

Pharmacists' knowledge, attitude and perception towards prevention and management of diabetes macrovascular complications

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Abstract

Background: Diabetes Macrovascular Complications (DMVCs) are reportedly responsible for 65% of deaths among diabetes patients. The possession of appropriate knowledge and attitude/perception towards the prevention and management of DMVCs by healthcare professionals can impact on the care of diabetic patients.

Methods: A cross-sectional descriptive study was conducted between December, 2014 and February, 2015, among Pharmacists in Jos metropolis using a self-administered questionnaire. Factors associated with Pharmacists' knowledge, attitude and perception regarding prevention and management of DMVCs were assessed.

Results: A total of 147 Pharmacists, mostly males (59%), in the age range of 30-39 years (46.3%), and working in the hospital setting (52%) took part in the survey. Overall, 67% of the respondents had adequate general knowledge of diabetes. The knowledge and attitude regarding prevention and management of DMVCs were poor; (22% & 46% respectively). Appropriate attitude/perception towards prevention and management of

DMVCs was significantly associated with the knowledge of DMVCs; $p = 0.004$. Males had a higher knowledge of risk factors compared to females (57.5% versus 35.4%, $p = 0.01$), while the knowledge of prevention and management of DMVCs was significantly higher among hospital and community pharmacists compared to those in industry and academic setting ($P = 0.03$).

Conclusion: Knowledge and attitude/perception regarding the prevention and management of DMVCs was poor among pharmacists in Jos metropolis. Continuous professional education and training interventions to improve Pharmacists' knowledge and attitude/perception towards prevention and management of DMVCs will equip pharmacists to contribute to improving treatment outcomes of diabetic patients.

Key words: Pharmacists, Diabetes mellitus, Macrovascular complications, knowledge, attitude, Perception.

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Introduction

Diabetes mellitus (DM) is currently a major public health problem all over the globe, including Sub-Saharan Africa (SSA) and Nigeria^{1,2}. The increasing prevalence of this disease is greatly fueled by rapid urbanization, nutrition transition, increase in sedentary lifestyles and physical inactivity^{3,4}. The International Diabetic Federation (IDF) in 2013 reported an estimate of 382 million people living with diabetes; a figure expected to almost double by 2030 because of the rapid increase in prevalence, especially in Asia and Africa⁵.

About 90% of diabetes patients belong to Type 2 diabetes (T2DM) category⁴, with varying degree of complications; ranging from heart disease, stroke, retinopathy, neuropathy, and nephropathy, especially in

individuals who have poorly managed hyperglycemia or are diagnosed late⁴. These complications are classified into 2 major groups; microvascular and macrovascular complications⁶. The microvascular complications include retinopathy, neuropathy and nephropathy; predominantly affecting the small blood vessels, while the macrovascular complications such as coronary artery disease, peripheral vascular disease and stroke affect the large blood vessels⁶ and are responsible for about 50% to 80% of all diabetes deaths. Most (80%) of these deaths occur in low-and middle-income countries⁷. The complications of diabetes can be prevented or delayed by correcting hyperglycemia, hypertension and dyslipidemia⁸. Several factors have been associated with the development of diabetic complications. In some studies⁹⁻¹¹ inadequate knowledge of diabetic patients and their health care providers (HCPs) on the disease condition and self-care have been associated with the development of complications. Other factors include longer duration of diabetes, lack of adherence to diabetes self-care management behaviors, lack of access to healthcare (physical availability and affordability), lack of adequate referral to dietitians/nutrition therapists or Pharmacists for appropriate nutrition or medication counseling, lack of adequate training of HCPs and insufficient knowledge of diabetes and other chronic

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Patients' education is an important component of diabetic care¹⁹. Therefore a coordinated approach to ensure consistency of advice, care and support to patients and their carers is important in reducing DMVCs. Moreover, patients with diabetes often have contact with multiple healthcare providers within the hospital and community practice setting²⁰. The involvement of pharmacists in the management of different chronic conditions is evolving and increasingly being recognized in different settings²¹. Adequate knowledge and attitude towards the prevention and management of diabetic complications will equip pharmacists to better provide appropriate education and support to diabetic patients.

Consequently, this research was conducted to assess the knowledge, attitude and perception of Pharmacists regarding the prevention and management of DMVCs. This will provide actionable data for interventions targeted at improving the knowledge attitude/perception of diabetic care among pharmacists.

Materials and Methods

A descriptive cross-sectional study was conducted among Pharmacists in Jos metropolis between December, 2014 and February, 2015. The study population comprised of 230 registered Pharmacists. The sample size was determined using the formula by Yamane²⁴: $[n=N/1+N(e)^2]$, where: n = desired sample size, N is the population size = 230 and e = desired level of precision = 0.05. Allowing for 10% attrition, a sample size of 161 was calculated. Pharmacists in Jos metropolis who consented to participate in the study were recruited using a non-probability sampling method to attain the desired sample size of 161.

Data Collection Instrument

A structured self-administered questionnaire consisting of 50 questions/statements that met the study objectives was used to obtain relevant information from eligible respondents. Most of the questions were adopted or modified form of the Michigan Diabetes Knowledge Test (MDKT)²⁵, which has been found to be valid, reliable and easy to use in assessing the knowledge and attitude of both HCPs and diabetes patients. The instrument was made up of different sections: Section A addressed respondents socio-demographic characteristics such as age, gender, marital status, level of education and job-related information; area of practice and duration of practice. Section B consists of 15 questions; 10 positive and 5 negative rating, which assessed attitude/perception towards diabetic care. The maximum score for attitude/perception assessment was 75. Scores were transformed into percentages and a percentage score of 60% and above was considered "appropriate

attitude/perception" while scores below 60% was considered "inappropriate attitude/perception".

Section C assessed respondents' Knowledge of diabetes DMVCs and prevention/management DMVCs using 27 items, sub-divided into the following sections: diabetes knowledge (four items), risk factors/causes of diabetes (two items), DMVCs/comorbidities (eight items), knowledge of diagnosis (three items), and Prevention and management of DMVCs (ten items). A score of 1 was assigned to each correct response, while a score of zero was given for an incorrect or 'no' response. Maximum score on this subscale was 27.

Data management

Data from completely filled valid questionnaires were entered and analyzed using version 20.0 of Statistical package for social sciences (SPSS) (IBM Corp, Armonk, New York, USA). Categorical variables were described by frequencies and proportions while Chi-square analysis was performed to evaluate factors associated with the knowledge, attitude and perception of Pharmacists regarding the prevention and management of DMVCs. For the bivariate (Chi-square) analysis; attitude/perception score was classified into inappropriate and appropriate for scores <60% and $\geq 60\%$ respectively. Similarly, knowledge was dichotomized into inadequate and adequate knowledge based on a score of <60% and $\geq 60\%$ respectively. A p-value < 0.05 was considered statistically significant.

Ethical consideration

The study protocol was approved by the Research and Ethics Committee of the Hospital Management Board, Plateau state (Ref: PSSH/ADM/ETH.CO/2014/100), while written consent was obtained from each respondent.

Results

A total of 147 out of 161 questionnaires distributed were filled and returned, representing a response rate of 91%. The characteristics of the participants are summarized in Table 1. Majority of the participants were males 59% (n=87), in the age range of 30-39 years (46.3%), and married (55%). Bachelor of pharmacy degree was the highest qualification of most (n=110; 74%) of the participants, with more than half (52%) practicing in the hospital setting. Participants with less than five years' work experience were 47%, followed closely by those who had worked for between six and 10 years (33%). Most (69%) of the participants had never attended a conference on diabetes.

Knowledge of diabetes mellitus and DMVCs by Pharmacists

Overall, 67% of Pharmacists had adequate general knowledge of diabetes mellitus. Knowledge of the

classification and pathophysiology was highest (99%), followed by knowledge of diagnostic criteria (94%). However, very few (22%) had adequate knowledge of prevention and management of DMVCs, while about half of the respondents had adequate knowledge of risk factors for DMVCs.

Table 1: Demographic characteristics of study participants (n=147)

Variable	Group	Frequency	Percentage
Age, years	20-29	47	32.0
	30-39	68	46.3
	40-49	18	12.2
	≥50	7	4.8
	Missing	7	4.8
Gender	Male	87	59.2
	Female	48	32.7
	Missing	12	8.2
Marital status	Single	55	37.4
	Married	81	55.1
	Widowed	1	0.7
	Missing	10	6.8
Education	B. Pharm	110	74.8
	Post graduate	32	21.8
	Missing	5	3.4
Area of practice	Hospital	77	52.4
	Community	26	17.7
	Academics	13	8.8
	Others	21	14.3
	Missing	10	6.8
Practice duration, years	<5	69	46.9
	6-10	49	33.3
	11-15	8	5.4
	16-20	8	5.4
	>20	7	4.8
Conference attendance	Yes	38	25.9
	No	102	69.4
	Missing	7	4.8

The association between respondents' demographic characteristics and knowledge of diabetes mellitus are summarized in Table 2. No significant association was found between respondents' demographic characteristics and the overall knowledge of diabetes. However, Pharmacists < 40 years of age and those with <20 years practice experience had better knowledge of diagnostic criteria; $p < 0.05$, while hospital Pharmacists had the highest score on knowledge of prevention and management compared to those who practiced in other settings; $p = 0.03$. Also males had a higher knowledge of risk factors and comorbidities compared to females (57.5% versus 35.4; $p = 0.01$).

Assessment of Pharmacists' attitude and perception regarding practice of diabetes care

The overall attitude/perception rating was low (46%), however, certain aspects of diabetic care had high perception score. These areas included membership of diabetic team (93.9%), the need for pharmacists to learn much about being teachers (91%), need for pharmacists to be taught communication (79.6%) and counseling skills (80%), and the necessity for regular counseling for all diabetic patients (76.2%). Other aspects such as the importance of support from family and friends in diabetes management and individualization of diabetic therapy received a positive rating from above 50% of respondents, while 63% of the respondents were unfavorably disposed to patients' autonomy in the management of diabetes and DMVCs.

Factors associated with Pharmacists' attitude and perception regarding the practice of diabetic care

A significant association was identified between the overall knowledge of diabetes mellitus and the pharmacists' attitude towards diabetic care practice (Table 3). Appropriate attitude towards practice of diabetic care was 84% versus 63% among Pharmacists with adequate and inadequate knowledge of diabetic care respectively ($p = 0.004$), while Pharmacists' knowledge of risk factors was significantly associated with appropriate attitude to practice (85% versus 69% for those with adequate and inadequate knowledge respectively, $p = 0.02$).

Table 2: Factors associated with adequate knowledge of diabetes mellitus among Pharmacists in Jos

Characteristics	Group	Number (%) of respondents with adequate knowledge							
		General knowledge	p value	Diagnosis	p value	Prevention & management	p value	Risk factors & comorbidities	p value
Gender	Male	58 (66.7)	1	82 (94.3)	0.96	19 (21.9)	0.89	50 (57.5)	0.01
	Female	32 (66.7)		45 (93.8)		11 (22.9)		17 (35.4)	
Age, years	20-29	29 (61.7)	0.24	43 (91.5)	0.02	13 (27.6)	0.83	23 (48.9)	0.58
	30-39	49 (72.1)		68 (100)		15 (22.1)		35 (51.5)	
	40-49	14 (77.7)		16 (88.9)		4(22.2)		6 (33.3)	
	≥50	3 (42.9)		6 (85.7)		1 (14.3)		3 (42.9)	
Marital status	Single	34 (61.8)	0.167	53 (96.4)	0.78	13 (23.6)	0.86	31(56.4)	0.24
	Married	58 (71.6)		76 (93.8)		19 (23.5)		36 (44.4)	
	Widowed	0		1 (100)		0		0	
Education	B. Pharm	73 (63.4)	0.55	105 (95.5)	0.29	25 (22.7)	0.79	56 (50.9)	0.31
	Postgraduate	23 (71.9)		29 (90.6)		8 (25)		13 (40.6)	
Area of practice	Hospital	49 (63.6)	0.62	72 (93.5)	0.59	21 (27.3)	0.03	42 (54.6)	0.23
	Community	20 (76.9)		26 (100)		6 (23.1)		10 (38.5)	
	Academics	9 (69.2)		12 (92.3)		2 (15.4)		4 (30.8)	
	Others	13 (61.9)		20 (95.2)		1 (4.8)		12 (57.1)	
Duration of practice, Years	<5	44 (63.7)	0.64	65 (94.2)	<0.001	19 (27.5)	0.21	36 (52.2)	0.82
	6-10	34 (69.4)		49 (100)		7 (14.3)		23 (46.9)	
	11-15	7 (87.5)		7 (87.5)		3 (37.5)		4 (50)	
	16-20	6 (75)		8 (100)		1 (12.5)		4 (50)	
	>20	4 (57.1)		4 (57.1)		3 (42.9)		2 (28.6)	
Has ever attended conference on diabetes	Yes	25 (65.8)	0.54	37 (97.4)	0.44	6 (15.8)	0.19	21 (55.3)	0.55
	No	70 (68.6)		95 (93.1)		27(26.5)		47(46.1)	

Table 3: Relationship between respondent's knowledge, attitude and perception, regarding the practice of diabetic care

Knowledge category	Knowledge level	Number (%) of respondents		P value
		Appropriate attitude to practice	inappropriate attitude to practice	
Classification and pathophysiology	Inadequate	1 (100)	0 (0)	0.06
	Adequate	33 (23)	113 (77)	
Risk factors	Inadequate	23 (31)	51 (69)	0.021
	Adequate	11 (15)	62 (85)	
Complications/ comorbidities	Inadequate	9 (38)	15 (63)	0.07
	Adequate	25 (20)	98 (80)	
Diagnostic criteria	Inadequate	3 (33)	6 (67)	0.45
	Adequate	31 (22)	107 (78)	
Prevention and management	Inadequate	28 (25)	86 (75)	0.44
	Adequate	6 (18)	27 (82)	
Overall knowledge	Inadequate	18 (38)	30 (63)	0.004
	Adequate	16 (16)	83 (84)	

Discussion

We observed that the overall knowledge of diabetes among pharmacists in Jos was adequate (67%), while the

knowledge of risk factors, prevention and management of diabetes and DMVCs were inadequate (50% & 22% respectively). This is associated with poor (46%) attitude and perception of Pharmacists towards the practice of diabetes care.

Consistent with the result of a survey conducted among community pharmacists in Kathmandu district in Nepal, where 76.5% of respondents had poor knowledge of diabetes²⁶, pharmacists in this study demonstrated poor knowledge of risk factors, prevention and management of DMVCs. However, the knowledge of DMVCs, its risk factors, prevention and management was significantly higher among younger pharmacists and those with shorter duration of practice. This finding and that of a similar study²⁶ highlights the need to integrate diabetes education into continuous professional development program for pharmacists in developing countries. Moreover, studies^{15, 16} have suggested an association between poor glycemic control and early onset of complications among T2DM and inadequate knowledge among patients and HCPs regarding diabetes and diabetes care.

We also observed that; apart from certain aspects of diabetic care such as pharmacists participating in interdisciplinary diabetic care teams, the need for tight

glycemic control to prevent the development of DMVCs²⁷⁻³⁰, the attitude/perception of pharmacists towards diabetic care was generally below average. This is further reflected in pharmacists' unfavorable disposition to patients' autonomy in the management of diabetes and DMVCs. This observation is consistent with findings from previous studies²⁷⁻²⁹ & ³¹. Odili and Opara²⁸ attributed the negative disposition to the fact that HCPs do not feel that patients are knowledgeable enough about their disease to make decision. On the other hand, peyrot and his friends³¹, reported in their result of the Cross-National Diabetes Attitude, Wishes and Needs (DAWN) Study that support for diabetic patients' autonomy, involvement in their management decisions and collaboration with HCPs was found to be the strongest predictor of patient-reported outcomes. Thus, there is need to carry out educational and other interventions on pharmacists to promote pharmacists' favorable disposition to patient's autonomy³¹.

Adequate knowledge of diabetes mellitus was significantly associated with attitude/perception of pharmacists towards appropriate practice of diabetic care. In agreement with the finding of this study, the attitude of HCPs towards practice standards for diabetic care is generally associated with the level of knowledge of different aspects of diabetes²⁶. Therefore, continuing professional education that addresses provider attitudes toward diabetes, in addition to updating their knowledge may be effective in promoting adherence to standards of care³². Additional changes are needed in our health care system to shift from an acute to a chronic disease model to effectively support diabetes care efforts³³. This study had some limitations which should be considered when interpreting the results: The use of convenient sampling method limited the distribution of respondents to represent their numerical proportion in the different practice settings. In addition, the study focused only on Pharmacists in Jos metropolis and the findings may not be generalized to Pharmacists population.

Conclusion

Pharmacists' general knowledge of diabetes mellitus was adequate. However, the level of knowledge among Pharmacists in Jos metropolis regarding prevention and management of DMVCs was inadequate (22%). This reflected in their inappropriate perception/attitude towards prevention and management of DMVCs (46%). On the other hand, the significant association between adequate knowledge and appropriate attitude/perception supports the fact that with further training and involvement in diabetes management, Pharmacists can contribute to reducing morbidity and mortality associated with diabetes mellitus and macrovascular complications in diabetic patients.

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