



Knowledge, Attitude and Referral Practices of Medical Doctors towards Oral Manifestation of Diabetes Mellitus in South East Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: Oral manifestations has been identified as a possible outcome associated with poorly controlled glucose levels in diabetic patients. The aim of this study is to assess the Knowledge, attitude and referral practices of medical doctors towards oral manifestations of diabetes mellitus in South East Nigeria.

Methods: This was a cross sectional study conducted among 379 medical doctors in Ebonyi State, Nigeria. A multi-staged sampling technique was used to select respondents and semi-structured self-administered questionnaire for data collection. Knowledge was assessed using 20 questions with 20 possible responses. Data was analysed using IBM SPSS version 21. Chi square test and bivariate logistic regression analysis was used to determine association between variables and statistical significance was set at $p < 0.05$ for all statistical associations.

Results: The mean age of the respondents was 33.2 ± 6.8 years. Only 21.1% of the respondents had good knowledge of oral complications of diabetes mellitus however, 83.3% had good attitude towards the condition and only 25.5% had good referral practice towards patients with oral complications from diabetes mellitus. Specialists and resident doctors had better referral practices compared to general practitioners and house officers. This relationship was statistically significant $p < 0.05$.

Conclusion: There was average knowledge, good attitude but poor referral practices of oral manifestations of diabetes mellitus among medical doctors. There was statistically significant association between Cadre of medical doctor and knowledge of oral manifestations of diabetes mellitus as well as referral of patients with oral manifestations of diabetes mellitus. It is therefore, important to retrain younger doctors during and after medical school on oral health.

Keywords: Knowledge; attitude; referral practices; oral manifestations; diabetes mellitus.

1. INTRODUCTION

Diabetes mellitus (DM) is a chronic non-communicable disease also one of the major global public health issues producing many complex changes in the lives of those affected. Diabetes mellitus is defined as a clinical syndrome characterized by hyperglycaemia and disturbance of carbohydrate, fat and protein metabolism due to defect in insulin secretion, insulin action, or both. It is estimated that 422 million adults were living with diabetes mellitus (DM) worldwide as at 2014 [1]. The global prevalence of Diabetes Mellitus in the adult population has nearly doubled since 1980, rising from 4.7% to 8.5% [1].

Diabetes mellitus (DM) can be classified into four general categories: type 1, type 2, gestational diabetes and other specific types of diabetes [2]. Although not commonly discussed in diabetes care, people with uncontrolled diabetes are also at increased risk of developing oral health problems, particularly periodontal (gum) disease [3]. Other non-periodontal oral complications of diabetes mellitus, includes Candida infection, xerostomia, burning mouth syndrome (BMS), and parotid sialosis/benign parotid hypertrophy [4]. There is large volume of evidence suggesting that DM worsen periodontal disease and vice versa. It has also been suggested that periodontal disease may result in increased insulin resistance and thereby making management of DM more difficult, and poor oral hygiene with recurrent periodontal abscess can

result in early tooth loss in poorly controlled DM patients [5].

Patients are unaware of this possible relationship between oral health and DM, the role of health-care providers becomes crucial in increasing the awareness of possible oral complications among DM patients. Actually, the International Diabetes Federation and World Dental Federation have made emphasis on the key of prevention of periodontitis for patients with DM lies in close collaboration between dentists and physicians [2]. However, studies reported that medical practitioners have limited knowledge of this possible relationship and very few are referring their diabetic patients to the dental practitioner for the advice [6].

A study showed endocrinologists were more aware of the relationship and referred their diabetic patients for regular dental visits compared to general medical practitioner and diabetologist, but only 17.8% referred their patients for dental and periodontal assessment [6]. However, not much has been done on this subject in our environment South East Nigeria.

Therefore, this study sought to assess the knowledge and attitude of medical doctors towards oral manifestations of DM, referral practices towards complications of oral manifestations of DM as well as associated factors influencing knowledge and referral practices of DM patients with complications to dental surgeons. This could direct attention to an apparent need for the organized course of action

to achieve a goal and interventional programs for the doctors who deal with diabetic patient for better professional collaboration and enhanced patient care.

2. MATERIALS AND METHODS

This study was a descriptive cross-sectional study among medical doctors managing diabetic patients in public and private hospitals in South East Nigeria. South East Nigeria is made up of five states, Enugu, Abia, Anambra, Imo and Ebonyi state. The region has at least one tertiary health centre in each of the states along with several secondary and primary health centres. There are also private clinics and hospitals providing services at every level of health care in each of the states. The population of medical doctors in south east Nigeria is about three thousand eight hundred (3,800) [7].

2.1 Sample Size and Sampling Technique

A minimum sample size of 379 was determined using the Cochran's formula for studying single proportions which was calculated considering a standard normal deviation of 1.96 at a significance level of 5%, degree of precision of 5%; 50% (the proportion in the target population estimated to have the characteristics) and a 10% non-response rate [8].

A multi-stage sampling technique was used to select participants. Stage 1 was stratification of health facilities into tertiary, secondary, primary health institutions and private hospitals using a list of all government and registered private hospitals in each state obtained from the supervising ministry (Ministry of Health). Stage two was to select one hospital from each stratum in each state using ballot method. The third stage was selection of participants through simple random sampling using a table of random numbers and a list of the doctors as a sampling frame and ensuring proportionate allocation from the hospitals chosen

2.2 Data Collation and Analysis

Data was collected using a pre-tested self-administered questionnaire. The questionnaires were collated and screened for completeness. The questionnaire comprised of four sections: socio-demographic characteristics, knowledge on oral manifestations of DM, attitude towards complications of oral manifestations of DM and referral practice complications of oral

manifestations of DM. Knowledge of oral manifestations of diabetes was assessed using 20 questions. A correct response was scored 1 and incorrect 0, giving a maximum and minimum score of 20 and 0, respectively. Scores were converted to percentage and scores 70% and above were considered as good knowledge of DM, scores 50% to 69% average knowledge and score less than 50% was considered as have poor knowledge. All the questions used in scoring knowledge were assessed for internal consistency reliability using the Cronbach's alpha test. A Cronbach's alpha value of 0.702 was obtained, indicating acceptable internal consistency and reliability.

Two questions were used to assessed attitude; if the respondents felt there was a need to educate medical practitioners on oral problems associated with diabetes or not and if they felt Dental surgeons should be part of Diabetic management. The maximum score for attitude was 2. Respondents who responded positively to both questions were scored 2, those who responded positively to one question was scored 1 and those who responded negatively to both questions were scored 0. A score of 2 was termed good attitude; 1 fair attitude and 0 poor attitude. Eight questions were used to assess the referral practices of Doctors. The maximum point for practice was 8. Every positive practice was scored 1 and negative practice 0. The scores were collated and a score of 6 and above was term good practice, 4 to 5 was fair while score of 3 and below was poor practice. The data was analysed using IBM SPSS version 21. Chi square test and bivariate logistic regression analysis were used to determine association between variables and statistical significance was set at $p < 0.05$ for all statistical associations. Frequency tables and charts were used to present the results.

3. RESULTS

A total of 365 medical doctors responded to giving a response rate of 96.3%. The mean age of the respondents was 33.2 ± 6.8 years and 82.2% of the respondents were males while 17.8% were female (see Figs. 1 and 2). By years of practice, a total of 60% of the respondents had practiced between 1-5 years, 23.3% between 6-10 years and 16.7% had practiced for more than 10 years. (see Fig. 3). Another 10.4% of the respondents were general practitioners, 29.3% house officers, 48.5% resident doctors and 11.8% were specialists, (see Fig. 4). Out of the

total respondents only 48.8% had previous oral health training while 51.2% had not received any training on oral health. Majority of those with previous oral health training had it as undergraduates. (See Fig. 5).

There were 77 (21.1%) doctors who had high knowledge, 249 (68.2%) had average knowledge and 39 (10.7%) had low knowledge on oral complications of DM this is shown on Fig. 6.

Table 1 shows the respondents' knowledge on individual oral manifestations and complications of DM. Majority (72.3%, 63%, 74.8% and 74.8%) knew that gingivitis, periodontitis and dental caries were oral manifestations and complications of DM respectively. However, 78.6% did not know xerostomia was an oral manifestation of DM. Statistically significant relationship between knowledge of the oral

complications of DM and cadre of medical doctors $p < 0.001$. There was no statistically significant relationship between age of doctor, sex, years of practice and knowledge of the condition (seen Table 2). There were 306 (83.8%) doctors with good attitude, 57 (15.6%) had fair attitude while 2 (0.6%) had poor attitude as shown in Fig. 7. There were 75 (20.5%) medical doctors with good referral practice and 166 (45.5%) had fair practice while 124 (34.0%) had poor referral practice (Fig. 8). Table 3 shows a greater percentage (87.9%) of doctors did not often refer DM patients to dental surgeons while those that did refer, did that when oral complications set in. There was statistically significant relationship between cadre of medical doctors and their referral practice $p = 0.01$. No relationship was found between doctors' practice and other sociodemographic characteristics as seen in Table 4.

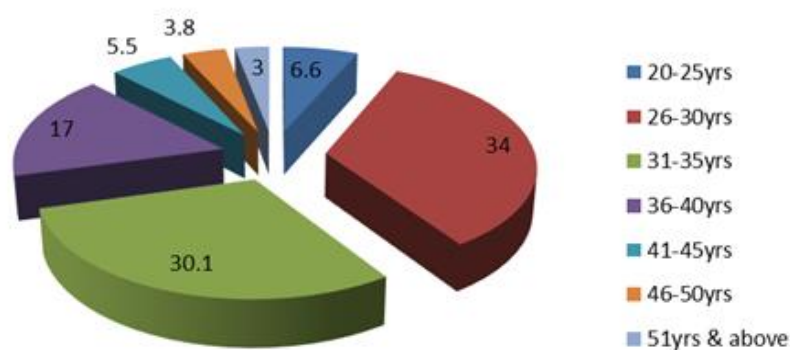


Fig. 1. Age Distribution of Respondents

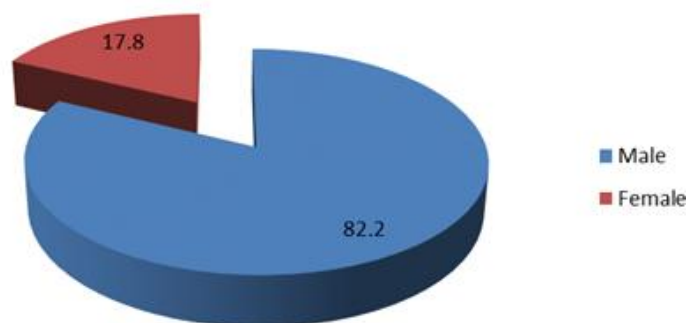


Fig. 2. Sex Distribution of Respondents

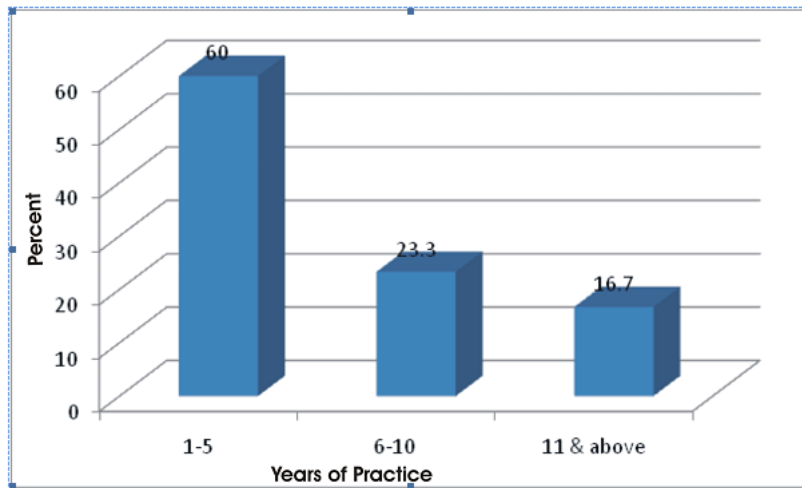


Fig. 3. Years of Practice of Respondents

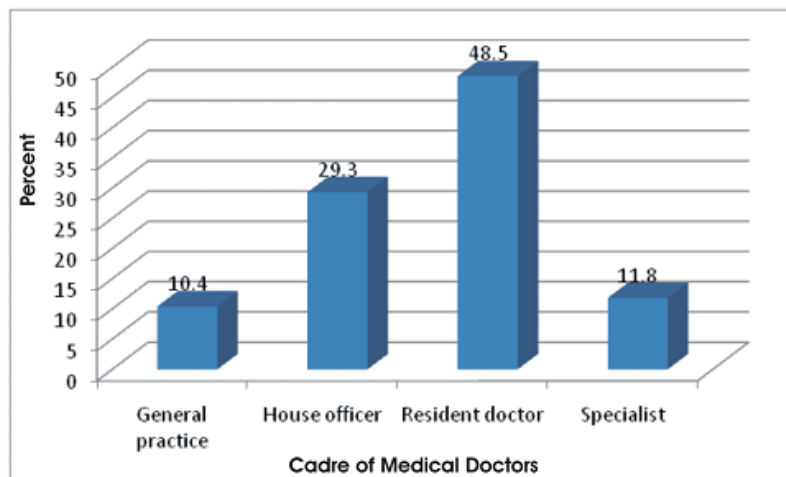


Fig. 4. Cadre of Respondents

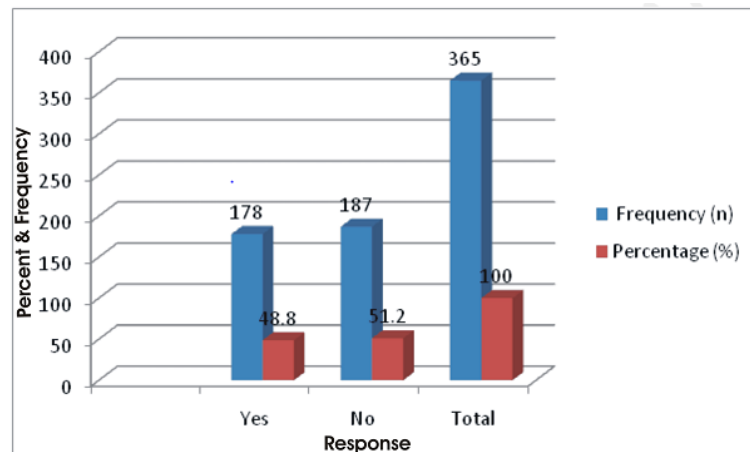


Fig. 5. Previous Oral Health Training of Respondents

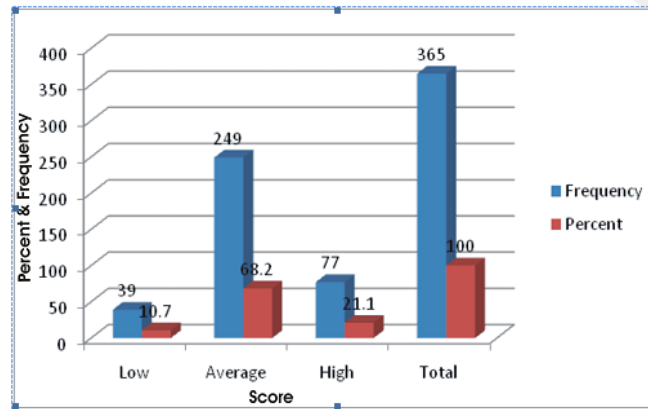


Fig. 6. Overall knowledge of oral complications of DM

Table 1. Respondents' knowledge of oral manifestations and complications of DM

Variables (n=365)	Frequency (%)	
	Yes	No
Gingivitis	264(72.3)	101(27.7)
Periodontitis	230(63.0)	135(37.0)
Dental caries	273(74.8)	92(25.2)
Burning mouth sensation	149(40.8)	216(59.2)
Oral thrush	299(81.9)	66(18.1)
Xerostomia	78(21.4)	287(78.6)
Increase risk of infection	332(91.0)	33(9.0)
Delayed wound healing	340(93.2)	25(6.8)
Altered taste sensation	206(56.4)	159(43.6)
Difficulty in swallowing	177(48.4)	188(51.4)
Salivary gland swelling	78(21.4)	287(78.6)

Table 2. Relationship between overall knowledge and sociodemographic characteristics variable

Variables	Frequency (%)				χ ²	P-value
	Low	Average	High	Total		
Age (years)					10.100	0.607
20-25	4(16.7)	12(50.0)	8(33.3)	24		
26-30	15(12.1)	85(68.5)	24(19.4)	124		
31-35	13(11.8)	78(70.9)	19(17.3)	110		
36-40	4(6.5)	43(69.4)	15(24.2)	62		
41-45	1(5.0)	14(70.0)	5(25.0)	20		
46-50	1(7.1)	8(57.1)	5(35.7)	14		
≥51	1(9.1)	9(81.8)	1(9.1)	11		
Sex					0.057	0.972
Male	32(10.7)	204(68.0)	64(21.3)	300		
Female	7(10.8)	45(69.2)	13(20.0)	65		
Years of practice					2.424	0.658
1-5	27(12.3)	144(65.8)	48(21.9)	219		
6-10	8(9.4)	61(71.8)	16(18.8)	85		
≥11	4(6.6)	44(72.1)	13(21.3)	61		
Cadre					28.525	0.000
General practice	1(2.6)	19(50.0)	18(47.4)	38		
House officer	19(17.8)	74(69.2)	14(13.1)	107		
Resident doctors	15(8.5)	122(68.9)	40(22.6)	177		
Specialist	4(9.3%)	34(79.1)	5(11.6)	43		

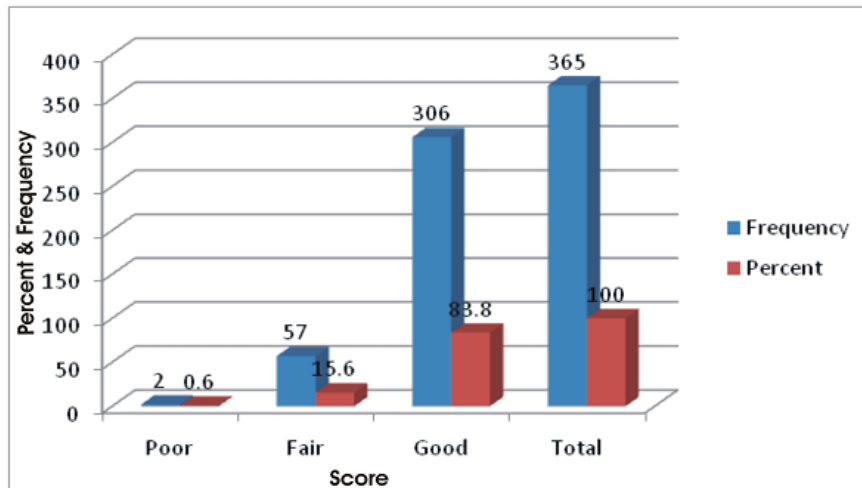


Fig. 7. Respondents' overall scores on attitude towards oral manifestations of DM

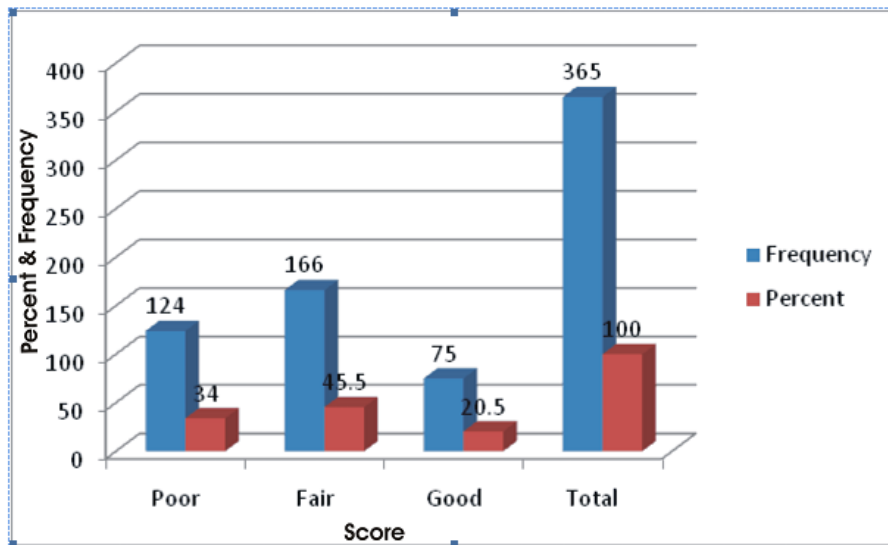


Fig. 8. Respondents' overall score of referral practice towards oral complications of DM

Table 3. Respondents' practice towards referral of oral complications for DM

Variable	Frequency (n = 365)	Percentage (%)
Frequency of referral		
Very often	44	12.1
Not often	321	87.9
Place of referral		
Private dental clinic	23	6.3
General hospital	13	3.6
Teaching hospital	222	60.8
None of the above	107	29.3
Stage at referral		
At first presentation	22	6
During course of treatment	43	11.8
When there is complication	189	51.8
None	111	30.4

Table 4. Relationship between referral practice and sociodemographic characteristics variable

Variable	Poor (%)	Fair (%)	Good (%)	Total	χ^2	P-value
Age(years)					12.799	0.384
20-25	11(45.8)	11(45.8)	2(8.4)	24		
26-30	46(37.1)	52(41.9)	26(21.0)	124		
31-35	40(36.4)	49(44.5)	21(19.1)	110		
36-40	19(30.6)	30(48.4)	13(21)	62		
41-45	3(15.0)	13(65.0)	4(20.0)	20		
46-50	2(14.3)	7(50.0)	5(35.7)	14		
≥51	3(27.3)	4(36.4)	4(36.4)	11		
Sex					2.643	0.267
Male	97(32.3)	142(47.3)	61(20.3)	300		
Female	27(41.5)	24(36.9)	14(21.5)	65		
Years of practice					5.844	0.211
1-5	83(37.9)	98(44.7)	38(17.4)	219		
6-10	26(30.6)	38(44.7)	21(24.7)	85		
≥11	15(24.6)	30(49.2)	16(26.2)	61		
Cadre					16.747	0.01
General practice	13(34.2)	24(63.2)	1(2.6)	38		
House officer	45(42.1)	44(41.1)	18(16.8)	107		
Resident doctor	52(29.4)	82(46.3)	43(24.3)	177		
Specialist	14(32.6)	16(37.2)	13(30.2)	43		

4. DISCUSSIONS

This study was on knowledge, attitude and referral practices of Medical Doctors on oral manifestations of diabetes mellitus in South East Nigeria. It found out that majority (68.2%) of the Medical Doctors had average knowledge of the oral complications of diabetes mellitus while a small proportion had a high knowledge of it. This may largely be due to that fact that most of them had not had any training in oral health and majority of those who had had oral health training, had it as undergraduates. There may be need to encourage more postgraduate trainings in oral health (trainings attained after undergraduate training) as this may contribute to improved knowledge of oral hygiene among Medical Doctors. A cross-sectional study conducted in Abuja, Nigeria in 2018 reported a good knowledge of oral complications of diabetes mellitus among Medical Doctors, revealed a significant relationship between age and good knowledge among Medical Doctors and suggested that dental postings be included in undergraduate medical training [9]. This is opposed to the average knowledge that was revealed in this present study among Medical Doctors which may be due to difference in the location of both studies. Different locations may present different opportunities for increasing one's average knowledge on oral complications of diabetes mellitus such presence of institutions

that provide further training on oral health. A cross-sectional study among 120 respondents in 2017 in Nigeria revealed poor knowledge of oral complications of diabetes mellitus among patients as opposed to average knowledge as reported in this study [10]. This may be due to growing awareness of oral health in the country. However, a better knowledge is expected among Medical Doctors when compared with patients. This is not in keeping with the findings in a cross-sectional study conducted in Egypt among 349 respondents which reported high knowledge with poor attitude among ministry Health workers [11]. This study's findings are also dissimilar to the findings in cross-sectional studies conducted in 2018 in China and Hong Kong among 66 and 168 respondents respectively which reported high knowledge of oral complications of Diabetes Mellitus among Medical Doctors [6] [12]. This difference may be accounted for by difference in the location of both studies. It is also possible that there are differences in the level of training exposures on oral health in both locations. A cross-sectional study among 200 respondents in 2017 in India revealed the low knowledge among respondents in keeping with the findings in my study. This poor knowledge may have been due to the fact that there is poor awareness of oral complication of diabetes mellitus among doctors and patient in India [13]. A systematic review among 27,894 respondents in 2018 reported poor knowledge of oral complications of diabetics

mellitus among patients against average knowledge reported in my study [14].

There was a statistically significant association between cadre of Medical Doctor and knowledge of oral complications of diabetes mellitus. It is possible that the more senior Medical Doctors may be more knowledgeable due to their number of years of experience when compared to the junior Medical Doctors such as House Officers and Junior Registrars.

It is worthy of note that this study found out that majority of the Medical Doctors had good attitude towards oral complications of diabetes mellitus. This is in keeping with the findings in a study in China [6]. This may be as a result of average knowledge of oral complications of Diabetes Mellitus among Medical Doctors in the locations of study.

This study revealed that majority of the Medical Doctors do not refer diabetic patients to dental surgeons, the few that do, do when complications have already set in. This finding may be as a result of much emphasis not being given to oral Health. This is similar to the findings in a cross-sectional study conducted in 2018 in India among 66 respondents, however, the sample size of this study was small which may not have given the study room for generalizability of findings [6]. This is also dissimilar to the findings in a cross-sectional study conducted in 2018 in Hong Kong among 168 respondents which reported high referral practice among Medical Doctors [12]. This disparity in findings may be due to difference in Health systems of both locations of study. Referral systems are largely health system related. Medical Doctors may be more likely to refer their patients to the next level of care in a Health system that has a good referral system in practice. The findings in this study are in keeping with that of a cross-sectional study conducted in Jordan in 2010 among 164 respondents which revealed that referral practice of diabetic oral complications by Medical Doctors was not high [15].

This study revealed a statistically significant relationship between cadre of Medical Doctor and referral of diabetic oral complications to dental surgeons. This may be related to difference in experience among the different cadres of Medical Doctors. The Senior ones may be more likely to recognize complications and need for referral. Conversely, the junior ones may not see the need to refer the diabetic

patients for oral care due to inexperience and inability to recognize their limits and employ a multi-disciplinary approach in patient care. A similar finding was reported in a cross-sectional study which revealed a statistically significant association between being a specialist and referral of diabetic oral complications [15]. It equally reported a statistically significant association between good knowledge and referral of diabetic oral complication [15].

5. CONCLUSIONS

There is average knowledge of oral manifestations of diabetes mellitus among medical doctors. Whereas their attitude towards oral manifestation of diabetes mellitus was good, there was a poor referral of patients with oral manifestations of diabetes mellitus for specialised dental care. There was a statistically significant relationship between Cadre of medical doctor and knowledge of oral manifestations of diabetes mellitus as well as referral of patients with oral manifestations of diabetes mellitus.

Additional training on oral health among medical doctors both in the undergraduate and postgraduate training is recommended as this could increase knowledge among all cadres of medical doctors and improve on the referral practices among them.

ETHICAL APPROVAL AND CONSENT

Ethical approval for this study was obtained from the Research and Ethics committee of Alex-Ekwueme Federal University Teaching Hospital Abakaliki with reference number FETHA/REC/VOL/1/2018/034. Informed consent was also obtained from each of the participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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