Knowledge, Attitude and Practice assessment of dental professionals towards diabetes : a cross sectional study

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Abstract

Introduction: Diabetes and its acute complications have become a significant health hazard worldwide, particularly in the Indian subcontinent. To date, there is no data on the awareness of dental professionals regarding the management of diabetic patients.
Aim: The aim of the study was to assess the knowledge, attitude and practice of dental professionals in India regarding the clinical manifestations and management of diabetic patients.
Materials and Method: The study was cross–sectional, comprising of 100 dental professionals, including dental graduates, post graduates, faculty members of dental colleges and private practitioners from the Delhi NCR region. Data was obtained by a self completion questionnaire which was pretested by conducting a pilot study, comprising of a fourteen item questionnaire aimed at assessing the knowledge, attitude and practice of dental fraternity regarding the manifestations and management of diabetic patients. In the questionnaire, nine questions aimed at assessing the knowledge, two questions assessed the attitude and three were for practice assessment.
Results: The results showed a clear cut knowledge deficit amongst dental fraternity regarding the manifestations and management of diabetics in dental practice.
Conclusion: The present study showed low level of awareness of dental fraternity regarding diabetes. Therefore, designing strong curriculum resources for oral health care providers, in order to enhance their awareness towards diabetes is the need of the hour.

Keywords: Dentists, Awareness, Oral Manifestations, Diabetes Mellitus, Dental Education

Introduction

Diabetes mellitus is a metabolic illness characterized by hyperglycemia ensuing from defects in the insulin secretion, insulin action or both. The prevalence of diabetes mellitus has increased to an extent that it has taken the form of an epidemic in various parts of the world.[1] The current estimates by the International Diabetes Federation have shown that the number of adults affected by the disease in 2011 was 365 million which was projected to increase to 552 million by 2030. In India 61.3 million people were affected from diabetes till 2011 and it is estimated to rise to 101.2 million by 2030.[2]

Diabetes and its acute complications have become a considerable health hazard worldwide, predominantly in the Indian subcontinent. As per the World Health Organization, India had 69.2 million people living with diabetes as per the 2015 data, of these, it remained undiagnosed in more than 36 million people. With its rising incidence, diabetes has captured the interest of specialists and general practitioners equally in medicine and dentistry.

Medical complications commonly associated with diabetes include nephropathy, retinopathy, neuropathy, peripheral vascular disease and coronary heart disease.[3] Oral health complications seemingly associated with diabetes consist of tooth loss, gingivitis, periodontitis and soft tissue pathologies. Periodontitis is perhaps the most widely noted oral manifestation of diabetes.[4]

The dangers of diabetes have been recognized worldwide. To date, there is no data on the awareness of dental professionals regarding the management of diabetic patients. With the increasing longevity and effective diagnostic aids, the dentists will be treating more patients with Diabetes Mellitus in the near future. Therefore, it becomes essential for a dental surgeon to be aware of medical and dental management of diabetic patients. Thus, the present study investigated oral health attitudes, knowledge and practice of dental professionals regarding aspects related to diabetes amongst adults.

The aim of the study was directed towards the assessment of the knowledge, attitude and practice of dental professionals regarding the clinical manifestations and management of diabetic patients.

Material and Methods

The present cross-sectional survey was conducted over a period of two months (July, 2015 –September,

2015) at ITS College of Dental Sciences and Research, Ghaziabad, Uttar Pradesh, India. Approval for the study was obtained from the research and ethical committee of the institution. The study comprised of interns, final year post graduate (MDS) students, MDS faculty members working as academicians in various dental colleges of Delhi-NCR region and private practitioners in the same region. The total number of participants were 100; comprising 25 members in each group. The participants were selected by convenience sampling technique. Informed consent was taken from all the participants after informing them of the objective of the study. If the participants were not available for filling the questionnaire when visited by the investigator, two more attempts were made to contact them. Candidates who were not available even after three visits and the ones who submitted incomplete questionnaires were excluded from the study. A pretested, structured, questionnaire was used which had both open ended and closed ended questions. A total of fourteen questions were framed satisfying all the aspects of assessing KAP (Knowledge, attitude and practice) of dental professionals out of which, nine questions aimed at assessing knowledge, two questions assessed the attitude and three assessed the practice management.

A pilot study of the questionnaire was conducted on 20 participants (5 representatives from each group) to study the feasibility and validity before commencing the study. According to the pilot study, the prevalence rate for awareness and preparedness was found to be 59%. Keeping the population size as infinite, we applied the formula for sample size $N = z^2pq/d^2$, where $z = 1.96$ @ 95% confidence level, p (prevalence) = 61.2% (determined from the pilot study), $q = 1-p$ (1-0.5=0.5), d (precision rate/ least permissible error) = 10%. The final sample size required for the study came out to be 100. Therefore, the study was conducted on 100 dental professionals.

Data collection: There was a single investigator in the study. Completely filled questionnaires were collected and the questionnaire was not left for filling for more than twenty minutes with the participants. The information obtained during data collection was kept strictly confidential. Only their professional designations were considered. The descriptive analysis of the collected data was done by statistical software using SPSS version 16.0.The responses for each question were given a percentage frequency distribution.

Results

A total of 100 dental professionals were approached in person for the study and all of them agreed to participate. (Table 1)

Table 1: The questionnaire with the results

Questions		Results
Question 1	You have a diabetic patient; will you take any precautions while scheduling an appointment for him?	76% stated morning appointments; 24% stated that no special precaution is needed
Question 2	Are you aware of the medications your diabetic patient might be taking?	50% aware of the medications; 50% had no clue
Question 3	What are the 3 cardinal signs of diabetes?	Results: 64% -3P's; 36% unaware
Question 4	Which is the most common *Oral manifestation* associated with diabetes?	83%- periodontitis 17% - caries, gingivitis
Question 5	Which is the most common *Oral mucosal lesion* associated with diabetes?	35% oral candidiasis. 20% oral lichen planus
Question 6	In a suspected diabetic patient which is the gold standard investigation?	20% Oral glucose tolerance test 70% -HbA1c, 10% Random BGL
Question 7	Do you have any device to monitor blood glucose level in your clinic?	42% had device to monitor blood glucose level 58% had no device
Question 8	Do you go for an antibiotic coverage before commencing any surgical procedure on a diabetic patient?	72% prescribe prophylactic antibiotics 18% do not prescribe
Question 9	What special measures will you take for controlling anxiety in a diabetic patient?	61% no special measures to control 39% take special measures
Question 10	What are the complications associated with dental treatment of uncontrolled diabetic patients?	65% aware 35% unaware
Question 11	Which is the major medical emergency encountered while treating a diabetic patient?	39% aware 61% unaware
Question 12	How will you manage the medical emergency?	35% aware, 65% unaware
Question 13	Do you counsel the patients regarding usage of oral hygiene aids?	87% do not counsel their patients; 13% counsel
Question 14	Have you attended any workshop especially tailored for	92% *never* attended;

	dental professionals on management of "diabetic patients"?	8% attended

Knowledge assessment of participants regarding the manifestations of diabetes: A total of nine questions in the questionnaire aimed at assessing the knowledge of the dental professionals. When asked about the scheduling of appointments for diabetics, 76% of the dentists stated that morning appointments were best suited for diabetics and 24% stated no special precautions were needed while scheduling the appointments for a diabetic patient. Surprisingly, only 50% of the dentists were aware of the medications a diabetic might be taking. Only 64% of the dentists knew that polyuria, polydipsia and polyphagia are the three cardinal features of diabetes, while, the remaining 36% had no idea. On being asked about the most common oral manifestation and oral mucosal lesion associated with diabetes, 83% dentists stated periodontitis as the most common oral manifestation. 35% dentist stated oral candidiasis and 20% said that oral lichen planus was the most common oral mucosal lesion associated with diabetes. The dental professional were asked about the gold standard investigation which they would like to go for, in case they encounter a patient who is unaware of his blood glucose level and is suspected to be a Diabetic patient. In response to this question, 20% stated they would opt for an oral glucose tolerance test. 70% of the dentists said glycosylated hemoglobin estimation would be the investigation of choice and 10% were in favor of random blood glucose level. 65% were aware and 35% were unaware of the complications associated with the treatment of patients with uncontrolled diabetes. Only 35% dentists knew the most common medical emergency associated with diabetics and 65% were unaware of the medical emergency. 39% dentists were aware of the measures to be taken for controlling the emergency and remaining 61% were not. The respondents had a good knowledge of the manifestations of diabetes and the scheduling of appointments for diabetics. There was a knowledge deficit with regards to the routine medications taken by diabetics and the medical emergency associated with dental treatment of diabetics in a dental office.

Assessment of attitude of participants regarding the manifestations of diabetes: Two questions aimed at assessing the attitude of participants regarding manifestations of diabetes. Patient motivation is an essential step. Based on this assumption, a question was framed to find the proportion of dentists who routinely counsel their diabetic patients regarding usage of oral hygiene aids. It was found that only 13% counsel their patients regarding the usage of oral hygiene aids. The dental professionals were asked if they had attended any workshop especially tailored for dentists on management of diabetic patients. 92% of the dentists had never attended any program /workshop on diabetes which was quite alarming. This clearly highlighted the negligence of the dental fraternity towards diabetes as a systemic disorder with enormous oral manifestations.

Assessment of practice of participants regarding the manifestations of diabetes: The dental professionals were asked if they had any device to monitor blood glucose level in their clinical setting. Only 42% dentists had the device to monitor blood glucose level. It is a well known fact that the diabetics are immunocompromised and have increased chances of contacting infections. Based on this, a question was framed regarding the prophylactic administration of antibiotics to a diabetic before commencing a surgical procedure. It was found that only 72% of the dentists prescribe prophylactic antibiotics. The dental professionals were questioned about the special measures they would take for controlling anxiety in a diabetic patient. 61% dentists confessed that they never take any special measures for controlling anxiety, while the rest 39% stated that they take special measures, like scheduling early morning appointments and ensuring that the patient has taken his meal properly before the commencement of a procedure. Some even stated that they prescribe anxiolytic medications to their patients.

Results have been graphically depicted (Graph 1).

Graph 1: Collective assessment of KAP levels: Knowledge 52%, Attitude 1.5% and Practice 46.5%
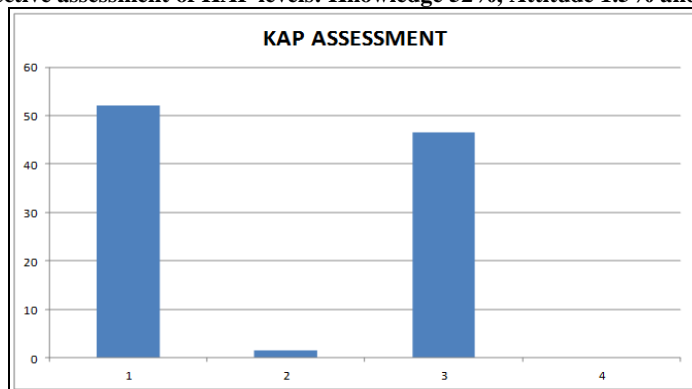
Discussion

To begin with, for a diabetic patient, morning appointments are always advisable since endogenous cortisol levels are higher at this time. Cortisol increases blood glucose levels and decreases the incidence of hypoglycemic episode during the appointment. For patients having Type 1 DM (Diabetes Mellitus) and receiving insulin therapy, appointments should be planned such that they do not overlap with the peaks of insulin activity.[5] In the present study 76% dental professionals were aware that there is a need to take precautions while scheduling appointments for diabetics.

It is very significant for the dentists to take a good drug history of their patients. The recent blood glucose levels should be asked. The time of administration and dosage administered should be assessed. There are a variety of medications which might interfere with the glucose metabolism. Sulfonylureas, have a hypoglycemic action which may be potentiated by highly protein bound drugs, such as, beta blockers, sulfonamides. There are certain drugs which have a hyperglycemic action like epinephrine, thiazides, oral contraceptives.[6] Therefore, it becomes essential for a dentist to have knowledge of the medications a patient of diabetes might be taking.

As far as clinical manifestations are considered, polyuria, polydipsia and polyphagia are the three cardinal features of diabetes. When blood glucose levels become elevated, glucose gets excreted in the urine, excessive urination occurs as a consequence of osmotic diuresis (polyuria). Increased fluid loss leads to dehydration resulting in excessive thirst (polydipsia). The patient experiences increased hunger (polyphagia). These are the classical signs and symptoms of Diabetes Mellitus.[6]

Periodontitis, is undoubtedly the most common oral manifestation of Diabetes Mellitus.[7] DM, when poorly controlled, increases the risk of periodontitis. The etiology warrants the role of polymorphonuclear leucocytes, whose function gets altered, abnormal collagen metabolism, formation of advanced glycation end products (AGEs), which negatively affect the collagen stability and vascular integrity.[8] AGE bind to macrophage and monocyte receptors and result in increased secretion of Interleukin-1 and Tumor Necrosis Factor alpha, thereby, increasing the tissue destruction. Demmer and colleagues, investigated the association of periodontal disease with the incidence of Type 2 Diabetes in over 7,000 participants. It was reported that there existed a positive association between baseline periodontal disease and incident Type 2 Diabetes in a cohort study of individuals who were followed for a mean of 17 years. It was also seen that periodontal disease was significantly associated with 50–100% greater risk for Type 2 Diabetes incidence at follow-up.

According to several authors, diabetics are highly prone to oral candidiasis, which has been linked to poor glycemic control and the usage of acrylic prosthesis.[9] The condition may be further aggravated by reduced salivary flow. Burning sensation and taste disturbances have also been reported in patients with uncontrolled Diabetes Mellitus.

Petrou et al. have stated that the prevalence of oral lichen planus is significantly higher in Type 1 and Type 2 Diabetics in contrast to the control population.[10]

Diabetics have been shown to have more active dental caries than the control subjects. The reason cited has been increased salivary glucose levels and xerostomia.

The dental professional were asked about the gold standard investigation, which they would like to go for in case they encounter a patient who is unaware of his blood glucose level and is suspected to be a diabetic. Hjellestad et al [4] conducted a study to compare the oral glucose tolerance test (OGTT) and glycosylated hemoglobin (HbA1c) and concluded that HbA1c at a cut-off value of $\geq$ 48 mmol/mol (6.5%) had a 45.5% sensitivity to diagnose DM in patients with peripheral arterial disease. Pathologic glucose metabolism was significantly higher based on HbA1c values than OGTT.

According to Cox et al, oral glucose tolerance testing was started in 1922 and has been one of the diagnostic tests of preference for the past 80 years. It is presently considered the gold standard for diagnosis of diabetes probably because of its longstanding use. It has been suggested by WHO for diagnosis and has been listed as an alternative, in the American Dental Association (ADA) recommendations, but its use in the clinic remains controversial.[5,10]

HbA1c testing was first proposed as a measure of blood glucose control in 1976.[9] Since the mid-1990s, it has been accepted as the gold standard for therapy assessment and prognostication. In June 2009, the test was approved by the ADA as a first-line screening and diagnostic test for Diabetes.[10] In a study by Wilder et al.[11] it was observed that that general dentists rarely actively manage patients with Diabetes. In their study conducted on dentists in North Carolina, it was seen that 37% of the respondents did not ask about or record blood glucose levels or HbA1c, and only 8% were likely to assess patients for diabetes using a glucose monitor. In the present study, majority of the dental professionals stated HbA1c, as the gold standard investigation, for screening individuals for diabetes and only 42% had a device to monitor blood glucose levels in their clinics.

Glucometer, is the device which is routinely used in the clinical set up for measurement of blood glucose levels. Measurement of blood glucose levels (BGL), in susceptible individuals before commencement of dental procedure should be done without fail. Pre assessment of blood glucose levels is a must for patients with

familial history and individuals falling into susceptible age groups. It should be made a part of the routine investigative work up.

Diabetic patients have high propensity for developing oral bacterial infections which is attributed to their immunocompromised status. Several studies[7,8,9] have reported that patients with diabetes are more susceptible to deep neck bacterial infection as compared to the patients without diabetes.

Anxiety control forms a crucial part of the management of a diabetic patient. Pre treatment anxiety can be reduced by antianxiety drugs. Pain during procedure can be reduced by a potent anesthetic without adrenaline. The release of stress hormones such as adrenaline can cause a buildup of blood glucose levels in a diabetic patient. Stress hormones have an inhibiting effect on insulin release from the pancreas.

If the surgical aspect is considered, poor soft tissue regeneration and delayed osseous healing in patients with diabetes are known complications during oral surgery, making the management and cure of patients more difficult. It was reported[1] that delayed vascularization, impaired blood flow, compromised innate immunity, decreased growth factor production and psychological stress may attribute to protracted healing of an oral wound in a diabetic patient.

The most common complication of DM that can occur in the dental office is a hypoglycemic episode.[4] If insulin or oral hypoglycemic drug levels exceed physiological needs, patient might experience a severe decline in the blood sugar level. Initial sign and symptoms include mood changes, hunger, weakness followed by sweating, incoherence and tachycardia.

If the clinician suspects that the patient is under a hypoglycemic episode, he should at once terminate the dental procedure. Patient should immediately be given fast acting carbohydrates like glucose tablets, sugar candy or juice. In case the patient is not able to swallow or is unconscious, 25 to 30 ml of 50% dextrose solution or 1 mg glucagon should be administered intravenously.[8]

As healthcare providers, counseling a patient forms a part of our diagnosis and treatment planning. Oral hygiene aids such as usage of soft toothbrushes which in turn minimize trauma to oral tissues, tongue cleaners to prevent deposition on tongue surface, use of dental floss for prevention of food impaction, interdentally and using alcohol free mouthwash to minimize xerostomia should be prescribed to a diabetic.[10]

Lastly, the dental professionals were asked if they had attended any workshop especially tailored for dentists on management of diabetic patients. A large percentage of the dentists had never attended any program /workshop on diabetes. To ascertain the cause for the same, a retrospective data search was made and there was no data available on the number of workshops held annually for diabetes awareness amongst dental professionals in India. In India,

approximately 25% patients visiting dental office suffer from diabetes and approximately 10.62% of the patients had suffered a hypoglycemic attack during a dental procedure. This clearly highlights the dire need for increasing the awareness amongst dental professionals regarding the management of diabetics in a dental set up.

Limitations

The present study was done on a small sample size and the results were not tabulated on the basis of various subgroups to ascertain the level of knowledge amongst dental fraternity. Similar studies can be carried out on a larger sample size covering larger geographical areas and including other aspects of diabetes.

Conclusion

The present study showed low level of awareness of dental fraternity regarding diabetes. The knowledge aspect of the questionnaire clearly depicted that the dental professionals had theoretical knowledge about certain aspects of diabetes but lagged behind when it came to the management of medical emergencies in the dental office. There is a need to implement the use of Blood Glucose Level (BGL) monitoring devices on a routine basis, prescribing prophylactic antibiotics to diabetics and counselling patients for using oral hygiene aids.

In order to increase the rate of awareness amongst dental fraternity for diabetes, there is a need to develop curriculum resources for oral health care providers. There is a need to create inter-professional learning experiences to cultivate an interdisciplinary approach for diabetes care. More number of workshops on diabetes should be organized for the dental fraternity to keep them abreast of the latest developments in the trends for the patient management. This would definitely help them to provide a better cure for a diabetic patient and minimize the incidence of the dental emergencies associated with dental treatment.

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