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Original Article

Knowledge and Practice of Diabetic Patients Attending Diabetic Clinic about Oral Health and Foot Care – Albyda, 2017

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ABSTRACT

Background: According to the International Diabetes Federation (IDF), more than 34.6 million people in the Middle East and North Africa Regions have diabetes. In Libya 2009 according to stepwise prevalence of diabetes was 16.4%**.** It is well-established that diabetes increases the prevalence, severity, and progression of oral diseases as well as foot ulcers. The role of health professional is very important in improving the knowledge and practices regarding oral health and foot care. Knowledge and awareness of Jordanian and Emirates diabetics were low about oral health. The aim of our study was to determine diabetic patients' level of knowledge, awareness and practice about oral health and foot care.

Subjects and methods; All diabetic cases attended AL-Bayda diabetic clinic during the year 2017 were included in the study. Cross section study design was applied using a structured questionnaire which included data related to personal characteristics and assessment of KAP of participants.

Results: The highest proportion of cases (53.2%) their age ranged from 50-59 years. Nearly 59% were females and 41 % were males. The mean duration of DM was 13.19± 7.92 years. Knowledge of participants about oral complication was low compared to systemic complication. Less than half of diabetic cases brushed their teeth, and eighteen percent used tooth floss. Only two percent of diabetics received their knowledge about diabetes from dentists.

Recommendation There is a need that all health professional including dentists should play an important role in educating diabetics about diabetes and related complications.

Keywords: diabetic cases**,** oral health care, periodontal diseases, foot care, diabetes complications

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INTRODUCTION

Complications of Diabetes mellitus (DM) had been associated with many pathological mechanisms. The activation of the sorbitol pathway, the formation of advanced glycation end-products (AGEs), the damaging effect of oxidative stress and altered lipid metabolism are examples of these mechanisms. DM complications include; retinopathy, nephropathy, neuropathy, macrovascular disease and poor wound healing, all of them can lead to chronic morbidities and mortality [(1)].

According to the International Diabetes Federation (IDF), more than 34.6 million people in the Middle East and North Africa Regions have diabetes. In Libya 2009 according to stepwise prevalence of diabetes was 16.4% [(2, 3)].

A number of oral disorders have been associated with diabetes mellitus [(4)]. The association between diabetes and periodontal diseases has been recognized in the dental literature for many decades [(5, 6)]. Periodontitis has been considered as the sixth complication of diabetes [(7)]. It is well-established that diabetes increases the prevalence, severity, and progression of periodontal disease [(8)]. It was also proved that periodontal diseases may complicate the severity of diabetes by worsening the degree of glycemic control [(9)]. Periodontitis is a chronic low-grade infection induced by multiple pathogens and can result in alteration of insulin action [(10)]. Chronic gram-negative periodontal infection is thought to increase insulin resistance, contributing to the development of metabolic imbalance [(11)]. Furthermore, uncontrolled or poorly controlled diabetes increases susceptibility to oral opportunistic infections (e.g., oral candidiasis) and contributes to xerostomia, which can

lead to caries, soreness, ulcers, and infections in the mouth [12].

The treatment guideline produced by the Centre of Disease Control and Prevention (CDC) recommends dental care for diabetics patients at least once in every 6 months [13]. The American Diabetes Association's (ADA) standard for treating diabetic patients include examination of the oral cavity as part of the patient's initial visit; however, unlike examinations of the eyes and feet, periodic oral examinations are not included as a standard of continuing car [14].

Furthermore, Al Habashneh R et al assessed oral health knowledge and behavior among Jordanians adults with diabetes and found that most of the participants were unaware of the oral health complications of diabetes mellitus and the need for preventive care [15]. Eldarrat conducted a study in United Arab Emirates and found that diabetic patients' awareness of their increased risk for oral diseases was low compared to their awareness of systemic diseases and a significant association was found between glycemic control and oral infections [16].

Foot ulcers are among the most common complications of diabetes with prevalence of 4-10 % leading to amputation of a lower extremity which is expensive to treat [17]. It has been shown that 49-85% of all diabetic foot related problems are preventable if appropriate measures are taken which include; risk assessment, foot-care education, preventive therapy, treatment of foot problems, and referral to specialists. All these measures should be provided by a multidisciplinary diabetes care team and appropriate education for both people with diabetes and health care professionals [18]. The role of health professional is very important in improving the knowledge and practices regarding foot care. Routine home care services may enhance the quality of care and decrease the incidence of lower-extremity complications [18].

Health education services provided by health care professionals will help diabetics to obtain information about diabetes which is the first step in formulating a prevention program for diabetes. Consequently, diabetics will be encouraged to self-care of themselves leading to proper glycemic control and decreasing all the complications of diabetes. The overall result will be reduction of diabetes burden on the health care system as a whole [19].

The aim of our study was to determine diabetic patients' level of knowledge, awareness and practice about oral health and foot care.

SUBJECTS AND METHODS

All diabetic cases attended AL-Bayda diabetic clinic during the period of study (2 months) - year 2017 were included in the study. The cross section study design which is a descriptive study was applied using a structured self-administered questionnaire. *The first section* is concerned with personal characteristics such as; age, gender, education and occupation. *The Second section* explored the level of knowledge and awareness of diabetic patients about diabetes and related oral health complications as well as their self-reported practices regarding oral health care. *The third section*, addressed participants' knowledge and practice about foot care. *In the fourth section*, diabetic patients were asked about their sources of information regarding oral and health foot care, and their suggestions to improve their knowledge about diabetes and its oral and foot complications.

Ethical consideration

After approval of the director of AL-Bayda diabetic clinic the questionnaires were distributed. The verbal consents of participants were taken after explaining the purpose of the study and assuring them that anonymous to gain participants' trust and confidence as well as to encourage them to share information.

Statistical analysis

Analysis of data was done by using SPSS, (Statistical Package for Social Science) for windows; version 22.0 [20]. Descriptive statistics were calculated as mean, median, mode, and standard deviation for quantitative variables as duration of diabetes and level of fasting blood sugar. Frequencies and percentages were used for the qualitative variables.

RESULTS

The highest proportion of cases (53.2%) aged between 50-59 years. Nearly 59% were females and 41 % were males (Figure 1). Most of the participants were Libyans (95.50%). The highest proportion of cases (27.9%) was Illiterate. Less than half of them (46.8%) were house wives, professional and skilled were nearly equal (18.00 % and 18.90 %).

The mean duration of DM was 13.19 ± 7.92 years and their mean fasting blood sugar level was197.25 ± 77.74 mg/dl with minimum and maximum level = 63 & 500 mg/dl respectively. Most of cases (46.85%) knew that they had DM accidently, 43.34% during routine checkup and

9.91% before operative procedure. More than half (53.15%) did not know the type of diabetes they had, 30.63% knew that they had Type 2 diabetes and 16.22% knew that they had Type 1 (Figure 2).

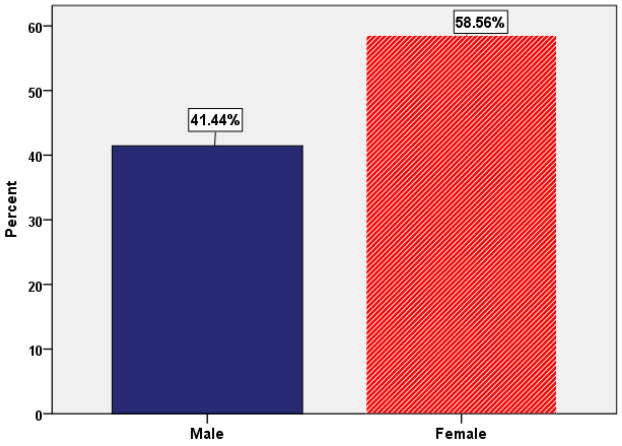

Figure 1: Distribution of diabetic cases attending diabetic clinic Al Byda according to their gender – 2017

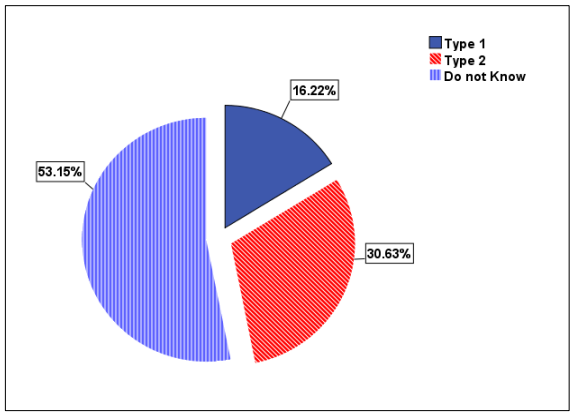

Figure 2: Participants' knowledge of their diabetes type

Regarding diabetic patients' knowledge and awareness of systemic complications associated with diabetes, most of the cases (94.6%) were aware of their increased risk for visual complications, followed by 80.2% for those who knew the cardiac complications and foot complications was 74.8% (Table 1).

Concerning the proportion of their knowledge and awareness about oral complications was as the following; gingival disease was 71.2%, an oral fungal infection was 61.2% and dental caries was 57.7%, while nearly one third (32.4%) had no knowledge that dental caries is common among diabetic cases (Table 1).

When cases were asked about their knowledge related to symptoms of gingivitis among diabetic patients, majority of them (72.1%) were aware that redness and swelling are signs of gingival disease, 45.9% were aware that halitosis of the gingiva is a sign of gingivitis. Lesser proportion of cases (42.3 %, 40.5% and 36% respectively) knew that mobility of the teeth, bleeding of the gingiva and sore mouth are signs of gingivitis. Whereas, equal proportions (18%) had no knowledge that mobility of the teeth and sore mouth are symptoms of gingivitis (Table 2).

Less than three quarters (73.9%) of patients suffered sometimes of dry mouth, while (9.9%) of participants were always suffering from dry mouth (Table 3).

More than half (56.8%) of the respondents did not practice teeth brushing and majority of cases (82%) never used dental floss and who were using dental floss represented only 18% (Table 4).

Regarding frequency of bushing, out of forty seven cases who were brushing their teeth, 42.5% brushed once a day, 36.1% were brushing twice a day and 21.2% were irregularly brushing their teeth. Quarter (25%) of the patients who were using dental floss reported using it once a day and 40% used it many times per day (Table 5).

During last year, less than half (45.9%) of cases did not visit dental clinic, 51.4% reported that they visited dental clinic when needed only and few (2.7%) of cases visited dental clinic twice a year (Table 6).

Majority (83.8%) of diabetic cases knew that burning and numbness are symptoms of feet infection in diabetic patients, 81.1% knew that delayed wound healing of the feet is another symptom, equal proportion 44.1% of patients knew that redness and swelling as well as inflammation of the feet are symptoms of feet infection. On the other hand, 49.5%, 45.9% and 44.1% lacked the knowledge that droplets of blood, inflammation of the feet and redness and swelling are symptoms of feet infection (Table 7).

As regards practice of diabetic patients of their feet care measures, 38.7% rarely check their shoes before wearing it, 28.8% rarely examine their feet and 19.8 were rarely drying well between toes. Nearly fifteen percent of cases developed foot ulcer in the past (Table 8).

The main sources of knowledge about diabetes were from; physicians (40.5%), family members (27.9%), and the mass media (20.7%). On the other hand, formal

education at school and dentists represented only 5%, and 1.8% respectively (Table 9). The majority (70.3%) of patients stated that they need more knowledge. The sources preferred by diabetic patients to gain more knowledge were diabetologists (60.4%), mass media (15.3%), health education (4.5%), schools (2.7%) and dentists (1.8%) (Table10).

Table 1: Distribution of diabetic patients regarding their knowledge about Diabetes complications.

Diabetes complications	Yes		No		Do not know	
	N	%	N	%	N	%
Visual	105	94.6	4	3.6	2	1.8
cardiac complications	89	80.2	14	12.6	8	7.2
foot complications	83	74.8	22	19.8	6	5.4
gingival complications	79	71.2	27	24.3	5	4.5
Dental caries	64	57.7	11	9.9	36	32.4
Oral Fungal infections	68	61.3	37	33.3	6	5.4

Table 2: Knowledge of diabetic patients about symptoms of gingivitis among diabetic patients - Diabetic clinic AlByda

Symptoms of gingivitis	Yes		No		Do not know	
	N	%	N	%	N	%
Redness & swelling	80	72.1	17	15.3	13	11.7
Bleeds during brushing	45	40.5	49	44.1	17	15.3
Sore	40	36.0	51	45.9	20	18.0
Halitosis of the gingiva	51	45.9	47	42.3	12	10.8
Mobility of the teeth	47	42.3	44	39.6	20	18.0

Table 3: History of dry mouth among diabetic patients - Diabetic clinic AlByda.

History of dry mouth among diabetic patients	N	%
Always	11	9.9
Sometimes	82	73.9
No	18	16.2
Total	111	100.0

Table 4: Practice of diabetic patients regarding their teeth care- Diabetic clinic AlByda.

Teeth care	Yes		No	
	N	%	N	%
Use of teeth brush	47	42.3	63	56.8
Use dental floss	20	18.0	91	82.0

Table 5: Practice of diabetic patients regarding frequency of using a toothbrush and dental floss- Diabetic clinic AlByda.

Frequency of using tooth brush and dental floss		N	%
For how many times use tooth brush	Once	20	42.5
	Twice	17	36.1
	Irregular	10	21.2
For how many times use dental floss	Once	5	25
	Many times	8	40
	Sometimes	7	35

Table 6: Frequency of visiting of diabetic patients to dental clinic

Frequency of visiting of diabetic patients to dental clinic	N	%
Yes, two times per year	3	2.7
No	51	45.9
When needed	57	51.4
Total	111	100.0

Table 7: Knowledge of diabetic patients about symptoms of feet infection in diabetic patients - Diabetic clinic AlByda.

Symptoms of feet infection	Yes		No		Do not know	
	N	%	N	%	N	%
Redness & swelling	49	44.1	49	44.1	13	11.7
Droplets of blood	44	39.6	55	49.5	12	10.8
Burning & numbness	93	83.8	7	6.3	11	9.9
Wound	54	48.6	47	42.3	10	9.0
Delaying of wound healing of the feet	90	81.1	11	9.9	10	9.0
Inflammation of the feet	49	44.1	51	45.9	11	9.9

Table 8: Practice of diabetic patients regarding their feet care measures - Diabetic clinic AlByda.

Practice of feet care of diabetic patients	Daily		Sometimes		Rare		Never	
	N	%	N	%	N	%	N	%
Examination of your feet	21	18.9	48	43.2	32	28.8	10	9.1
Do you check your shoes	40	36.0	18	16.2	43	38.7	10	9.1
Do you choose the proper shoes	50	45.0	44	39.6	15	13.5	2	1.8
Do you dry well between the toes	46	41.4	42	37.8	21	19.8	9	8
Do you use moistening creams on your feet	46	41.4	24	21.6	53	47.7	16	14.4
Do you cut your toe nail straight	18	16.2	74	66.7	9	8.1	1	0.9
Do you test water temperature before putting your foot in	41	36.9	53	47.7	7	6.3	9	8.1

Table 9: Sources of knowledge about diabetes among diabetic patients - Diabetic clinic AlByda.

Source of knowledge of diabetic patients about diabetes	Yes		No	
	N	%	N	%
From school	5	4.5	106	95.5
From family	31	27.9	80	72.1
From the media	23	20.7	87	78.4
From the physician	45	40.5	66	59.5
From the dentist	2	1.8	109	98.2

Table 10: Sources which diabetic patients preferred to gain more knowledge about diabetes- Diabetic clinic AlByda.

Statement		N	% *
Need more knowledge.(N=110)	Yes	78	70.3
	No	32	28.8
	Missing	1	0.9
Methods by which diabetic patients prefer to gain more knowledge (N= 94)	Health education program	5	4.5
	Schools	3	2.7
	The media	17	15.3
	Diabetologist	67	60.4
	Dentist	2	1.8

*percentage was calculated from the total participants (111).

DISCUSSION

The greatest increase in prevalence of DM is occurring in low- and middle-income countries. It was declared by WHO that 366 million people are expected to suffer from diabetes mellitus by 2030 [(21)].

The present study assessed knowledge and practice of diabetic patients about foot and oral health care in diabetic clinic, AL-Bayda-Libya, using a structured self-administered questionnaire. Thirty percent of participants had Type 2 diabetes, 16.22% suffered from Type 1 and, unexpectedly, more than half (53.15%) of participants did not know which type of diabetes they had. On the other hand, El-Khawaga G & Abdel-Wahab F conducted a study in Egypt, revealed that 93.1% of the participants had type 2 and 6.9 had type 1 [(22)].

A considerable percentage of diabetic patients' demonstrated adequate knowledge and awareness of systemic complications associated with diabetes. Most of the cases (94.6%) were aware of their increased risk for visual complications, followed by 80.2% for those who knew the cardiac complications, foot complications was 74.8%. While, their awareness about oral complications associated with DM was lower as; gingival disease was 71.2%, an oral fungal infection was 61.2% and dental caries was 57.7% and nearly one third (32.4%) had no knowledge that dental caries is common among diabetic cases. These findings are consistent with Allen et al, who found out that the participants' knowledge was much higher about systemic complications than about oral complications [(23)].

In contrary to our findings a study on diabetic cases in Dhaka-India, reported that higher proportion (62.6%) of patients had more score of knowledge about oral disease than foot and visual complication (37.2% and 18.3%) respectively [(24)].

Majority of (72.1%) diabetic patients in the present study were aware that redness and swelling are signs of gingival disease, 40.5% of diabetic patients were aware that bleeds during brushing is a sign of gingival disease, and 36% were aware that soreness of the gingiva is a sign of periodontal disease. This level of knowledge was higher compared to another study randomly selected sample of 500 diabetic patients was recruited from three hospitals and three comprehensive health centers that represent both urban and rural populations in Jordan [(15)].

This study also revealed an important finding that more than 70% of the participants were suffering from dry mouth. This finding is consistent with a systemic review of over fifty studies conducted by Pintor et al on prevalence rates of xerostomia in the DM and non-DM population, which reported that there is a higher prevalence of xerostomia (dry mouth) and lower salivary flow rates among Diabetes mellitus patients [25].

Regarding oral self-care practices, 42.3% of participants brushed their teeth, and 82% never used dental floss to clean between their teeth. Similar results were reported in study among diabetic patients in Dubai, United Arab Emirates, where half of the participants brushed their teeth once and 66% never used dental floss [16]. The present results indicate a great need to focus on raising the awareness about oral self-care.

The data of the present study showed that only 2.7% of the participants had visited a dental clinic two times per year, 51.4% visited a dental clinic only when they needed to receive treatment for pain and / or discomfort and 45.9% did not visit dentist. This finding is consistent with the result of a study which reported that only 14% of diabetic patients attending the outpatient diabetic clinic in United Arab Emirates visited regularly for dental check-ups [16]. A survey done in the United Kingdom by Allen revealed higher percentage of diabetics was visiting dentists compared to our cases [23].

The main source of diabetic patients' information about diabetes effects was the physician. The physician is essential in the planning, development and implementation of any intervention programs designed to assess diabetes impact and to reduce diabetic complication among diabetic patients [26]. These findings in disagreement with study in Jordan where the media was the main source of knowledge [15].

In addition, the majority of diabetic patients (70.3%) in the present study needed more knowledge and wished to receive information about diabetes counseling through diabetologist. This fact should alert the physician's behavior and attitude which have positive effect on their patients care practice [24]. On the other hand, some physician's focus on acute management rather than preventive care due to heavy load of patients. Existing clinical evidence suggests that increasing community awareness regarding diabetes management is an ultimate tool for halting complications due to diabetes [14, 15].

In the present study a considerable percentage of diabetic patients had adequate knowledge about symptoms of feet infection. Other studies reported similar findings such as Chandalia. et al ,who found that Indian diabetic patients had adequate knowledge of symptoms relating to diabetic foot. Also, chin et al reported that most of patients with a history of diabetic foot ulcers knew the warning signs of peripheral vascular insufficiency and severe infection of feet [27, 28]. This might be attributed to the fact that diabetic foot is a common health problem among diabetics.

Evaluation of foot self-care status among participants of the present study demonstrated that; 21% of patients checked their feet daily, 36% checked inside their shoes daily, 41% washed their feet daily and dry in between the toes thoroughly, and 16% made an effort to avoid injuries to their feet and clipped their toenails with care. This result is considered high compared to other studies conducted in India, Tanzania and Nigeria which revealed that awareness and practice of foot care measures is very poor among diabetic cases [19, 29, 26]. This difference could be attributed to the place of our study which was urban area.

A study conducted in Lahore reported that higher proportion of patients checked water temperature before using it compared to the present study [30]. The findings could be due to more awareness among participants of Lahore study.

Realizing the importance of diabetic foot problems, IDF chose theme of World Diabetes Day in 2005 "Put Feet First, Prevent Amputations". In this study, the prevalence of history of foot ulcer among patients attending Diabetic clinic in AlByda was15.3%. A similar prevalence was reported among diabetic patients admitted to public diabetic clinics in, Tanzania [29].

Limitations encountered by the investigator were many patients did not participate in the study as they had short time to spend in the clinic. Also the result of this study may not reflect the actual practices of the patients due to reliance on self-reporting of practices.

CONCLUSIONS AND RECOMMENDATIONS

There is a need that all health professional including dentists should play an important role in educating diabetics about diabetes and related complications. Good communication between dentists and physicians will improve oral health which could influence the control of blood glucose level. Awareness of the potential associations between diabetes, oral health and general health needs to be increased in diabetic patients.

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