ORIGINAL RESEARCH ARTICLE

KNOWLEDGE, ATTITUDE AND PRACTICE RELATED TO DIABETES MELLITUS IN DENTISTS OF NEPAL

Bishal Joshi[1,*], Buddhi Raj Pokhrel[2], Laxmi Shrestha[3], Sanjit Kumar Kar[1], Narayan Bahadur Mahotra[4]

[1]Department of Physiology, Universal College of Medical Sciences, Bhairahawa, Nepal
[2]Department of Biochemistry, Universal College of Medical Sciences, Bhairahawa, Nepal
[3]Department of Pharmacology, Universal College of Medical Sciences, Bhairahawa, Nepal
[4]Department of Physiology, Maharajgunj Medical Campus, IOM, TU, Kathmandu, Nepal

ABSTRACT

Background: Diabetes mellitus (DM) is one of the most common systemic diseases encountered by dentists in daily practice. The present study aimed to assess the knowledge, attitude, and practice of dentists regarding diabetes mellitus.

Methods: This cross-sectional study was conducted among the dentists of Nepal from August to December 2020. A total of 345 dentists throughout the country took part in this study. A set of 27 self-designed questions was used as the study tool, among which 11 questions were about knowledge, seven were about attitude, and nine were about practice related to DM. The result was expressed in frequency and percentage. Chi square and Spearman's correlation analysis were performed with SPSS version 16.

Results: The mean knowledge score was 8.15 ± 1.54 with 11 being the highest possible score. Of the total participants, 252 (73%) had good knowledge regarding DM. The mean attitude score was 4.68 ±1.19, where seven was the highest possible score. Of the total respondents, only 190 (55.1%) had a positive attitude. The mean practice score was 7.19 ± 1.19, with nine being the highest possible score. A majority of the respondents (N = 320, 92.8%) had good practice habits regarding diabetic patients. Correlation analysis showed a weak positive but significant correlation among knowledge, attitude, and practice.

Conclusions: There was good knowledge and practice in dentists though there were frequent areas of improvement in attitude. Various trainings like continuing medical educations (CME) may be beneficial to improve personal beliefs.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia due to a defect in insulin secretion or its action.[1] According to World Health Organization (WHO), more than 422 million adults were afflicted from diabetes mellitus worldwide in 2014,[2] and this number may increase to 642 million by 2040 as per the prediction of international diabetes federation (IDF).[3] Nepal is no different from the global scenario as a recent study shows that prevalence of the pre-diabetic population is 9.2% and that of a diabetic is 8.5% in Nepal.[4]

DM is characterized by classical symptoms of polyuria, polyphagia, and polydipsia along with several microvascular and macrovascular complications.[5-7] Gingivitis and periodontitis are the most common oral manifestations of DM whereas, several other oral changes like; dental caries, oral candidiasis, oral mucosal disorders, dysfunctions of salivary glands and taste, and neurosensory disorders are also observed.[8,9]

Dentists are one of the leading health professionals who are encountered with diabetic patients regularly. The responsibilities of dentists include; recognition of diabetic patients, their effective management, and proper counseling so that oral health is properly maintained and its systemic hazards are diminished.[10] Unfortunately, no single study has been conducted on the KAP of dentists regarding DM in Nepal and even a very few studies with small sample sizes have been conducted worldwide. Therefore, we commenced this study to understand the level of knowledge of dentists, their perceptions, and prevalent practice in Nepal in the management of DM in dental setup.

METHODS

This questionnaire-based cross-sectional study was conducted in dentists of Nepal from August to December 2020 AD after taking approval from the institutional review committee of Universal College of Medical Sciences, Bhairahawa, Nepal. A total of 1117 dentists were approached among which only 345 dentists responded. The convenience sampling technique was used, and the questionnaire was distributed through an online Google form. The purpose of this study was well explained to the participants and

written consent was obtained through the Google form. The questionnaire was designed meticulously so that it could truly access the knowledge, attitude, and practice of dentists. For validation of the questionnaire, a thorough consultation was done with the physician, diabetologist, oral surgeon, periodontist, and oral pathologist and necessary crafting and customization were done based on their suggestions. For further validation of questionnaires, a pilot study was conducted on 18 practicing dentists (8 male and 10 female) of the Universal College of Medical Sciences. After that, individual feedback was taken from each participant, and questions were reviewed and refined with necessary modifications in various areas like language, clarity, and feasibility.

The questionnaires contained two major components. In the first part, demographic details like age, gender, place of work, the highest degree of qualification, and years of experience were asked. The second component contained 27 questionnaires, among which 11 questions were about knowledge, seven were about attitude, and nine were about practice related to DM.

In the knowledge section, we assigned the maximum score of one to each question, making 11 the highest possible score. For eight questions, each correct answer was given a score of one and an incorrect answer would yield zero. Three questions had multiple answers possible and were informed as such. For these questions, the score for each correct option was distributed equally to yield the total score of one. The students who scored 7.15 (65%) or more were regarded as having good knowledge, and those scoring below 7.15 were considered as having poor knowledge related to diabetes. The attitude of the dentists was assessed with seven questions with three levels of options containing "yes," "no," and "not sure". Each correct option was allocated one mark, and the maximum possible score was seven. Dentists who scored 4.55 (65%) or more were regarded as having a good attitude, and those scoring below 4.55 were considered as having a poor attitude. The practice was accessed using nine questions each containing two level options of "yes" and "no". Each correct answer was allocated one score and maximum possible score was nine. Participants

scoring 5.85 (65%) or more were considered as having good practice and below this cut off value were considered as having poor practice.

From Google form, the data were transferred to Microsoft excel. Statistical package for social sciences (SPSS) version 16 was used for data analysis. The results were expressed in frequency and percentage and a chi-square test was performed to see the association between socio-demographic variables and KAP score category. A P-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 1117 dentists were asked to participate in the study, of which 345 responded. The sex and age-wise distribution of the participants are shown in figure 1. Of the total participants, 161 (46.7%) were BDS, 115 (33.3%) were MDS, 28 (8.1%) were postgraduate students, 36 (10.5%) were masters in various other specialties, and 5 (1.4%) were PhDs. The majority of them either worked in medical college (N = 126, 36.5%) or were private practitioners (N=114, 33%). Most of the participants (N = 118, 34.2%) had work experience of less than 2 years. The mean knowledge score was 8.15 ± 1.54 with 11 being the highest possible score. Of the total participants, 252 (73%) had good knowledge regarding DM. The details of the questions and the corresponding responses are presented in table 1.
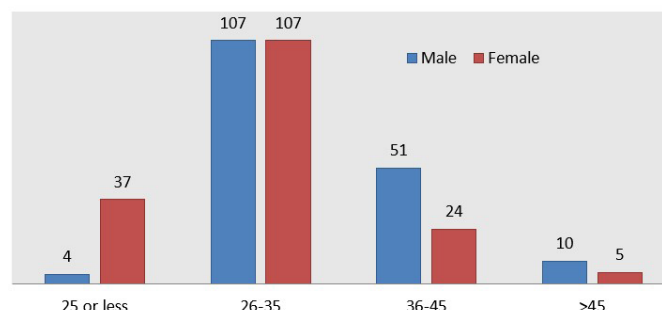

Figure 1: Age and Gender-wise distribution of study participants

Table 1: Knowledge among dentists regarding DM

S.N.	Questions	Correct Answer	Correct Option	Incorrect Option
1	DM is due to dysfunction of	Pancreas	342 (99.1%)	3 (0.9%)
2.	Which of the following are WHO criteria for diagnosis of DM?	Fasting: ≥126mg/dl; Random: ≥200 mg/dl + classical symptoms	287 (83.2%)	58 (16.8%)
3.	HbA1c (glycated Hb) is an important indicator of long-term glycemic control with the ability to reflect the cumulative glycemic history of	2-3 months	255 (73.9%)	90 (26.1%)
4.	Does physical work or exercise and Yoga based life style modification help to prevent diabetic complication?	Yes	325 (94.2%)	20 (5.8%)
5.	Most common route of insulin administration is	Subcutaneous	255 (73.9%)	90 (26.1%)
6.	DKA is more common in	Type 1 DM	202 (58.6%)	143 (41.4%)
7.	The most common complication of DM therapy that can occur in the dental office	Hypoglycemia	236 (68.4%)	109 (31.6%)

| 8. | Reason for diabetic complications, including deteriorating periodontal health is | AGEs | 140 (40.6%) | 205 (59.4%) |

DM- DM; Hb- Hemoglobin; DKA- Diabetic Ketoacidosis; AGEs-Advanced glycation end products

The three questions not shown in the table had multiple answers possible. The first among them was to assess the risk factors of DM, and had six right options. All six correct options were predicted correctly by 63 (18.3%) of the respondents, while 174 (50.43%) predicted at least four correct answers but not all. The second question dealt with the common symptoms of DM, and had six options available of which only four were correct. All four right options were marked by 192 (55.6%) of the respondents, while 122 (35.4%) correctly predicted at least three right answers. The third question assessed the long-term complications of the DM and had seven options out of which six were correct. Only 56 (16.2%) correctly predicted all the right answers while 205 (59.4%) ticked at least four accurate long-term complications of DM.

Seven questions were asked to assess the attitude of dentists regarding DM. The mean attitude score was 4.68±1.19, where seven was the highest possible score. Of the total respondents only 190 (55.1%) had the positive attitude concerning the management of diabetic patients in the dental set up. The details are shown in table 2.

Table 2: Attitude of dentists regarding DM

S.N.	Questions	Yes	No	Not sure
1	Do you think medication alone can better control glucose than diet and medications?	10 (2.9%)	327 (94.8%)	8 (2.3%)
2	Do you think you have a role as a dentist in the screening of Diabetes Mellitus?	327 (94.8%)	6 (1.7%)	12 (3.5%)
3	Do you think Diabetes can increase the risk of dental caries?	219 (63.5%)	93 (26.7%)	34 (9.9%)
4	Do you think that treatment of periodontal disease can have a positive impact on glycemic control?	169 (49%)	104 (30.1%)	72 (20.9%)
5	Do you think counseling every diabetic patient regarding the oral complications of diabetes mellitus is necessary?	339 (98.3%)	2 (0.6%)	4 (1.2%)
6	Dentists should have sufficient knowledge of the appropriate medications related to patients with diabetes	128 (37.1%)	114 (33%)	103 (37.1%)
7	Dentists should be able to screen diabetes mellitus in previously undiagnosed patients.	128 (37.1%)	114 (33%)	103 (29.9%)

Nine questions were asked to assess whether the dentists practiced efficiently with regard to DM. The mean practice score was 7.19 ± 1.19, with nine being the highest possible score. A majority of the respondents (N = 320, 92.8%) had good practice habits regarding diabetic patients. The details are given in table 3.

Table 3: Practice of dentists regarding DM

S.N.	Questions	Yes	No
1	I always instruct diabetic patients to have more frequent dental check-ups.	324 (93.9%)	21 (6.1%)
2	I usually schedule treatment of diabetic patients in the morning.	310 (89.9%)	35 (10.1%)
3	I have device to monitor blood glucose level in my clinic.	103 (29.9%)	242 (70.1%)
4	I prescribe prophylactic antibiotics to my diabetic patients before invasive dental procedure.	266 (77.1%)	79 (22.9%)
5	I always make sure to keep sources of sugars handy before initiating the treatment of diabetic patient.	264 (76.5%)	81 (23.5%)
6	I have received enough training regarding the management of diabetic patients in the dental set up.	183 (53%)	162 (47%)
7	I always ask if the patient has taken his/her usual diet and diabetic medication before the treatment.	339 (98.3%)	6 (1.7%)
8	I always instruct diabetic patients about poor wound healing after invasive procedure and put him/her under antibiotic coverage after the treatment.	334 (96.8%)	11 (3.2%)
9	I always counsel my diabetic patients regarding oral hygiene maintenance and oral hygiene aids.	341 (98.8%)	4 (1.2%)

Effects of socio-demographic variables on knowledge, attitude, and practice

There were no statistically significant differences among the socio-demographic characters of the participants regarding knowledge and practice. However, age-group and years of practice had significant effect in the attitude of the dentists regarding DM. The details of the analysis are presented in table 4.

Table 4: Correlation of socio-demographic variables with knowledge, attitude, and practice

		Knowledge		p-value	Attitude		p-value	Practice		p-value
		Good (N=252)	Poor (N =93)		Positive (N =190)	Negative (N =155)		Good (N =320)	Poor (N=25)	
Gender	Male	123	49	0.523	102	70	0.115	161	11	0.543
	Female	129	44		88	85		159	14	
Age Group (Years)	≤25	29	12	0.329	18	23	**0.031**	37	4	0.845
	26-35	163	51		112	102		198	16	
	36-45	51	24		52	23		71	4	
	>45	9	6		8	7		14	1	
Years of Practice	<2	81	37	0.233	60	58	**0.015**	108	10	0.762
	2-5	75	20		47	48		90	5	
	5-10	59	18		42	35		72	5	
	>10	37	18		41	14		50	5	
Level of Education	BDS	113	48	0.261	77	84	0.052	148	13	0.709
	PG	25	3		14	14		27	1	
	MDS	86	29		76	39		108	7	
	PhD	3	2		3	2		5	0	
	Others	25	11		20	16		32	4	
Workplace	Med. Col.	91	35	0.051	69	57	0.081	116	10	0.407
	PP	75	39		54	60		103	11	
	Govt.	29	5		22	12		34	0	
	Med. Col. + PP	22	4		19	7		24	2	
	Govt. + PP	6	2		7	1		7	1	
	Others	23	3		14	12		26	0	
	Not Answered	6	5		5	6		10	1	

Results obtained from chi-square analysis. P-value <0.05 considered statistically significant, and indicated in bold typing
Abbreviations: PG- Post Graduate; Med. col.- Medical College; Govt.-Government Service; PP- Private Practice

Spearman correlation analysis showed weak positive but significant correlation of knowledge, attitude, and practice with each other. The correlation coefficients and respective p-values are presented in table 5.

Table 5: Correlation of knowledge, attitude, and practice scores

Correlation Variables	Correlation Coefficient(ρ)	P- Value
K and A	0.199	**< 0.001***
A and P	0.166	**0.002***
K and P	0.125	**0.021***
Abbreviations: K = Knowledge score; A = Attitude Score; P = Practice score. * statistically significant		

DISCUSSION

This study was conducted among the dentists of Nepal to assess the knowledge attitude and practice related to DM. A total of 345 dentists throughout the country took part in this study which is more than nine percent of the total 3663 Nepal Medical Council (NMC) registered dentists of Nepal. There was almost equal representation of males (172) and females (173).

In the present study, we found that more than two-thirds of the dentists had good knowledge about DM. This result is quite motivating comparing to the similar study conducted by Saad MA et al in Alexandria, Egypt, in which only 55% of the dentists had good knowledge.[11] Almost all the dentists in the present study correctly identified pancreatic dysfunction as the cause of DM, and most of them were well acquainted with WHO diagnostic criteria for DM. More than two-thirds of the practitioners correctly recognized four or more risk factors,

and more than ninety percent of them answered three or more correct symptoms of DM. This result is totally in agreement with a similar study by Paquette DW et al in which they found that dentists were quite knowledgeable about risk factors of systemic diseases.[12] Good knowledge in dentists about systemic diseases like DM may be due to the inclusion of this topic in preclinical and clinical syllabus in various Universities of Nepal. Though overall knowledge of dentists was good, we found a lack of knowledge in few things related to DM. HbA1c (glycated Hb) is a crucial indicator of long-term glycemic control with the ability to reflect the cumulative glycemic history of two to three months.[13] More than a quarter of the dentists were unknown about this important indicator for blood glucose monitoring. Similarly, the same percentages of the dentists were unknown about the common route of insulin administration. Likewise, more than forty percent of dentists failed to correlate type 1 diabetes with DKA. Regular upgrade in knowledge of basics

and recent advances is very crucial in health care professionals. These outcomes of our study also indicate the need for timely brushing up of knowledge in dentists regarding DM. In chronic hyperglycemic conditions, glycosylation of several proteins produces advanced glycemic end (AGE) products that cross-link with collagen fibers leading to a decrease in their reparative tendency, aggravate the periodontal disease, and increase complications.[14] Surprisingly, more than 59% of the practitioners were unaware of this fact. This result again reflects the need for regular training and continuing medical educations (CME) to update knowledge of dentists of Nepal.

We found that 54.1% of the dentists had a positive attitude regarding the management of diabetic patients in dental setup. This result is inconsistent with the outcome of a similar study done by Saad MA et al[11] in which they observed that the majority (83%) of the dentists had a positive attitude towards DM.

Dentists are one of the leading health professionals encountered with diabetic patients in daily practice. Most of the dentists opined that they have a vital role in screening DM. This result shows the positive attitude of dentists in regards to the diagnosis of DM in the dental office, at the same time also challenges them to equip their setups with crucial screening tools for DM. According to the American Diabetes Association, oral glucose tolerance tests or fasting blood glucose are the standard screening tests for DM.[15] However, a glucometer can be a piece of handy equipment for primary screening of DM in dental setup. Ironically, we found that only less than 30% of the dentists had glucometer in their clinic. In a similar study by Saxena K et al[16], 42% of dentists reported that they had the device to monitor glucose in their clinic. These outcomes signify that, although the dentists in the present study had a positive attitude, there still existed a big challenge in bringing this attitude into practice.

It is now well established that the treatment of periodontal disease has a positive impact on glycemic control.[17-19] It was quite alarming that more than half of the dentists in the present study were unknown about this fact. This outcome highlights the need for regular upgrading in knowledge in dentists. Seminars and continued dental education (CDE) can be beneficial for keeping dentists well acquainted with recent advances. Oral complications like periodontal disease, fungal infections, xerostomia, and dental caries are common in DM.[20] It is the responsibility of dentists to increase awareness among the patients regarding such oral manifestations of DM. Almost all the dentists in the present study agreed that proper counseling regarding complications is a must for all diabetic patients. However, only 37% of the dentists acknowledged that knowledge regarding appropriate medication related to DM is helpful in their practice. Surprisingly, the same percentage of dentists opined that they should be able to screen DM in their dental clinic. In a similar study by Paquette DW et al in the dentists of North Carolina, 75% of dentists had opined that they should be trained to manage patients with a systemic disease like DM.[21] The differences in attitudes in these studies may be due to better medical education

systems and advanced practice in such developed countries than in Nepal. This observation also highlights the need for improvement in the attitude of dentists regarding DM. Therefore new educational strategies directed on the belief of dentists should be instituted that could bring positive changes regarding the management of systemic diseases like DM. However we found significant positive shift in attitude with increase in years of practice (P=0.015).

The most encouraging part of the present research was that most of the dentists (92.8%) working in Nepal had good practice in handling diabetic patients. This observation indicates that though there were areas of improvement in the attitude of dentists, most of them had excellent practice in the management of systemic diseases like DM. The endogenous cortisol level is high in the morning hours which maintain sufficient blood glucose. Therefore morning appointments are highly recommended in diabetic patients under hypoglycemic therapy.[22] Almost 90% of the dentists in the present study had good practice of scheduling morning appointments for such patients. This result was quite motivating comparing similar research conducted in the Delhi NCR region of India, where Saxena K et al[16] found that only 76% of the dentists were scheduling morning appointments for diabetic patients.

During dental treatment, patients taking insulin therapy may undergo hypoglycemic episodes. In such a condition, the treatment should be stopped, and 15 grams of the readymade source of carbohydrates like; glucose tablets, candy, or juices should be given immediately for recovery.[7,23] In the present study, we observed that 76.5% of the dentists practiced keeping the source of sugar handy in their clinics. The availability of glucose in the clinic can be life-saving in emergency conditions, so we suggest that the practice should be adopted by every clinician.

In the present study, only 53% of dentists thought they needed extra training for handling systemic diseases like DM. This result is consistent with the similar study done by Saad MA et al[11] in which 47% of the dentists believed that they had not received enough training for handling diabetic patients. In a similar study, Chandrupatla SG et al suggested that there is a need for additional training among dental students to improve early detection of DM and identification of high-risk patients to minimize potential morbidity due to diabetes.[24] This shows that continuing dental education (CDE) is the demand of present, as reported by the dentists in this study. Recently continuing medical education (CME) is one of the widely discussed topics in the medical field of Nepal as the Nepal medical council (the umbrella organization for medical doctors and dentists of Nepal) has given much focus to Continuing Professional Development (CPD) program. Hopefully, such programs will enhance the knowledge, skill, professional performance and will make dentists more competent and confident in handling systemic diseases like DM in their clinic.

Comparison was done with only few studies due to limited numbers of published literatures. In this study the

questionnaires were distributed through online media which may cause bias in few sections.

CONCLUSION

Most of the dentists working in Nepal had good knowledge and practice related to DM even though there were areas for improvement in their attitudes. Thorough knowledge about various aspects of DM is crucial for dentists to develop a positive attitude for the effective management of diabetic patients. Further improvements can be achieved via regular trainings and CMEs. This study was the first-ever conducted study on KAP of dentists in regards to diabetes mellitus in Nepal. So we think that this study can be very fruitful to develop an insight on awareness of dentists related to DM and can be a good reference for future researchers.

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