

## An Enquiry into Oral Health in Diabetic Patients of Kahuta, District Rawalpindi: A Cross Sectional Study



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### Abstract

**Background:** The main purpose of this study is to evaluate the oral health of diabetic patients through the application of Knowledge, Attitude and Practices (KAP), since periodontitis considered to be one of the complications of diabetes.

**Methods:** This cross-sectional study was conducted at THQ hospital, Kahuta district Rawalpindi, where 104 diabetic patients were selected as study participants. Data was collected by using a structured questionnaire and further analysis was done by using SPSS 21.

**Results:** The study showed that only 38.5% of the participants had adequate knowledge regarding oral manifestations of diabetes. The oral health attitudes and compliance of suggested oral cleanliness practices were also poor. The study results showed that 55% of the diabetic patients brushed their teeth once a day. While only 16.3% brushed twice a day. 39.4% of the participants did not visit the dental clinic within the last 1 year.

**Conclusion:** The study concluded that knowledge about the oral complications was deficient in the diabetic patients. There is need to improve the oral health knowledge of the diabetic patients along with emphasis on adaptation of oral hygiene practices, regular dental visits and strict glycemetic control.

**Keywords:** Diabetes, oral health, knowledge, attitudes, practices

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### Introduction

Diabetes is a metabolic disease<sup>(1)</sup> that effects the body systems chronically. In this disease, mainly blood sugar level is increased known as hyperglycemia, which increase the risk of microvascular damage like nephropathy, neuropathy & retinopathy. In this disease, blood glucose levels are high over a prolong period of time. Frequent urination, increased thirst and increased hunger are main symptoms of Diabetes<sup>(2)</sup>. Oral manifestations occur as periodontal diseases, xerostomia, greater plaque accumulation, oral paresthesia, altered taste and delayed wound healing<sup>(3)</sup>.

Periodontal diseases are inflammatory diseases including gingivitis and periodontitis<sup>(4)</sup>. periodontitis is an infectious chronic disease that affects the supportive tissues of the teeth. It is assessed that 30% people of more than 50 years and 10-15% of people of 21-50 years suffer from severe periodontitis<sup>(5)</sup>. People suffering from periodontitis have tooth attachment loss in the alveolar bone, resulting in periodontal pockets, gum recession, mobile teeth, and ultimately teeth exfoliation. This scenario changes the eating habits and affect the general health<sup>(6)</sup>. The main sign and symptoms of periodontitis are red swollen gums, which can easily bleed. Gums become tender, when touched. Halitosis or bad breath is another issue for the patients. In

periodontitis, due to gum recession, the teeth look elongated than normal teeth. Due to these problems, patient have difficulty in eating food<sup>(7)</sup>.

The relationship between diabetes mellitus and periodontal diseases appears as bidirectional. Both diseases can stimulate the release of pro inflammatory cytokines that damage the periodontal tissue<sup>(8)</sup>. Oral diseases are affecting over 5 billion people. It is particularly prevailing in the underdeveloped parts of the world<sup>(9)</sup>. Dental health is essential for overall health and quality of life. Diabetic patients are at high risk of developing oral diseases like periodontitis that can affect their overall health<sup>(10)</sup>. A study was done at Kenyatta National Hospital that defined the link among periodontal disease and treatment method, age and diabetes duration. 86 respondents were selected in study. The study concluded that diabetic patients were disposed to develop more severe type of periodontal diseases, as compared to nondiabetic respondents<sup>(11)</sup>.

The diabetic patient's knowledge and information regarding oral health is not appropriate. According to a Nigerian study<sup>(12)</sup> most of the diabetic patients do not have knowledge that factors in diabetes have role in developing oral diseases and most of the diabetic patients were not aware of the need of blood sugar control to avoid the oral diseases and infections. Due to lack of information, the diabetic patients are not

aware that diabetes can affect their gums and teeth (13). So, the prevalence of periodontal diseases in diabetic patients is very high, which lead to teeth mobility and inflammation of gum, as a result their quality of life is affected. Patients have difficulty in eating, painful gums and teeth. It is established that through effective education and enhanced knowledge, patients can decrease the known risk factors (14).

Pakistan is included in that countries, where diabetes prevalence is very high. In Pakistan there were 5.2 million people suffered from diabetes in 2000. In Pakistan it is expected that this number will rise up to 13.9 million by the year 2030(15). It is evident that diabetic patients are at high risk to develop periodontal diseases (16). Periodontitis is considered as an important complication of diabetes (17). Most of the diabetic patients suffer from periodontitis and gingivitis, which may lead to teeth mobility, loss of teeth, inflammation and bleeding gums. In Pakistan limited research has been done to assess oral health related knowledge, attitude and practices. Most of the diabetic patients have no knowledge that their periodontal problems are due to their diabetes and there is need to control their blood sugar level to avoid these oral problems (18). I assessed during my working as dental surgeon in Kahuta that most of the diabetic patients don't know that their gum problems are due to their diabetes and what is the role of oral hygiene maintenance and preventive measures in diabetes to avoid periodontal diseases. So, it is very important to determine their knowledge, practices and behaviors regarding dental and oral health as on the behalf of their knowledge, the diabetic patients attending the hospital can get enough information about oral health from their doctors and it can further be incorporated into community level programs, addressing diabetes. So that the quality of life of diabetic patients can be improved by reducing dental complications associated to diabetes mellitus

### Methodology

A cross sectional study was conducted in dental OPD of THQ hospital, Kahuta of District Rawalpindi. It is a secondary care government hospital providing preventive, diagnostic and curative services. The hospital offers inpatient as well as outpatient services (19). The daily OPD in Non-communicable diseases (NCD) clinic of this hospital is 250-300 patients. In dental department, 50-60 patients visit on daily basis. The diagnosed diabetic patients were selected as study participants. The participants were selected by using consecutive sampling technique. Informed consent was taken from the participants. Data was collected by using a structured questionnaire, that was adapted from a published study (20). The questionnaire was filled by principal investigator by asking questions from participants, addressing their knowledge, attitude and practices regarding dental care. At the end of questioning, information regarding oral health was provided to the participants.

Sample size was calculated using formula for one proportion with the help of following equation eq. (1)

$$n = z^2 \cdot p(1 - p) / d^2 \quad (1)$$

Where z is the z statistic of 95% confidence level (1.96), p is prevalence (50%), d is the margin of error at (0.1 or 10%) and adding 10% for non-response. The sample size is 100 patients, after incorporating selection criterion<sup>1</sup>.

For analysis, SPSS version 21 was used. Descriptive statistics was done for demographic variables, general characteristics (weight, height, diabetic history, and diabetic duration), biological parameters (BSR, blood pressure and diabetic medication), and oral health knowledge, attitude and practices variables. Frequency and percentages were calculated for categorical variables. Chi-square was used to determine the association of oral health Knowledge of diabetic patients with their practices.

## Results

### Empirical Specification

#### Sociodemographic characteristics of the sample

In this study, sample of 104 diabetic patients was taken. 37% participants were males, while 62% were females.

**Table 1: Sociodemographic characteristics of sample population**

Variables	Categories	Frequency (n)	Percent (%)
Gender	Male	39	37.5
	Female	65	62.5
AGE	21-30	5	4.8
	31-40	12	11.5
	41-50	13	12.5
	51-60	34	32.7
	61-70	40	38.5
Marital Status	Single	3	2.9
	Married	81	77.9
	Divorced/ Separated	1	1.0
	widow	18	17.3
Education level	Illiterate	55	52.9
	Primary	24	23.1
	Secondary	20	19.2
	Bachelor	5	4.8
Occupation	Agriculture	1	1.0
	Employee	2	1.9
	Retired	10	9.6
	Merchant	4	3.8
	Private business	6	5.8
	No occupation	72	69.2
	Others	9	8.7

#### Graphical presentation of gender distribution with Age Scale

In the Figure 1, male and female distribution is shown in percent with reference to Age scale. The bar graph shows that there was total 62.50% females while 37.50% total males. This figure shows that most of the males of the study were lie in the range of 61-70 years. However, in the range of 21-30 years of age, there were 60.00% females and 40.00% males.

<sup>1</sup>All adult diabetic patients were selected as study participants, who were diagnosed any types of diabetes either type 1 or 2 by medical physician minimum 6 months before, coming in dental OPD for their dental check- up, with the exception of those who were suffering from acute illness and major psychiatric problem.

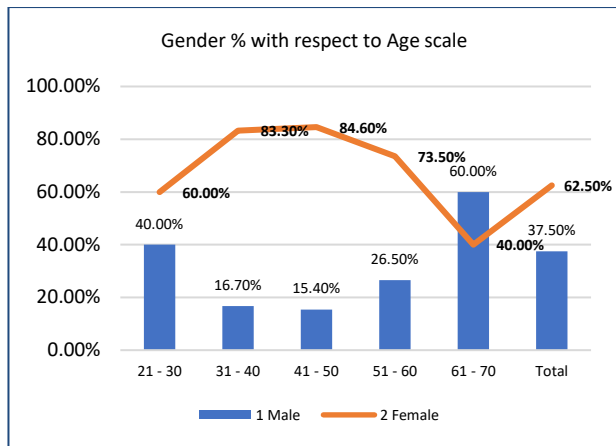


Figure 1: Distribution of male and female in percent with reference to Age scale

**General characteristics of diabetic patients**

Table 2 displays that weight of most of the study participants was in the range of 70-89kg. The below table also reveals that height of most of the participants was in the range of 5-5.4ft. The reason of this may be that most of the study participants were females. When it is asked from diabetic patients that either any one has diabetes in their family like parents, siblings or first relatives, 53.8% said “yes”.

Table 2: General physical characteristics of the sample population

Variables	Category	Frequency (n)	Percent (%)
Weight	<50kg	9	8.7
	50-69kg	38	36.5
	70-89kg	46	44.2
	90-109kg	9	8.7
	>110kg	2	1.9
Height	5-5.4ft	57	54.8
	5.5-5.9ft	46	44.2
	>6ft	1	1.0
Diabetic history	yes	56	53.8
	No	48	46.2
Diabetic duration	< 1year	8	7.7
	1-5years	44	42.3
	6-10years	28	26.9
	11-15year	15	14.4
	>15years	9	8.7

**Clinical parameters of study population**

**Blood sugar level**

As shown in Figure 2, the most of the study participants had high blood glucose level at the time of data collection. The diabetic patients who visited the dental OPD in THQ hospital, Kahuta and selected as study participants were sent to NCD clinic for their blood pressure checkup and BSR test. The percentage of sample population was 83.7, who had high blood glucose level. The blood sugar level of 16.3% of the diabetic patients was normal while there was no one in the sample, whose BSR was low than normal.

**Blood pressure**

The Figure 3 is showing the number of the patients having low, normal and high blood pressure. In this study, there were 69 diabetic patients, whose blood pressure was normal at the time of data collection. Whereas there were 34 diabetic patients, whom blood pressure was high.

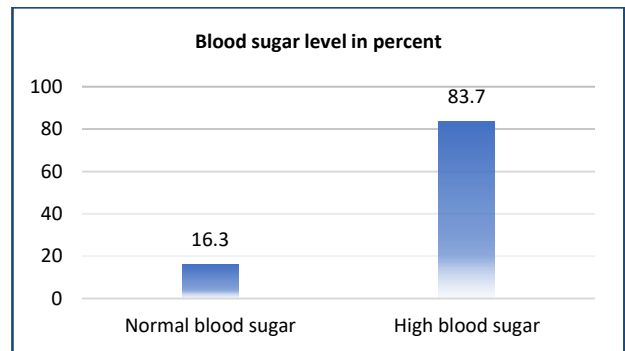


Figure 2: Blood sugar levels of diabetic patients

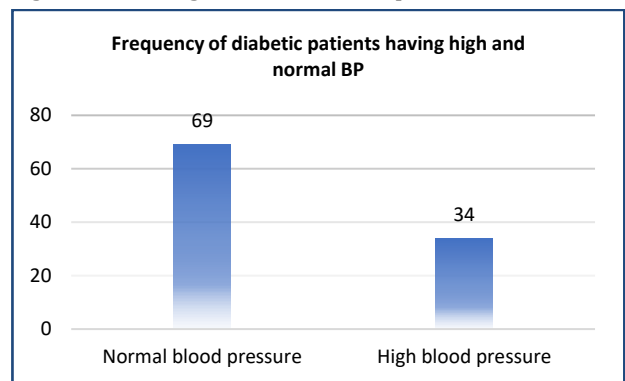


Figure 3: Bar chart showing number of diabetic patients having normal and high blood pressure

**Medication**

The Figure 4 shown most of the patients were taking some treatment for their diabetes but their BSR levels were high at the time of data collection. It shows that it is needed to improve their nutritional and life style modification knowledge so that they can control their blood sugar levels by changing their diet and life style along with the medication.

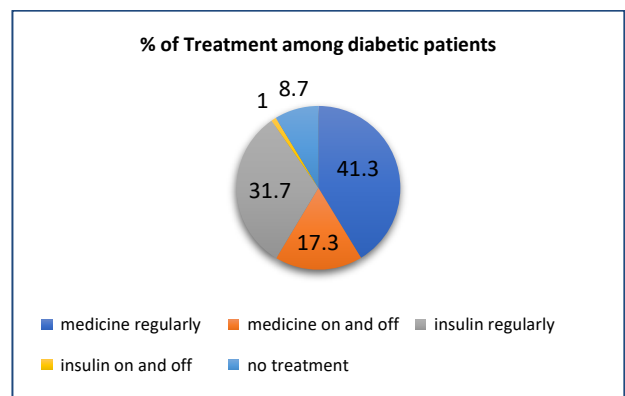


Figure 4: Pie chart showing distribution of treatment in percent of the diabetic patients

### Frequencies and percentages of knowledge, attitude and practices

#### Knowledge about diabetic systemic and oral complications

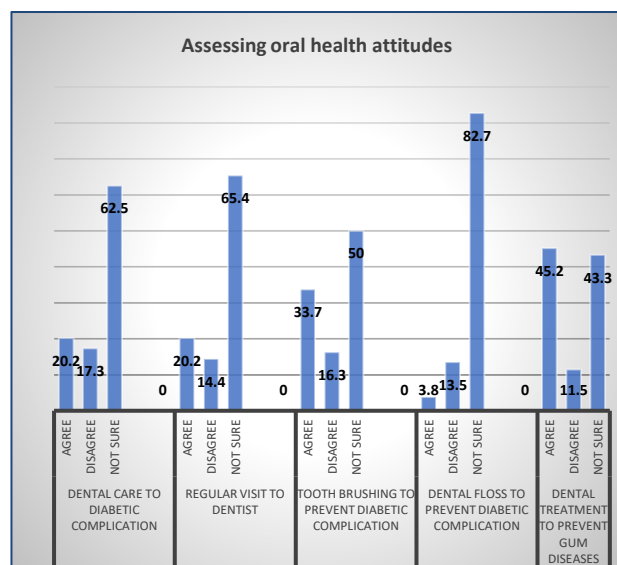
The below table 3 shows that most of the diabetic patients were aware about the diabetes related systemic complications but their knowledge about oral complications was very low.

**Table 3: knowledge of diabetic patients regarding diabetic systemic and oral complications**

Variables	Items	Percent (%)
Knowledge about diabetic systemic complications	Heart diseases	54.8%
	Kidney diseases	57.7%
	Eye problem	88.5%
	Stroke	23.1%
	Foot problems	89.4%
Knowledge about diabetes related oral complications	Oral health information by physicians	4.8%
	Gum diseases	39.4%
	Oral infections	40.4%
	Teeth and gums affected by diabetes	40.4%
	Bleeding gums, early sign of gum diseases	37.5%
	Gum diseases lead to tooth loss	31.7%

#### Oral health attitudes

The Figure 5 shows the frequency and percent of the answers of the oral health attitude items that the study participants gave during the data collection. It shows that most of the participants were not sure about the statement describing the oral health attitude. When it is asked from the study participants that what is their idea that “Dental care is important to prevent diabetic oral complications”, 62.5% were not sure about this statement.



**Figure 5: Assessing oral health attitudes**

#### Oral health practices

The Table 4 shown below point out that 66.3% of the diabetic patients were using “Tooth brush” for cleaning their teeth while the percent for using “Maswaak” was 42.3. but most of the participants (55%) were brushing their teeth only in the morning.

**Table 4: Frequency and percent of oral health practices items**

Oral practice variables	Response	Frequency	Percent	
Method of cleaning teeth	Tooth brushing	Yes	69	66.3
		No	35	33.7
	Mouth wash	Yes	12	11.5
		No	92	88.5
	Salt solution rinse	Yes	14	13.5
		No	90	86.5
	Dental floss	Yes	0	0.0
		No	104	100.0
Maswaak	Yes	44	42.3	
	No	60	57.7	
Frequency of tooth brushing	Once a day	52	55.0	
	Twice a Day	17	16.3	
	No brushing	35	33.7	
Duration of tooth brushing	<1 minute	19	18.3	
	1-2 minutes	15	14.3	
	>2 minutes	35	33.7	
	None	35	33.7	
	How long is it since you last visit to dentist	<6 months	29	27.9
	6-12months	15	14.4	
	>1year<2years	12	11.5	
	>2years<5year	8	7.7	
	>5years	21	20.2	
	Never visited	19	18.3	
Last dental services received	Extraction	48	46.2	
	Restoration	1	1.0	
	Cleaning	4	3.8	
	Dentures	6	5.8	
	Others	26	25.0	
	None	19	18.3	
Reason of dental visit	Emergency	3	2.9	
	Others	82	78.8	
	None	19	18.3	
Did you ever visit to any dentist/dental practitioner	Yes	85	81.7	
	No	19	18.3	

#### Association of oral health knowledge to oral health practices

##### Adequate and inadequate knowledge

Oral health knowledge variable had 6 items and each item had three response options that were 1. Yes, 2. No and 3. Don't know. Items of the knowledge were computed and response of each item was recoded as adequate and inadequate (including the “Don't know” response option). The Participants whose response was in the range of (1-9), had adequate knowledge while the participants whose response was in the range of (10-18) had inadequate knowledge.

##### Bad and good oral health practices

The oral health practice variable had 6 items and each item had two response options that were 1. Yes and 2.No. The items of practices were computed and response of each item was recoded as poor and good. The Participants whose response was in the range of (1-9), had good practices while the participants whose response was in the range of (10-12) had bad practices.

**Table 5: Association between Oral Health Knowledge and Practices**

Oral health knowledge	Categories	Oral health practices				P value
		Good		Bad		
		Freq.	%	Freq.	%	
	Yes/ Adequate	8	20.0%	32	80.0%	.556
	No/ Inadequate	16	25.0%	48	75.0%	

The association of oral health knowledge was determined to oral health practices by using Chi square. Cross tabulation was done of oral health knowledge to oral health practices as shown in table 5. The Chi-Square statistic was calculated and compared it against the critical value from the Chi square distribution. The p value of the Chi square statistic was “.556”, which was more than 0.05(alpha level with 95% confidence level). On the basis of this, it was concluded that there is no statistical relationship between oral health knowledge and oral health practices. Both variables are independent of each other.

## Discussion

Oral diseases effect the people of any sex, age and locality (21). Prevalence of periodontal diseases is very high in diabetic patients (22)(23).

In this study, results revealed that 38.5% of the diabetic patients had adequate oral health knowledge. These outcomes are consistent with a cross sectional study conducted in Malaysian diabetic patients to assess their oral health seeking behaviors. Most of the study participants were females (62.3%). This study by Sahril N et al showed that only 35.5% of the diabetic participants said that there was a connection between diabetes mellitus and oral health (24). These results were also consistent with other researches done worldwide in the developing countries (25,26).

In Pakistan a study was conducted in Lahore that was cross sectional descriptive in nature. The outcomes of this study were also persistent with the present study as this study also concluded that only 35.4% of the study participants had knowledge about the oral complications of diabetes (27). Another cross-sectional study of 300 diabetic patients was conducted in Armed Forces Institute of Dentistry, Rawalpindi (28). This study displayed that 64% of the diabetic patients were aware of the oral complications related to diabetes. But these results were not consistent with the present study and the other studies conducted in developing countries. The reason for this was mentioned in that study as it was conducted in an army set up so army personals are educated and can take good care of their health.

In this present study a statistically significant association was found between oral health knowledge and systemic complications knowledge (P value = .008). These results were evident with the study conducted in Abha city on 612 diabetic patients (29). This study showed that 65.2% of the diabetic patients were aware of eye problems, 65% had knowledge of kidney problems while 84.8% knew about diabetes related foot problems. These findings may show

that physicians or doctors did not guide the diabetic patients about oral health complications.

When it is asked from the study participants that “Have you ever receiving oral health care information from health personnel”, 95.2 % refused it. These findings are consistent with other studies conducted in past like a study done by Ismaeil F et al (29). Another study by Tsai C et al (23) also showed similar results.

In the present study, on assessing the oral health practices of the diabetic patients, it was concluded that the overall oral health practices of the diabetic patients were 23% that were very poor. The use of the tooth brushing for cleaning teeth was 66.3% while 42.3 % were using Maswaak for cleaning teeth. When tooth brushing was assessed on frequency basis, it was estimated that there were 55% of the diabetic patients who brushed their teeth once a day. While 16.3% brushed their teeth twice a day. 39.4% of the participants did not visit the dental clinic with in the last 1 year. The main reason of their visit was pain.

However, when the oral health knowledge was cross tabulated with oral health practices and their association was measured by using Chi square, a statistically non-significant association was found between two variables. This finding of no association is constant with the study conducted to determine oral health knowledge and behaviour of diabetics (30).

## Conclusion

The main finding of study was that knowledge of the diabetic patients about oral health complications was very low. The data visibly showed that the awareness of the diabetic patients regarding systemic complications was high as compared to oral complications related to diabetes mellitus. The knowledge of oral health was deficient in the diabetic patients which was reflecting by their poor oral attitudes and poorer compliance of suggested oral cleanliness practices like brushing of teeth two times a day and regular dental check-ups.

## Limitation

This research was conducted in Kahuta, District Rawalpindi which is an underdeveloped area. Research conducted in the urban and developed settings of the country may produce dissimilar results. Secondly as it was a hospital-based study so the results may not be generalized on overall diabetic population.

## Recommendation and Way forward

There is substantial need of effective health education and promotion programs at Government level to motivate the diabetic patients to enhance their oral health knowledge and implementation and maintenance of oral hygiene behaviors that may improve their periodontal status. It is recommended to train the physicians and health care providers so that they can deliver adequate information and improve the oral health status and as a result, quality of life of diabetic patients.



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