ORAL HEALTH BEHAVIOR AND KNOWLEDGE OF ADULT DIABETIC PATIENTS REGARDING ORAL COMPLICATIONS OF DIABETES MELLITUS; A DESCRIPTIVE CROSS SECTIONAL STUDY IN TERTIARY CARE HOSPITAL OF RAWALPINDI

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ABSRTACT

Objective: To determine the knowledge of diabetic patients regarding oral complications of diabetes mellitus in tertiary care hospital of Rawalpindi. To determine the oral health behavior including their oral health care practices, attitudes and utilization of dental services of diabetic patients in tertiary care hospital of Rawalpindi.
Study Design: Descriptive cross-sectional study.
Place and Duration of Study: Combined Military Hospital, Rawalpindi. 6 months from July 18 to Dec 18.
Material and Methods: Non probability convenient Sampling was used on 344 diabetic patients who visited outpatient medical department of CMH, Rawalpindi. The data was collected by using a semi structured questionnaire developed with the help of literature review. Frequency and percentages were computed and chi square was used to find associations between demographics status and knowledge about oral complications of diabetes mellitus. Age, duration of diabetes, education, family history and mode of treatment were the independent variables and knowledge, behavior, attitude and utilization of dental services were dependent variables.
Results: Of the 344 participants recruited in the study 62% (214) were females, 67% (230) had a family history of diabetes, 55% (188) had more than 10 years of schooling and 24% (82) had received oral health education. 86% used tooth brush and fluoridated paste to clean their teeth. 48% (165) brushed only once daily. Of the 211 patients who did use an interdental cleaning aid, 168 preferred a tooth pick. Only 10 percent (35) had knowledge about periodontitis as the most frequently encountered disease in diabetics, many did not visit a dental facility at least once a year. Chi square test showed a significant association between education and knowledge about oral diseases and frequency of tooth brushing (p-value<0.05).

Keywords: Behaviors, Diabetes, Knowledge, Oral health, Oral complications.

INTRODUCTION

Diabetes mellitus is a Chronic, non-communicable disease which can occur when pancreas, a gland in the abdomen whose primary function is digestion and blood sugar regulation, does not produce enough insulin in the body (a hormone that regulates blood glucose), or when the body cannot efficiently use the insulin which is being produced by the pancreas[1,2]. One of the most distinctive feature of the disease is that people who suffer from diabetes either from type 1 or type 2, universally experience hyperglycemia or high blood sugar levels in the body, a condition in which excessive amount of glucose circulates in the blood plasma as result of body's inability to maintain normal blood glucose levels[3]. According to WHO estimation, 422 million adults aged over 18 years were living with diabetes in 2014 globally. The largest numbers of people living with diabetes are estimated for the South-East Asia and Western Pacific Regions and accounts for approximately half the diabetes cases in the world[4]. There has also been an increase in mortality and morbidity attributed to diabetes. In 2015 it was estimated that almost 1.6 million deaths were directly due to diabetes and it will be the seventh leading cause of death in 2030. Pakistan takes the seventh place in prevalence of diabetes[5]. By the year 2025 it will be at fourth place. International Diabetic Foundation states that Pakistan had 6.2 million

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people with diabetes in 2003 and is expected to rise to 14.5 million by 2025[6]. Prevalence of diabetes in the district of Rawalpindi was found to be 34% which is higher than the previous studies, showing an increase in number of people living with diabetes[7].

Poorly controlled diabetes results in many systemic medical complications as well as oral complications which includes xerostomia, increased chances of bacterial & fungal infections, delayed healing, caries, premature tooth loss, loose teeth, taste alterations, burning mouth syndrome, alveolar bone resorption, gingivitis, salivary gland dysfunction and periodontitis[8-10], which is regarded as the 6th most prevalent complication of diabetes[9,11]. These oral diseases are regarded as the silent epidemic, which adversely affects a person's general health and quality of life. The importance of this statement can be judged by the fact that there is believed to be a bidirectional, two-way relationship between diabetes and periodontitis, i.e. that diabetes is major risk factor for periodontitis and periodontitis in return has a negative impact on the glycemic control[12]. Despite these established facts, patients with diabetes are often unaware of the clear link between oral health and diabetes and this is following an international pattern with studies across Europe, North America and the middle East[10,13]. According to recent studies done in Pakistan it was concluded that most patients were aware of other systemic complications of the disease e.g. foot ulcers etc, whereas less than half of the study participants had knowledge about oral complications[13,14]. The key factors contributing to this outcome could be that health care professionals do not advise them on their oral needs, patients do not visit their dentists regularly and only seek advice from dental professionals when they think it is necessary or in pain or they have low accessibility and lack of time[9,15].

With such increase in prevalence in diabetes across the globe and very limited knowledge about oral health much work needs to be done regarding improving the oral health behavior and knowledge of oral complications of diabetes in diabetic patients especially when there is a dearth of such studies in the district of Rawalpindi. This study is aimed to assess the oral health behavior and knowledge of oral complications of diabetes mellitus and its associated factors.

It is expected that the findings of this study will improve the oral health status of diabetic patients by taking measures for increasing awareness in the community especially in diabetic patients generally for promotion of oral health.

MATERIAL AND METHODS

This study was a cross sectional survey (Quantitative) and used a cross-sectional design that allowed the researcher to determine the trends about Oral health behaviors and practices and other sample characteristics. Descriptive survey method was used to observe, describe and document different aspects of Oral health behaviors including the level of knowledge of oral complications of diabetes mellitus (which was quantified). The sampling technique used was non-probability convenience sampling. The participants were volunteers and they were chosen based on their availability and willingness to participate in the study.

This study setting was a hospital known as Combined Military Hospital Rawalpindi which is a tertiary care military hospital in Rawalpindi. It provides specialized treatment to the armed forces personnel, their immediate families as well as civilians. It is an A Class Combined Military Hospital. It is the chief medical hospital of the cantonment area of Rawalpindi, along with being a Military Hospital for the Armed Forces of Pakistan.

The sample size for the study was 344, calculated by using Sample Size calculating Equation: $N = \frac{Z^2\ Pq}{e^2}$. The participants for the study were adult patients suffering from any kind of Diabetes whether gestational, Type 1 or Type 2 and those who had at least one tooth in their mouth. Those patients who had no tooth in their mouth and were admitted in wards due to

systemic complications were excluded from the study.

Informed consent was taken from all respondents. The study participants were ensured that their responses will be kept anonymous. Healthcare providers and respondents who did not consent for participation were excluded from the study.

RESULTS

Socio demographic characteristics of the sample are given below in table-I.

Table-II outlines the oral health behaviors of the study participants.

When assessing the knowledge of the patients, it came to light that majority of patients thought that most commonly encountered oral disease in a diabetic patient was xerostomia instead of periodontitis and 49% (167/344) thought that treatment of gum diseases did not affect glycemic control in any way (figure 1). 70% (240/344) of the patients knew that diabetes can cause caries and gingivitis. 64% (220/344) of diabetics were also aware of the fact that patients with tooth and gum problems have poorer glycemic control.

While evaluating the results of utilization of dental services it was revealed that most patients had a professional dental visit almost 2 years ago. 61%(211/344) of the patients visited the dental facility for extraction and restorative care,

Table-I: Summary of results - demographic characteristics.

Characteristics	Frequency (n)	Percentage (%)
Gender		
Males	130	37.8
Females	214	62.2
Total	344	100.0
Family History		
Yes	230	66.9
No	114	33.1
Total	344	100.0
Mode of Treatment		
Oral hypoglycemic drugs	201	58.4
Insulin	67	19.5
Self remedy/ herb	33	9.6
Both insulin and oral hypoglycemic drugs	43	12.5
Total	344	100
Education		
Never went to School	39	11.3
<5 years of schooling	40	11.6
<10 years of schooling	77	22.4
>10 years of schooling	188	54.7
Total	344	100.0
Duration of Diabetes		
<5 years	137	39.8
>5 years	65	18.9
>10 years	142	41.3
Total	344	100.0
Educated About Diabetic Oral Complications		
Yes	82	23.8
No	262	76.2
Total	344	100.0

whereas 64% (220/344) reported that the reason for not visiting a dental facility more often, was that they did not have a dental problem, which shows that they did have a chronic underlying oral problem which eventually led to restoration and extraction but they were totally unaware of the disease.

Table–II: Summary of results – oral health behaviors.

Do you clean your teeth?	**Frequency (n)**	**Percentage (%)**
Yes	342	99.4
No	2	0.6
Total	344	100.0
How do you clean your teeth?		
Neem Stick	22	6.4
Finger and tooth powder	23	6.7
Tooth brush and tooth paste	294	85.9
Any other (Mouthwash Rinse)	3	0.87
Total	342	100.0
Frequency of Cleaning Teeth		
Occasionally	23	6.7
One time	165	48.2
Two times	129	37.7
More than two times	25	7.3
Total	342	100.0
Use of Fluoridated Toothpaste		
Yes	294	85.96
No	48	14.03
Total	342	100
Use of Mouthwash		
Yes	66	19.2
No	276	80.7
Total	342	100
Use of Interdental Cleaning Aid		
Yes	211	61.69
No	131	38.30
Total	342	100.0
Frequently Used Interdental Cleaning Aid		
Tooth pick	168	79.6
Floss	20	9.5
Thread	23	10.9
Total	211	100.0
Frequency of Using Interdental Cleaning Aid		
Occasionally	145	68.7
one time	11	5.2
two times	15	7.1
more than two times	40	19.0
Total	211	100.0

Discussing the attitude related results, majority of the patients answered that if they did have a dental problem they would prefer to visit

a dentist and 93% (320/344) of the patients were in the favor of getting oral health education.

DISCUSSION

When discussing about knowledge regarding oral manifestations of diabetes mellitus the results of my study highlighted the fact that only about 24 percent of the diabetic patients had been given any kind of formal education/ information about oral complications of diabetes while majority 76 percent confided that they had never received any such information. These findings are consistent with a ;study done in Saudia regarding health care professionals' involvement in dental care, 94.8% of respondents reported that they had never received advice on oral hygiene tasks in relation to diabetes from a health professional[16]. Referring to the question that which is most commonly encountered oral disease in a diabetic patient, the results in my study revealed that only 10% patients knew that periodontitis is the correct answer while majority (54%) thought that it was dry mouth. The results are somewhat similar to a study conducted in hospital of Kuala Lampur which highlighted that only 19.6% of respondents were aware of the risk of developing periodontal disease[17]. Yet another descriptive study carried out in Manglore India illuminated the fact that only 11 (22.5 %) people knew about periodontal conditions associated with diabetes[18].

However knowledge related to caries and gingivitis in my study was higher as compared to other studies carried out in Asia probably due to the fact that most patients in my study despite being not educated about oral health did have more than 10 years of schooling and the study was carried out in a tertiary care hospital.

Triangulating the behaviors of my study participants with another study conducted in Institute of dental sciences the results were somewhat similar. Regarding frequency of brushing, 49% reported brushing once daily, as compared with 22% that brushed twice daily. Among these patients, 92.4% were using fluoridated toothpaste. Mouthwash use was reported by 18.4% of patients. The most common device for interdental cleaning was toothpicks (34%), followed by dental floss (16%) and interdental brushes (8%)[13].

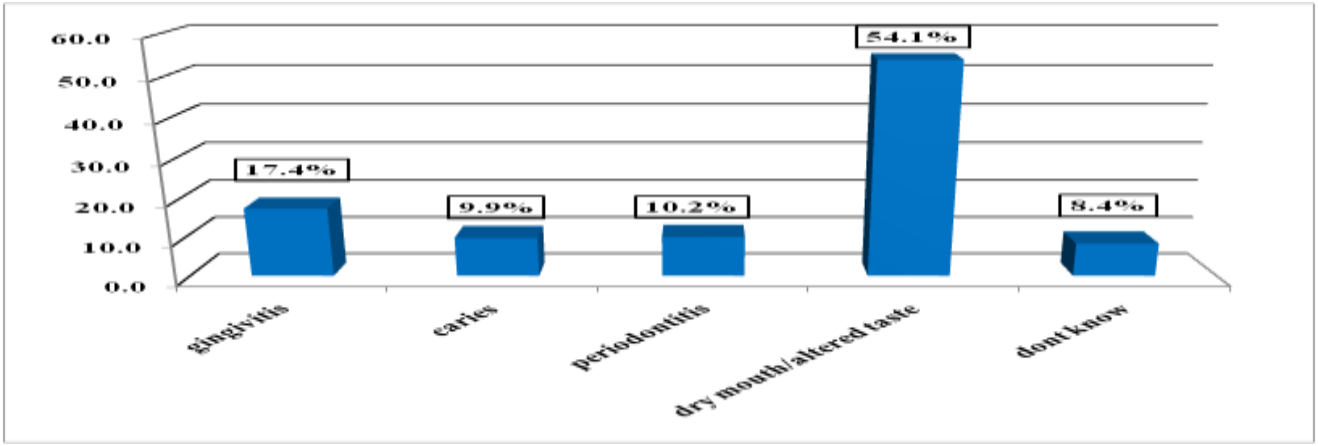

Figure: Knowledge about commonly encountered diseases in diabetic patients.

Regarding utilization of dental services my study results again bore similarity to other studies as a Malaysian survey also illuminated the same fact that regular dental attendance was not deemed necessary by Diabetic patients as only 35.3% had their last dental visit within the past one year. This accounted for only 16.7% of all respondents recruited in the study[14]. Attitude of my sample was positive as most patients reported that they would visit a dentist if they had an oral problem and would like to get oral health education and so was the case in other studies too[19].

CONCLUSION

One can conclude from my study that knowledge about oral disease i.e. caries and gingivitis was good but knowledge about most prevalent oral disease in diabetics was deficient. So is the case with oral health practices as almost all patients do clean their teeth and most prefer tooth paste and tooth brush but the frequency of tooth brushing was only once a day. Use of tooth pick was popular instead of floss. Many did not visit a dental facility once a year and had not received any oral health education. From this entire scenario one can recommend that Oral health should be included in diabetes education programs, management strategies or complication screening processes. With oral health included in diabetes management education, it can increase awareness of the relationship between diabetes and periodontal disease and improve oral health behaviors.

Medical professionals should provide oral health education routinely to people with diabetes primarily and Strong communication and collaboration between oral health professionals and medical professionals should be a significant bridge for the coordinated manage-ment of adults with diabetes.

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CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Organization WH. Global report on diabetes: World Health Organization; 2016.
2. International Diabetes Federation. What is diabetes 2018 [cited 2018]. Available from: https://www.idf.org/ aboutdiabetes/ what-is-diabetes.html.
3. Vernillo AT. Dental considerations for the treatment of patients with diabetes mellitus. The J Am Dental Assoc 2003; 24S-33S.
4. Smolen J, Burmester G, Combeet B. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in diabetes since 1980: A pooled analysis of 751 population-based studies with 44 million participants. Lancet 2016; 387: 1513–30.
5. Gul N. Knowledge, attitudes and practices of type 2 diabetic patients. Journal of Ayub Medical College Abbottabad. 2010; 22(3): 128-31.
6. Zafar J, Nadeem D, Khan SA, Abbasi JM, Aziz F, Saeed S. Prevalence of diabetes and its correlates in urban population of Pakistan: A Cross-sectional survey. J Pak Med Assoc 2016; 66(8): 922-7.
7. Bowyer V, Sutcliffe P, Ireland R, Lindenmeyer A, Gadsby R, Graveney M, et al. Oral health awareness in adult patients with diabetes: a questionnaire study. British Dental J 2011; 211(6): e12.
8. Mohamed HG, Idris SB, Ahmed MF, Bøe OE, Mustafa K, Ibrahim SO, et al. Association between oral health status and type 2 diabetes mellitus among Sudanese adults: a matched case-control study. PloS one 2013; 8(12): e82158.
9. Preshaw P, Alba A, Herrera D, Jepsen S, Konstantinidis A, Makrilakis K, et al. Periodontitis and diabetes: a two-way relationship. Diabetologia 2012; 55(1): 21-31.
10. Mohamed HG, Idris SB, Ahmed MF, Boe OE, Mustafa K, Ibrahim SO, et al. Association between oral health status and type 2 diabetes mellitus among Sudanese adults: A matched case-control study. PloS one 2013; 8(12): e82158.
11. Albert DA, Ward A, Allweiss P, Graves DT, Knowler WC, Kunzel C, et al. Diabetes and oral disease: Implications for health professionals. Annals of the New York Academy of Sciences. 2012; 1255(1): 1-15.
12. Ofilada EJ. Managing Periodontitis in Type 1 Diabetic Patients Improves Glycemic Control: A Case Report. J ASEAN Federation Endocrine Societies 2016; 31(2): 160.
13. Aggarwal A, Panat SR. Oral health behavior and HbA1c in Indian adults with type 2 diabetes. J Oral science 2012; 54(4): 293-301.
14. Sahril N, Aris T, Mohd Asari AS, Yaw SL, Saleh NC, Omar MA, et al. Oral health seeking behaviour among Malaysians with type II diabetes. J Public Health Aspects 2014; 1(1): 1.
15. Eldarrat AH. Diabetic patients: their knowledge and perception of oral health. Libyan Journal of Medicine 2011; 6(1): 5691.
16. Bahammam MA. Periodontal health and diabetes awareness among Saudi diabetes patients. Patient preference and adherence 2015; 9: 225.
17. Badiah B. A Preliminary Survey on Awareness of Periodontal Risk and Oral Health Practices among Diabetic Patients in Hospital Kuala Lumpur. Malaysian Dental J 2012; 34(1): 5-9.
18. Kamath DG, Nayak SU, Pai KK, Shenoy R. Knowledge and awareness of oral health among diabetic patients—a cross-sectional study from Mangalore City. International J Diabetes in Developing Countries. 2015;35(2):71-5.
19. Ismaeil F, Ali N. Diabetic patients knowledge, attitude and practice toward oral health. JEP. 2013; 4(20): 19-25.