalities involving carbohydrates, fats and proteins.

Diabetes represents an extreme disturbance in glucose metabolism with severe hyperglycemia and insulin deficiency. A number of oral disorders have been associated with DM such as dental caries, gingivitis, periodontitis, salivary dysfunction, altered taste, oral mucosal diseases and infections such as lichen planus, recurrent aphthous stomatitis and candidiasis [18-20].

The prevention of periodontal breakdown in diabetic patients is mostly based on the education of the individual. Thus, patients should be informed about the importance of oral health for diabetics, and they should be taught that the main symptom of periodontal disease is gingival bleeding [21]. Candidiasis is a manifestation of an immunocompromised state, and a reduction in salivary flow is another risk factor for oral candidiasis [18].

Table 1: Socio & Demographic Details

Groups	Group A	Group B
Socio demographic variables	Diabetic group	Control group
Total Cases	50	50
Age (years):		
10-12	23	25
13-15	27	25
Sex:		
Male	20	23
Female	30	27
Socioeconomic status: Upper class	3	5
Middle Class	21	16
Lower Class	26	29

Table 2: Oral hygiene habits

Groups	Group A	Group B
Oral hygiene habits	**Diabetic group**	**Control group**
Frequency of tooth brushing		
Once weekly	4	2

Once daily	18	16
Twice daily	25	30
More than twice daily	3	2
Using fluoridated toothpastes		
Don't know	2	2
Always	42	27
Sometimes	0	3
Rare	2	0
Never	4	8
Parent helps tooth brushing		
Always	6	15
Sometimes	10	13
Rare	4	5
Never	30	17
Dietary habits		
Regular meals		
Always	39	45
Sometimes	11	3
Never	0 (0)	2
Consumption of sweet snacks		
Never	2	2
Once weekly	13	12
Up to 2 snacks per day	28	35
More than 2 snacks per day	7	1
Frequency of dental visits		
Twice yearly	7	12
Once yearly	20	15
No regular visits	12	15
Never	11	8
Oral examination		
Plaque index	0.24 – 0.65	0.11 – 0.37
Gingival index	0.35 – 0.96	0.1 – 0.43
DMFT DMFT = Decayed (D), Missing (M) or Filled (F) Permanent Teeth	2- 5	1 - 3

In the study by Kneckt *et al*. [22] they concluded that there are common psychological factors between oral hygiene metabolic control of diabetes, and those with good control of the diabetes have a better oral hygiene status compared to the group with weak control.

A cross-sectional survey was done in randomly selected general practitioners practicing in Kuwait by Areef K. *et al*. regarding the knowledge about association between diabetes mellitus and periodontal diseases. Out of 510 general practitioners (232 physicians and 278 dentists) who participated in the study 50% believed that patients with diabetes were more susceptible to tooth loss because of periodontal diseases than were individuals without diabetes [23].

Numerous contributing factors which are responsible for increased susceptibility of diabetic patients to periodontitis are compromised polymorphonuclear leukocyte function due to impaired neutrophil adherence, chemotaxis and phagocytosis. This prevents destruction of bacteria in the periodontal pocket and markedly enhances periodontal destruction. Abnormalities of collagen metabolism, impaired proliferation of osteoblasts, and weakened mechanical properties of newly formed bone have been documented in hyperglycemic patients [24-25]. Patients with uncontrolled diabetes show exaggerated response to local factors such as plaque and calculus leading to the sequelae of gingivitis, periodontitis and alveolar bone loss. Graves and colleagues [26] reviewed the pathogenesis of periodontal disease in patients with diabetes and concluded that, in addition to the robust inflammatory response, enhanced apoptosis (the sequence of programmed events leading to cell death) may contribute to periodontitis as a complication of diabetes.

In connection with the effect of diabetes on the incidence of dental problems, various studies have been completed. For example, Miralles *et al* (2006) also showed that during the study of diabetes and complications from the disease affects increased dental caries [27] The study Miko *et al* (2010) also found that poorly controlled blood sugar levels and early onset diabetes mellitus may increase the risk of tooth decay. [28].

Present study has reported that diabetes is a major risk factor for the development of oral manifestations of diabetes mellitus, and it will not be appropriate to use the data available from, as confounding factors like alcohol use, literacy, diet, health education, obesity economical status etc can play important role in the aetiopathogenesis of these manifestations [29-32]. Therefore a lot of practice is to be done to decrease the frequency of these complications to reduce the morbidity in diabetic patients.Strong communication of dentist with diabetologist is a critical component while treating patients with diabetes. Diabetologist must be aware of oral manifestations of the diabetes such as periodontitis and other and dentists must be updated on glycemic control in order to maintain a patient's oral health [33].

The reason for these contradictions are differences in the study sample, as well as differences in the method of research and analysis of the findings. Differences in the age of subjects, status of control of their disease, gender, and race are among the differences in the study sample. The difference between the indexes used in the research, the number of samples, the error of examiner and the statistical methods used to analyze the data are of differences of study method and analysis.

Conclusion

Despite the similarity between oral hygiene levels in children with type 1 diabetes and healthy children, the prevalence of gingivitis and periodontal diseases in children with type 1 diabetes was higher than healthy peers. The goal of therapy is to promote oral health in patients with diabetes, to diagnose diabetes in dental patients receiving routine stomatological care and to enhance the quality of life for patients with this disease. Hence, there is a need for appropriate health education as good oral health is important for diabetic individuals.

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