Oral Health Problems of Diabetic Patients

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Abstract

The worldwide estimated prevalence of Diabetes Mellitus is 4.6% in 20-79 year aged population. In 1985, an estimated 30 million people worldwide had diabetes. The World Health Organization warns diabetes will reach epidemic with 300 million by 2025.The prevalence of diabetes is the highest in developed countries but developing countries are expected to have the largest increase in next decade. Uncontrolled diabetes leads to soreness, ulcers, infections and tooth decay and decrease oral health status.

Objective: *To assess oral health status among the diabetic patients in dental department of BIRDEM.*

Methods: *It was a descriptive study conducted among 110 patients for 6 months period. Data were collected using questionnaire and oral examination checklist. SPSS software was used for data analysis.*

Results: *Males were 61.8% and 32.7% were in 40-50 years age group, post-graduate educated were 47.3%, 40.9% were employed in job and monthly family income was taka >20000. The highest 31.8% were diabetic for 3-10 years and 47.3% were under control. Regularly 85.5% patients checked blood sugar and followed the advice. Oral hypoglycemic was taken by 60.9% patients and followed diabetic diet 76.4%. Dental health problems developed in 44.5% diabetes patients, 41.8% developed Gum Swelling, 22.7% Bleeding during brushing teeth, 16.4% Bad breath, 16.4% had Pain and 2.7% having loosening their teeth. Both grade 3 gingivitis and grade 2 periodontitis were found in 34.5%. Maximum 48.2% visited dental surgeon.*

Conclusion: *Regular dental care is particularly important for people with diabetes.*

Key Words: *Oral health problems, Diabetic patients.*

Introduction

Diabetes mellitus is a common chronic disease with increasing burdens. In uncontrolled states, diabetes is characterized by protein breakdown and lowered resistance to infection producing a higher susceptibility to infection, slower healing rate, vascular deficiencies and an increase in the severity of inflammatory reactions.

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Because of their lowered resistance, oral tissues are more susceptible to the local irritants found in the oral cavity. Research indicates that diabetes may accentuate the resorption of bone in periodontitis.[1] The prevalence of diabetes worldwide is estimated to be 4.6% in the 20-79 year age. In 1985, an estimated 30 million people worldwide had diabetes .In a little over 10 years that number has risen to 150 million people. The World Health Organization warns that diabetes will reach epidemic proportions with the number of people having diabetes which has been anticipated to reach 300 million patients by 2025.The prevalence of diabetes is the highest in developed countries but developing countries are expected to have the largest increase in next decade. The rapid rise of diabetes in developing countries is associated with economic development, westernization & urbanization; all of which are contributing factors to an increasing prevalence in these countries.[2]

People with Diabetes Face A Higher Risk
Dry mouth: Uncontrolled diabetes can decrease saliva flow, resulting in dry mouth. Dry mouth can further lead to soreness, ulcers, infections & tooth decay.

Gum inflammation (gingivitis & periodontitis):
Besides impairing white blood cells, another complication of diabetes is that it causes blood vessels to thicken, which slows the flow of nutrients to & waste products from body tissues, including the mouth .When this combination of events happens, the body's ability to fight infections is reduced. Since periodontal disease is a bacterial infection, diabetic patients may experience more frequent & more severe gum disease.

Poor healing of oral tissues: People with uncontrolled diabetes do not heal quickly after oral surgery or other dental procedures because blood flow to the treatment site can be impaired.

Thrush: People with diabetes who frequently take antibiotics to fight various infections are especially prone to developing a fungal infection of the mouth & tongue. The fungus thrives on the high levels of sugar in the saliva of people with uncontrolled diabetes.

Burning mouth &/or tongue: This condition is caused by the presence of thrush.

Relevance with smoking: People having diabetes that smoke are at even a higher risk-up to 20 times more likely than non-smokers-for the development of thrush & periodontal disease. Smoking also seems to impair blood flow to the gums-which may affect wound healing in this tissue area.[3]

Diabetes mellitus is a common & growing global health problem leading to several complications. Periodontal diseases are considered as the sixth complication of diabetes mellitus. Periodontitis in patients with diabetes is more prevalent & severe than normal population. Diabetes mellitus patients have increased disposition of the manifestation of oral diseases like oral candidiasis which is associated with poor glycaemic control & therapeutic dentures. Xerostomia may increase glucose levels in oral fluids or immune deregulation.[4] Sustained hyperglycaemia affects almost all tissues in the body including oral cavity.[5] Oral complications of diabetes mellitus include xerostomia, opportunistic infections, greater accumulation of plaque, delayed wound healing, susceptibility to periodontal disease, oral paresthesia & altered taste.[6] Studies suggest a bidirectional adverse relationship between diabetes & periodontal disease, diabetes can aggravate periodontitis & periodontitis can negatively affect the control of diabetes.[7,8] Therefore, preventive behaviors like brushing, flossing & periodic dental visits which have a positive correlation with better periodontal health, becomes paramount for diabetic patients.[9,10] Oral hygiene behavior & seeking oral health care depends upon a number of factors.

Patients comply better with oral health care regimens when informed & positively reinforced. Lack of information is among the reasons for non-adherence with oral hygiene practices.[11] Diabetes patients have dental health risk in periodontitis, decayed tooth more than normal person. And periodontal disease causes loosening of tooth which make problem-chewing food & decrease quality of life. According to current information, most of the diabetes patients tend to have dental problem such as dental caries, periodontal disease, early loosening teeth & oral candidiasis. To solve this problem, we must know oral health status & influencing factors in diabetes patients in order to set dental health promotion, prevention treatment, rehabilitation plan & management limited resource such as budget, dentist for most effective management.

Justification
Bangladesh is a developing country and the majority of the population live under the poverty line and also, they have a lack of personal hygiene. On the other hand, people who live above the poverty line, they have little sense about the specific and limited needs of the body. Both the class suffer from different kinds of oral health problems.

Diabetes causes slowness in healing wounds and this problem leads to various kinds of infections. Magnitude of diabetes is increasing day by day, as the diagnostic facility is reaching towards the door of people. It is well justified reason of today to think about the oral hygiene practice of the diabetic patients of our country, because people with diabetes might not notice the gradual onset of the periodontal infections, mucosal lesions have been established, as it is painless at the beginning. And ultimately result is not only extensive bone destruction, tooth loss, mucosal lesions but now, we must also consider about the risk to one's general health if left untreated. So every diabetic patient should be aware of oral health that ultimately destroys one's general health both physically & mentally. Loss of teeth & soreness in mouth (due to mucosal lesions), patients become helpless & they cannot enjoy their food & sound health due to lack in the ability in digestion. Diabetic patient should bear the knowledge about oral hygiene practices & regular check-up to enjoy sound life with healthy oral environment. They need extra care and concentrated treatment which justifies my cause of elaborating this topic.

Materials and Methods

This was a cross sectional type of descriptive study carried out in the dental out-patient department of Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) hospital, Wari, Dhaka. Every day, a good number of diabetic patients visit the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) hospital with the co-operation of the doctors. The study was conducted from January 2012 to June 2012. The study population was all diabetic patients taking dental treatment or follow-up BIRDEM Hospital.

Determination of Sample Size: Sample size was estimated using formula $n = z2pq / d2$. Where, $z = 1.96$ (95% confidence interval), p= Proportion of diabetic patients willing to participate in the study, q= (1-p) = Proportion of diabetes patients who did not agree to participate in the study, d= Precession, n= Estimated minimum sample size. In the present study, p=0. 65, q= 1-p= 1-0.65= o.35, d= 0.09.Therefore, n= 108≠ 110. A total of 110 diabetic patients were selected for study, who attended the outpatient department for dental problem. The data were collected employing non-probability convenient sampling technique. In order to collect the data, a structured questionnaire and a checklist were prepared at the beginning of the study considering all objectives and variables of the study. It had been pretested on patients attending the outpatient department of Pioneer dental college and hospital in Dhaka city. After making necessary alteration and correction, a final questionnaire was developed in Bangla. Data were collected by the researcher herself through direct interview of the diabetic patient & clinical examination of oral cavity. A verbal consent was taken from the study samples. Data analysis was done using SPSS 17 version.

RESULTS

The study was carried out among 110 diabetic dental patients of (BIRDEM),Wari, Dhaka. The Duration of data collection was January 2012 to June 2012. Data were presented through tables and figures and were organized under following sections:

Table 1: Distribution of the respondents by their Socio-demographic characteristics

Socio-demographic characteristics:	Frequency	(%)
Distribution of the respondents by their sex:		
Male	68	61.8
Female	42	38.2
Total	**110**	**100**
Distribution of the respondents by their Age group:(age in years)		
30-50	58	52.7
50-70	52	47.3
Total	**110**	**100**
Distribution of the respondents by their Religion:		
Islam	102	92.7
Hindu	7	6.4
Buddhism	1	0.9
Total	**110**	**100**
Distribution of the respondents by their educational level:		
Post-graduate	52	47.3
Graduate	30	27.3
HSC	17	15.5
SSC	6	5.5
Primary	2	1.8
Illiterate	3	2.7
Total	**110**	**100**
Distribution of the respondents by their Occupation:		
Housewife	33	30.0
Service	45	40.9
Business	26	23.6
Day labor	2	1.8
Others	4	3.6
Total	**110**	**100**
Distribution of the respondents by their family members:		
≤3	8	7.2
4-5	56	50.9
6 and above	46	41.8
Total	**110**	**100**
Distribution of the respondents by their monthly family income:(in taka)		
5000/--15000/-	7	6.3
15000/--25000/-	103	93.6
Total	**110**	**100**

The table 1 shows among the respondents male were 61.8% and female were 38.2%. The maximum percentage 52.7% were 30-50 years old and 47.3% were 50-70 years old. Mean (x) = 49.90, Median = 49.17, SD Mode = 50.99, Minimum age was 30 years, Maximum age was 70 years. Among the respondents religious distribution, 92.7% were Muslims, 6.4% were Hindus and 0.9% was Buddhists. According to the educational level of the respondents, 47.3% were post graduate, 27.3% were graduate, 15.5% passed HSC, 5.5% passed SSC, 2.7% were illiterate and 1.8 % of the respondents were educated up to primary level. The table shows 50.9% had 4-5 members in their family, 41.8% had 6 and above family members, 7.2% of the respondents had less than 3 or 3 members in their family. Among all the respondents, 93.6% have family income more than 15000-25000 taka, 6.3% earn 5000-15000 taka per month. Mean (x) = 19663.64, SD (±) = 3900.78, Minimum 5000, Maximum 25000.

Table 2: Distribution of the respondents by their Diabetic assessment

Diabetic assessment:	Frequency	(%)
Distribution of the respondents by duration of suffering diabetes(in years):		
≤3	10	9.1
4-6	35	31.8
7-9	30	27.3
≥10	35	31.8
Total	**110**	**100**
Distribution of the respondents by their Blood sugar level remaining normal:		
Yes	52	47.3
No	58	52.7
Total	**110**	**100**
Distribution of the respondents by their regular blood checking:		
Yes	94	85.5
No	16	14.5
Total	**110**	**100**
Distribution of the respondents by following the advice of their physician:		
Yes	94	85.5
No	16	14.5
Total	**110**	**100**
Distribution of the respondents by their type of the medications followed:		
Oral hypoglycemic agent	67	60.9
Insulin	34	30.9
Diet chart	5	4.5
Other medication	4	3.6
Total	**110**	**100**
Distribution of the respondents by following diabetic diet chart:		
Yes	84	76.4
No	26	23.6
Total	**110**	**100**

The table 2 shows among the respondents, 31.8% for 4-6 years, 31.8% for more than 10 years, 27.3% for 7-9 years, 9.1% were suffering from diabetes for 3 years or less. The blood sugar level of 52.7% respondents did not remain within normal range and that of 47.3% respondents always remained within normal range. 85.5% of the respondents check blood sugar regularly and 14.5 % not check blood sugar regularly. Above table shows 85.5% of the respondents followed the advice of their physician and 14.5 % did not follow the advice of their physician. Among the respondents 60.9% used Oral hypoglycemic agent, 30.9% used Insulin, 4.5% used Diet chart and 3.6% used other medication. 76.4% of the respondents followed the diabetic diet chart while 23.6% did not follow the diabetic diet chart.

Table 3: Distribution of the respondents by their Diabetic complications

Diabetic complications:	Frequency	(%)
Distribution of the respondents by their type of complication faced regularly after developing diabetes:		
CVD	3	2.7
Renal problem	49	44.5
Neurological	5	4.5
Skin infection	4	3.6
Dental problem	49	44.5
Total	**110**	**100**
Distribution of the respondents by their Dental Problem:		
Yes	107	97.3
No	3	2.7
Total	**110**	**100**
Distribution of the respondents by the type of dental problem:		
Pain	18	16.4
Gum swelling	46	41.8
Bleeding during brushing	25	22.7
Bad breath	18	16.4
Loosening of teeth	3	2.7
Total	**110**	**100**

Above table 3 shows among the diabetic patients, 44.5% faced Dental problem, 44.5% faced Renal problem, 4.5% faced Neurological, 3.6% faced Skin Infection and 2.7% faced CVD. Among the diabetic patients, 97.3% had dental problems and 2.7% did not have dental problems. The respondents who had dental problem, 41.8% had Gum swelling, 22.7% had Bleeding during brushing, 16.4% had Pain, 16.4% had Bad breath and 2.7% had Loosening of teeth.

Table 4: Distribution of the respondents by their Dental care seeking behaviors

Dental care seeking behaviors:	Frequency	(%)
Distribution of the respondents by their visiting dental surgeon for dental problem:		
Yes	94	85.5
No	16	14.5
Total	**110**	**100**
Distribution of the respondents by their frequency of visiting to dental surgeon:(in months)		
≤6	23	20.9
>6	34	30.9
During emergency	53	48.2
Total	**110**	**100**
Distribution of the respondents by their last visit to dental surgeon:		
Years before	77	70
Months before	22	20
Never	11	10
Total	**110**	**100**
Distribution of the respondents by following the advice given by dental surgeon:		
Yes	78	70.9
No	32	29.1
Total	**110**	**100**

Above table 4 shows the respondents who had dental problem, 85.5% visited dental surgeon and 14.5% did not. The respondents with dental problems, 48.2% visited dental surgeon during emergency, 30.9% visited dental surgeon more than 6 months interval and 19.1% visited dental surgeon within 6 months or less. 70% of the respondents visited dental surgeon years before, 20% visited months before and 10% never visited dental surgeon. 70.9% of the respondents followed the advice given by dental surgeon whereas 29.1% did not.

Table 5: Distribution of the respondents by their Oro-dental cleaning behaviors

Oro-dental cleaning behaviors:	Frequency	(%)
Distribution of the respondents by their cleaning of teeth regularly:		
Yes	81	73.6
No	29	26.4
Total	**110**	**100**
Distribution of the respondents by their number of times of cleaning teeth		
Once	56	50.9
Twice	37	33.6
Thrice	1	0.9
After meal	1	0.9
Not regularly	15	13.6
Total	**110**	**100**
Distribution of the respondents by their things to clean teeth:		
Tooth paste	75	68.2
Tooth powder	21	19.1
Charcoal	14	12.7
Total	**110**	**100**
Distribution of the respondents by their type of material used to clean teeth everyday:		
Tooth brush	77	70.0
Wood stick	6	5.5
Finger	27	24.5
Total	**110**	**100**

Among the respondents, 60% had decayed teeth, 40% did not have any decayed teeth. As a systemic disease, diabetes mellitus may lead to several complications affecting both the quality and the length of life. While periodontal disease is one of the major oral health problems in patients with diabetes, reports of an increased risk of dental caries among diabetes are controversial. Among the respondents 20% have oral prosthesis and 80% did not have oral prosthesis. Among the respondents with oral prosthesis 4% have complete denture and 96% have partial denture. 40% of the respondents have soreness on tongue or oral soft tissues while 60% did not have. Among the respondents 61.8% were male and 38.2% were female. For the age distribution, 20% were 30-40 years old, 32.7% were 40-50 years old, 25.5% were 50-60 years old and 21.8% were 60-70 years old. The proportion was quite congested with the people 40-50 years old. 92.7% were Muslim, 6.4% were Hindu and 0.9% was Buddhist. 2.7% were illiterate, 1.8% of the respondents are educated up to primary level, 5.5% have passed SSC, 15.5% have passed HSC, 27.3% are graduate and the rest 47.3% are post graduate. The area was quite a renowned area that is why respondents were pretty educated. 30% were house wife, 40.9% were in service, 23.6% were doing business, 1.8% was day labor, and 3.6% were in other service. 2.7% of the respondents had 2 family member, 4.5% had 3, 19.1% had 4, 31.8% had 5, 28.2% had 6, 3.6% had 7 and 10% had 8 family member. There are two schools of thought on this topic. One school believes that high levels of sugar in the saliva of people with uncontrolled diabetes helps bacteria thrive, which leads to the development of cavities as well as sets the stage for gum disease. Also, the fact that diabetic patients tend to eat smaller, more frequent meals throughout the day may mean there is a greater chance for bacteria to grow and lead to the development of cavities. The other school of thought is that because people with diabetes are more knowledgeable about what they eat and the need to closely monitor their sugar intake, they do not eat many foods that contain cavity-causing sugar. 9.1% were suffering from diabetes for 1-3 years, 31.8% for 3-6 years, 27.3% for 6-9 years, and 31.8% for 10 years or more. The fact is that people whose diabetes is well controlled have less periodontal disease then persons with uncontrolled diabetes. Good oral hygiene and maintenance of blood sugar within the accepted range are the best protections against cavity formation and periodontal disease. 2.7% faced CVD, 44.5% faced renal problem, 4.5% faced Neurological, 3.6% faced Skin Infection, and 44.5% faced Dental problem.

Among the diabetic patients, 97.3% had dental problems, and 2.7% did not have dental problems. The blood sugar of 47.3% respondents always remaining within normal range and that of 52.7% respondents did not remain within normal range. 85.5% of the respondents check blood sugar regularly and 14.5 % did not check blood sugar regularly. 85.5% of the respondents followed the advice of their physician and 14.5 % did not follow the advice of their physician. Among the respondents 4.5% used diet chart, 60.9% used Oral hypoglycemic agent, 30.9% used Insulin and 3.6% used other medication. 76.4% of the respondents followed the diabetic diet chart. While 23.6% did not follow the diabetic diet chart. Oral hygiene is the main thing affects gums and tooth of people. Among the respondents 73.6% clean teeth regularly and 26.4% did not clean teeth regularly. 50.9% cleaned teeth once a day, 33.6% twice, 0.9% thrice, 0.9% after meal and the rest 13.6% did not clean teeth regularly. 68.2% of the respondents use Tooth paste to clean teeth, 19.1% use Tooth powder and 12.7% use Charcoal to clean teeth. 70% of the respondents used Tooth brush to clean teeth, 5.5% used Wood stick and 24.5% used Finger to clean teeth. The good news for people with diabetes is that by practicing good dental care and oral hygiene habits brushing at least twice daily (or preferably after every meal) with a fluoride-containing toothpaste and flossing daily and by keeping blood sugar levels under control, the potential for infection from periodontal disease will be greatly reduced or eliminated as will the risk of tooth loss. Many factors play a role in the loss of teeth in people with diabetes. First, people with uncontrolled diabetes are more prone to the development of gingivitis and periodontal disease. If the infection persists, it can spread to the underlying bone that anchors the teeth. The fact is that infections do not resolve as quickly in people with diabetes. With close medical care and self care that keeps blood sugar as close to normal as possible and good personal and professional dental care, problems after surgery are no more likely in people with diabetes than in those without the disease. 85.5% visit dental surgeon and 14.5% did not visit dental surgeon. 1.8% visit dental surgeon in 3 months, 19.1% visit dental surgeon in 6 months, 30.9% visit dental surgeon in a year and 48.2% visit dental surgeon when problem arise. 20% of the respondents visited dental surgeon months before, 70% visited years before and 10% never visited dental surgeon.

70.9% of the respondents followed the advice given by dental surgeon where as 29.1% did not. From a scholarly article of Gun E. Sandberg, Faculty of Health Sciences, Linköping University, Sweden we found that, a controlled study was carried out in mid-Sweden with 102 randomly sampled type 2 diabetic patients. Most individuals, but fewer in the diabetic group, were regular visitors to dental care and the majority felt unaffected when confronted with dental services. More than 90% in both groups brushed their teeth daily and more than half of those with natural teeth did proximal cleaning. Subjects in the diabetic group as well as in the control group were content with their teeth and mouth (83% vs 85%). Those with solely natural teeth and those with complete removable dentures expressed most satisfaction.[14]

Conclusion

Dental care is particularly important for people with diabetes they face a higher than normal risk of oral health problems due to poorly controlled blood sugars. The less well controlled the blood sugar, the more likely oral health problems will arise. Uncontrolled diabetes impairs white blood cells, which are the body's main defense against bacterial infections that can occur in the mouth. Uncontrolled glycemia, regardless of the type of diabetes, exerts an adverse effect on oral hygiene status. During diabetes, pathologic lesions develop in the oral cavity. A strong correlation was noted between gender, oral health status and dental service needs, to the disadvantage of diabetic patients. There was also a relation between the place of residence (town, village), oral health status, and dental service needs, to the advantage of patients residing in towns. It is proven that when a person gets pain in mouth, most of the time the pain is so severe that, the person tends to run to the dentist. Now-a-days, diabetes is very common disease among the upper social class and aged people. If this epidemic problem cannot be controlled and taken care of, no individual will be able to get rid of it.

Acknowledgement

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